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Text Part Number: 78EE117C99-1231834474

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Found in path(s):

\* /opt/cola/permits/1110632783\_1607450976.71/0/isarray-1-0-0-7-tgz/package/README.md

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*/
```

Found in path(s):

```
* /opt/cola/permits/1110631596_1606854664.8/0/regenerator-runtime-0-11-1-3-tgz/package/path.js
```

```
* /opt/cola/permits/1110631596_1606854664.8/0/regenerator-runtime-0-11-1-3-tgz/package/runtime-module.js
```

```
* /opt/cola/permits/1110631596_1606854664.8/0/regenerator-runtime-0-11-1-3-tgz/package/runtime.js
```

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## 1.36 babel-plugin-syntax-object-rest-spread

### 6.13.0

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## 1.37 babel-plugin-transform-object-rest-spread 6.26.0

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```
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```

```
*/
```

Found in path(s):

```
* /opt/cola/permits/1118635499_1608577327.84/0/regenerator-runtime-0-11-0-2-tgz/package/runtime.js
```

## 1.56 semver 6.3.0

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## 1.60 sourcemap-codec 1.4.8

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\* /opt/cola/permits/1130385952\_1612556944.79/0/2138-fs-stat-1-1-3-tgz/package/README.md

# 1.73 is-number 7.0.0

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## 1.106 mixin-deep 1.3.2



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## 1.122 ret 0.1.15

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## 1.124 repeat-string 1.6.1

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# 1.126 micromatch 3.1.10

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# 1.133 set-value 2.0.1

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## 1.136 source-map-url 0.4.1

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## 1.137 snapdragon-util 3.0.1

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## 1.141 repeat-element 1.1.3

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## 1.157 string-width 4.2.3

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```
* @license\n * Copyright Google Inc. All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-\n style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport {\n  Path,\n  join,\n  normalize,\n  relative,\n  strings,\n  basename,\n  extname,\n  dirname,\n} from '@angular-devkit/core';\nimport {\n  DirEntry, Tree } from '@angular-devkit/schematics';\n\nexport interface ModuleOptions {\n  module?: string;\n  name: string;\n  flat?: boolean;\n  path?: string;\n  skipImport?: boolean;\n}\n\n/**\n * Find the module referred by a\n * set of options passed to the schematics.\n */\nexport function findModuleFromOptions(\n  host: Tree,\n  options: ModuleOptions\n): Path | undefined {\n  if (options.hasOwnProperty('skipImport')\n    && options.skipImport) {\n    return undefined;\n  }\n  if (!options.module) {\n    const pathToCheck =\n      (options.path || '') +\n      (options.flat ? '' : '/' + strings.dasherize(options.name));\n    return\n      normalize(findModule(host, pathToCheck));\n  } else {\n    const modulePath = normalize('/' + options.path + '/' +\n      options.module);\n    const moduleName = normalize(modulePath).split('/').pop();\n    if\n      (host.exists(modulePath)) {\n        return normalize(modulePath);\n      } else if (host.exists(modulePath + '.ts')) {\n        return normalize(modulePath + '.ts');\n      } else if (host.exists(modulePath + '.module.ts')) {\n        return\n          normalize(modulePath + '.module.ts');\n      } else if (host.exists(modulePath + '/' + moduleName + '.module.ts')) {\n        return\n          normalize(modulePath + '/' + moduleName + '.module.ts');\n      } else {\n        throw new\n          Error(`Specified module path ${modulePath} does not exist`);\n      }\n  }\n}\n\n/**\n * Function\n * to find the "closest" module to a generated file's path.\n */\nexport function findModule(host: Tree, generateDir:\n  string): Path {\n  let dir: DirEntry | null = host.getDir('/' + generateDir);\n  const moduleRe = /\.module\\.ts$/;\n  const routingModuleRe = /-routing\\.module\\.ts/;\n  while (dir) {\n    const matches = dir.subfiles.filter(\n      (p)\n        => moduleRe.test(p) && !routingModuleRe.test(p)\n    );\n    if (matches.length === 1) {\n      return join(dir.path,\n        matches[0]);\n    } else if (matches.length > 1) {\n      throw new Error(\n        'More than one module matches. Use\n        skip-import option to skip importing '\n        +\n        'the component into the closest module.\n        ');\n    }\n    dir =\n      dir.parent;\n  }\n  throw new Error(\n    'Could not find an NgModule. Use the skip-import '\n    +\n    'option to skip
```

```

importing in NgModule.\n );\n}\n\n/**\n * Build a relative path from one file path to another file path.\n */\nexport
function buildRelativePath(from:
string, to: string): string {\n const {\n path: fromPath,\n filename: fromFileName,\n directory:
fromDirectory,\n } = parsePath(from);\n const {\n path: toPath,\n filename: toFileName,\n directory:
toDirectory,\n } = parsePath(to);\n const relativePath = relative(fromDirectory, toDirectory);\n const
fixedRelativePath = relativePath.startsWith('.')\n ? relativePath\n : `.${relativePath}`;\n\n return !toFileName ||
toFileName === 'index.ts'\n ? fixedRelativePath\n : `${\n fixedRelativePath.endsWith('/')\n ?
fixedRelativePath\n : fixedRelativePath + '/'\n
}`;\n}\n\nfunction parsePath(path: string) {\n const pathNormalized
= normalize(path) as Path;\n const filename = extname(pathNormalized) ? basename(pathNormalized) : '';\n const
directory = filename ? dirname(pathNormalized) : pathNormalized;\n return {\n path: pathNormalized,\n
filename,\n directory,\n };\n}\n\n/**\n * Strips the typescript extension and clears index filenames\n * foo.ts -> foo\n * index.ts -> empty\n */\nfunction
convertToTypeScriptFileName(filename: string | undefined) {\n return filename ?
filename.replace(/(\\.ts)|(index\\.ts)$/, '') : '';\n}\n}

```

Found in path(s):

```

* /opt/cola/permits/1762774560_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-core/utility/find-
module.js.map

```

No license file was found, but licenses were detected in source scan.

```

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```

* as ts from 'typescript';
import { Tree, UpdateRecorder } from '@angular-devkit/schematics';
import { Path } from '@angular-devkit/core';

/** istanbul ignore file */
import * as license from 'license';
import * as Copyright from 'copyright';
import * as AllRights from 'all-rights';
import * as Use from 'use';
import * as MIT from 'mit';
import * as License from 'license';
import * as Host from 'host';
import * as Change from 'change';
import * as Apply from 'apply';
import * as TheFile from 'the-file';
import * as Some from 'some';
import * as Changes from 'changes';
import * as Bottom from 'bottom';
import * as Top from 'top';
import * as Order from 'order';
import * as Description from 'description';
import * as Nothing from 'nothing';
import * as NoopChange from 'noop-change';
import * as InsertChange from 'insert-change';
import * as RemoveChange from 'remove-change';

export interface Host {
  write(path: string, content: string): Promise<void>;
  read(path: string): Promise<string>;
}

export interface Change {
  apply(host: Host): Promise<void>;
  // The file this change should be applied to. Some changes might not apply to
  // a file (maybe the config).
  readonly path: string | null;
  // The order this change should be applied. Normally the position inside the file.
  // Changes are applied from the bottom of a file to the top.
  readonly order: number;
  // The description of this change. This will be outputted in a dry or verbose run.
  readonly description: string;
}

/** An operation that does nothing. */
export class NoopChange implements Change {
  description = 'No operation.';
  order = Infinity;
  path = null;
  apply() {
    return Promise.resolve();
  }
}

/** Will add text to the source code. */
export class InsertChange implements Change {
  order: number;
  description: string;
  constructor(public path: string, public pos: number, public toAdd: string) {
    if (pos < 0) {
      throw new Error('Negative positions are invalid');
    }
    this.description = `Inserted ${toAdd} into position ${pos} of ${path}`;
    this.order = pos;
  }
  /** This method does not insert spaces if there is none in the original string. */
  apply(host: Host) {
    return host.read(this.path).then((content) => {
      const prefix = content.substring(0, this.pos);
      const suffix = content.substring(this.pos);
      return host.write(this.path, `${prefix}${this.toAdd}${suffix}`);
    });
  }
}

/** Will remove text from the source code. */
export class RemoveChange implements Change {

```



```

error occurs in the main actions stream.\n *\/n useEffectsErrorHandler?: boolean;\n}\n\nexport const
DEFAULT_EFFECT_CONFIG: Readonly<Required<EffectConfig>> = {\n  dispatch: true,\n  useEffectsErrorHandler: true,\n};\n\nexport const CREATE_EFFECT_METADATA_KEY =
'__@ngrx/effects_create__';\n\nexport interface CreateEffectMetadata {\n
[CREATE_EFFECT_METADATA_KEY]: EffectConfig;\n}\n\nexport type EffectPropertyKey<T extends Object>
= Exclude<\n
  keyof T,\n  keyof Object\n>;\n\nexport interface EffectMetadata<T extends Object>\n  extends
Required<EffectConfig> {\n  propertyName: EffectPropertyKey<T>;\n}\n\nexport type EffectsMetadata<T> = {\n
[key in EffectPropertyKey<T>]?: EffectConfig;\n};\n\n", "import { Observable } from 'rxjs';\nimport { Action,
ActionCreator } from '@ngrx/store';\nimport {\n  EffectMetadata,\n  EffectConfig,\n  DEFAULT_EFFECT_CONFIG,\n  CreateEffectMetadata,\n  CREATE_EFFECT_METADATA_KEY,\n} from
'./models';\n\ntype DispatchType<T> = T extends { dispatch: infer U } ? U : true;\ntype ObservableType<T,
OriginalType> = T extends false ? OriginalType : Action;\ntype EffectResult<OT> = Observable<OT> | ((...args:
any[]) => Observable<OT>);\ntype ConditionallyDisallowActionCreator<DT, Result> = DT extends false\n ?
unknown // If DT (DispatchType is false, then we don't enforce any return types)\n : Result extends
EffectResult<infer OT>\n ? OT extends ActionCreator\n ? 'ActionCreator cannot be dispatched.
Did you forget to call the action creator function?'\n : unknown\n : unknown;\n\n**\n * @description\n *
Creates an effect from an `Observable` and an `EffectConfig`.\n * \n * @param source A function which returns an
`Observable`.\n * @param config A `Partial<EffectConfig>` to configure the effect. By default, `dispatch` is true
and `useEffectsErrorHandler` is true.\n * @returns If `EffectConfig`#`dispatch` is true, returns
`Observable<Action>`. Else, returns `Observable<unknown>`.\n * \n * @usageNotes\n * \n * ** Mapping to a
different action **\n * \n * ``\n * effectName$ = createEffect(\n * () => this.actions$.pipe(\n *
ofType(FeatureActions.actionOne),\n * map(() => FeatureActions.actionTwo()))\n * );\n * \n * ``\n * \n * **
Non-dispatching effects **\n * \n * ``\n * effectName$ = createEffect(\n * () => this.actions$.pipe(\n *
ofType(FeatureActions.actionOne),\n * tap(() => console.log('Action One Dispatched'))\n * ),\n * { dispatch:
false }\n *
  // FeatureActions.actionOne is not dispatched\n * );\n * ``\n * \n\nexport function createEffect<\n C extends
EffectConfig,\n DT extends DispatchType<C>,\n OT extends ObservableType<DT, OT>,\n R extends
EffectResult<OT>\n>(\n  source: () => R & ConditionallyDisallowActionCreator<DT, R>,\n  config?:
Partial<C>)\n): R & CreateEffectMetadata {\n  const effect = source();\n  const value: EffectConfig = {\n
...DEFAULT_EFFECT_CONFIG,\n  ...config, // Overrides any defaults if values are provided\n  };\n  Object.defineProperty(effect, CREATE_EFFECT_METADATA_KEY, {\n    value,\n  });\n  return effect as typeOf
effect & CreateEffectMetadata;\n}\n\nexport function getCreateEffectMetadata<\n T extends { [props in keyof T]:
Object }\n>(\n  instance: T\n): EffectMetadata<T>[] {\n  const propertyNames = Object.getOwnPropertyNames(instance)
as Array<keyof T>;\n  const metadata: EffectMetadata<T>[] = propertyNames\n    .filter((propertyName) => {\n
if (\n      instance[propertyName] &&\n
      instance[propertyName].hasOwnProperty(CREATE_EFFECT_METADATA_KEY)\n    ) {\n      // If the
property type has overridden `hasOwnProperty` we need to ensure\n      // that the metadata is valid (containing a
`dispatch` property)\n      // https://github.com/ngrx/platform/issues/2975\n      const property =
instance[propertyName] as any;\n      return
property[CREATE_EFFECT_METADATA_KEY].hasOwnProperty('dispatch');\n    }\n    return false;\n  })\n  .map((propertyName) => {\n    const metaData = (instance[propertyName] as any)[\n
CREATE_EFFECT_METADATA_KEY\n  ];\n    return {\n      propertyName,\n      ...metaData,\n    };\n  });\n  return metadata;\n}\n\n", "export function getSourceForInstance<T>(\n  instance: T\n): T {\n  return
Object.getPrototypeOf(instance);\n}\n\n", "import { compose } from '@ngrx/store';\nimport {\n  DEFAULT_EFFECT_CONFIG,\n  EffectConfig,\n  EffectMetadata,\n  EffectPropertyKey,\n} from
'./models';\nimport { getSourceForInstance

```

```

} from './utils';
const METADATA_KEY = '__@ngrx/effects__';
/**
 * @deprecated The Effect decorator
 * (@Effect) is deprecated in favor of the `createEffect` method.
 * See the docs for more info { @link
 * https://ngrx.io/guide/migration/v11#the-effect-decorator}
 */
export function Effect(config: EffectConfig = {})
{
  return function <T extends Object, K extends EffectPropertyKey<T>>(
    target: T,
    propertyName: K
  ) {
    const metadata: EffectMetadata<T> = {
      ...DEFAULT_EFFECT_CONFIG,
      ...config, // Overrides
      any defaults if values are provided
      propertyName,
    };
    addEffectMetadataEntry<T>(target, metadata);
  };
}

export function getEffectDecoratorMetadata<T>(
  instance: T
): EffectMetadata<T>[] {
  const
  effectsDecorators: EffectMetadata<T>[] = compose(
    getEffectMetadataEntries,
    getSourceForInstance
  )(instance);
  return effectsDecorators;
}

/**
 * Type guard to determine whether METADATA_KEY is
 * already
 * present on the Class
 */
function hasMetadataEntries<T extends Object>(
  sourceProto: T
):
sourceProto is typeof sourceProto & {
  constructor: typeof sourceProto.constructor & {
    [METADATA_KEY]:
    EffectMetadata<T>[];
  };
} {
  return sourceProto.constructor.hasOwnProperty(METADATA_KEY);
}

/**
 * Add Effect Metadata to the Effect Class constructor under specific key
 */
function addEffectMetadataEntry<T
extends object>(
  sourceProto: T,
  metadata: EffectMetadata<T>
) {
  if (hasMetadataEntries(sourceProto))
  {
    sourceProto.constructor[METADATA_KEY].push(metadata);
  }
  else {
    Object.defineProperty(sourceProto.constructor, METADATA_KEY, {
      value: [metadata],
    });
  }
}

function getEffectMetadataEntries<T extends object>(
  sourceProto: T
): EffectMetadata<T>[] {
  return hasMetadataEntries(sourceProto)
    ? sourceProto.constructor[METADATA_KEY]
    : [];
}

", "import {
EffectMetadata, EffectsMetadata } from './models';
import
{ getCreateEffectMetadata } from './effect_creator';
import { getEffectDecoratorMetadata } from
'./effect_decorator';
export function getEffectsMetadata<T>(instance: T): EffectsMetadata<T> {
  return
  getSourceMetadata(instance).reduce(
    (acc: EffectsMetadata<T>, {
      propertyName, dispatch,
      useEffectsErrorHandler
    }) => {
      acc[propertyName] = {
        dispatch, useEffectsErrorHandler
      };
      return
      acc;
    },
    {}
  );
}

export function getSourceMetadata<T>(instance: T): EffectMetadata<T>[] {
  const
  effects: Array<(instance: T) => EffectMetadata<T>[] = [
    getEffectDecoratorMetadata,
    getCreateEffectMetadata,
  ];
  return effects.reduce<EffectMetadata<T>[]>(
    (sources, source) =>
    sources.concat(source(instance)),
    []
  );
}

", "/*!

```

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SOFTWARE.\r\n\*\*\*\*\*

```

*/
global Reflect, Promise
const extendStatics = function(d, b) {
  extendStatics =
  Object.setPrototypeOf ||
  ({ __proto__: [] } instanceof Array && function(d, b) {
    d.__proto__ = b;
  }) ||
  function(d, b) {
    for (var p in b) if (Object.prototype.hasOwnProperty.call(b, p))
      d[p] = b[p];
  };
  return
  extendStatics(d,
  b);
}

export function __extends(d, b) {
  if (typeof b !== \"function\" && b !== null)
    throw
    new TypeError(\"Class extends value \" + String(b) + \" is not a constructor or null\");
  extendStatics(d, b);
  function __() {
    this.constructor = d;
  }
  d.prototype = b === null ? Object.create(b) :
  (__proto__ = b.prototype,
  new __());
}

export var __assign = function() {
  __assign = Object.assign || function __assign(t) {
    for (var s, i = 1, n = arguments.length; i < n; i++) {
      s = arguments[i];
      for (var p in s) if
      (Object.prototype.hasOwnProperty.call(s, p))
        t[p] = s[p];
    }
    return
    t;
  }
  return
  __assign;
}

```

```

__assign.apply(this, arguments);\r\n\r\n\r\nexport function __rest(s, e) {\r\n  var t = {};\r\n  for (var p in s) if
(Object.prototype.hasOwnProperty.call(s, p) && e.indexOf(p) < 0)\r\n    t[p] = s[p];\r\n  if (s != null && typeof
Object.getPrototypeOfSymbols
=== "function")\r\n    for (var i = 0, p = Object.getPrototypeOfSymbols(s); i < p.length; i++) {\r\n      if
(e.indexOf(p[i]) < 0 && Object.prototype.propertyIsEnumerable.call(s, p[i]))\r\n        t[p[i]] = s[p[i]];\r\n
}\r\n  return t;\r\n}\r\n\r\n\r\nexport function __decorate(decorators, target, key, desc) {\r\n  var c = arguments.length,
r = c < 3 ? target : desc === null ? desc = Object.getPrototypeOfDescriptor(target, key) : desc, d;\r\n  if (typeof
Reflect === "object" && typeof Reflect.decorate === "function") r = Reflect.decorate(decorators, target, key,
desc);\r\n  else for (var i = decorators.length - 1; i >= 0; i--) if (d = decorators[i]) r = (c < 3 ? d(r) : c > 3 ? d(target,
key, r) : d(target, key)) || r;\r\n  return c > 3 && r && Object.defineProperty(target, key, r, r);\r\n}\r\n\r\n\r\nexport
function __param(paramIndex, decorator) {\r\n  return function (target, key) { decorator(target, key, paramIndex);
}\r\n}\r\n\r\n\r\nexport
function __metadata(metadataKey, metadataValue) {\r\n  if (typeof Reflect === "object" && typeof
Reflect.metadata === "function") return Reflect.metadata(metadataKey, metadataValue);\r\n}\r\n\r\n\r\nexport
function __awaiter(thisArg, _arguments, P, generator) {\r\n  function adopt(value) { return value instanceof P ?
value : new P(function (resolve) { resolve(value); }); }\r\n  return new (P || (P = Promise))(function (resolve, reject)
{\r\n    function fulfilled(value) { try { step(generator.next(value)); } catch (e) { reject(e); } }\r\n    function
rejected(value) { try { step(generator["throw"](value)); } catch (e) { reject(e); } }\r\n    function step(result) {
result.done ? resolve(result.value) : adopt(result.value).then(fulfilled, rejected); }\r\n    step((generator =
generator.apply(thisArg, _arguments || [])).next());\r\n  });\r\n}\r\n\r\n\r\nexport function __generator(thisArg, body)
{\r\n  var _ = { label: 0, sent: function() { if (t[0] & 1)
throw t[1]; return t[1]; }, trys: [], ops: [] }, f, y, t, g;\r\n  return g = { next: verb(0), "throw": verb(1), "return":
verb(2) }, typeof Symbol === "function" && (g[Symbol.iterator] = function() { return this; }), g;\r\n  function
verb(n) { return function (v) { return step([n, v]); }; }\r\n  function step(op) {\r\n    if (f) throw new
TypeError("Generator is already executing.");\r\n    while (_) try {\r\n      if (f = 1, y && (t = op[0] & 2 ?
y["return"] : op[0] ? y["throw"] || ((t = y["return"]) && t.call(y, 0) : y.next) && !(t = t.call(y, op[1])).done)
return t;\r\n      if (y = 0, t) op = [op[0] & 2, t.value];\r\n      switch (op[0]) {\r\n        case 0: case 1: t =
op; break;\r\n        case 4: _.label++; return { value: op[1], done: false }; \r\n        case 5: _.label++; y =
op[1]; op = [0]; continue;\r\n        case 7: op = _.ops.pop(); _.trys.pop(); continue;\r\n        default: \r\n
if (!(t = _.trys, t = t.length > 0 && t[t.length - 1]) && (op[0] === 6 || op[0] === 2)) { _ = 0; continue; }\r\n
if (op[0] === 3 && (!t || (op[1] > t[0] && op[1] < t[3]))) { _.label = op[1]; break; }\r\n        if
(op[0] === 6 && _.label < t[1]) { _.label = t[1]; t = op; break; }\r\n        if (t && _.label < t[2]) { _.label =
t[2]; _.ops.push(op); break; }\r\n        if (t[2] && !_.ops.pop())\r\n          _.trys.pop(); continue;\r\n
}\r\n        op = body.call(thisArg, _); \r\n      } catch (e) { op = [6, e]; y = 0; } finally { f = t = 0; }\r\n      if (op[0]
& 5) throw op[1]; return { value: op[0] ? op[1] : void 0, done: true }; \r\n    }\r\n}\r\n\r\n\r\nexport var __createBinding
= Object.create ? (function(o, m, k, k2) {\r\n  if (k2 === undefined) k2 = k;\r\n  Object.defineProperty(o, k2, {
enumerable: true, get: function() { return m[k]; } });\r\n}) : (function(o, m, k, k2) {\r\n  if (k2
=== undefined) k2 = k;\r\n  o[k2] = m[k];\r\n});\r\n\r\n\r\nexport function __exportStar(m, o) {\r\n  for (var p in m)
if (p !== "default" && !Object.prototype.hasOwnProperty.call(o, p)) __createBinding(o, m, p);\r\n}\r\n\r\n\r\nexport
function __values(o) {\r\n  var s = typeof Symbol === "function" && Symbol.iterator, m = s && o[s], i = 0;\r\n  if (m)
return m.call(o);\r\n  if (o && typeof o.length === "number") return {\r\n    next: function () {\r\n      if (o && i >= o.length) o = void 0;\r\n      return { value: o && o[i++], done: !o }; \r\n    }\r\n  };\r\n  throw
new TypeError(s ? "Object is not iterable." : "Symbol.iterator is not defined.");\r\n}\r\n\r\n\r\nexport function
__read(o, n) {\r\n  var m = typeof Symbol === "function" && o[Symbol.iterator];\r\n  if (!m) return o;\r\n  var
i = m.call(o), r, ar = [], e;\r\n  try {\r\n    while ((n === void 0 || n-- > 0) && !(r = i.next()).done)
ar.push(r.value);\r\n  } catch (error)
  { e = { error: error }; }\r\n  finally {\r\n    try {\r\n      if (r && !r.done && (m = i["return"])) m.call(i);\r\n
}\r\n    finally { if (e) throw e.error; }\r\n  }\r\n  return ar;\r\n}\r\n\r\n\r\nexport function

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__spread() {\r\n  for (var ar = [], i = 0; i < arguments.length; i++)\r\n    ar = ar.concat(__read(arguments[i]));\r\n  return ar;\r\n}\r\n\r\n/** @deprecated */\r\n\r\nexport function __spreadArrays() {\r\n  for (var s = 0, i = 0, il = arguments.length; i < il; i++) s += arguments[i].length;\r\n  for (var r = Array(s), k = 0, i = 0; i < il; i++)\r\n    for (var a = arguments[i], j = 0, jl = a.length; j < jl; j++, k++)\r\n      r[k] = a[j];\r\n  return r;\r\n}\r\n\r\n\r\nexport function __spreadArray(to, from) {\r\n  for (var i = 0, il = from.length, j = to.length; i < il; i++, j++)\r\n    to[j] = from[i];\r\n  return to;\r\n}\r\n\r\n\r\nexport function __await(v) {\r\n  return this instanceof __await ? (this.v = v, this) : new __await(v);\r\n}\r\n\r\n\r\nexport function __asyncGenerator(thisArg, _arguments, generator) {\r\n  if (!Symbol.asyncIterator) throw new TypeError("`Symbol.asyncIterator` is not defined.");\r\n  var g = generator.apply(thisArg, _arguments || []), i, q = [];\r\n  return i = {}, verb("next"), verb("throw"), verb("return"), i[Symbol.asyncIterator] = function () { return this; }, i;\r\n  function verb(n) { if (g[n]) i[n] = function (v) { return new Promise(function (a, b) { q.push([n, v, a, b]) > 1 || resume(n, v); }); }; }\r\n  function resume(n, v) { try { step(g[n](v)); } catch (e) { settle(q[0][3], e); } }\r\n  function step(r) { r.value instanceof __await ? Promise.resolve(r.value.v).then(fulfill, reject) : settle(q[0][2], r); }\r\n  function fulfill(value) { resume("next", value); }\r\n  function reject(value) { resume("throw", value); }\r\n  function settle(f, v) { if (f(v), q.shift(), q.length) resume(q[0][0], q[0][1]); }\r\n}\r\n\r\n\r\nexport function __asyncDelegator(o) {\r\n  var i, p;\r\n  return i = {}, verb("next"), verb("throw"), function (e) { throw e; }, verb("return"), i[Symbol.iterator] = function () { return this; }, i;\r\n  function verb(n, f) { i[n] = o[n] ? function (v) { return (p = !p) ? { value: __await(o[n](v)), done: n === "return" } : f ? f(v) : v; } : f; }\r\n}\r\n\r\n\r\nexport function __asyncValues(o) {\r\n  if (!Symbol.asyncIterator) throw new TypeError("`Symbol.asyncIterator` is not defined.");\r\n  var m = o[Symbol.asyncIterator], i;\r\n  return m ? m.call(o) : (o = typeof __values === "function" ? __values(o) : o[Symbol.iterator](), i = {}, verb("next"), verb("throw"), verb("return"), i[Symbol.asyncIterator] = function () { return this; }, i);\r\n  function verb(n) { i[n] = o[n] && function (v) { return new Promise(function (resolve, reject) { v = o[n](v), settle(resolve, reject, v.done, v.value); }); }; }\r\n  function settle(resolve, reject, d, v) { Promise.resolve(v).then(function(v) { resolve({ value: v, done: d }); }, reject); }\r\n}\r\n\r\n\r\nexport function __makeTemplateObject(cooked, raw) {\r\n  if (Object.defineProperty) { Object.defineProperty(cooked, "raw", { value: raw }); } else { cooked.raw = raw; }\r\n  return cooked;\r\n}\r\n\r\n\r\nvar __setModuleDefault = Object.create ? (function(o, v) {\r\n  Object.defineProperty(o, "default", { enumerable: true, value: v });\r\n}) : function(o, v) {\r\n  o["default"] = v;\r\n}\r\n\r\n\r\nexport function __importStar(mod) {\r\n  if (mod && mod.__esModule) return mod;\r\n  var result = {};\r\n  if (mod != null) for (var k in mod) if (k !== "default" && Object.prototype.hasOwnProperty.call(mod, k)) __createBinding(result, mod, k);\r\n  __setModuleDefault(result, mod);\r\n  return result;\r\n}\r\n\r\n\r\nexport function __importDefault(mod) {\r\n  return (mod && mod.__esModule) ? mod : { default: mod }\r\n}\r\n\r\n\r\nexport function __classPrivateFieldGet(receiver, state, kind, f) {\r\n  if (kind === "a" && !f) throw new TypeError("`Private` accessor was defined without a `getter`");\r\n  if ((typeof state === "function" ? receiver !== state || !f : !state.has(receiver)) throw new TypeError("`Cannot read private member from an object whose class did not declare it`")); \r\n  return kind === "m" ? f : kind === "a" ? f.call(receiver) : f ? f.value : state.get(receiver);\r\n}\r\n\r\n\r\nexport function __classPrivateFieldSet(receiver, state, value, kind, f) {\r\n  if (kind === "m") throw new TypeError("`Private` method is not writable");\r\n  if (kind === "a" && !f) throw new TypeError("`Private` accessor was defined without a `setter`");\r\n  if ((typeof state === "function" ? receiver !== state || !f : !state.has(receiver)) throw new TypeError("`Cannot write private member to an object whose class did not declare it`")); \r\n  return (kind === "a" ? f.call(receiver, value) : f ? f.value = value : state.set(receiver, value)), value;\r\n}\r\n\r\n\r\n", "import { Action } from '@ngrx/store';\r\nimport { merge, Observable } from 'rxjs';\r\nimport { ignoreElements, map, materialize } from 'rxjs/operators';\r\nimport { EffectNotification } from './effect_notification';\r\nimport { getSourceMetadata } from './effects_metadata';\r\nimport { EffectsErrorHandler } from './effects_error_handler';\r\nimport { getSourceForInstance } from './utils';\r\nimport { ErrorHandler } from '@angular/core';\r\n\r\nexport function mergeEffects(\r\n  sourceInstance: any,\r\n  globalErrorHandler: ErrorHandler,\r\n  effectsErrorHandler: EffectsErrorHandler\r\n): Observable<EffectNotification> {\r\n  const sourceName =

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getSourceForInstance(sourceInstance).constructor.name;\n\n const observables$: Observable<any>[] =
getSourceMetadata(sourceInstance).map(\n ({\n  propertyName,\n  dispatch,\n  useEffectsErrorHandler,\n
}): Observable<EffectNotification> => {\n  const observable$: Observable<any> =\n    typeof
sourceInstance[propertyName] === 'function'\n
  ? sourceInstance[propertyName]()\n    : sourceInstance[propertyName];\n\n  const effectAction$ =
useEffectsErrorHandler\n  ? effectsErrorHandler(observable$, globalErrorHandler)\n    : observable$;\n\n  if (dispatch === false) {\n    return effectAction$.pipe(ignoreElements());\n  }\n\n  const materialized$ =
effectAction$.pipe(materialize<Action>());\n\n  return materialized$.pipe(\n    map(\n      (notification):
EffectNotification => ({\n        effect: sourceInstance[propertyName],\n        notification,\n        propertyName,\n        sourceName,\n        sourceInstance,\n      })\n    )\n  );\n\n  return
merge(...observables$);\n}\n\n", "import { ErrorHandler } from '@angular/core';\nimport { Action } from
'@ngrx/store';\nimport { Observable } from 'rxjs';\nimport { catchError } from 'rxjs/operators';\n\nexport type
EffectsErrorHandler = <T extends Action>(\n  observable$: Observable<T>,\n
  errorHandler: ErrorHandler)\n=> Observable<T>;\n\nconst MAX_NUMBER_OF_RETRY_ATTEMPTS =
10;\n\nexport function defaultEffectsErrorHandler<T extends Action>(\n  observable$: Observable<T>,\n
  errorHandler: ErrorHandler,\n  retryAttemptLeft: number = MAX_NUMBER_OF_RETRY_ATTEMPTS)\n:\nObservable<T> {\n  return observable$.pipe(\n    catchError((error) => {\n      if (errorHandler)
errorHandler.handleError(error);\n      if (retryAttemptLeft <= 1) {\n        return observable$; // last attempt\n      }\n
      // Return observable that produces this particular effect\n      return defaultEffectsErrorHandler(\n
        observable$,\n        errorHandler,\n        retryAttemptLeft - 1\n      );\n    })\n  );\n\n", "import { Inject, Injectable }
from '@angular/core';\nimport {\n  Action,\n  ActionCreator,\n  Creator,\n  ScannedActionsSubject,\n} from
'@ngrx/store';\nimport { Observable, OperatorFunction, Operator } from 'rxjs';\nimport { filter } from
'rxjs/operators';\n\n@Injectable()\nexport
class Actions<V = Action> extends Observable<V> {\n  constructor(@Inject(ScannedActionsSubject) source?:
Observable<V>) {\n    super();\n\n    if (source) {\n      this.source = source;\n    }\n  }\n\n  override
lift<R>(operator: Operator<V, R>): Observable<R> {\n    const observable = new Actions<R>();\n
    observable.source = this;\n    observable.operator = operator;\n    return observable;\n  }\n\n  // Module-private
helper type\ntype ActionExtractor<T extends string | AC, AC extends ActionCreator<string, Creator>,\n  E\n> = T extends string ? E : ReturnType<Extract<T, AC>>;\n\nexport function ofType<T extends
ActionCreator<string, Creator>[], U extends Action = Action, V =
ReturnType<AC[number]>\n>(...allowedTypes: AC): OperatorFunction<U, V>;\n\nexport function ofType<T extends AC, U
extends Extract<U, { type: T1 }>,\n  AC extends ActionCreator<string, Creator>,\n  T1 extends string | AC,\n  U
extends Action = Action,\n  V = T1 extends string ? E : ReturnType<Extract<T1,
AC>>\n>(t1: T1): OperatorFunction<U, V>;\n\nexport function ofType<T extends AC, U extends Extract<U, { type: T1 | T2
}>,\n  AC extends ActionCreator<string, Creator>,\n  T1 extends string | AC,\n  T2 extends string | AC,\n  U
extends Action = Action,\n  V = ActionExtractor<T1 | T2, AC, E>\n>(t1: T1, t2: T2): OperatorFunction<U,
V>;\n\nexport function ofType<T extends AC, U extends Extract<U, { type: T1 | T2 | T3 }>,\n  AC extends ActionCreator<string,
Creator>,\n  T1 extends string | AC,\n  T2 extends string | AC,\n  T3 extends string | AC,\n  U extends Action =
Action,\n  V = ActionExtractor<T1 | T2 | T3, AC, E>\n>(t1: T1, t2: T2, t3: T3): OperatorFunction<U, V>;\n\nexport
function ofType<T extends AC, U extends Extract<U, { type: T1 | T2 | T3 | T4 }>,\n  AC extends ActionCreator<string,
Creator>,\n  T1 extends string | AC,\n  T2 extends string | AC,\n  T3 extends string | AC,\n  T4 extends string |
AC,\n  U extends Action = Action,\n  V = ActionExtractor<T1 | T2 | T3 | T4, AC, E>\n>(t1: T1, t2: T2, t3: T3, t4:
T4):
OperatorFunction<U, V>;\n\nexport function ofType<T extends AC, U extends Extract<U, { type: T1 | T2 | T3 | T4 | T5 }>,\n
AC extends ActionCreator<string, Creator>,\n  T1 extends string | AC,\n  T2 extends string | AC,\n  T3 extends
string | AC,\n  T4 extends string | AC,\n  T5 extends string | AC,\n  U extends Action = Action,\n  V =
ActionExtractor<T1 | T2 | T3 | T4 | T5, AC, E>\n>(t1: T1, t2: T2, t3: T3, t4: T4, t5: T5): OperatorFunction<U,
V>;\n\n**\n* Fallback for more than 5 arguments.\n* There is no inference, so the return type is the same as the

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input -\n \* Observable<Action>.\n \*\n \* We provide a type parameter, even though TS will not infer it from the\n \* arguments, to preserve backwards compatibility with old versions of ngrx.\n \* ^\nexport function ofType<V extends Action>(\n ...allowedTypes: Array<string | ActionCreator<string, Creator>>)\n): OperatorFunction<Action, V>;\n/\*\*\n \* `ofType` filters an Observable of `Actions` into an Observable of the actions\n \* whose type strings are passed to it.\n \*\n \* For example, if `actions` has type `Actions<AdditionAction|SubstractionAction>`, and\n \* the type of the `Addition` action is `add`, then\n \* `actions.pipe(ofType('add'))` returns an\n \* `Observable<AdditionAction>`.\n \*\n \* Properly typing this function is hard and requires some advanced TS\n \* tricks\n \* below.\n \*\n \* Type narrowing automatically works, as long as your `actions` object\n \* starts with a\n \* `Actions<SomeUnionOfActions>` instead of generic `Actions`.\n \*\n \* For backwards compatibility, when one passes a single type argument\n \* `ofType<T>('something')` the result is an `Observable<T>`. Note, that `T`\n \* completely overrides any possible inference from 'something'.\n \*\n \* Unfortunately, for unknown 'actions: Actions' these types will produce\n \* 'Observable<never>'. In such cases one has to manually set the generic type\n \* like\n \* `actions.ofType<AdditionAction>('add')`.\n \*\n \* @usageNotes\n \*\n \* Filter the Actions stream on the `customers page loaded`"

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action\n *\n * ``\n * import { ofType } from '@ngrx/effects';\n * import * fromCustomers from '../customers';\n *\n * this.actions$.pipe(\n * ofType(fromCustomers.pageLoaded)\n * )\n * ``\n * ^\nexport function ofType(\n ...allowedTypes: Array<string | ActionCreator<string, Creator>>)\n): OperatorFunction<Action, Action> {\n return\n filter((action: Action) =>\n allowedTypes.some((typeOrActionCreator) => {\n if (typeof typeOrActionCreator\n === 'string') {\n // Comparing the string to type\n return typeOrActionCreator === action.type;\n }\n // We are filtering by ActionCreator\n return typeOrActionCreator.type === action.type;\n })\n);\n}\n\n",\nimport { ErrorHandler } from '@angular/core';\nimport { Action } from '@ngrx/store';\nimport {\n Notification, Observable } from 'rxjs';\n\nexport interface EffectNotification {\n effect: Observable<any> | (() =>\n Observable<any>);\n propertyName: PropertyKey;\n sourceName: string;\n sourceInstance:\n any;\n notification: Notification<Action | null | undefined>;\n}\n\nexport function reportInvalidActions(\n output:\n EffectNotification,\n reporter: ErrorHandler)\n {\n if (output.notification.kind === 'N') {\n const action =\n output.notification.value;\n const isInvalidAction = !isAction(action);\n if (isInvalidAction) {\n reporter.handleError(\n new Error(\n `Effect ${getEffectName(\n output\n )} dispatched an\n invalid action: ${stringify(action)}\n )\n );\n }\n }\n}\n\nfunction isAction(action: any): action is Action\n {\n return (\n typeof action !== 'function' &&\n action &&\n action.type &&\n typeof action.type ===\n 'string'\n );\n}\n\nfunction getEffectName({\n propertyName,\n sourceInstance,\n sourceName,\n }:\n EffectNotification) {\n const isMethod = typeof sourceInstance[propertyName] === 'function';\n return\n `\"${sourceName}.${String(propertyName)}${isMethod ? '()' : ''}\";\n}\n\nfunction\n stringify(action: Action | null | undefined) {\n try {\n return JSON.stringify(action);\n } catch {\n return\n action;\n }\n}\n\n",\nimport { Observable } from 'rxjs';\nimport { EffectNotification } from '.';\nimport { Action } from '@ngrx/store';\n\n/**\n * @description\n * Interface to set an identifier for effect instances.\n *\n * By default, each Effects class is registered\n * once regardless of how many times the Effect class\n * is loaded. By implementing this interface, you define\n * a unique identifier to register an Effects class instance\n * multiple times.\n *\n * @usageNotes\n *\n * ### Set an identifier for an Effects class\n *\n * ``\n * class\n * EffectWithIdentifier implements OnIdentifyEffects {\n * constructor(private effectIdentifier: string) {\n * }\n *\n * ngrxOnIdentifyEffects() {\n * return this.effectIdentifier;\n * }\n * }\n * ``\n * ^\nexport declare interface\n OnIdentifyEffects {\n /**\n * @description\n * String identifier to differentiate effect instances.\n *\n * ^\n ngrxOnIdentifyEffects(): string;\n}\n\nexport const onIdentifyEffectsKey: keyof OnIdentifyEffects =\n 'ngrxOnIdentifyEffects';\n\nexport function isOnIdentifyEffects(\n instance: any):\n instance is OnIdentifyEffects\n {\n return isFunction(instance, onIdentifyEffectsKey);\n}\n\n/**\n * @description\n * Interface to control the lifecycle of effects.\n *\n * By default, effects are merged and subscribed to the store. Implement the OnRunEffects\n * interface to control the lifecycle of the resolved effects.\n *\n * @usageNotes\n *\n * ### Implement the OnRunEffects interface on an Effects class\n *\n * ``\n * export class UserEffects implements OnRunEffects {\n * constructor(private actions$: Actions) {\n * }\n *\n * ngrxOnRunEffects(resolvedEffects$:\n
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Observable<EffectNotification>) {\n *   return this.actions$.pipe(\n *     ofType('LOGGED_IN'),\n *     exhaustMap(() =>{\n *       resolvedEffects$.pipe(\n *         takeUntil(this.actions$.pipe(ofType('LOGGED_OUT')))\n *       )\n *     })\n *   );\n * }\n * }\n * ```\n * /\n * export declare interface OnRunEffects {\n *   /**\n *    * @description\n *    * Method to control the lifecycle of effects.\n *    * /\n *   ngOnRunEffects(\n *     resolvedEffects$: Observable<EffectNotification>\n *   ): Observable<EffectNotification>;\n * }\n * }\n * export const onRunEffectsKey: keyof OnRunEffects = 'ngOnRunEffects';\n * }\n * export function isOnRunEffects(instance: any): instance is OnRunEffects {\n *   return isFunction(instance, onRunEffectsKey);\n * }\n * }\n * /\n * @description\n * Interface to dispatch an action after effect registration.\n * *\n * Implement this interface to dispatch a custom action after\n * the effect has been added. You can listen to this action\n * in the rest of the application to execute something after\n * the effect is registered.\n * *\n * @usageNotes\n * *\n * ### Set an identifier for an Effects class\n * *\n * ```\n * class EffectWithInitAction implements OnInitEffects {\n *   ngOnInitEffects() {\n *     return {\n *       type: '[EffectWithInitAction] Init' }\n *     }\n *   }\n * }\n * ```\n * /\n * export declare interface OnInitEffects {\n *   /**\n *    * @description\n *    * Action to be dispatched after the effect is registered.\n *    * /\n *   ngOnInitEffects(): Action;\n * }\n * }\n * export const onInitEffects: keyof OnInitEffects = 'ngOnInitEffects';\n * }\n * export function isOnInitEffects(instance: any): instance is OnInitEffects {\n *   return isFunction(instance, onInitEffects);\n * }\n * }\n * nfunction isFunction(instance: any, functionName: string) {\n *   return (\n *     instance &&\n *     functionName in instance &&\n *     typeof instance[functionName] === 'function'\n *   );\n * }\n * }\n * ", "import { InjectionToken, Type } from '@angular/core';\n * import { EffectsErrorHandler } from './effects_error_handler';\n * export const _ROOT_EFFECTS_GUARD = new InjectionToken<void>(\n * '@ngrx/effects Internal Root Guard'\n * );\n * export const USER_PROVIDED_EFFECTS = new InjectionToken<Type<any>[]>(\n * '@ngrx/effects User Provided Effects'\n * );\n * export const _ROOT_EFFECTS = new InjectionToken<Type<any>[]>(\n * '@ngrx/effects Internal Root Effects'\n * );\n * export const ROOT_EFFECTS = new InjectionToken<Type<any>[]>(\n * '@ngrx/effects Root Effects'\n * );\n * export const _FEATURE_EFFECTS = new InjectionToken<Type<any>[]>(\n * '@ngrx/effects Internal Feature Effects'\n * );\n * export const FEATURE_EFFECTS = new InjectionToken<any[][]>(\n * '@ngrx/effects Feature Effects'\n * );\n * export const EFFECTS_ERROR_HANDLER = new InjectionToken<EffectsErrorHandler>(\n * '@ngrx/effects Effects Error Handler'\n * );\n * ", "import { ErrorHandler, Inject, Injectable } from '@angular/core';\n * import { Action } from '@ngrx/store';\n * import { Notification, Observable, Subject, merge } from 'rxjs';\n * import {\n *   dematerialize,\n *   exhaustMap,\n *   filter,\n *   groupBy,\n *   map,\n *   mergeMap,\n *   take,\n * } from 'rxjs/operators';\n * import {\n *   reportInvalidActions,\n *   EffectNotification,\n * } from './effect_notification';\n * import { EffectsErrorHandler } from './effects_error_handler';\n * import { mergeEffects } from './effects_resolver';\n * import {\n *   onIdentifyEffectsKey,\n *   onRunEffectsKey,\n *   OnRunEffects,\n *   onInitEffects,\n *   isOnIdentifyEffects,\n *   isOnRunEffects,\n *   isOnInitEffects,\n * } from './lifecycle_hooks';\n * import { EFFECTS_ERROR_HANDLER } from './tokens';\n * import { getSourceForInstance } from './utils';\n * n@Injectable()\n * export class EffectSources extends Subject<any> {\n *   constructor(\n *     private errorHandler: ErrorHandler,\n *     @Inject(EFFECTS_ERROR_HANDLER)\n *     private effectsErrorHandler: EffectsErrorHandler\n *   ) {\n *     super();\n *   }\n *   addEffects(effectSourceInstance: any): void {\n *     this.next(effectSourceInstance);\n *   }\n * }\n * /\n * @internal\n * *\n * toActions(): Observable<Action> {\n *   return this.pipe(\n *     groupBy(getSourceForInstance),\n *     mergeMap((source$) => {\n *       return source$.pipe(groupBy(effectsInstance));\n *     }),\n *     mergeMap((source$) => {\n *       const effect$ = source$.pipe(\n *         exhaustMap((sourceInstance) => {\n *           return resolveEffectSource(\n *             this.errorHandler,\n *             this.effectsErrorHandler\n *           )(sourceInstance);\n *         }),\n *         map((output) => {\n *           reportInvalidActions(output, this.errorHandler);\n *           return output.notification;\n *         }),\n *         filter(\n *           (\n *             notification\n *           ): notification is Notification<Action> & {\n *             kind: 'N';\n *             value: Action;\n *           } => notification.kind === 'N' && notification.value != null\n *         ),\n *         dematerialize()\n *       );\n *       // start the stream with an INIT action\n *       // do this only for the first Effect instance\n *       const init$ = source$.pipe(\n *         take(1),\n *         filter(isOnInitEffects),\n *         map((instance) =>

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instance.ngrxOnInitEffects())\n    );\n    return merge(effect$, init$);\n  })\n );\n }\n}\n\nfunction
effectsInstance(sourceInstance: any) {\n  if (isOnIdentifyEffects(sourceInstance))
  {\n    return sourceInstance.ngrxOnIdentifyEffects();\n  }\n  return "";\n}\n\nfunction resolveEffectSource(\n
errorHandler: ErrorHandler,\n effectsErrorHandler: EffectsErrorHandler)\n: (sourceInstance: any) =>
Observable<EffectNotification> {\n  return (sourceInstance) => {\n    const mergedEffects$ = mergeEffects(\n
sourceInstance,\n    errorHandler,\n    effectsErrorHandler\n );\n    if (isOnRunEffects(sourceInstance)) {\n
return sourceInstance.ngrxOnRunEffects(mergedEffects$);\n    }\n    return mergedEffects$;\n  };}\n\n","import {
Injectable, OnDestroy } from '@angular/core';\nimport { Store } from '@ngrx/store';\nimport { Subscription } from
'rxjs';\nimport { EffectSources } from './effect_sources';\n\n@Injectable()\nexport class EffectsRunner implements
OnDestroy {\n  private effectsSubscription: Subscription | null = null;\n\n  constructor(\n    private effectSources:
EffectSources,\n    private store: Store<any>\n ) {\n\n  start()\n
  {\n    if (!this.effectsSubscription) {\n      this.effectsSubscription = this.effectSources\n        .toActions()\n
        .subscribe(this.store);\n    }\n\n    ngOnDestroy() {\n      if (this.effectsSubscription) {\n
this.effectsSubscription.unsubscribe();\n      this.effectsSubscription = null;\n    }\n  }\n\n},"import { NgModule,
Inject, Optional } from '@angular/core';\nimport {\n  createAction,\n  StoreModule,\n  Store,\n  StoreRootModule,\n
StoreFeatureModule,\n} from '@ngrx/store';\nimport { EffectsRunner } from './effects_runner';\nimport {
EffectSources } from './effect_sources';\nimport { ROOT_EFFECTS, _ROOT_EFFECTS_GUARD } from
'./tokens';\n\nexport const ROOT_EFFECTS_INIT = '@ngrx/effects/init';\n\nexport const rootEffectsInit =
createAction(ROOT_EFFECTS_INIT);\n\n\n@Injectable()\nexport class EffectsRootModule {\n  constructor(\n
private sources: EffectSources,\n    runner: EffectsRunner,\n    store: Store<any>,\n    @Inject(ROOT_EFFECTS)
rootEffects: any[],\n
    @Optional() storeRootModule: StoreRootModule,\n    @Optional() storeFeatureModule: StoreFeatureModule,\n
    @Optional()\n    @Inject(_ROOT_EFFECTS_GUARD)\n    guard: any\n ) {\n    runner.start();\n\n    rootEffects.forEach((effectSourceInstance) =>\n      sources.addEffects(effectSourceInstance)\n    );\n\n    store.dispatch({ type: ROOT_EFFECTS_INIT });\n  }\n\n  addEffects(effectSourceInstance: any) {\n
this.sources.addEffects(effectSourceInstance);\n  }\n\n},"import { NgModule, Inject, Optional } from
'@angular/core';\nimport { StoreRootModule, StoreFeatureModule } from '@ngrx/store';\nimport {
EffectsRootModule } from './effects_root_module';\nimport { FEATURE_EFFECTS } from
'./tokens';\n\n\n@Injectable()\nexport class EffectsFeatureModule {\n  constructor(\n    root: EffectsRootModule,\n
    @Inject(FEATURE_EFFECTS) effectSourceGroups: any[][],\n    @Optional() storeRootModule:
StoreRootModule,\n    @Optional() storeFeatureModule: StoreFeatureModule\n ) {\n
effectSourceGroups.forEach((group)
=>\n  group.forEach((effectSourceInstance) =>\n    root.addEffects(effectSourceInstance)\n  )\n );\n
}\n\n"},"import {\n  Injector,\n  ModuleWithProviders,\n  NgModule,\n  Optional,\n  Self,\n  SkipSelf,\n  Type,\n}
from '@angular/core';\nimport { Actions } from './actions';\nimport { EffectSources } from
'./effect_sources';\nimport { EffectsFeatureModule } from './effects_feature_module';\nimport {
defaultEffectsErrorHandler } from './effects_error_handler';\nimport { EffectsRootModule } from
'./effects_root_module';\nimport { EffectsRunner } from './effects_runner';\nimport {\n  _FEATURE_EFFECTS,\n
_ROOT_EFFECTS,\n  _ROOT_EFFECTS_GUARD,\n  EFFECTS_ERROR_HANDLER,\n
FEATURE_EFFECTS,\n  ROOT_EFFECTS,\n  USER_PROVIDED_EFFECTS,\n} from
'./tokens';\n\n\n@Injectable()\nexport class EffectsModule {\n  static forFeature(\n    featureEffects: Type<any>[]
= []\n ): ModuleWithProviders<EffectsFeatureModule> {\n    return {\n      ngModule: EffectsFeatureModule,\n
      providers: [\n        featureEffects,\n        {\n          provide: _FEATURE_EFFECTS,\n          multi: true,\n
          useValue: featureEffects,\n        },\n        {\n          provide: USER_PROVIDED_EFFECTS,\n          multi: true,\n
          useValue: [],\n        },\n        {\n          provide: FEATURE_EFFECTS,\n          multi: true,\n
          useFactory: createEffects,\n          deps: [Injector, _FEATURE_EFFECTS, USER_PROVIDED_EFFECTS],\n        },\n      ],\n
    };\n  }\n\n  static forRoot(\n    rootEffects: Type<any>[] = []\n ): ModuleWithProviders<EffectsRootModule> {\n
return {\n      ngModule: EffectsRootModule,\n      providers: [\n        {\n          provide:

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EFFECTS_ERROR_HANDLER,\n      useValue: defaultEffectsErrorHandler,\n    },\n    EffectsRunner,\n    EffectSources,\n    Actions,\n    rootEffects,\n    {\n      provide: _ROOT_EFFECTS,\n      useValue: [rootEffects],\n    },\n    {\n      provide: _ROOT_EFFECTS_GUARD,\n      useFactory: _provideForRootGuard,\n      deps: [\n        [EffectsRunner, new Optional(), new SkipSelf()],\n        [_ROOT_EFFECTS, new Self()],\n      ],\n    },\n    {\n      provide: USER_PROVIDED_EFFECTS,\n      multi: true,\n      useValue: [],\n    },\n    {\n      provide: ROOT_EFFECTS,\n      useFactory: createEffects,\n      deps: [Injector, _ROOT_EFFECTS, USER_PROVIDED_EFFECTS],\n    },\n  ],\n};\n}\n}\n\nexport function createEffects(\n  injector: Injector,\n  effectGroups: Type<any>[][],\n  userProvidedEffectGroups: Type<any>[][]\n): any[] {\n  const mergedEffects: Type<any>[] = [];\n  for (const effectGroup of effectGroups) {\n    mergedEffects.push(...effectGroup);\n  }\n  for (const userProvidedEffectGroup of userProvidedEffectGroups) {\n    mergedEffects.push(...userProvidedEffectGroup);\n  }\n  return createEffectInstances(injector, mergedEffects);\n}\n\nexport function createEffectInstances(\n  injector: Injector,\n  effects: Type<any>[]\n): any[] {\n  return effects.map((effect) => injector.get(effect));\n}\n\nexport function _provideForRootGuard(\n  runner: EffectsRunner,\n  rootEffects: any[][]\n): any {\n  // check whether any effects are actually passed\n  const hasEffects = !(rootEffects.length === 1 && rootEffects[0].length === 0);\n  if (hasEffects && runner) {\n    throw new TypeError(\n      `EffectsModule.forRoot() called twice. Feature modules should use EffectsModule.forFeature() instead.`\n    );\n  }\n  return 'guarded';\n}\n\nimport { Action } from '@ngrx/store';\nimport {\n  defer,\n  merge,\n  Notification,\n  Observable,\n  OperatorFunction,\n  Subject,\n} from 'rxjs';\nimport {\n  concatMap,\n  dematerialize,\n  filter,\n  finalize,\n  map,\n  materialize,\n} from 'rxjs/operators';\n\n/** Represents config with named parameters for act */\nexport interface ActConfig<\n  Input,\n  OutputAction extends Action,\n  ErrorAction extends Action\n> {\n  // Project function that produces the output actions in success cases\n  project: (input: Input, index: number) => Observable<OutputAction>;\n  // Error handle function for project\n  // error that happened during project execution\n  // input value that project errored with\n  error: (error: any, input: Input) => ErrorAction;\n  // Optional complete action provider\n  // count is the number of actions project emitted before completion\n  // input value that project completed with\n  complete?: (count: number, input: Input) => CompleteAction;\n  // Optional flattening operator\n  operator?: <Input, OutputAction>(\n    project: (input: Input, index: number) => Observable<OutputAction>\n  ) => OperatorFunction<Input, OutputAction>;\n  // Optional unsubscribe action provider\n  // count is the number of actions project emitted before unsubscribing\n  // input value that was unsubscribed from\n  unsubscribe?: (count: number, input: Input) => UnsubscribeAction;\n}\n\nexport function act<\n  Input,\n  OutputAction extends Action,\n  ErrorAction extends Action\n>(\n  project: (input: Input, index: number) => Observable<OutputAction>,\n  error: (error: any, input: Input) => ErrorAction\n): (source: Observable<Input>) => Observable<OutputAction | ErrorAction>;\n\nexport function act<\n  Input,\n  OutputAction extends Action,\n  ErrorAction extends Action,\n  CompleteAction extends Action = never,\n  UnsubscribeAction extends Action = never\n>(\n  config: ActConfig<\n    Input,\n    OutputAction,\n    ErrorAction,\n    CompleteAction,\n    UnsubscribeAction\n  >\n): (\n  source: Observable<Input>\n) => Observable<\n  OutputAction | ErrorAction | CompleteAction | UnsubscribeAction\n>;\n\n/**\n * Wraps project fn with error handling making it safe to use in Effects.\n * Takes either a config with named properties that represent different possible\n * callbacks or project/error callbacks that are required.\n */\nexport function actOrProject<\n  Input,\n  OutputAction extends Action,\n  ErrorAction extends Action,\n  CompleteAction extends Action = never,\n  UnsubscribeAction extends Action = never\n>(\n  /** Allow to take either config object or project/error functions */\n  configOrProject: (\n    | ActConfig<\n      Input,\n      OutputAction,\n      ErrorAction,\n      CompleteAction,\n      UnsubscribeAction\n    >\n    | ((input: Input, index: number) => Observable<OutputAction>),\n    errorFn?: (error: any, input: Input) => ErrorAction\n  )\n)

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* from './index';\n\nexport {getSourceMetadata as a} from './src/effects_metadata';\n\nexport {_provideForRootGuard as c,createEffects as b} from './src/effects_module';\n\nexport {FEATURE_EFFECTS as h,ROOT_EFFECTS as f,_FEATURE_EFFECTS as g,_ROOT_EFFECTS as e,_ROOT_EFFECTS_GUARD as d} from './src/tokens';\n\n],\"names\":[\"compose\",\"ignoreElements\",\"materialize\",\"map\",\"merge\",\"catchError\",\"Observable\",\"Injectable\",\"Inject\",\"ScannedActionsSubject\",\"filter\",\"InjectionToken\",\"groupBy\",\"mergeMap\",\"exhaustMap\",\"dematerialize\",\"take\",\"Subject\",\"ErrorHandler\",\"Store\",\"createAction\",\"NgModule\",\"StoreRootModule\",\"Optional\",\"StoreFeatureModule\",\"Injector\",\"SkipSelf\",\"Self\",\"concatMap\",\"defer\",\"Notification\",\"finalize\",\"pipe\",\"of\",\"withLatestFrom\"],\"mappings\":\":::;;IAeO,IAAM,qBAAqB,GAAqC;QACrE,QAAQ,EAAE,IAAI;QACd,sBAAsB,EAAE,IAAI;KAC7B,CAAC;IAEK,IAAM,0BAA0B,GAAG,0BAA0B;;ICCpE;;;;;aAgCgB,YAAy,CAM1B,MAA2D,EAC3D,MAAmB;QAEb,IAAM,MAAM,GAAG,MAAM,EAAE,CAAC;QACxB,IAAM,KAAK,mCACN,qBAAqB,GACrB,MAAM,CACV,CAAC;QACF,MAAM,CAAC,cAAc,CAAC,MAAM,EAAE,0BAA0B,EAAE;YACxD,KAAK,OAAA;SACN,CAAC,CAAC;QACH,OAAO,MAA8C,CAAC;IACxD,CAAC;aAeE,uBAAuB,CAErC,QAAW;QACX,IAAM,aAAa,GAAG,MAAM,CAAC,mBAAmB,CAAC,QAAQ,CAAmB,CAAC;QAE7E,IAAM,QAAQ,GAAwB,aAAa;aAChD,MAAM,CAAC,UAAc,YAAy;YACnB,IACE,QAAQ,CAAC,YAAy,CAAC;gBACtB,QAAQ,CAAC,YAAy,CAAC,CAAC,cAAc,CAAC,0BAA0B,CAAC,EACjE;;;gBAIA,IAAM,QAAQ,GAAG,QAAQ,CAAC,YAAy,CAAQ,CAAC;gBAC/C,OAAO,QAAQ,CAAC,0BAA0B,CAAC,CAAC,cAAc,CAAC,UAAU,CAAc,CAAC;aACxE;YACD,OAAO,KAAK,CAAC;SACd,CAAC;aACD,GAAG,CAAC,UAAc,YAAy;YACb,IAAM,QAAQ,GAAl,QAAQ,CAAC,YAAy,CAAS,CAC9C,0BAA0B,CAC3B,CAAC;YACF,uBACE,YAAy,cAAA,IACt,QAAQ,EACX;SACH,CAAC,CAAC;QAEI,OAAO,QAAQ,CAAC;IACIB;;aCvGgB,oBAAoB,CAAI,QAAW;QACjD,OAAO,MAAM,CAAC,cAAc,CAAC,QAAQ,CAAC,CAAC;IACzC;;ICQA,IAAM,YAAy,GAAG,mBAAmB,CAAC;IAEzC;;;aAIgB,MAAM,CAAC,MAAyB;QAAzB,uBAAA,EAAA,WAAyB;QAC9C,OAAO,UACL,MAAS,EACT,YAAe;YAEf,IAAM,QAAQ,iDACT,qBAAqB,GACrB,MAAM;gBACT,YAAy,cAAA;cACb,CAAC;YACF,sBAAsB,CAAI,MAAM,EAAE,QAAQ,CAAC,CAAC;SAC7C,CAAC;IACJ,CAAC;aAeE,0BAA0B,CACxC,QAAW;QAEX,IAAM,iBAAiB,GAAwBA,aAAO,CACpD,wBAAwB,EACxB,oBAAoB,CACrB,CAAC,QAAQ,CAAC,CAAC;QAEZ,OAAO,iBAAiB,CAAC;IAC3B,CAAC;IAED;;;IAIA,SAAS,kBAaKB,CACzB,WAAc;QAMd,OAAO,WAAW,CAAC,WAAW,CAAC,cAAc,CAAC,YAAy,CAAC,CAAC;IAC9D,CAAC;IAED;IACA,SAAS,sBAAsB,CAC7B,WAAc,EACd,QAA2B;QAE3B,IAAI,kBAaKB,CAAC,WAAW,CAAC,EAAE;YACnC,WAAW,CAAC,WAAW,CAAC,YAAy,CAAC,CAAC,IAAI,CAAC,QAAQ,CAAC,CAAC;SACtD;aAAM;YACL,MAAM,CAAC,cAAc,CAAC,WAAW,CAAC,WAAW,EAAE,YAAy,EAAE;gBAC3D,KAAK,EAAE,CAAC,QAAQ,CAAC;aACIB,CAAC,CAAC;SACJ;IACH,CAAC;IAED,SAAS,wBAAwB,CAC/B,WAAc;QAEd,OAAO,kBAaKB,CAAC,WAAW,CAAC;cACIC,WAAW,CAAC,WAAW,CAAC,YAAy,CAAC;cACrC,EAAE,CAAC;IACt;;aCvEgB,kBAaKB,CAAI,QAAW;QAC/C,OAAO,iBAAiB,CAAC,QAAQ,CAAC,CAAC,MAAM,CACvC,UACE,GAAuB,EACvB,EAAkD;gBAAhD,YAAy,kBAAA,EAAE,QAAQ,cAAA,EAAE,sBAAsB,4BAAA;YAEhD,GAAG,CAAC,YAAy,CAAc,GAAG,EAAE,QAAQ,UAAA,EAAE,sBAAsB,wBAAA,EAAE,CAAC;YACzD,OAAO,GAAG,CAAC;SACZ,EACD,EAAE,CACH,CAAC;IACJ,CAAC;aAeE,iBAAiB,CAAI,QAAW;QAC9C,IAAM,OAAO,GAAG;YAC3D,0BAA0B;YAC1B,uBAAuB;SACxB,CAAC;QAEF,OAAO,OAAO,CAAC,MAAM,CACnB,UAAc,OAAO,EAAE,MAAM,IAAK,OAAA,OAAO,CAAC,MAAM,CAAC,MAAM,CAAC,QAAQ,CAAC,CAAC,GAAA,EACrD,EAAE,CACH,CAAC;IACJ;;IC3BA;;;;;IACa;IAEA,IAAI,aAAa,GAAG,UAAc,CAAC,EAAE,CAAC;QAC7B,aAAa,GAAG,MAAM,CAAC,cAAc;aAChC,EAAE,SAAS,EAAE,EAAE,EAAE,YAAy,KAAK,IAAI,UAAU,CAAC,EAAE,CAAC,IAAI,CAAC,CAAC,SAAS,GAAG,CAAC,CAAC,EAAE,CAAC;YAC5E,UAAU,CAAC,EAAE,CAAC,IAAI,KAAK,IAAI,CAAC,IAAI,CAAC;gBAAE,IAAI,MAAM,CAAC,SAAS,CAAC,cAAc,CAAC,IAAI,CAAC,CAAC,EAAE,CAAC,CAAC;oBAAE,CAAC,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC,CAAC,EAAE,CAAC;QACtG,OAAO,aAAa,CAAC,CAAC,EAAE,CAAC,CAAC,CAAC;IAC/B,CAAC,CAAC;aAEc,SAAS,CAAC,CAAC,EAAE,CAAC;QAC1B,IAAI,OAAO,CAAC,KAAK,UAAU,IAAI,CAAC,KAAK,IAAI;YACrC,MAAM,IAAI,SAAS,CAAC,sBAAsB,GAAG,MAAM,CAAC,CAAC,CAAC,GAAG,+BAA+B,CAAC,CAAC;QAC9F,aAAa,CAAC,CAAC,EAAE,CAAC,CAAC,CAAC;QACpB,SAAS,EAAE,KAAK,IAAI,CAAC,WAAW,GAAG,CAAC,CAAC,EAAE;QACvC,CAAC,CAAC,SAAS,GAAG,CAAC,KAAK,IAAI,GAAG,MAAM,CAAC,MAAM,CAAC,CAAC,CAAC,IAAI,EAAE,CAAC,SAAS,GAAG,CAAC,CAAC,SAAS,EAAE,IAAI,EAAE,EAAE,CAAC,CA
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Found

in path(s):

\* /opt/cola/permits/1762774560\_1695958509.9796505/0/effects-12-5-1-tgz/package/bundles/ngrx-effects.umd.js.map

No license file was found, but licenses were detected in source scan.

/\*! \*\*\*\*\*

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No license file was found, but licenses were detected in source scan.

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* @license\n * Copyright Google Inc. All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *^nconst
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= /([a-z\\d])([A-Z]+)/g;\nconst STRING_UNDERSCORE_REGEXP_2 = /-|\\s+|_/g;\n\n/**\n * Converts a camelized
string into all lower case separated by underscores.\n *\n ```javascript\n decamelize('innerHTML'); //
'inner_html'\n decamelize('action_name'); // 'action_name'\n decamelize('css-class-name'); // 'css-class-name'\n
decamelize('my favorite items'); // 'my favorite items'\n ```\n */\nexport function decamelize(str: string): string {\n
return str.replace(STRING_DECAMELIZE_REGEXP, '$1_$2').toLowerCase();\n}\n\n/**\n Replaces underscores,
spaces, or camelCase with dashes.\n *\n ```javascript\n dasherize('innerHTML'); // 'inner-html'\n
dasherize('action_name'); // 'action-name'\n dasherize('css-class-name'); // 'css-class-name'\n dasherize('my
favorite items'); // 'my-favorite-items'\n ```\n */\nexport function dasherize(str?: string): string {\n
return decamelize(str || '').replace(STRING_DASHERIZE_REGEXP, '-');\n}\n\n/**\n Returns the lowerCamelCase form
of a string.\n *\n ```javascript\n camelize('innerHTML'); // 'innerHTML'\n camelize('action_name'); //
```

```
'actionName'\n camelize('css-class-name'); // 'cssClassName'\n camelize('my favorite items'); //
'myFavoriteItems'\n camelize('My Favorite Items'); // 'myFavoriteItems'\n ```\n *\nexport function
camelize(str: string): string {\n return str\n .replace(\n STRING_CAMELIZE_REGEXP,\n (_match: string,
_separator: string, chr: string) => {\n return chr ? chr.toUpperCase() : '';\n })\n .replace(/^[A-Z]/,
(match: string) => match.toLowerCase());\n}\n\n/**\n Returns the UpperCamelCase form of a string.\n\n
```javascript\n 'innerHTML'.classify(); // 'InnerHTML'\n 'action_name'.classify(); // 'ActionName'\n 'css-
class-name'.classify(); // 'CssClassName'\n 'my favorite items'.classify(); // 'MyFavoriteItems'\n ```\n *\nexport
function classify(str: string): string {\n return str\n .split('.')\n .map((part) => capitalize(camelize(part)))\n
.join('.');\n}\n\n/**\n More general than decamelize. Returns the lower\_case\_and\_underscored form of a
string.\n\n ```javascript\n 'innerHTML'.underscore(); // 'inner_html'\n 'action_name'.underscore(); //
'action_name'\n 'css-class-name'.underscore(); // 'css_class_name'\n
'my favorite items'.underscore(); // 'my_favorite_items'\n ```\n *\nexport function underscore(str: string): string {\n
return str\n .replace(STRING_UNDERSCORE_REGEXP_1, '$1_$2')\n
.replace(STRING_UNDERSCORE_REGEXP_2, '_')\n .toLowerCase();\n}\n\n/**\n Returns the Capitalized form
of a string.\n\n ```javascript\n 'innerHTML'.capitalize() // 'InnerHTML'\n 'action_name'.capitalize() //
'Action_name'\n 'css-class-name'.capitalize() // 'Css-class-name'\n 'my favorite items'.capitalize() // 'My favorite
items'\n ```\n *\nexport function capitalize(str: string): string {\n return str.charAt(0).toUpperCase() +
str.substr(1);\n}\n\n/**\n Returns the plural form of a string.\n\n ```javascript\n 'innerHTML'.pluralize() //
'innerHTMLs'\n 'action_name'.pluralize() // 'actionNames'\n 'css-class-name'.pluralize() // 'cssClassNames'\n
'regex'.pluralize() // 'regexes'\n 'user'.pluralize() // 'users'\n ```\n *\nexport
function pluralize(str: string): string {\n return camelize(\n /([aeiou]y)/, /fe?$/,\n /([aeiou]o|[[sxz]]|[[ch]])$/).map(\n (c, i) => (str = str.replace(c, ` $1${'iv'[i] || ''}e`))\n ) && str + 's'\n
);\n}\n\nexport function group(name: string, group: string | undefined) {\n return group ? `${group}/${name}` :
name;\n}\n\nexport function featurePath(\n group: boolean | undefined,\n flat: boolean | undefined,\n path:
string,\n name: string)\n {\n if (group && !flat) {\n return `../../${path}/${name}/`;\n }\n\n return group ?
`../${path}/` : './';\n}\n\n}}}
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Found in path(s):

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* /opt/cola/permits/1762774560_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-
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* @license\n * Copyright Google Inc. All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-\n style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {\n  Path,\n  join,\n  normalize,\n  relative,\n  strings,\n  basename,\n  extname,\n  dirname,\n} from '@angular-devkit/core';\nimport {\n  DirEntry, Tree } from '@angular-devkit/schematics';\n\nexport interface ComponentOptions {\n  component?:\n  string;\n  name: string;\n  flat?: boolean;\n  path?: string;\n  skipImport?: boolean;\n}\n\n/**\n * Find the component\n referred by a set of options passed to the schematics.\n */\nexport function findComponentFromOptions(\n  host:\n  Tree,\n  options: ComponentOptions\n): Path | undefined {\n  if (options.hasOwnProperty('skipImport') &&\n    options.skipImport)\n\n    {\n      return undefined;\n    }\n\n  if (!options.component) {\n    const pathToCheck =\n      (options.path || '') +\n      (options.flat ? '' : '/' + strings.dasherize(options.name));\n\n    return normalize(findComponent(host,\n      pathToCheck));\n  } else {\n    const componentPath = normalize(\n      '/' + options.path + '/' + options.component\n    );\n    const componentBaseName = normalize(componentPath).split('/').pop();\n\n    if\n      (host.exists(componentPath)) {\n        return normalize(componentPath);\n      } else if (host.exists(componentPath +\n        '.ts')) {\n        return normalize(componentPath + '.ts');\n      } else if (host.exists(componentPath + '.component.ts')) {\n        return normalize(componentPath + '.component.ts');\n      } else if (\n        host.exists(componentPath + '/' +\n        componentBaseName + '.component.ts')) {\n        return normalize(\n          componentPath + '/' +\n          componentBaseName + '.component.ts'\n        );\n      } else {\n        throw new Error(\n          `Specified component\n path ${componentPath} does not exist`\n        );\n      }\n    }\n  }\n}\n\n/**\n * Function to find the \"closest\" component to\n a generated file's path.\n */\nexport function findComponent(\n  host: Tree, generateDir: string\n): Path {\n  let dir:\n  DirEntry | null = host.getDir('/' + generateDir);\n\n  const componentRe = /\\.component\.ts$/;\n\n  while (dir) {\n    const matches = dir.subfiles.filter((p) => componentRe.test(p));\n\n    if (matches.length === 1) {\n      return\n        join(dir.path, matches[0]);\n    } else if (matches.length > 1) {\n      throw new Error(\n        'More than one\n component matches. Use skip-import option to skip importing '\n        +\n        'the component store into the closest\n component.'\n      );\n    }\n\n    dir = dir.parent;\n  }\n\n  throw new Error(\n    'Could not find an Component. Use
```

```

the skip-import '+\n    'option to skip importing in Component.\n );\n}\n\n/**\n * Build a relative path from one
file path to another file path.\n */\nexport function buildRelativePath(from:
string, to: string): string {\n  const {\n    path: fromPath,\n    filename: fromFileName,\n    directory:
fromDirectory,\n  } = parsePath(from);\n  const {\n    path: toPath,\n    filename: toFileName,\n    directory:
toDirectory,\n  } = parsePath(to);\n  const relativePath = relative(fromDirectory, toDirectory);\n  const
fixedRelativePath = relativePath.startsWith('.')\n    ? relativePath\n    : `.${relativePath}`;\n  return !toFileName ||
toFileName === 'index.ts'\n    ? fixedRelativePath\n    : `.${relativePath.endsWith('/')\n    ?
fixedRelativePath\n    : fixedRelativePath + '/'\n
} ${convertToTypeScriptFileName(toFileName)}`;\n}\n\nfunction parsePath(path: string) {\n  const pathNormalized
= normalize(path) as Path;\n  const filename = extname(pathNormalized) ? basename(pathNormalized) : '';\n  const
directory = filename ? dirname(pathNormalized) : pathNormalized;\n  return {\n    path: pathNormalized,\n    filename,\n    directory,\n  };\n}\n\n/**\n * Strips the typescript extension and clears index filenames\n * foo.ts -> foo\n * index.ts -> empty\n */\nfunction convertToTypeScriptFileName(filename: string | undefined) {\n  return filename ?
filename.replace(/(\\.ts)|(index\\.ts)$/, '') : '';\n}\n}

```

Found in path(s):

```

* /opt/cola/permits/1762774560_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-core/utility/find-
component.js.map

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No license file was found, but licenses were detected in source scan.

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CvE,UAAU,CAAC,IAAK,OAAA,CAAC,CAAC,OAAO,EAAE,KAAC,YAAU,EAA5B,CAA4B,CACpC,CAAC;I  
ACF,IAAI,WAAW,GAAG,CAAC,CAAC;IACpB,IAAI,SAAS,CAAC,MAAM,GAAG,CAAC,EAAE;QACxB,WA  
AW,GAAG,SAAS,CAAC,CAAC,CAAC,GAAG,CAAC;KAChC;IACD,IAAM,IAAI,GAAG,SAAS,CAAC,

CAAC,CAAC,EAAE,CAAC,CAAC,CAAC,IAAI,CAAC;IACnC,IAAM,KAAC,GAAG,SAAS,CAAC,CAAC,CAA  
C,EAAE,CAAC,CAAC,CAAC,IAAI,CAAC;IACpC,wFAAwF;IACxF,IAAM,iBAaIB,GAAG,UAAU,CAAC,MA  
AM,KAAC,CAAC,IAAI,SAAS,CAAC,MAAM,KAAC,CAAC,CAAC;IAC5E,IAAM,SAAS,GAAG,iBAaIB,CAA  
C,CAAC,CAAC,EAAE,CAAC,CAAC,CAAC,KAAC,CAAC;IACjD,IAAM,QAAQ,GACT,SAAS,eAAU,IAAI,GA  
AG,UAAU,GAAG,KAAO;SACjD,YAAU,QAAQ,UAAI,iBAaIB,CAAC,CAAC,CAAC,KAAC,CAAC,CAAC,CA  
AC,EAAE,CAAE,CAAA,CAAC;IAEzD,OAAO,yBAaYB,CAC9B,UAAU,EACV,QAAQ,EACR,UAAU,EACV,W  
AAW,EACX,EAAE,CAAC,UAAU,CAAC,aAAa,CAC5B,CAAC;AACJ,CAAC;AAxFD,oCAwFC;AAED,SAAGB,  
aAAa,CAC3B,UAAyB,EACzB,IAAU,EACV,UAAkB,EACIB,UAAkB,EACIB,UAAkB;IAEIB,IAAM,OAAO,GA  
AG,UAAU,CAAC,UAAU;SACIC,MAAM,CAAC,EAAE,CAAC,mBAAmB,CAAC;SAC9B,MAAM,CACL,UAA  
C,EAAMb;YAAjB,eAAe,qBAAA;QACbB,OAAA,eAAe,CAAC,OAAO,CAAC,UAAU,CAAC,KAAC,MAAI,UA  
AU,MAAG;YACzD,eAAe,CAAC,OAAO,CAAC,UAAU,CAAC,KAAC,OAAI,UAAU,OAAG;IADzD,CACyD,CA  
C5D,CAAC;IAEJ,IAAI,OAAO,CAAC,MAAM,KAAC,CAAC,EAAE;QACxB,OAAO,EAAE,CAAC;KACX;IAED  
,IAAM,UAAU,GAAG,UAAU,SAA6B;QAC/C,IAAI,SAAS,CAAC,IAAI,CAAC,IAAI,EAAE;YACvB,OAAO,SA  
AS,CAAC,IAAI,CAAC,IAAI,CAAC;SAC5B;QAED,uBAaUB;QACvB,IAAI,SAAS,CAAC,YAAY,IAAI,SAAS,C  
AAC,YAAY,CAAC,IAAI,EAAE;YACzD,OAAO,SAAS,CAAC,YAAY,CAAC,IAAI,CAAC;SACpC;QAED,OAA  
O,EAAE,CAAC;IACZ,CAAC,CAAC;IAEF,IAAM,OAAO,GAAG,OAAO,CAAC,GAAG,CAAC,UAAU,CAAC;Q  
AC5B,IAAM,YAAY,GAAG,MAAA,CAAC,aAAD,CAAC,uBAAD,CAAC,CAAE,YAAY,0CAAE,aAAgC,CAAC;  
QACvE,IAAI,CAAC,YAAY,EAAE;YACjB,OAAO,EAAE,CAAC;SACX;QAED,IAAM,gBAAGB,GAAG,YAAY,  
CAAC,QAAQ,CAAC;QAC/C,IAAM,iBAaIB,GAAG,gBAAGB;aACvC,GAAG,CAAC,UAAU,CAAC;aACf,QAA  
Q,CAAC,UAAU,CAAC,CAAC;QAExB,IAAM,aAAa,GAAG,gBAAGB,CAAC,GAAG,CAAC,UAAU,SAAS,EAA  
E,KAAC;YACID,IAAM,IAAI,GAAG,UAAU,CAAC,SAAS,CAAC,CAAC;YAEnC,0DAA0D;YACID,IAAI,IAAI  
,KAAC,UAAU,EAAE;gBACvB,OAAO,SAAS,CAAC;aACIB;YAED,kFAAKF;YACIF,IAAI,CAAC,iBAaIB,EAA  
E;gBACtB,OAAO,4BAAmB,CACxB,UAAU,EACV,SAAS,EACT,UAAU,EACV,UAAU,CACX,CAAC;aACH;Y  
AED,IAAM,cAAc,GAAG,gBAAGB,CAAC,KAAC,GAAG,CAAC,CAAC,CAAC;YACnD,qDAAqD;YACrD,IAAI  
,cAAc,EAAE;gBACIB,OAAO,2BAaKB,CACvB,UAAU,EACV,SAAS,EACT,SAAS,CAAC,QAAQ,CAAC,UAA  
U,CAAC,EAC9B,cAAc,CAAC,QAAQ,CAAC,UAAU,CAAC,CACpC,CAAC;aACH;YAED,iDAaID;YACjD,OA  
AO,2BAaKB,CACvB,UAAU,EACV,SAAS,EACT,SAAS,CAAC,QAAQ,CAAC,UAAU,CAAC,EAC9B,SAAS,CA  
AC,MAAM,EAAE,CACnB,CAAC;QACJ,CAAC,CAAC,CAAC;QAEH,OAAO,aAAa,CAAC,MAAM,CAAC,OA  
AO,CAAqC,CAAC;IAC3E,CAAC,CAAC,CAAC;IAEH,OAAO,OAAO,CAAC,MAAM,CAAC,UAAU,OAAO,EA  
AE,IAAI,IAAK,OAAA,OAAO,CAAC,MAAM,CAAC,IAAI,CAAC,EAAPB,CAAoB,EAAE,EAAE,CAAC,CAAC  
;AACrE,CAAC;AArFD,sCAqFC;AAED,SAAGB,gBAAGB,CAC9B,aAAyC,EACzC,YAAoB;IAEPB,OAAO,CAC  
L,aAAa;QACb,aAAa,CAAC,UAAU,CAAC,IAAI,CAC3B,UAAU,IAAI;YACH,OAAA,EAAE,CAAC,oBAAoB,C  
AAC,IAAI,CAAC;gBAC7B,EAAE,CAAC,YAAY,CAAC,IAAI,CAAC,IAAI,CAAC;gBAC1B,IAAI,CAAC,IAAI,  
CAAC,IAAI,KAAC,YAAY;QAF/B,CAE+B,CACIC,CACF,CAAC;AACJ,CAAC;AAbD,4CAaC", "sourcesContent  
":["/\*

```
istanbul ignore file */\n/**\n * @license\n * Copyright Google Inc. All Rights Reserved.\n * Use of this source  
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport * as ts from 'typescript';\nimport {\n  Change,\n  InsertChange,\n  NoopChange,\n  createReplaceChange,\n  ReplaceChange,\n  RemoveChange,\n  createRemoveChange,\n} from './change';\nimport {\n  Path\n} from '@angular-devkit/core';\n\n/**\n * Find all nodes from the AST in the subtree of node of SyntaxKind  
kind.\n * @param node\n * @param kind\n * @param max The maximum number of items to return.\n * @return  
all nodes of kind, or [] if none is found\n */\nexport function findNodes(\n  node: ts.Node,\n  kind: ts.SyntaxKind,\n  max = Infinity):\n  ts.Node[] {\n  if (!node || max === 0) {\n    return [];\n  }\n  const arr: ts.Node[] = [];\n  if\n  (node.kind === kind) {\n    arr.push(node);\n    max--;\n  }\n  if (max > 0) {\n    for (const child of\n      node.getChildren()) {\n      findNodes(child, kind, max).forEach((node) => {\n        if (max > 0) {\n          arr.push(node);\n          max--;\n        }\n      });\n    }\n    if (max <= 0) {\n      break;\n    }\n  }\n  return\n  arr;\n}\n\n/**\n * Get all the nodes from a source.\n * @param sourceFile The source file object.\n * @returns  
{Observable<ts.Node>} An observable of all the nodes in the source.\n */\nexport function
```

```

getSourceNodes(sourceFile: ts.SourceFile): ts.Node[] {\n  const nodes: ts.Node[] = [sourceFile];\n  const result = [];\n  while (nodes.length > 0) {\n    const node = nodes.shift();\n    if (node) {\n      result.push(node);\n      if (node.getChildCount(sourceFile) >= 0) {\n        nodes.unshift(...node.getChildren());\n      }\n    }\n  }\n  return result;\n}\n\n/**\n * Helper for sorting nodes.\n * @return function to sort nodes in increasing order of position in sourceFile\n */\nfunction nodesByPosition(first: ts.Node, second: ts.Node): number {\n  return first.pos - second.pos;\n}\n\n/**\n * Insert `toInsert` after the last occurrence of `ts.SyntaxKind[nodes[i].kind]` or after the last occurrence of `syntaxKind` if the last occurrence is a sub child of ts.SyntaxKind[nodes[i].kind] and save the changes in file.\n * @param nodes insert after the last occurrence of nodes\n * @param toInsert string to insert\n * @param file file to insert changes into\n * @param fallbackPos position to insert if toInsert happens to be the first occurrence\n * @param syntaxKind the ts.SyntaxKind of the subchildren to insert after\n * @return Change instance\n * @throw Error if toInsert is first occurrence but fall back is not set\n */\nexport function insertAfterLastOccurrence(\n  nodes: ts.Node[],\n  toInsert: string,\n  file: string,\n  fallbackPos: number,\n  syntaxKind?: ts.SyntaxKind\n): Change {\n  let lastItem = nodes.sort(nodesByPosition).pop();\n  if (!lastItem) {\n    throw new Error();\n  }\n  if (syntaxKind) {\n    lastItem = findNodes(lastItem, syntaxKind).sort(nodesByPosition).pop();\n  }\n  if (!lastItem && fallbackPos === undefined) {\n    throw new Error(`tried to insert ${toInsert} as first occurrence with no fallback position`);\n  }\n  const lastItemPosition: number = lastItem ? lastItem.end : fallbackPos;\n  return new InsertChange(file, lastItemPosition, toInsert);\n}\n\nexport function getContentOfKeyLiteral(\n  _source: ts.SourceFile,\n  node: ts.Node\n): string | null {\n  if (node.kind === ts.SyntaxKind.Identifier) {\n    return (node as ts.Identifier).text;\n  } else if (node.kind === ts.SyntaxKind.StringLiteral) {\n    return (node as ts.StringLiteral).text;\n  } else {\n    return null;\n  }\n}\n\nfunction _angularImportsFromNode(\n  node: ts.ImportDeclaration,\n  _sourceFile: ts.SourceFile\n): { [name: string]: string } {\n  const ms = node.moduleSpecifier;\n  let modulePath: string;\n  switch (ms.kind) {\n    case ts.SyntaxKind.StringLiteral:\n      modulePath = (ms as ts.StringLiteral).text;\n      break;\n    default:\n      return {};\n  }\n  if (!modulePath.startsWith('@angular/')) {\n    return {};\n  }\n  if (node.importClause) {\n    if (node.importClause.name) {\n      // This is of the form `import Name from 'path'. Ignore.\n      return {};\n    } else if (node.importClause.namedBindings) {\n      const nb = node.importClause.namedBindings;\n      if (nb.kind === ts.SyntaxKind.NamespaceImport) {\n        // This is of the form `import * as name from 'path'. Return `name`. \n        return {\n          [(nb as ts.NamespaceImport).name.text + '.']: modulePath,\n        }; \n      } else {\n        // This is of the form `import {a,b,c} from 'path' \n        const namedImports = nb as ts.NamedImports;\n        return namedImports.elements\n          .map((is: ts.ImportSpecifier) => {\n            is.propertyName ? is.propertyName.text : is.name.text\n          })\n          .reduce((acc: { [name: string]: string }, curr: string) => {\n            acc[curr] = modulePath;\n            return acc;\n          }, {});\n      }\n    } else {\n      // This is of the form `import 'path';`. Nothing to do.\n      return {};\n    }\n  }\n}\n\nexport function getDecoratorMetadata(\n  source: ts.SourceFile,\n  identifier: string,\n  module: string\n): ts.Node[] {\n  const angularImports: { [name: string]: string } = findNodes(\n    source,\n    ts.SyntaxKind.ImportDeclaration\n  ).map((node) => _angularImportsFromNode(node as ts.ImportDeclaration, source))\n  .reduce(\n    (\n      acc: { [name: string]: string },\n      current: { [name: string]: string }\n    ) => {\n      for (const key of Object.keys(current)) {\n        acc[key] = current[key];\n      }\n      return acc;\n    },\n    {}\n  );\n  return getSourceNodes(source)\n    .filter((node) => {\n      return (\n        node.kind === ts.SyntaxKind.Decorator &&\n        (node as ts.Decorator).expression.kind === ts.SyntaxKind.CallExpression\n      );\n    })\n    .map((node) => (node as ts.Decorator).expression as ts.CallExpression)\n    .filter((expr) => {\n      if (expr.expression.kind === ts.SyntaxKind.Identifier) {\n        const id = expr.expression as ts.Identifier;\n        return (\n          id.getFullText(source) === identifier &&\n          angularImports[id.getFullText(source)] === module\n        );\n      } else if (\n        expr.expression.kind === ts.SyntaxKind.PropertyAccessExpression\n      ) {\n        // This covers foo NgModule when importing * as foo.\n        const paExpr = expr.expression as ts.PropertyAccessExpression;\n        // If the left expression is not an identifier, just give up at that point.\n        if (paExpr.expression.kind !== ts.SyntaxKind.Identifier)\n
```

```

    {
      return false;
    }
    const id = paExpr.name.text;
    const moduleId = (paExpr.expression as ts.Identifier).getText(source);
    return id === identifier && angularImports[moduleId + '.'] === module;
  }
  .filter((expr) => expr.arguments[0] && expr.arguments[0].kind === ts.SyntaxKind.ObjectLiteralExpression)
  .map((expr) => expr.arguments[0] as ts.ObjectLiteralExpression);
}

function _addSymbolToNgModuleMetadata(
  source: ts.SourceFile,
  ngModulePath: string,
  metadataField: string,
  symbolName: string,
  importPath: string): Change[] {
  const nodes = getDecoratorMetadata(source, 'NgModule', '@angular/core');
  let node: any = nodes[0]; // eslint-disable-line @typescript-eslint/no-explicit-any
  // Find the decorator declaration.
  if (!node) {
    return [];
  }
  // Get all the children property assignment of object literals.
  const matchingProperties: ts.ObjectLiteralElement[] = (node as ts.ObjectLiteralExpression).properties
    .filter((prop) => prop.kind === ts.SyntaxKind.PropertyAssignment)
    // Filter out every fields that's not "metadataField". Also handles string literals
    // (but not expressions).
    .filter((prop: any) => {
      const name = prop.name;
      switch (name.kind) {
        case ts.SyntaxKind.Identifier:
          return (name as ts.Identifier).getText(source) === metadataField;
        case ts.SyntaxKind.StringLiteral:
          return (name as ts.StringLiteral).text === metadataField;
      }
    })
    // Get the last node of the array literal.
    if (!matchingProperties) {
      return [];
    }
    if (matchingProperties.length === 0) {
      // We haven't found the field in the metadata declaration. Insert a new field.
      const expr = node as ts.ObjectLiteralExpression;
      let position: number;
      let toInsert: string;
      if (expr.properties.length === 0) {
        position = expr.getEnd() - 1;
        toInsert = ` ${metadataField}: [${symbolName}];`;
      } else {
        node = expr.properties[expr.properties.length - 1];
        position = node.getEnd();
        // Get the indentation of the last element, if any.
        const text = node.getFullText(source);
        const matches = text.match(/^(\\r?\\n\\s*)/);
        if (matches.length > 0) {
          toInsert = ` ${matches[0]} ${metadataField}: [${symbolName}];`;
        } else {
          toInsert = ` ${metadataField}: [${symbolName}];`;
        }
      }
      const newMetadataProperty = new InsertChange(
        ngModulePath,
        position,
        toInsert
      );
      const newMetadataImport = insertImport(
        source,
        ngModulePath,
        symbolName.replace(/\\..*/g, ''),
        importPath
      );
      return [newMetadataProperty, newMetadataImport];
    }
    const assignment = matchingProperties[0] as ts.PropertyAssignment;
    // If it's not an array, nothing we can do really.
    if (assignment.initializer.kind !== ts.SyntaxKind.ArrayLiteralExpression) {
      return [];
    }
    const arrLiteral = assignment.initializer as ts.ArrayLiteralExpression;
    if (arrLiteral.elements.length === 0) {
      // Forward the property.
      node = arrLiteral;
    } else {
      node = arrLiteral.elements;
    }
    if (!node) {
      console.log('No app module found. Please add your new class to your component. ');
      return [];
    }
    if (Array.isArray(node)) {
      const nodeArray = (node as {}) as Array<ts.Node>;
      const symbolsArray = nodeArray.map((node) => node.getText());
      if (symbolsArray.includes(symbolName)) {
        return [];
      }
      node = node[node.length - 1];
      const effectsModule = nodeArray.find(
        (node) => (node.getText().includes('EffectsModule.forRoot') &&
          symbolName.includes('EffectsModule.forRoot')) ||
          (node.getText().includes('EffectsModule.forFeature') &&
            symbolName.includes('EffectsModule.forFeature'))
      );
      if (effectsModule && symbolName.includes('EffectsModule')) {
        const effectsArgs = (effectsModule as any).arguments.shift();
        if (effectsArgs && effectsArgs.kind === ts.SyntaxKind.ArrayLiteralExpression) {
          const effectsElements = (effectsArgs as ts.ArrayLiteralExpression).elements;
          const [, effectsSymbol] = (<any>symbolName).match(/\\[(.*)\\]/);
          let epos;
          if (effectsElements.length === 0) {
            epos = effectsArgs.getStart() + 1;
          }
          return [new InsertChange(ngModulePath, epos, effectsSymbol)];
        } else {
          const lastEffect = effectsElements[effectsElements.length - 1] as ts.Expression;
          epos = lastEffect.getEnd();
          // Get the indentation of the last element, if any.
          const text: any = lastEffect.getFullText(source);
          let effectInsert: string;
          if (text.match(/^(\\r?\\n\\s*)/)) {
            effectInsert = ` ${text.match(/^(\\r?\\n\\s+)[0]} ${effectsSymbol}`;
          } else {
            effectInsert = ` ${effectsSymbol}`;
          }
          return [new InsertChange(ngModulePath, epos, effectInsert)];
        }
      } else {
        return [];
      }
    }
  }
}

```

```

    }\n  }\n }\n\n let toInsert: string;\n let position = node.getEnd();\n if (node.kind ==
ts.SyntaxKind.ObjectLiteralExpression) {\n // We haven't found the field in the metadata declaration. Insert a
new\n // field.\n const expr = node as ts.ObjectLiteralExpression;\n if (expr.properties.length == 0) {\n
position = expr.getEnd() - 1;\n toInsert = ` ${metadataField}: [${symbolName}]\n`; \n } else {\n node =
expr.properties[expr.properties.length - 1];\n position = node.getEnd();\n // Get the indentation of the last
element, if any.\n const text = node.getFullText(source);\n if (text.match(/^\r?\n/))
{\n toInsert = `${\n text.match(/^\r?\n\s+/)[0] }${metadataField}: [${symbolName}]`; \n }
else {\n toInsert = ` ${metadataField}: [${symbolName}]`; \n }\n }\n } else if (node.kind ==
ts.SyntaxKind.ArrayLiteralExpression) {\n // We found the field but it's empty. Insert it just before the `]`.\n
position--;\n toInsert = `${symbolName}`; \n } else {\n // Get the indentation of the last element, if any.\n
const text = node.getFullText(source);\n if (text.match(/^\r?\n/)) {\n toInsert =
`${text.match(/^\r?\n(\r?)\s+/)[0]}${symbolName}`; \n } else {\n toInsert = ` ${symbolName}`; \n }\n }\n
}\n\n const insert = new InsertChange(ngModulePath, position, toInsert);\n const importInsert: Change = insertImport(\n
source,\n ngModulePath,\n symbolName.replace(/\\.*/g, ""),\n importPath\n );\n\n return [insert,
importInsert];\n }\n\n function _addSymbolToComponentMetadata(\n source:
ts.SourceFile,\n componentPath: string,\n metadataField: string,\n symbolName: string,\n importPath: string\n):
Change[] {\n const nodes = getDecoratorMetadata(source, 'Component', '@angular/core');\n let node: any =
nodes[0]; // eslint-disable-line @typescript-eslint/no-explicit-any\n\n // Find the decorator declaration.\n if (!node)
{\n return [];\n }\n\n // Get all the children property assignment of object literals.\n const matchingProperties:
ts.ObjectLiteralElement[] = (node as ts.ObjectLiteralExpression).properties\n .filter((prop) => prop.kind ==
ts.SyntaxKind.PropertyAssignment)\n // Filter out every fields that's not "metadataField". Also handles string
literals\n // (but not expressions).\n .filter((prop: any) => {\n const name = prop.name;\n switch
(name.kind) {\n case ts.SyntaxKind.Identifier:\n return (name as ts.Identifier).getText(source) ==
metadataField;\n case ts.SyntaxKind.StringLiteral:\n return
(name as ts.StringLiteral).text == metadataField;\n }\n\n return false;\n });\n\n // Get the last node of the
array literal.\n if (!matchingProperties) {\n return [];\n }\n if (matchingProperties.length == 0) {\n // We
haven't found the field in the metadata declaration. Insert a new field.\n const expr = node as
ts.ObjectLiteralExpression;\n let position: number;\n let toInsert: string;\n if (expr.properties.length == 0) {\n
position = expr.getEnd() - 1;\n toInsert = ` ${metadataField}: [${symbolName}]\n`; \n } else {\n node =
expr.properties[expr.properties.length - 1];\n position = node.getEnd();\n // Get the indentation of the last
element, if any.\n const text = node.getFullText(source);\n const matches = text.match(/^\r?\n\s*/);\n if
(matches.length > 0) {\n toInsert = `${matches[0]}${metadataField}: [${symbolName}]`; \n } else {\n
toInsert = ` ${metadataField}: [${symbolName}]`; \n }\n }\n }\n\n const newMetadataProperty = new InsertChange(\n
componentPath,\n position,\n toInsert\n
);\n const newMetadataImport = insertImport(\n source,\n componentPath,\n
symbolName.replace(/\\.*/g, ""),\n importPath\n );\n\n return [newMetadataProperty, newMetadataImport];\n
}\n\n const assignment = matchingProperties[0] as ts.PropertyAssignment;\n\n // If it's not an array, nothing we can
do really.\n if (assignment.initializer.kind !== ts.SyntaxKind.ArrayLiteralExpression) {\n return [];\n }\n\n const
arrLiteral = assignment.initializer as ts.ArrayLiteralExpression;\n if (arrLiteral.elements.length == 0) {\n //
Forward the property.\n node = arrLiteral;\n } else {\n node = arrLiteral.elements;\n }\n\n if (!node) {\n
console.log(\n 'No component found. Please add your new class to your component.'\n );\n\n return [];\n
}\n\n if (Array.isArray(node)) {\n const nodeArray = (node as
{} as Array<ts.Node>);\n const symbolsArray = nodeArray.map((node) => node.getText());\n if
(symbolsArray.includes(symbolName)) {\n return [];\n }\n\n node = node[node.length - 1];\n }\n\n let
toInsert: string;\n let position = node.getEnd();\n if (node.kind == ts.SyntaxKind.ObjectLiteralExpression) {\n //
We haven't found the field in the metadata declaration. Insert a new\n // field.\n const expr = node as
ts.ObjectLiteralExpression;\n if (expr.properties.length == 0) {\n position = expr.getEnd() - 1;\n toInsert = `
${metadataField}: [${symbolName}]\n`; \n } else {\n node = expr.properties[expr.properties.length - 1];\n
}

```



```

position = node.getEnd();\n // Get the indentation of the last element, if any.\n const text =
node.getFullText(source);\n if (text.match(/^\r?\r?\n')) {\n toInsert = `,\n
text.match(/^\r?\n\s+\/)[0]\n }${metadataField}: [${symbolName}];\n } else {\n toInsert
= `,\n ${metadataField}: [${symbolName}];\n }\n } else if (node.kind ===
ts.SyntaxKind.ArrayLiteralExpression) {\n // We found the field but it's empty. Insert it just before the `]\n
position--;\n toInsert = `${symbolName}`;\n } else {\n // Get the indentation of the last element, if any.\n
const text = node.getFullText(source);\n if (text.match(/^\r?\n\/)) {\n toInsert =
`,\n ${text.match(/^\r?\n(\r?)\s+\/)[0]}${symbolName}`;\n } else {\n toInsert = `,\n ${symbolName}`;\n }\n }\n
const insert = new InsertChange(componentPath, position, toInsert);\n const importInsert: Change = insertImport(\n
source,\n componentPath,\n symbolName.replace(/\/.*$/, ""),\n importPath\n );\n\n return [insert,
importInsert];\n}\n\n/**\n * Custom function to insert a declaration (component, pipe, directive)\n * into NgModule
declarations. It also imports the component.\n */\nexport function addDeclarationToModule(\n source:
ts.SourceFile,\n
modulePath: string,\n classifiedName: string,\n importPath: string\n): Change[] {\n return
_addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'declarations',\n classifiedName,\n
importPath\n );\n}\n\n/**\n * Custom function to insert a declaration (component, pipe, directive)\n * into
NgModule declarations. It also imports the component.\n */\nexport function addImportToModule(\n source:
ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath: string\n): Change[] {\n return
_addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'imports',\n classifiedName,\n importPath\n
);\n}\n\n/**\n * Custom function to insert a provider into NgModule. It also imports it.\n */\nexport function
addProviderToModule(\n source: ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath:
string\n): Change[] {\n return _addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'providers',\n
classifiedName,\n
importPath\n );\n}\n\n/**\n * Custom function to insert a provider into Component. It also imports it.\n
*/\nexport function addProviderToComponent(\n source: ts.SourceFile,\n componentPath: string,\n
classifiedName: string,\n importPath: string\n): Change[] {\n return _addSymbolToComponentMetadata(\n
source,\n componentPath,\n 'providers',\n classifiedName,\n importPath\n );\n}\n\n/**\n * Custom function
to insert an export into NgModule. It also imports it.\n */\nexport function addExportToModule(\n source:
ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath: string\n): Change[] {\n return
_addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'exports',\n classifiedName,\n importPath\n
);\n}\n\n/**\n * Custom function to insert an export into NgModule. It also imports it.\n */\nexport function
addBootstrapToModule(\n source: ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath:
string\n):
Change[] {\n return _addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'bootstrap',\n
classifiedName,\n importPath\n );\n}\n\n/**\n * Add Import `import { symbolName } from fileName` if the
import doesn't exist\n * already. Assumes fileToEdit can be resolved and accessed.\n * @param fileToEdit (file we
want to add import to)\n * @param symbolName (item to import)\n * @param fileName (path to the file)\n *
@param isDefault (if true, import follows style for importing default exports)\n * @return Change\n */\nexport
function insertImport(\n source: ts.SourceFile,\n fileToEdit: string,\n symbolName: string,\n fileName: string,\n
isDefault = false\n): Change {\n const rootNode = source;\n const allImports = findNodes(rootNode,
ts.SyntaxKind.ImportDeclaration);\n\n // get nodes that map to import statements from the file fileName\n const
relevantImports = allImports.filter((node) => {\n // StringLiteral of the ImportDeclaration is the import file
(fileName in this case).\n const importFiles = node\n .getChildren()\n .filter((child) => child.kind ===
ts.SyntaxKind.StringLiteral)\n .map((n) => (n as ts.StringLiteral).text);\n\n return importFiles.filter((file) =>
file === fileName).length === 1;\n });\n\n if (relevantImports.length > 0) {\n let importsAsterisk = false;\n //
imports from import file\n const imports: ts.Node[] = [];\n relevantImports.forEach((n) => {\n
Array.prototype.push.apply(\n imports,\n findNodes(n, ts.SyntaxKind.Identifier)\n );\n if
(findNodes(n, ts.SyntaxKind.AsteriskToken).length > 0) {\n importsAsterisk = true;\n }\n });\n\n // if

```

```

imports * from fileName, don't add symbolName\n    if (importsAsterisk) {\n        return new NoopChange();\n    }\n\n    const importTextNodes = imports.filter(\n        (n) => (n as ts.Identifier).text === symbolName\n    );\n\n    // insert import if it's not there\n    if (importTextNodes.length ===\n    0) {\n        const fallbackPos =\n            findNodes(\n                relevantImports[0],\n                ts.SyntaxKind.CloseBraceToken\n            )[0].getStart() ||\n            findNodes(relevantImports[0],\n                ts.SyntaxKind.FromKeyword)[0].getStart();\n\n        return insertAfterLastOccurrence(\n            imports,\n            `,\n            ${symbolName}`,\n            fileToEdit,\n            fallbackPos\n        );\n    }\n\n    return new NoopChange();\n    }\n\n    // no such import declaration exists\n    const useStrict = findNodes(rootNode, ts.SyntaxKind.StringLiteral).filter(\n        (n)\n        => n.getText() === 'use strict'\n    );\n    let fallbackPos = 0;\n    if (useStrict.length > 0) {\n        fallbackPos =\n            useStrict[0].end;\n    }\n    const open = isDefault ? "'{'" : "'";\n    const close = isDefault ? "''" : "'";\n    // if there are no imports or 'use strict' statement, insert import at beginning of file\n    const insertAtBeginning = allImports.length === 0 && useStrict.length === 0;\n    const separator = insertAtBeginning ? ";\n";\n    const toInsert =\n        `\n    ${separator}import ${open}${symbolName}${close}` +\n        ` from '${fileName}'${insertAtBeginning ?\n        ';\n' : ''}`;\n\n    return insertAfterLastOccurrence(\n        allImports,\n        toInsert,\n        fileToEdit,\n        fallbackPos,\n        ts.SyntaxKind.StringLiteral\n    );\n}\n\nexport function replaceImport(\n    sourceFile: ts.SourceFile,\n    path: Path,\n    importFrom: string,\n    importAsIs: string,\n    importToBe: string\n): (ReplaceChange | RemoveChange)[] {\n    const imports = sourceFile.statements\n        .filter(ts.isImportDeclaration)\n        .filter(\n            (moduleSpecifier) =>\n            moduleSpecifier.getText(sourceFile) === `${importFrom}` ||\n            moduleSpecifier.getText(sourceFile) ===\n            `${importFrom}`"\n        );\n\n    if (imports.length === 0) {\n        return [];\n    }\n\n    const importText = (specifier: ts.ImportSpecifier) => {\n        if (specifier.name.text) {\n            return specifier.name.text;\n        }\n\n        // if import is renamed\n        if (specifier.propertyName && specifier.propertyName.text) {\n            return specifier.propertyName.text;\n        }\n\n        return ";\n";\n    }\n\n    const changes = imports.map((p) => {\n        const namedImports = p?.importClause?.namedBindings as ts.NamedImports;\n        if (!namedImports) {\n            return [];\n        }\n\n        const importSpecifiers = namedImports.elements;\n        const isAlreadyImported = importSpecifiers\n            .map(importText)\n            .includes(importToBe);\n\n        const importChanges = importSpecifiers.map((specifier,\n            index) => {\n            const text = importText(specifier);\n\n            // import is not the one we're looking for, can be skipped\n            if (text !== importAsIs) {\n                return undefined;\n            }\n\n            // identifier has not been imported, simply replace the old text with the new text\n            if (!isAlreadyImported) {\n                return createReplaceChange(\n                    sourceFile,\n                    specifier,\n                    importAsIs,\n                    importToBe\n                );\n            }\n\n            const nextIdentifier = importSpecifiers[index + 1];\n            // identifier is not the last, also clean up the comma\n            if (nextIdentifier) {\n                return createRemoveChange(\n                    sourceFile,\n                    specifier,\n                    specifier.getStart(sourceFile),\n                    nextIdentifier.getStart(sourceFile)\n                );\n            }\n\n            // there are no imports following, just remove it\n            return createRemoveChange(\n                sourceFile,\n                specifier,\n                specifier.getStart(sourceFile),\n                specifier.getEnd()\n            );\n        });\n\n        return importChanges.filter(Boolean) as (ReplaceChange | RemoveChange)[];\n    });\n\n    return changes.reduce((imports, curr) => imports.concat(curr), []);\n}\n\nexport function containsProperty(\n    objectLiteral: ts.ObjectLiteralExpression,\n    propertyName: string\n) {\n    return (\n        objectLiteral &&\n        objectLiteral.properties.some(\n            (prop) =>\n            ts.isPropertyAssignment(prop) &&\n            ts.isIdentifier(prop.name) &&\n            prop.name.text === propertyName\n        )\n    );\n}\n}

```

Found in path(s):

\* /opt/cola/permits/1762774560\_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-core/utility/ast-utils.js.map

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# @ngrx/effects

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\* /opt/cola/permits/1762774560\_1695958509.9796505/0/effects-12-5-1-tgz/package/README.md

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\* /opt/cola/permits/1762774560\_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-core/utility/strings.js

\* /opt/cola/permits/1762774560\_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-core/utility/ast-utils.js

\* /opt/cola/permits/1762774560\_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-core/utility/find-component.js

\* /opt/cola/permits/1762774560\_1695958509.9796505/0/effects-12-5-1-tgz/package/schematics-core/utility/find-module.js

## 1.191 @momentum-ui/angular 9.4.6

### 1.191.1 Available under license :

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## 1.193 ngrx-store 12.5.1

### 1.193.1 Available under license :

No license file was found, but licenses were detected in source scan.

```
{"version":3,"file":"strings.js","sourceRoot":"","sources":["../.././../modules/store/schematics-core/utility/strings.ts"],"names":[],"mappings":":;AAAA;:::;GAMG;AACH,IAAM,uBAAuB,GAAG,OAAO,CAAC;AACxC,IAAM,wBAAwB,GAAG,mBAAmB,CAAC;AACrD,IAAM,sBAAsB,GAAG,mBAAmB,CAAC;AACnD,IAAM,0BAA0B,GAAG,oBAAoB,CAAC;AACxD,IAAM,0BAA0B,GAAG,QAAQ,CAAC;AAE5C;:::;GASG;AACH,SAAgB,UAAU,CAAC,GAAW;IACpC,OAAO,GAAG,CAAC,OAAO,CAAC,wBAAwB,EAAE,OAAO,CAAC,CAAC,WAAW,EAAE,CAAC;AACtE,CAAC;AAFD,gCAEC;AAED;:::;GASG;AACH,SAAgB,SAAS,CAAC,GAAY;IACpC,OAAO,UAAU,CAAC,GAAG,IAAI,EAAE,CAAC,CAAC,OAAO,CAAC,uBAAuB,EAAE,GAAAG,CAAC,CAAC;AACrE,CAAC;AAFD,8BAEC;AAED;:::;GAUG;AACH,SAAgB,QAAQ,CAAC,GAAW;IAClC,OAAO,GAAG;SACP,OAAO,CACN,sBAAsB,EACtB,UAAU,MAAc,EAAE,UAAkB,EAAE,GAAW;QAC9C,OAAO,GAAG,CAAC,CAAC,CAAC,GAAG,CAAC,WAAW,EAAE,CAAC,CAAC,CAAC,EAAE,CAAC;IACtC,CAAC,CACF;SACA,OAAO,CAAC,UAAU,EAAE,UAAU,KAAa,IAAK,OAAA,KAAC,CAAC,WAAW,EAAE,EAAnB,CAAmB,CAAC,CAAC;AACjE,CAAC;AATD,4BASC;AAED;:::;GASG;AACH,SAAgB,QAAQ,CAAC,GAAW;IACiC,OAAO,GAAG;SACP,KAAC,CAAC,GAAG,CAAC;SACV,GAAG,CAAC,UAAU,IAAI,IAAK,OAAA,UAAU,CAAC,QAAQ,CAAC,IAAI,CAAC,CAAC,EAAI,CAA0B,CAAC;SACzC,IAAI,CAAC,GAAG,CAAC,CAAC;AACf,CAAC;AALD,4BAKC;AAED;:::;GAUG;AACH,SAAgB,UAAU,CAAC,GAAW;IACpC,OAAO,GAAG;SACP,OAAO,CAAC,0BAA0B,EAAE,OAAO,CAAC;SAC5C,OAAO,CAAC,0BAA0B,EAAE,GAAG,CAAC;
```

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```
STRING_DASHERIZE_REGEXP = /[ _]/g;\nconst STRING_DECAMELIZE_REGEXP = /([a-z\\d])([A-Z])/g;\nconst STRING_CAMELIZE_REGEXP = /(-|_|\\.|\\s)+/g;\nconst STRING_UNDERSCORE_REGEXP_1 = /[a-z\\d])([A-Z]+)/g;\nconst STRING_UNDERSCORE_REGEXP_2 = /-|_|\\s+/g;\n\n/**\n * Converts a camelized string into all lower case separated by underscores.\n */\nfunction decamelize(str: string): string {\n  return str.replace(STRING_DECAMELIZE_REGEXP, '$1_$2').toLowerCase();\n}\n\n/**\n * Replaces underscores, spaces, or camelCase with dashes.\n */\nfunction dasherize(str: string): string {\n  return str.replace(STRING_DASHERIZE_REGEXP, '-');\n}\n\n/**\n * Returns the lowerCamelCase form of a string.\n */\nfunction camelize(str: string): string {\n  return str\n    .replace(STRING_CAMELIZE_REGEXP, (match: string, _separator: string, chr: string) => {\n      return chr ? chr.toUpperCase() : '';\n    })\n    .replace(/^[A-Z]/, (match: string) => match.toLowerCase());\n}\n\n/**\n * Returns the UpperCamelCase form of a string.\n */\nfunction classify(str: string): string {\n  return str\n    .split('.')\n    .map((part) => capitalize(camelize(part)))\n    .join('.');\n}\n\n/**\n * More general than decamelize. Returns the lower\\_case\\_and\\_underscored form of a string.\n */\nfunction underscore(str: string): string {\n  return str\n    .replace(STRING_UNDERSCORE_REGEXP_1, '$1_$2')\n    .replace(STRING_UNDERSCORE_REGEXP_2, '_')\n    .toLowerCase();\n}\n\n/**\n * Returns the Capitalized form of a string.\n */\nfunction capitalize(str: string): string {\n  return str.charAt(0).toUpperCase() + str.substr(1);\n}\n\n/**\n * Returns the plural form of a string.\n */\nfunction pluralize(str: string): string {\n  return camelize([\n    /([\\^aeiou]y)?$/, /o)fe?$/, /([\\^aeiou]o|[sxz][cs]h)?$/\n  ]).map((c, i) => (str = str.replace(c, ` $1${'iv'[i] || 'e'}`))\n    ) && str + 's';\n}\n\nfunction group(name: string,
```

```
group: string | undefined) {\n  return group ? `${group}/${name}` : name;\n}\n\nexport function featurePath(\n  group: boolean | undefined,\n  flat: boolean | undefined,\n  path: string,\n  name: string)\n  {\n    if (group && !flat) {\n      return `../../${path}/${name}/`;\n    }\n    return group ? `../../${path}/` : './';\n  }\n}
```

Found in path(s):

```
* /opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-core/utility/strings.js.map
```

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```
/*! *****
```

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```
***** */
```

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```
* /opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/bundles/ngrx-store.umd.js
```

```
*
```

```
/opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/bundles/ngrx-store-testing.umd.js
```

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```
*/
```

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```
* /opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-core/utility/find-component.js
```

```
* /opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-core/utility/ast-utils.js
```

```
* /opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-core/utility/strings.js
```

```
* /opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-core/utility/find-module.js
```

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# @ngrx/store

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No license file was found, but licenses were detected in source scan.

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CAAC,IAAI,KAAK,YAAY;QAF/B,CAE+B,CACIC,CACF,CAAC;AACJ,CAAC;AAbD,4CAaC", "sourcesContent  
":["/\*

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istanbul ignore file */**\n * @license\n * Copyright Google Inc. All Rights Reserved.\n *\n * Use of this source  
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport * as ts from 'typescript';\nimport {\n  Change,\n  InsertChange,\n  NoopChange,\n  createReplaceChange,\n  ReplaceChange,\n  RemoveChange,\n  createRemoveChange,\n} from './change';\nimport {\n  Path\n} from '@angular-devkit/core';\n\n/**\n * Find all nodes from the AST in the subtree of node of SyntaxKind  
kind.\n * @param node\n * @param kind\n * @param max The maximum number of items to return.\n * @return  
all nodes of kind, or [] if none is found\n */\nexport function findNodes(\n  node: ts.Node,\n  kind: ts.SyntaxKind,\n  max\n  = Infinity\n): ts.Node[] {\n  if (!node || max === 0) {\n    return [];\n  }\n\n  const arr: ts.Node[] = [];\n  if (node.kind\n    === kind) {\n    arr.push(node);\n    max--;\n  }\n  if (max > 0) {\n    for (const child of node.getChildren()) {\n      findNodes(child, kind, max).forEach((node) => {\n        if (max > 0) {\n          arr.push(node);\n        }\n        max--;\n      });\n    }\n\n    if (max <= 0) {\n      break;\n    }\n  }\n\n  return arr;\n}\n\n/**\n * Get all the nodes from a  
source.\n * @param sourceFile The source file object.\n * @returns {Observable<ts.Node>} An observable of all  
the nodes in the source.\n */\nexport function getSourceNodes(sourceFile: ts.SourceFile): ts.Node[] {\n  const\n  nodes: ts.Node[] = [sourceFile];\n  const result = [];\n\n  while (nodes.length > 0) {\n    const node =\n    nodes.shift();\n\n    if (node) {\n      result.push(node);\n      if (node.getChildCount(sourceFile) >= 0) {\n        nodes.unshift(...node.getChildren());\n      }\n    }\n  }\n\n  return result;\n}\n\n/**\n * Helper for sorting nodes.\n * @return function to sort nodes in increasing  
order of position in sourceFile\n */\nfunction nodesByPosition(first: ts.Node, second: ts.Node): number {\n  return\n  first.pos - second.pos;\n}\n\n/**\n * Insert `toInsert` after the last occurrence of `ts.SyntaxKind[nodes[i].kind]` or  
after the last of occurrence of `syntaxKind` if the last occurrence is a sub child  
of ts.SyntaxKind[nodes[i].kind]  
and save the changes in file.\n * @param nodes insert after the last occurrence of nodes\n * @param toInsert  
string to insert\n * @param file file to insert changes into\n * @param fallbackPos position to insert if toInsert
```

```

happens to be the first occurrence\n * @param syntaxKind the ts.SyntaxKind of the subchildren to insert after\n *
@return Change instance\n * @throw Error if toInsert is first occurrence but fallback is not set\n */\nexport function
insertAfterLastOccurrence(\n nodes: ts.Node[],\n toInsert: string,\n
file: string,\n fallbackPos: number,\n syntaxKind?: ts.SyntaxKind\n): Change {\n let lastItem =
nodes.sort(nodesByPosition).pop();\n if (!lastItem) {\n throw new Error();\n }\n if (syntaxKind) {\n lastItem =
findNodes(lastItem, syntaxKind).sort(nodesByPosition).pop();\n }\n if (!lastItem && fallbackPos === undefined)\n {\n throw new Error(\n `tried to insert ${toInsert} as first occurrence with no fallback position`\n );\n }\n
const lastItemPosition: number = lastItem ? lastItem.end : fallbackPos;\n\n return new InsertChange(file,\n
lastItemPosition, toInsert);\n}\n\nexport function getContentOfKeyLiteral(\n _source: ts.SourceFile,\n node:
ts.Node\n): string | null {\n if (node.kind === ts.SyntaxKind.Identifier) {\n return (node as ts.Identifier).text;\n }
else if (node.kind === ts.SyntaxKind.StringLiteral) {\n return (node as ts.StringLiteral).text;\n } else {\n return
null;\n }\n}\n\nfunction _angularImportsFromNode(\n node: ts.ImportDeclaration,\n
_sourceFile: ts.SourceFile\n): { [name: string]: string } {\n const ms = node.moduleSpecifier;\n let modulePath:
string;\n switch (ms.kind) {\n case ts.SyntaxKind.StringLiteral:\n modulePath = (ms as ts.StringLiteral).text;\n
break;\n default:\n return {};\n }\n\n if (!modulePath.startsWith('@angular/')) {\n return {};\n }\n\n if
(node.importClause) {\n if (node.importClause.name) {\n // This is of the form `import Name from 'path`.\n
Ignore.\n return {};\n } else if (node.importClause.namedBindings) {\n const nb =
node.importClause.namedBindings;\n if (nb.kind === ts.SyntaxKind.NamespaceImport) {\n // This is of the
form `import * as name from 'path`. Return `name`.\n return {\n [(nb as ts.NamespaceImport).name.text
+ '.']: modulePath,\n }; \n } else {\n // This is of the form `import {a,b,c} from 'path`\n const
namedImports = nb as ts.NamedImports;\n return namedImports.elements\n
.map((is: ts.ImportSpecifier) =>\n is.propertyName ? is.propertyName.text : is.name.text\n
)\n
.reduce((acc: { [name: string]: string }, curr: string) => {\n acc[curr] = modulePath;\n\n return acc;\n
}, {});\n }\n }\n\n return {};\n } else {\n // This is of the form `import 'path';`. Nothing to do.\n return
{};\n }\n}\n\nexport function getDecoratorMetadata(\n source: ts.SourceFile,\n identifier: string,\n module:
string\n): ts.Node[] {\n const angularImports: { [name: string]: string } = findNodes(\n source,\n
ts.SyntaxKind.ImportDeclaration\n )\n .map((node) =>\n _angularImportsFromNode(node as
ts.ImportDeclaration, source)\n )\n .reduce(\n (\n acc: { [name: string]: string },\n current: { [name:
string]: string }\n ) => {\n for (const key of Object.keys(current)) {\n acc[key] = current[key];\n
}\n\n return
acc;\n },\n {} \n );\n\n return getSourceNodes(source)\n .filter((node) => {\n return (\n node.kind
=== ts.SyntaxKind.Decorator &&\n (node as ts.Decorator).expression.kind === ts.SyntaxKind.CallExpression\n
);\n })\n .map((node) => (node as ts.Decorator).expression as ts.CallExpression)\n .filter((expr) => {\n if
(expr.expression.kind === ts.SyntaxKind.Identifier) {\n const id = expr.expression as ts.Identifier;\n return
(\n id.getFullText(source) === identifier &&\n angularImports[id.getFullText(source)] === module\n
);\n } else if (\n expr.expression.kind === ts.SyntaxKind.PropertyAccessExpression\n ) {\n // This
covers foo.NgModule when importing * as foo.\n const paExpr = expr.expression as
ts.PropertyAccessExpression;\n // If the left expression is not an identifier, just give up at that point.\n if
(paExpr.expression.kind !== ts.SyntaxKind.Identifier)\n {\n return false;\n }\n\n const id = paExpr.name.text;\n const moduleId = (paExpr.expression as
ts.Identifier).getText(source);\n return id === identifier && angularImports[moduleId + '.'] === module;\n
}\n\n return false;\n })\n .filter(\n (expr) =>\n expr.arguments[0] &&\n expr.arguments[0].kind
=== ts.SyntaxKind.ObjectLiteralExpression\n )\n .map((expr) => expr.arguments[0] as
ts.ObjectLiteralExpression);\n}\n\nfunction _addSymbolToNgModuleMetadata(\n source: ts.SourceFile,\n
ngModulePath: string,\n metadataField: string,\n symbolName: string,\n importPath: string\n): Change[] {\n const
nodes = getDecoratorMetadata(source, 'NgModule', '@angular/core');\n let node: any = nodes[0]; // eslint-disable-
line @typescript-eslint/no-explicit-any\n\n // Find the decorator declaration.\n if (!node) {\n return [];\n }\n\n //
Get all the children property assignment of object literals.\n const

```

```

    matchingProperties: ts.ObjectLiteralElement[] = (node as ts.ObjectLiteralExpression).properties\n    .filter((prop)
=> prop.kind === ts.SyntaxKind.PropertyAssignment)\n    // Filter out every fields that's not \"metadataField\". Also
handles string literals\n    // (but not expressions).\n    .filter((prop: any) => {\n    const name = prop.name;\nswitch (name.kind) {\n    case ts.SyntaxKind.Identifier:\n        return (name as ts.Identifier).getText(source) ===
metadataField;\n    case ts.SyntaxKind.StringLiteral:\n        return (name as ts.StringLiteral).text ===
metadataField;\n    }\n\n    return false;\n    });\n\n    // Get the last node of the array literal.\n    if
(!matchingProperties) {\n    return [];\n    }\n    if (matchingProperties.length === 0) {\n    // We haven't found the field
in the metadata declaration. Insert a new field.\n    const expr = node as ts.ObjectLiteralExpression;\n    let position:
number;\n    let toInsert: string;\n    if (expr.properties.length
=== 0) {\n    position = expr.getEnd() - 1;\n    toInsert = ` ${metadataField}: [${symbolName}]\n`;
    } else {\n    node = expr.properties[expr.properties.length - 1];\n    position = node.getEnd();\n    // Get the indentation of the
last element, if any.\n    const text = node.getFullText(source);\n    const matches = text.match(/^\r?\n\s*/);\n    if
(matches.length > 0) {\n    toInsert = ` ${matches[0]} ${metadataField}: [${symbolName}]\n`;
    } else {\n    toInsert = ` ${metadataField}: [${symbolName}]\n`;
    }\n    }\n    const newMetadataProperty = new
InsertChange(\n    ngModulePath,\n    position,\n    toInsert\n    );\n    const newMetadataImport =
insertImport(\n    source,\n    ngModulePath,\n    symbolName.replace(/\\.*/$, \"\"),\n    importPath\n    );\n    return [newMetadataProperty, newMetadataImport];\n    }\n\n    const assignment = matchingProperties[0] as
ts.PropertyAssignment;\n\n    // If it's not an array, nothing
we can do really.\n    if (assignment.initializer.kind !== ts.SyntaxKind.ArrayLiteralExpression) {\n    return [];\n
}\n\n    const arrLiteral = assignment.initializer as ts.ArrayLiteralExpression;\n    if (arrLiteral.elements.length === 0)
{\n    // Forward the property.\n    node = arrLiteral;\n    } else {\n    node = arrLiteral.elements;\n    }\n\n    if (!node) {\n
console.log(\n    'No app module found. Please add your new class to your component.\n    ');\n    return [];\n
}\n\n    if (Array.isArray(node)) {\n    const nodeArray = (node as {}) as Array<ts.Node>;\n    const symbolsArray =
nodeArray.map((node) => node.getText());\n    if (symbolsArray.includes(symbolName)) {\n    return [];\n    }\n\n    node =
node[node.length - 1];\n    const effectsModule = nodeArray.find(\n    (node) =>\n    (node.getText().includes('EffectsModule.forRoot') &&\n    symbolName.includes('EffectsModule.forRoot')) ||\n    (node.getText().includes('EffectsModule.forFeature') &&\n
symbolName.includes('EffectsModule.forFeature'))\n    );\n\n    if (effectsModule &&
symbolName.includes('EffectsModule')) {\n    const effectsArgs = (effectsModule as any).arguments.shift();\n\n    if (\n    effectsArgs &&\n    effectsArgs.kind === ts.SyntaxKind.ArrayLiteralExpression\n    ) {\n    const
effectsElements = (effectsArgs as ts.ArrayLiteralExpression)\n    .elements;\n    const [, effectsSymbol] =
(<any>symbolName).match(/^(.*)$/);\n\n    let epos;\n    if (effectsElements.length === 0) {\n    epos =
effectsArgs.getStart() + 1;\n    return [new InsertChange(ngModulePath, epos, effectsSymbol)];\n    } else {\n    const
lastEffect = effectsElements[\n    effectsElements.length - 1\n    ] as ts.Expression;\n    epos =
lastEffect.getEnd();\n    // Get the indentation of the last element, if any.\n    const text: any =
lastEffect.getFullText(source);\n\n    let effectInsert:
string;\n    if (text.match(/^\r?\n\r?\n')) {\n    effectInsert =
` ${text.match(/^\r?\n\s+$/)[0]} ${effectsSymbol}`;\n    } else {\n    effectInsert = ` ${effectsSymbol}`;\n
}\n\n    return [new InsertChange(ngModulePath, epos, effectInsert)];\n    }\n    } else {\n    return [];\n
}\n    }\n\n    let toInsert: string;\n    let position = node.getEnd();\n    if (node.kind ===
ts.SyntaxKind.ObjectLiteralExpression) {\n    // We haven't found the field in the metadata declaration. Insert a
new\n    // field.\n    const expr = node as ts.ObjectLiteralExpression;\n    if (expr.properties.length === 0) {\n
position = expr.getEnd() - 1;\n    toInsert = ` ${metadataField}: [${symbolName}]\n`;
    } else {\n    node =
expr.properties[expr.properties.length - 1];\n    position = node.getEnd();\n    // Get the indentation of the last
element, if any.\n    const text = node.getFullText(source);\n    if (text.match(/^\r?\n\r?\n'))
{\n    toInsert = ` ${\n    text.match(/^\r?\n\s+$/)[0]\n    } ${metadataField}: [${symbolName}]\n`;
    }
    else {\n    toInsert = ` ${metadataField}: [${symbolName}]\n`;
    }\n    }\n    } else if (node.kind ===
ts.SyntaxKind.ArrayLiteralExpression) {\n    // We found the field but it's empty. Insert it just before the `]\n

```

```

position--; \n  toInsert = `${symbolName}`; \n } else { \n // Get the indentation of the last element, if any. \n
const text = node.getFullText(source); \n if (text.match(/^\\r?\\n/) ) { \n  toInsert =
`${text.match(/^\\r?\\n(\\r?)\\s+)[0]}${symbolName}`; \n } else { \n  toInsert = ` `; \n } \n } \n } \n
const insert = new InsertChange(ngModulePath, position, toInsert); \n const importInsert: Change = insertImport( \n
source, \n  ngModulePath, \n  symbolName.replace(/\\.*/g, ""), \n  importPath \n ); \n \n return [insert,
importInsert]; \n } \n \n function _addSymbolToComponentMetadata( \n  source:
ts.SourceFile, \n  componentPath: string, \n  metadataField: string, \n  symbolName: string, \n  importPath: string \n ):
Change[] { \n  const nodes = getDecoratorMetadata(source, 'Component', '@angular/core'); \n  let node: any =
nodes[0]; // eslint-disable-line @typescript-eslint/no-explicit-any \n \n // Find the decorator declaration. \n if (!node)
{ \n  return []; \n } \n \n // Get all the children property assignment of object literals. \n const matchingProperties:
ts.ObjectLiteralElement[] = (node as ts.ObjectLiteralExpression).properties \n  .filter((prop) => prop.kind ===
ts.SyntaxKind.PropertyAssignment) \n // Filter out every fields that's not "metadataField". Also handles string
literals \n // (but not expressions). \n  .filter((prop: any) => { \n  const name = prop.name; \n  switch
(name.kind) { \n    case ts.SyntaxKind.Identifier: \n      return (name as ts.Identifier).getText(source) ===
metadataField; \n    case ts.SyntaxKind.StringLiteral: \n      return
(name as ts.StringLiteral).text === metadataField; \n    } \n  }); \n \n // Get the last node of the
array literal. \n if (!matchingProperties) { \n  return []; \n } \n if (matchingProperties.length === 0) { \n // We
haven't found the field in the metadata declaration. Insert a new field. \n  const expr = node as
ts.ObjectLiteralExpression; \n  let position: number; \n  let toInsert: string; \n  if (expr.properties.length === 0) { \n
position = expr.getEnd() - 1; \n  toInsert = ` ${metadataField}: [${symbolName}]\n`; \n } else { \n  node =
expr.properties[expr.properties.length - 1]; \n  position = node.getEnd(); \n // Get the indentation of the last
element, if any. \n  const text = node.getFullText(source); \n  const matches = text.match(/^\\r?\\n\\s*/); \n  if
(matches.length > 0) { \n  toInsert = `${matches[0]}${metadataField}: [${symbolName}]\n`; \n } else { \n
toInsert = ` ${metadataField}: [${symbolName}]\n`; \n
} \n } \n  const newMetadataProperty = new InsertChange( \n  componentPath, \n  position, \n  toInsert \n
); \n  const newMetadataImport = insertImport( \n  source, \n  componentPath, \n
symbolName.replace(/\\.*/g, ""), \n  importPath \n ); \n \n return [newMetadataProperty, newMetadataImport]; \n
} \n \n const assignment = matchingProperties[0] as ts.PropertyAssignment; \n \n // If it's not an array, nothing we can
do really. \n if (assignment.initializer.kind !== ts.SyntaxKind.ArrayLiteralExpression) { \n  return []; \n } \n \n const
arrLiteral = assignment.initializer as ts.ArrayLiteralExpression; \n if (arrLiteral.elements.length === 0) { \n //
Forward the property. \n  node = arrLiteral; \n } else { \n  node = arrLiteral.elements; \n } \n \n if (!node) { \n
console.log( \n  'No component found. Please add your new class to your component. \n ); \n \n return []; \n
} \n \n if (Array.isArray(node)) { \n  const nodeArray = (node as { })
as Array<ts.Node>; \n  const symbolsArray = nodeArray.map((node) => node.getText()); \n  if
(symbolsArray.includes(symbolName)) { \n  return []; \n } \n \n  node = node[node.length - 1]; \n } \n \n let
toInsert: string; \n let position = node.getEnd(); \n if (node.kind === ts.SyntaxKind.ObjectLiteralExpression) { \n //
We haven't found the field in the metadata declaration. Insert a new \n // field. \n  const expr = node as
ts.ObjectLiteralExpression; \n  if (expr.properties.length === 0) { \n  position = expr.getEnd() - 1; \n  toInsert = `
${metadataField}: [${symbolName}]\n`; \n } else { \n  node = expr.properties[expr.properties.length - 1]; \n
position = node.getEnd(); \n // Get the indentation of the last element, if any. \n  const text =
node.getFullText(source); \n  if (text.match(/^\\r?\\r?\\n')) { \n  toInsert = ` ${ \n
text.match(/^\\r?\\n\\s+)[0] \n  }${metadataField}: [${symbolName}]\n`; \n } else { \n  toInsert
= ` ${metadataField}: [${symbolName}]\n`; \n } \n } \n } else if (node.kind ===
ts.SyntaxKind.ArrayLiteralExpression) { \n // We found the field but it's empty. Insert it just before the `}`. \n
position--; \n  toInsert = `${symbolName}`; \n } else { \n // Get the indentation of the last element, if any. \n
const text = node.getFullText(source); \n if (text.match(/^\\r?\\n/) ) { \n  toInsert =
`${text.match(/^\\r?\\n(\\r?)\\s+)[0]}${symbolName}`; \n } else { \n  toInsert = ` `; \n } \n } \n } \n
const insert = new InsertChange(componentPath, position, toInsert); \n const importInsert: Change = insertImport( \n

```

```

source,\n componentPath,\n symbolName.replace(/\\.*$/, ''),\n importPath\n );\n\n return [insert,\n importInsert];\n}\n\n/**\n * Custom function to insert a declaration (component, pipe, directive)\n * into NgModule declarations. It also imports the component.\n */\nexport function addDeclarationToModule(\n source:\n ts.SourceFile,\n\n modulePath: string,\n classifiedName: string,\n importPath: string\n): Change[] {\n return\n _addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'declarations',\n classifiedName,\n importPath\n );\n}\n\n/**\n * Custom function to insert a declaration (component, pipe, directive)\n * into NgModule declarations. It also imports the component.\n */\nexport function addImportToModule(\n source:\n ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath: string\n): Change[] {\n return\n _addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'imports',\n classifiedName,\n importPath\n );\n}\n\n/**\n * Custom function to insert a provider into NgModule. It also imports it.\n */\nexport function addProviderToModule(\n source: ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath:\n string\n): Change[] {\n return _addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'providers',\n classifiedName,\n\n importPath\n );\n}\n\n/**\n * Custom function to insert a provider into Component. It also imports it.\n */\nexport function addProviderToComponent(\n source: ts.SourceFile,\n componentPath: string,\n\n classifiedName: string,\n importPath: string\n): Change[] {\n return _addSymbolToComponentMetadata(\n source,\n componentPath,\n 'providers',\n classifiedName,\n importPath\n );\n}\n\n/**\n * Custom function to insert an export into NgModule. It also imports it.\n */\nexport function addExportToModule(\n source:\n ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath: string\n): Change[] {\n return\n _addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'exports',\n classifiedName,\n importPath\n );\n}\n\n/**\n * Custom function to insert an export into NgModule. It also imports it.\n */\nexport function addBootstrapToModule(\n source: ts.SourceFile,\n modulePath: string,\n classifiedName: string,\n importPath:\n string\n):\n\n Change[] {\n return _addSymbolToNgModuleMetadata(\n source,\n modulePath,\n 'bootstrap',\n classifiedName,\n importPath\n );\n}\n\n/**\n * Add Import `import { symbolName } from fileName` if the\n import doesn't exist\n * already. Assumes fileToEdit can be resolved and accessed.\n * @param fileToEdit (file we\n want to add import to)\n * @param symbolName (item to import)\n * @param fileName (path to the file)\n * @param isDefault (if true, import follows style for importing default exports)\n * @return Change\n */\nexport\n function insertImport(\n source: ts.SourceFile,\n fileToEdit: string,\n symbolName: string,\n fileName: string,\n\n isDefault = false\n): Change {\n const rootNode = source;\n const allImports = findNodes(rootNode,\n ts.SyntaxKind.ImportDeclaration);\n\n // get nodes that map to import statements from the file fileName\n const\n relevantImports = allImports.filter((node) => {\n // StringLiteral of the ImportDeclaration is the import file\n (fileName\n\n in this case).\n const importFiles = node\n .getChildren()\n .filter((child) => child.kind ===\n ts.SyntaxKind.StringLiteral)\n .map((n) => (n as ts.StringLiteral).text);\n\n return importFiles.filter((file) =>\n file === fileName).length === 1;\n });\n\n if (relevantImports.length > 0) {\n let importsAsterisk = false;\n //\n imports from import file\n const imports: ts.Node[] = [];\n relevantImports.forEach((n) => {\n\n Array.prototype.push.apply(\n imports,\n findNodes(n, ts.SyntaxKind.Identifier)\n );\n\n if\n (findNodes(n, ts.SyntaxKind.AsteriskToken).length > 0) {\n importsAsterisk = true;\n }\n });\n\n // if\n imports * from fileName, don't add symbolName\n if (importsAsterisk) {\n return new NoopChange();\n }\n\n const importTextNodes = imports.filter(\n (n) => (n as ts.Identifier).text === symbolName\n );\n\n //\n insert import if it's not there\n if (importTextNodes.length ===\n\n 0) {\n const fallbackPos =\n findNodes(\n relevantImports[0],\n\n ts.SyntaxKind.CloseBraceToken\n )[0].getStart() ||\n findNodes(relevantImports[0],\n\n ts.SyntaxKind.FromKeyword)[0].getStart();\n\n return insertAfterLastOccurrence(\n imports,\n `,\n\n ${symbolName},\n fileToEdit,\n fallbackPos\n );\n }\n }\n\n return new NoopChange();\n }\n\n // no\n such import declaration exists\n const useStrict = findNodes(rootNode, ts.SyntaxKind.StringLiteral).filter(\n (n)

```



```

=> n.getText() === 'use strict\n );\n let fallbackPos = 0;\n if (useStrict.length > 0) {\n  fallbackPos =
useStrict[0].end;\n }\n const open = isDefault ? " : '{';\n const close = isDefault ? " : '";\n // if there are no
imports or 'use strict' statement, insert import at beginning of file\n const insertAtBeginning = allImports.length
=== 0 && useStrict.length === 0;\n const separator = insertAtBeginning ? " : '\\n';\n const toInsert
=\n ` ${separator}import ${open} ${symbolName} ${close} ` +\n ` from '${fileName}' ${insertAtBeginning ?
';\n' : ''};\n\n return insertAfterLastOccurrence(\n allImports,\n toInsert,\n fileToEdit,\n fallbackPos,\n
ts.SyntaxKind.StringLiteral\n );\n}\n\nexport function replaceImport(\n sourceFile: ts.SourceFile,\n path: Path,\n
importFrom: string,\n importAsIs: string,\n importToBe: string\n): (ReplaceChange | RemoveChange)[] {\n const
imports = sourceFile.statements\n .filter(ts.isImportDeclaration)\n .filter(\n ({ moduleSpecifier }) =>\n
moduleSpecifier.getText(sourceFile) === ` ${importFrom} ` ||\n moduleSpecifier.getText(sourceFile) ===
` ${importFrom} `)\n );\n\n if (imports.length === 0) {\n return [];\n }\n\n const importText = (specifier:
ts.ImportSpecifier) => {\n if (specifier.name.text) {\n return specifier.name.text;\n }\n\n // if import is
renamed\n if (specifier.propertyName && specifier.propertyName.text)
{\n return specifier.propertyName.text;\n }\n\n return ";\n };\n\n const changes = imports.map((p) => {\n
const namedImports = p?.importClause?.namedBindings as ts.NamedImports;\n if (!namedImports) {\n return
[];\n }\n\n const importSpecifiers = namedImports.elements;\n const isAlreadyImported = importSpecifiers\n
.map(importText)\n .includes(importToBe);\n\n const importChanges = importSpecifiers.map((specifier,
index) => {\n const text = importText(specifier);\n\n // import is not the one we're looking for, can be
skipped\n if (text !== importAsIs) {\n return undefined;\n }\n\n // identifier has not been imported,
simply replace the old text with the new text\n if (!isAlreadyImported) {\n return createReplaceChange(\n
sourceFile,\n specifier,\n importAsIs,\n importToBe\n );\n }\n\n const nextIdentifier =
importSpecifiers[index
+ 1];\n // identifier is not the last, also clean up the comma\n if (nextIdentifier) {\n return
createRemoveChange(\n sourceFile,\n specifier,\n specifier.getStart(sourceFile),\n
nextIdentifier.getStart(sourceFile)\n );\n }\n\n // there are no imports following, just remove it\n return
createRemoveChange(\n sourceFile,\n specifier,\n specifier.getStart(sourceFile),\n
specifier.getEnd()\n );\n });\n\n return importChanges.filter(Boolean) as (ReplaceChange |
RemoveChange)[];\n });\n\n return changes.reduce((imports, curr) => imports.concat(curr), []);\n}\n\nexport
function containsProperty(\n objectLiteral: ts.ObjectLiteralExpression,\n propertyName: string\n) {\n return (\n
objectLiteral &&\n objectLiteral.properties.some(\n (prop) =>\n ts.isPropertyAssignment(prop) &&\n
ts.isIdentifier(prop.name) &&\n prop.name.text === propertyName\n
)\n );\n}\n}\n}

```

Found in path(s):

\* /opt/cola/permits/1762774590\_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-core/utility/ast-utils.js.map

No license file was found, but licenses were detected in source scan.

```

{"version":3,"file":"ngrx-store-testing.umd.js","sources":["../../node_modules/tslib/tslib.es6.js","../../modules/store/testing/src/mock_state.ts","../../modules/store/testing/src/tokens.ts","../../modules/store/testing/src/mock_store.ts","../../modules/store/testing/src/mock_reducer_manager.ts","../../modules/store/testing/src/testing.ts","../../modules/store/testing/src/ngrx-store-testing.ts"],"sourcesContent":["/*!

```

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SOFTWARE.

```
*****
*/ global Reflect, Promise
var extendStatics = function(d, b) {
  extendStatics =
Object.setPrototypeOf ||
  ({ __proto__: [] } instanceof Array && function(d, b) { d.__proto__ = b; }) ||
  function(d, b) { for (var p in b) if (Object.prototype.hasOwnProperty.call(b, p)) d[p] = b[p]; };
  return
  extendStatics(d, b);
};
export function __extends(d, b) {
  if (typeof b !== "function" && b !==
null)
    throw new TypeError("Class extends value " + String(b) + " is not a constructor or null");
  extendStatics(d, b);
  function __() { this.constructor
= d; }
  d.prototype = b === null ? Object.create(b) : (
__proto__ = b.prototype, new __());
}
export
var __assign = function() {
  __assign = Object.assign || function __assign(t) {
    for (var s, i = 1, n =
arguments.length; i < n; i++) {
      s = arguments[i];
      for (var p in s) if
(Object.prototype.hasOwnProperty.call(s, p)) t[p] = s[p];
    }
    return t;
  };
  return
  __assign.apply(this, arguments);
}
export function __rest(s, e) {
  var t = {};
  for (var p in s) if
(Object.prototype.hasOwnProperty.call(s, p) && e.indexOf(p) < 0)
    t[p] = s[p];
  if (s != null && typeof
Object.getOwnPropertySymbols === "function")
    for (var i = 0, p = Object.getOwnPropertySymbols(s); i <
p.length; i++) {
      if (e.indexOf(p[i]) < 0 && Object.prototype.propertyIsEnumerable.call(s, p[i]))
        t[p[i]] = s[p[i]];
    }
  return
  t;
}
export function __decorate(decorators, target, key, desc) {
  var c = arguments.length, r = c < 3 ?
target : desc === null ? desc = Object.getOwnPropertyDescriptor(target, key) : desc, d;
  if (typeof Reflect ===
"object" && typeof Reflect.decorate === "function") r = Reflect.decorate(decorators, target, key, desc);
  else
for (var i = decorators.length - 1; i >= 0; i--) if (d = decorators[i]) r = (c < 3 ? d(r) : c > 3 ? d(target, key, r) : d(target,
key)) || r;
  return c > 3 && r && Object.defineProperty(target, key, r), r;
}
export function __param(paramIndex, decorator) {
  return function (target, key) { decorator(target, key, paramIndex);
};
}
export function __metadata(metadataKey, metadataValue) {
  if (typeof Reflect === "object" &&
typeof Reflect.metadata === "function") return Reflect.metadata(metadataKey, metadataValue);
}
export
function __awaiter(thisArg, _arguments, P, generator) {
  function adopt(value) { return value instanceof P ? value : new P(function (resolve) { resolve(value); }); }
  return new (P || (P = Promise))(function (resolve, reject) {
    function fulfilled(value) { try {
step(generator.next(value)); } catch (e) { reject(e); } }
    function rejected(value) { try {
step(generator["throw"](value)); } catch (e) { reject(e); } }
    function step(result) { result.done ?
resolve(result.value) : adopt(result.value).then(fulfilled, rejected); }
    step((generator =
generator.apply(thisArg, _arguments || []).next()).value);
  });
}
export function __generator(thisArg, body) {
  var _ = { label: 0, sent: function() { if (t[0] & 1) throw t[1]; return t[1]; }, trys: [], ops: [] }, f, y, t, g;
  return g = { next: verb(0), "throw": verb(1), "return": verb(2) }, typeof Symbol === "function" &&
(g[Symbol.iterator] = function() { return this; });
  function verb(n) { return function (v) { return
step([n, v]); }; }
  function step(op) {
    if (f) throw new TypeError("Generator is already
executing.");
    while (_) try {
      if (f = 1, y && (t = op[0] & 2 ? y["return"] : op[0] ? y["throw"] ||
((t = y["return"]) && t.call(y, 0) : y.next) && !(t = t.call(y, op[1])).done) return t;
      if (y = 0, t) op =
[op[0] & 2, t.value];
      switch (op[0]) {
        case 0: case 1: t = op; break;
        case 4:
          _.label++; return { value: op[1], done: false };
        case 5: _.label++; y = op[1]; op = [0]; continue;
        case 7: op = _.ops.pop(); _.trys.pop(); continue;
        default:
          if (!(t = _.trys, t = t.length >
0 && t[t.length - 1]) && (op[0] === 6 || op[0] === 2)) { _ = 0; continue; }
          if (op[0] === 3 && (!t ||
op[1] > t[0] && op[1] < t[3])) { _.label = op[1]; break; }
          if (op[0] === 6 && _.label

```

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< t[1] { ._label = t[1]; t = op; break; }
    if (t && ._label < t[2]) { ._label = t[2]; ._ops.push(op); break;
}
    if (t[2]) ._ops.pop();
    ._trys.pop(); continue;
    op =
body.call(thisArg, _);
    catch (e) { op = [6, e]; y = 0; } finally { f = t = 0; }
    if (op[0] & 5) throw
op[1]; return { value: op[0] ? op[1] : void 0, done: true };
}
}
export var __createBinding =
Object.create ? (function(o, m, k, k2) {
    if (k2 === undefined) k2 = k;
    Object.defineProperty(o, k2, {
enumerable: true, get: function() { return m[k]; } });
}) : (function(o, m, k, k2) {
    if (k2 === undefined) k2 =
k;
    o[k2] = m[k];
});
export function __exportStar(m, o) {
    for (var p in m) if (p !== "default"
&& !Object.prototype.hasOwnProperty.call(o, p)) __createBinding(o, m, p);
}
export function __values(o) {
    var s = typeof
Symbol === "function" && Symbol.iterator, m = s && o[s], i = 0;
    if (m) return m.call(o);
    if (o &&
typeof o.length === "number") return {
        next: function () {
            if (o && i <= o.length) o = void 0;
            return { value: o && o[i++], done: !o };
        }
    };
    throw new TypeError(s ? "Object is not
iterable." : "Symbol.iterator is not defined.");
}
export function __read(o, n) {
    var m = typeof
Symbol === "function" && o[Symbol.iterator];
    if (!m) return o;
    var i = m.call(o), r, ar = [], e;
    try {
        while ((n === void 0 || n-- > 0) && !(r = i.next()).done) ar.push(r.value);
    } catch (error) { e = {
error: error }; }
    finally {
        try {
            if (r && !r.done && (m = i["return"])) m.call(i);
        } finally {
            if (e) throw e.error;
        }
    }
    return ar;
}
/** @deprecated */
export function __spread() {
    for (var ar = [], i = 0; i < arguments.length; i++)
        ar = ar.concat(__read(arguments[i]));
    return
ar;
}
/** @deprecated */
export function __spreadArrays() {
    for (var s = 0, i = 0, il =
arguments.length; i < il; i++) s += arguments[i].length;
    for (var r = Array(s), k = 0, i = 0; i < il; i++)
        for (var a = arguments[i], j = 0, jl = a.length; j < jl; j++, k++)
            r[k] = a[j];
    return r;
}
export function __spreadArray(to, from) {
    for (var i = 0, il = from.length, j = to.length; i < il; i++, j++)
        to[j] = from[i];
    return to;
}
export function __await(v) {
    return this instanceof __await ? (this.v = v,
this) : new __await(v);
}
export function __asyncGenerator(thisArg, _arguments, generator) {
    if (!Symbol.asyncIterator) throw new TypeError("Symbol.asyncIterator is not defined.");
    var g =
generator.apply(thisArg, _arguments || []), i, q = [];
    return i = {}, verb("next"), verb("throw"), verb("return"), i[Symbol.asyncIterator] = function () { return this; }, i;
    function verb(n) {
        if (g[n]) i[n] = function (v) { return new Promise(function (a, b) { q.push([n, v, a, b]) >
1 || resume(n, v); }); };
    }
    function resume(n, v) {
        try { step(g[n](v)); } catch (e) { settle(q[0][3], e); }
    }
    function step(r) {
        r.value instanceof __await ? Promise.resolve(r.value.v).then(fulfill, reject) : settle(q[0][2], r);
    }
    function fulfill(value) { resume("next", value); }
    function reject(value) { resume("throw", value); }
    function settle(f, v) {
        if (f(v), q.shift(), q.length) resume(q[0][0], q[0][1]);
    }
}
export function __asyncDelegator(o) {
    var i, p;
    return i = {}, verb("next"), verb("throw"), function (e) { throw e; },
verb("return"), i[Symbol.iterator] = function () { return this; }, i;
    function verb(n, f) {
        i[n] = o[n] ? function (v) { return (p =
!p) ? { value: __await(o[n](v)), done: n === "return" } : f ? f(v) : v; } : f;
    }
}
export function __asyncValues(o) {
    if (!Symbol.asyncIterator) throw new TypeError("Symbol.asyncIterator is not
defined.");
    var m = o[Symbol.asyncIterator], i;
    return m ? m.call(o) : (o = typeof __values ===
"function" ? __values(o) : o[Symbol.iterator](), i = {}, verb("next"), verb("throw"), verb("return"),
i[Symbol.asyncIterator] = function () { return this; }, i);
    function verb(n) {
        i[n] = o[n] && function (v) { return
new Promise(function (resolve, reject) { v = o[n](v), settle(resolve, reject, v.done, v.value); }); };
    }
    function settle(resolve, reject, d, v) {
        Promise.resolve(v).then(function(v) { resolve({ value: v, done: d }); }, reject);
    }
}
export function __makeTemplateObject(cooked, raw) {
    if (Object.defineProperty) {
        Object.defineProperty(cooked, "raw", { value: raw });
    } else {
        cooked.raw = raw;
    }
    return
cooked;
}
__setModuleDefault = Object.create ? (function(o, v) {
    Object.defineProperty(o, "default", { enumerable:
true, value: v });
}) : function(o, v) {
    o["default"] = v;
};
export function __importStar(mod) {

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if (mod && mod.__esModule) return mod;\r\n  var result = {};\r\n  if (mod != null) for (var k in mod) if (k !==
\"default\" && Object.prototype.hasOwnProperty.call(mod, k)) __createBinding(result, mod, k);\r\n
__setModuleDefault(result, mod);\r\n  return result;\r\n}\r\n\r\nexport function __importDefault(mod) {\r\n
return (mod && mod.__esModule) ? mod : { default: mod };\r\n}\r\n\r\nexport function
__classPrivateFieldGet(receiver, state, kind, f) {\r\n  if (kind === \"a\" && !f) throw new TypeError(\"Private
accessor was defined without a getter\");\r\n  if (typeof state === \"function\" ? receiver !== state || !f :
!state.has(receiver)) throw new TypeError(\"Cannot read private member from an object whose class did
not declare it\");\r\n  return kind === \"m\" ? f : kind === \"a\" ? f.call(receiver) : f ? f.value :
state.get(receiver);\r\n}\r\n\r\nexport function __classPrivateFieldSet(receiver, state, value, kind, f) {\r\n  if (kind
=== \"m\") throw new TypeError(\"Private method is not writable\");\r\n  if (kind === \"a\" && !f) throw new
TypeError(\"Private accessor was defined without a setter\");\r\n  if (typeof state === \"function\" ? receiver !==
state || !f : !state.has(receiver)) throw new TypeError(\"Cannot write private member to an object whose class did
not declare it\");\r\n  return (kind === \"a\" ? f.call(receiver, value) : f ? f.value = value : state.set(receiver, value)),
value;\r\n}\r\n\"import { Injectable } from '@angular/core';\nimport { BehaviorSubject } from
'rxjs';\n\n@Injectable()\nexport class MockState<T> extends {}> extends BehaviorSubject<T> {\n  constructor() {\n
super(<T>{});\n  }\n}\n\n\"import { InjectionToken } from '@angular/core';\n\nexport const
MOCK_SELECTORS = new InjectionToken('@ngrx/store Mock Selectors');\n\n\"import { Inject, Injectable } from
 '@angular/core';\nimport { TestBed } from '@angular/core/testing';\nimport { Observable, BehaviorSubject } from
'rxjs';\nimport {\n  Action,\n  ActionsSubject,\n  INITIAL_STATE,\n  ReducerManager,\n  Store,\n  createSelector,\n  MemoizedSelectorWithProps,\n  MemoizedSelector,\n} from '@ngrx/store';\nimport { MockState
} from './mock_state';\nimport { MockSelector } from './mock_selector';\nimport { MOCK_SELECTORS } from
 './tokens';\n\nif (typeof afterEach === 'function') {\n  afterEach(() => {\n    try {\n      const mockStore: MockStore |
undefined = TestBed.inject(MockStore);\n      if (mockStore) {\n        mockStore.resetSelectors();\n      }\n      //
eslint-disable-next-line no-empty\n    } catch {}\n  });\n}\n\ntype OnlyMemoized<T, Result> = T extends string |
MemoizedSelector<any, any> | ? MemoizedSelector<any, Result> | ? T extends
MemoizedSelectorWithProps<any, any> |
any> | ? MemoizedSelectorWithProps<any, any, Result> | ? never;\n\ntype Memoized<Result> = |
MemoizedSelector<any, Result> | MemoizedSelectorWithProps<any, any, Result>;\n\n@Injectable()\nexport
class MockStore<T = object> extends Store<T> {\n  private readonly selectors = new Map<Memoized<any> |
string, any>();\n  private readonly scannedActions$: Observable<Action>;\n  private lastState?: T;\n  constructor(\n
private state$: MockState<T>,\n  actionsObserver: ActionsSubject,\n  reducerManager: ReducerManager,\n
@Inject(INITIAL_STATE) private initialState: T,\n  @Inject(MOCK_SELECTORS) mockSelectors:
MockSelector[] = []\n ) {\n    super(state$, actionsObserver, reducerManager);\n    this.resetSelectors();\n
this.setState(this.initialState);\n    this.scannedActions$ = actionsObserver.asObservable();\n    for (const
mockSelector of mockSelectors) {\n      this.overrideSelector(mockSelector.selector, mockSelector.value);\n    }\n
  }\n  setState(nextState: T): void {\n
    this.state$.next(nextState);\n    this.lastState = nextState;\n  }\n  overrideSelector<\n  Selector extends
Memoized<Result>,\n  Value extends Result,\n  Result = Selector extends MemoizedSelector<any, infer T> |
? T | ? Selector extends MemoizedSelectorWithProps<any, any, infer U> | ? U | ? Value | ?>(\n
selector: Selector | string,\n  value: Value | ?>): OnlyMemoized<typeof selector, Result> {\n
    this.selectors.set(selector, value);\n    const resultSelector: Memoized<Result> = | ? typeof selector === 'string' |
? createSelector(\n      () => {},\n      (): Result => value | ?> | ? selector;\n
    resultSelector.setResult(value);\n    return resultSelector as OnlyMemoized<typeof selector, Result>;\n  }\n  resetSelectors() {\n
for (const selector of this.selectors.keys()) {\n    if (typeof selector !== 'string') {\n
      selector.release();\n      selector.clearResult();\n    }\n  }\n}\n  this.selectors.clear();\n}\n  override select(selector: any, prop?: any) {\n
if (typeof selector === 'string' &&
this.selectors.has(selector)) {\n    return new BehaviorSubject<any>(\n      this.selectors.get(selector)\n
    ).asObservable();\n  }\n  return super.select(selector, prop);\n}\n  override addReducer() {\n    /* noop */\n
}

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}\n\n override removeReducer() {\n  /* noop */\n }\n\n /**\n  * Refreshes the existing state.\n  */\n  refreshState() {\n    if (this.lastState) this.setState({ ...this.lastState });\n  }\n}\n\n", "import { Injectable } from\n '@angular/core';\nimport { BehaviorSubject } from 'rxjs';\nimport { ActionReducer } from\n '@ngrx/store';\n\n@Injectable()\nexport class MockReducerManager extends BehaviorSubject<\n ActionReducer<any, any>> {\n  constructor() {\n    super(() => undefined);\n  }\n\n  addFeature(feature: any) {\n    /* noop */\n  }\n\n  addFeatures(feature: any) {\n    /* noop */\n  }\n\n  removeFeature(feature: any) {\n    /* noop */\n  }\n\n  removeFeatures(features: any) {\n    /* noop */\n  }\n\n  addReducer(key: any, reducer: any) {\n    /* noop */\n  }\n\n  addReducers(reducers: any) {\n    /* noop */\n  }\n\n  removeReducer(featureKey: any) {\n    /*\n    noop */\n  }\n\n  removeReducers(featureKeys: any) {\n    /* noop */\n  }\n}\n\n", "import {\n ExistingProvider,\n FactoryProvider,\n Injector,\n ValueProvider,\n } from '@angular/core';\nimport { MockState } from\n './mock_state';\nimport {\n ActionsSubject,\n INITIAL_STATE,\n ReducerManager,\n StateObservable,\n Store,\n setNgrxMockEnvironment,\n } from '@ngrx/store';\nimport { MockStore } from './mock_store';\nimport {\n MockReducerManager } from './mock_reducer_manager';\nimport { MockSelector } from\n './mock_selector';\nimport { MOCK_SELECTORS } from './tokens';\n\nexport interface MockStoreConfig<T> {\n  initialState?: T;\n  selectors?: MockSelector[];\n}\n\n/**\n * @description\n * Creates mock store providers.\n */\nexport\n @param config `MockStoreConfig<T>`\n to provide the values for `INITIAL_STATE` and `MOCK_SELECTORS` tokens.\n * By default, `initialState` and\n `selectors` are not defined.\n * @returns Mock store providers that can be used with both\n `TestBed.configureTestingModule` and `Injector.create`.\n */\nexport\n @usageNotes\n /**\n * **With\n `TestBed.configureTestingModule` **\n * `typescript`\n * describe('Books Component', () => {\n *   let store:\n MockStore;\n *   beforeEach(() => {\n *     TestBed.configureTestingModule({\n *       providers: [\n *\n provideMockStore({\n *         initialState: { books: { entities: [] } },\n *         selectors: [\n *           { selector:\n selectAllBooks, value: ['Book 1', 'Book 2'] },\n *           { selector: selectVisibleBooks, value: ['Book 1'] },\n *\n ],\n *         },\n *       ],\n *     });\n *     store = TestBed.inject(MockStore);\n *   });\n * });\n * `typescript`\n * describe('Counter Component', () =>\n {\n *   let injector: Injector;\n *   let store: MockStore;\n *   beforeEach(() => {\n *     injector =\n Injector.create({\n *       providers: [\n *         provideMockStore({\n initialState: { counter: 0 } },\n *         ],\n *       });\n *     store = injector.get(MockStore);\n *   });\n * });\n * `typescript`\n * export function provideMockStore<T =\n any>(\n *   config: MockStoreConfig<T> = {}): (ValueProvider | ExistingProvider | FactoryProvider)[] {\n *     setNgrxMockEnvironment(true);\n *     return [\n *       {\n *         provide: ActionsSubject,\n *         useFactory: () => new\n ActionsSubject(),\n *         deps: [],\n *       },\n *       {\n *         provide: MockState, useFactory: () => new MockState<T>(),\n *         deps: []\n *       },\n *       {\n *         provide: MockReducerManager,\n *         useFactory: () => new MockReducerManager(),\n *         deps: [],\n *       },\n *       {\n *         provide: INITIAL_STATE, useValue: config.initialState || {} },\n *       {\n *         provide: MOCK_SELECTORS,\n *         useValue: config.selectors },\n *       {\n *         provide: StateObservable, useExisting: MockState },\n *       {\n *         provide: ReducerManager, useExisting: MockReducerManager },\n *       {\n *         provide: MockStore,\n *         useFactory:\n mockStoreFactory,\n *         deps: [\n *           MockState,\n *           ActionsSubject,\n *           ReducerManager,\n *           INITIAL_STATE,\n *           MOCK_SELECTORS,\n *         ],\n *       },\n *       {\n *         provide: Store, useExisting: MockStore },\n *     ];\n *   }\n * }\n\nfunction mockStoreFactory<T>(\n *   mockState: MockState<T>,\n *   actionsSubject: ActionsSubject,\n *   reducerManager: ReducerManager,\n *   initialState: T,\n *   mockSelectors: MockSelector[]\n * ): MockStore<T> {\n *   return new MockStore(\n *     mockState,\n *     actionsSubject,\n *     reducerManager,\n *     initialState,\n *     mockSelectors\n *   );\n * }\n\n/**\n * @description\n * Creates mock store with all necessary dependencies outside of\n the `TestBed`.\n * @param config `MockStoreConfig<T>` to provide the values for `INITIAL_STATE` and\n `MOCK_SELECTORS` tokens.\n * By default, `initialState` and `selectors` are not defined.\n * @returns\n `MockStore<T>`\n */\nexport\n @usageNotes\n /**\n * `typescript`\n * describe('Books Effects', () => {\n *   let store: MockStore;\n *   beforeEach(() => {\n *     store = getMockStore({\n *       initialState: { books: { entities: ['Book 1', 'Book 2', 'Book 3'] } },\n *       selectors:\n [\n *         { selector: selectAllBooks, value: ['Book 1', 'Book 2'] },\n *         { selector: selectVisibleBooks, value:\n ['Book 1'] },\n *       ],\n *     });\n *   });\n * });\n * `typescript`\n * export function getMockStore<T>(config:

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MockStoreConfig<T> = {}): MockStore<T> {\n  const injector = Injector.create({ providers:\n  provideMockStore(config) });\n  return injector.get(MockStore);\n}\n\nexport { MockReducerManager } from\n './mock_reducer_manager';\nexport { MockState } from './mock_state';\nexport { MockStore } from\n './mock_store';\nexport { MockSelector } from './mock_selector';\n\n"/**\n * Generated bundle index. Do not edit.\n */\n\nexport * from './public_api';\n\nexport {MOCK_SELECTORS as a} from\n './tokens';\n\n,"names":["BehaviorSubject","Injectable","InjectionToken","TestBed","createSelector","Store","Actions\nSubject","ReducerManager","Inject","INITIAL_STATE","setNgrxMockEnvironment","StateObservable","Injector\n"],"mappings":";;;;;;IAAA;;;;;;;;;;IACa;IAEA,IAAI,aAAa,GAAG,UAAS,CAAC,EAAE,CAAC;QAC7B,aAAa,GA\nAG,MAAM,CAAC,cAAc;aAChC,EAAE,SAAS,EAAE,EAAE,EAAE,YAAY,KAAK,IAAI,UAAU,CAAC,EAAE,\nCAAC,IAAI,CAAC,CAAC,SAAS,GAAG,CAAC,CAAC,EAAE,CAAC;YAC5E,UAAU,CAAC,EAAE,CAAC,IAA\nI,KAAK,IAAI,CAAC,IAAI,CAAC;gBAAE,IAAI,MAAM,CAAC,SAAS,CAAC,cAAc,CAAC,IAAI,CAAC,CAAC,\nEAAE,CAAC,CAAC;oBAAE,CAAC,CAAC,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC,CAAC,EAAE,C\nAAC;QACtG,OAAO,aAAa,CAAC,CAAC,EAAE,CAAC,CAAC,CAAC;IAC/B,CAAC,CAAC;aAEc,SAAS,CAAC\n,CAAC,EAAE,CAAC;QAC1B,IAAI,OAAO,CAAC,KAAK,UAAU,IAAI,CAAC,KAAK,IAAI;YACrC,MAAM,IA\nAI,SAAS,CAAC,sBAAsB,GAAG,MAAM,CAAC,CAAC,CAAC,GAAG,+BAA+B,CAAC,CAAC;QAC9F,aAAa,C\nAAC,CAAC,EAAE,CAAC,CAAC,CAAC;QACpB,SAAS,EAAE,KAAK,IAAI,CAAC,WAAW,GAAG,CAAC,CA\nAC,EAAE;QACvC,CAAC,CAAC,SAAS,GAAG,CAAC,KAAK,IAAI,GAAG,MAAM,CAAC,MAAM,CAAC,CA\nAC,CAAC,IAAI,EAAE,CAAC,SAAS,GAAG,CAAC,CAAC,SAAS,EAAE,IAAI,EAAE,EAAE,CAAC,CAAC;IAC\nzF,CAAC;IAEM,IAAI,QAAQ,GAAG;QAC1B,QAAQ,GAAG,MAAM,CAAC,MAAM,IAAI,SAAS,QAAQ,CAAC,\nCAAC;YAC3C,KAAK,IAAI,CAAC,EAAE,CAAC,GAAG,CAAC,EAAE,CAAC,GAAG,SAAS,CAAC,MAAM,E\nAAE,CAAC,GAAG,CAAC,EAAE,CAAC,EAAE,EAAE;gBACjD,CAAC,GAAG,SAAS,CAAC,CAAC,CAAC,CA\nAC;gBACjB,KAAK,IAAI,CAAC,IAAI,CAAC;oBAAE,IAAI,MAAM,CAAC,SAAS,CAAC,cAAc,CAAC,IAAI,C\nAAC,CAAC,EAAE,CAAC,CAAC;wBAAE,CAAC,CAAC,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC,CAAC,C\nAAC;aAChF;YACD,OAAO,CAAC,CAAC;SACZ,CAAA;QACD,OAAO,QAAQ,CAAC,KAAK,CAAC,IAAI,EAA\nE,SAAS,CAAC,CAAC;IAC3C,CAAC,CAAA;aAEe,MAAM,CAAC,CAAC,EAAE,CAAC;QACvB,IAAI,CAAC,G\nAAG,EAAE,CAAC;QACX,KAAK,IAAI,CAAC,IAAI,CAAC;YAAE,IAAI,MAAM,CAAC,SAAS,CAAC,cAAc,C\nAAC,IAAI,CAAC,CAAC,EAAE,CAAC,CAAC,IAAI,CAAC,CAAC,OAAO,CAAC,CAAC,CAAC,GAAG,CAAC;\ngBAC/E,CAAC,CAAC,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC,CAAC,CAAC;QACbB,IAAI,CAAC,IAAI,IA\nAI,IAAI,OAAO,MAAM,CAAC,qBAAqB,KAAK,UAAU;YAC/D,KAAK,IAAI,CAAC,GAAG,CAAC,EAAE,CAA\nC,GAAG,MAAM,CAAC,qBAAqB,CAAC,CAAC,CAAC,EAAE,CAAC,GAAG,CAAC,CAAC,MAAM,EAAE,CA\nAC,EAAE,EAAE;gBACpE,IAAI,CAAC,CAAC,OAAO,CAAC,CAAC,CAAC,CAAC,CAAC,CAAC,GAAG,CAA\nC,IAAI,MAAM,CAAC,SAAS,CAAC,oBAAoB,CAAC,IAAI,CAAC,CAAC,EAAE,CAAC,CAAC,CAAC,CAAC,C\nAAC;oBAC1E,CAAC,CAAC,CAAC,CAAC,CAAC,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC,CAAC,CAAC,C\nAAC,CAAC,CAAC;aACzB;QACL,OAAO,CAAC,CAAC;IACb,CAAC;aAEe,UAAU,CAAC,UAAU,EAAE,MAA\nM,EAAE,GAAG,EAAE,IAAI;QACpD,IAAI,CAAC,GAAG,SAAS,CAAC,MAAM,EAAE,CAAC,GAAG,CAAC,G\nAAG,CAAC,GAAG,MAAM,GAAG,IAAI,KAAK,IAAI,GAAG,IAAI,GAAG,MAAM,CAAC,wBAAwB,CAAC,M\nAAM,EAAE,GAAG,CAAC,GAAG,IAAI,EAAE,CAAC,CAAC;QAC7H,IAAI,OAAO,OAAO,KAAK,QAAQ,IAAI\n,OAAO,OAAO,CAAC,QAAQ,KAAK,UAAU;YAAE,CAAC,GAAG,OAAO,CAAC,QAAQ,CAAC,UAAU,EAAE,\nMAAM,EAAE,GAAG,EAAE,IAAI,CAAC,CAAC;;YAC1H,KAAK,IAAI,CAAC,GAAG,UAAU,CAAC,MAAM,G\nAAG,CAAC,EAAE,CAAC,IAAI,CAAC,EAAE,CAAC,EAAE;gBAAE,IAAI,CAAC,GAAG,UAAU,CAAC,CAAC\n,CAAC;oBAAE,CAAC,GAAG,CAAC,CAAC,GAAG,CAAC,GAAG,CAAC,CAAC,CAAC,GAAG,CAAC,\nGAAG,CAAC,GAAG,CAAC,MAAM,EAAE,GAAG,EAAE,CAAC,CAAC,GAAG,CAAC,CAAC,MAAM,\nEAAE,GAAG,CAAC,KAAK,CAAC,CAAC;QACIJ,OAAO,CAAC,GAAG,CAAC,IAAI,CAAC,IAAI,MAAM,CA\nAC,cAAc,CAAC,MAAM,EAAE,GAAG,EAAE,CAAC,CAAC,EAAE,CAAC,CAAC;IACIE,CAAC;aAEe,OAAO,\nCAAC,UAAU,EAAE,SAAS;QACzC,OAAO,UAAU,MAAM,EAAE,GAAG,IAAI,SAAS,CAAC,MAAM,EAAE,G\nAAG,EAAE,UAAU,CAAC,CAAC,EAAE,CAAA;IACzE,CAAC;aAEe,UAAU,CAAC,WAAW,EAAE,aAAa;QACj\nD,IAAI,OAAO,OAAO,KAAK,QAAQ,IAAI,OAAO,OAAO,CAAC,QAAQ,KAAK,UAAU;YAAE,OAAO,OAAO,\nCAAC,QAAQ,CAAC,WAAW,EAAE,aAAa,CAAC,CAAC;IACnI,CAAC;aAEe,SAAS,CAAC,OAAO,EAAE,UAA
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No license file was found, but licenses were detected in source scan.

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```
* as ts from 'typescript';\nimport { Tree, UpdateRecorder } from '@angular-devkit/schematics';\nimport { Path } from '@angular-devkit/core';\n\n/* istanbul ignore file */\n\n * @license\n * Copyright Google Inc. All Rights Reserved.\n\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n\n * \n\nexport interface Host {\n  write(path: string, content: string): Promise<void>;\n  read(path: string): Promise<string>;\n}\n\nexport interface Change {\n  apply(host: Host): Promise<void>;\n\n  // The file this change should be applied to. Some changes might not apply to\n  // a file (maybe the config).\n  readonly path: string | null;\n\n  // The order this change should be applied. Normally the position inside the file.\n  // Changes are applied from the bottom of a file to the top.\n  readonly order: number;\n\n  // The description of this change. This will be outputted in a dry or verbose run.\n  readonly description: string;\n}\n\n/*\n * An operation that does nothing.\n */\n\nexport class NoopChange implements Change {\n  description = 'No operation.';\n  order = Infinity;\n  path = null;\n  apply() {\n    return Promise.resolve();\n  }\n}\n\n/*\n * Will add text to the source code.\n */\n\nexport class InsertChange implements Change {\n  order: number;\n  description: string;\n\n  constructor(public path: string, public pos: number, public toAdd: string) {\n    if (pos < 0) {\n      throw new Error('Negative positions are invalid');\n    }\n\n    this.description = `Inserted ${toAdd} into position ${pos} of ${path}`;\n    this.order = pos;\n  }\n\n  /*\n   * This method does not insert spaces if there is none in the original string.\n   */\n  apply(host: Host) {\n    return host.read(this.path).then((content) => {\n      const prefix = content.substring(0, this.pos);\n      const suffix = content.substring(this.pos);\n      return host.write(this.path, `${prefix}${this.toAdd}${suffix}`);\n    });\n  }\n}\n\n/*\n * Will remove text from the source code.\n */\n\nexport class RemoveChange implements Change {\n  order: number;\n  description: string;\n\n  constructor(public path: string, public pos: number, public end: number) {\n    if (pos < 0 || end < 0) {\n      throw new Error('Negative positions are invalid');\n    }\n\n    this.description = `Removed text in position ${pos} to ${end} of ${path}`;\n    this.order = pos;\n  }\n\n  apply(host: Host):
```

```

Promise<void> {\n  return host.read(this.path).then((content)
=> {\n    const prefix = content.substring(0, this.pos);\n    const suffix = content.substring(this.end);\n    //
TODO: throw error if toRemove doesn't match removed string.\n    return host.write(this.path,
`${prefix}${suffix}`);\n  });\n  }\n}\n\n/n/*\n * Will replace text from the source code.\n */\nexport class
ReplaceChange implements Change {\n  order: number;\n  description: string;\n  constructor(\n    public path:
string,\n    public pos: number,\n    public oldText: string,\n    public newText: string\n  ) {\n    if (pos < 0) {\n
throw new Error('Negative positions are invalid');\n    }\n    this.description = `Replaced ${oldText} into position
${pos} of ${path} with ${newText}`;\n    this.order = pos;\n  }\n  apply(host: Host): Promise<void> {\n    return
host.read(this.path).then((content) => {\n      const prefix = content.substring(0, this.pos);\n      const suffix =
content.substring(this.pos + this.oldText.length);\n      const text = content.substring(this.pos,
this.pos + this.oldText.length);\n      if (text !== this.oldText) {\n        return Promise.reject(\n          new
Error('Invalid replace: "${text}" !== "${this.oldText}"`.\n        ));\n      }\n      // TODO: throw error if oldText
doesn't match removed string.\n      return host.write(this.path, `${prefix}${this.newText}${suffix}`);\n    });\n  }\n}\n\nexport function createReplaceChange(\n  sourceFile: ts.SourceFile,\n  node: ts.Node,\n  oldText: string,\n  newText: string\n): ReplaceChange {\n  return new ReplaceChange(\n    sourceFile.fileName,\n    node.getStart(sourceFile),\n    oldText,\n    newText\n  );\n}\n\nexport function createRemoveChange(\n  sourceFile:
ts.SourceFile,\n  node: ts.Node,\n  from = node.getStart(sourceFile),\n  to = node.getEnd()\n): RemoveChange {\n  return
new RemoveChange(sourceFile.fileName, from, to);\n}\n\nexport function createChangeRecorder(\n  tree:
Tree,\n  path: string,\n  changes: Change[]): UpdateRecorder {\n  const
recorder = tree.beginUpdate(path);\n  for (const change of changes) {\n    if (change instanceof InsertChange) {\n
recorder.insertLeft(change.pos, change.toAdd);\n    } else if (change instanceof RemoveChange) {\n
recorder.remove(change.pos, change.end - change.pos);\n    } else if (change instanceof ReplaceChange) {\n
recorder.remove(change.pos, change.oldText.length);\n    recorder.insertLeft(change.pos, change.newText);\n  }\n  return
recorder;\n}\n\nexport function commitChanges(tree: Tree, path: string, changes: Change[]) {\n  if
(changes.length === 0) {\n    return false;\n  }\n  const recorder = createChangeRecorder(tree, path, changes);\n
tree.commitUpdate(recorder);\n  return true;\n}\n}]]

```

Found in path(s):

```

* /opt/cola/permits/1762774590_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-
core/utility/change.js.map

```

No license file was found, but licenses were detected in source scan.

```

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```

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THE USE OR PERFORMANCE OF THIS

SOFTWARE.

```
global Reflect, Promise
var extendStatics = function(d, b) {
  extendStatics =
  Object.setPrototypeOf ||
  ({ __proto__: [] } instanceof Array && function(d, b) { d.__proto__ = b; }) ||
  function(d, b) { for (var p in b) if (Object.prototype.hasOwnProperty.call(b, p)) d[p] = b[p]; };
  return extendStatics(d, b);
};
export function __extends(d, b) {
  if (typeof b !== "function" && b !== null)
    throw new TypeError("Class extends value " + String(b) + " is not a constructor or null");
  extendStatics(d, b);
  function __() { this.constructor = d; }
  d.prototype = b === null ? Object.create(b) :
  (__proto__ = b.prototype, new __());
}
export var __assign = function() {
  __assign = Object.assign ||
  function __assign(t) {
    for (var s, i = 1, n = arguments.length; i < n; i++) {
      s = arguments[i];
      for (var p in s) if (Object.prototype.hasOwnProperty.call(s, p))
        t[p] = s[p];
    }
    return t;
  };
  return __assign.apply(this, arguments);
}
export function __rest(s, e) {
  var t = {};
  for (var p in s) if (Object.prototype.hasOwnProperty.call(s, p) && e.indexOf(p) < 0)
    t[p] = s[p];
  if (s != null && typeof Object.getOwnPropertySymbols === "function")
    for (var i = 0, p = Object.getOwnPropertySymbols(s); i < p.length; i++) {
      if (e.indexOf(p[i]) < 0 && Object.prototype.propertyIsEnumerable.call(s, p[i]))
        t[p[i]] = s[p[i]];
    }
  return t;
}
export function __decorate(decorators, target, key, desc) {
  var c = arguments.length, r = c < 3 ? target : desc === null ? desc = Object.getOwnPropertyDescriptor(target, key) : desc, d;
  if (typeof Reflect === "object" && typeof Reflect.decorate === "function") r = Reflect.decorate(decorators, target, key, desc);
  else for (var i = decorators.length - 1; i >= 0; i--) if (d = decorators[i]) r = (c < 3 ? d(r) : c > 3 ? d(target, key, r) : d(target, key)) || r;
  return c > 3 && r && Object.defineProperty(target, key, r, r);
}
export function __param(paramIndex, decorator) {
  return function(target, key) { decorator(target, key, paramIndex); };
}
export function __metadata(metadataKey, metadataValue) {
  if (typeof Reflect === "object" && typeof Reflect.metadata === "function") return Reflect.metadata(metadataKey, metadataValue);
}
export function __awaiter(thisArg, _arguments, P, generator) {
  function adopt(value) { return value instanceof P ? value : new P(function(resolve) { resolve(value); }); }
  return new (P || (P = Promise))(function(resolve, reject) {
    function fulfilled(value) { try { step(generator.next(value)); } catch (e) { reject(e); } }
    function rejected(value) { try { step(generator["throw"](value)); } catch (e) { reject(e); } }
    function step(result) { result.done ? resolve(result.value) : adopt(result.value).then(fulfilled, rejected); }
    step((generator = generator.apply(thisArg, _arguments || [])).next());
  });
}
export function __generator(thisArg, body) {
  var _ = { label: 0, sent: function() { if (t[0] & 1) throw t[1]; return t[1]; }, trys: [], ops: [] }, f, y, t, g;
  return g = { next: verb(0), "throw": verb(1), "return": verb(2) }, typeof Symbol === "function" && (g[Symbol.iterator] = function() { return this; }), g;
  function verb(n) { return function(v) { return step([n, v]); }; }
  function step(op) {
    if (f) throw new TypeError("Generator is already executing.");
    while (_) try {
      if (f = 1, y && (t = op[0] & 2 ? y["return"] : op[0] ? y["throw"] || ((t = y["return"]) && t.call(y, 0) : y.next) && !(t = t.call(y, op[1])).done) return t;
      if (y = 0, t) op = [op[0] & 2, t.value];
      switch (op[0]) {
        case 0: case 1: t = op; break;
        case 4: _label++; return { value: op[1], done: false };
        case 5: _label++; y = op[1]; op = [0]; continue;
        case 7: op = _ops.pop(); _trys.pop(); continue;
        default:
          if (!(t = _trys, t = t.length > 0 && t[t.length - 1]) && (op[0] === 6 || op[0] === 2)) { _ = 0; continue; }
          if (op[0] === 3 && (!t || (op[1] > t[0]) &&
```

```

op[1] < t[3])) { _label = op[1]; break; }
if (op[0] === 6 && _label < t[1]) { _label = t[1]; t = op;
break; }
if (t && _label < t[2]) { _label = t[2]; _ops.push(op); break; }
if (t[2])
_ops.pop();
_trys.pop(); continue;
}
op = body.call(thisArg, _);
} catch (e) { op = [6, e]; y = 0; } finally { f = t = 0; }
if (op[0] &
5) throw op[1]; return { value: op[0] ? op[1] : void 0, done: true };
}
}
}
}
export var __createBinding =
Object.create ? (function(o, m, k, k2) {
if (k2 === undefined) k2 = k;
Object.defineProperty(o, k2, {
enumerable: true, get: function() { return m[k]; } });
}) : (function(o, m, k, k2) {
if (k2 === undefined) k2 =
k;
o[k2] = m[k];
});
export function __exportStar(m, o) {
for (var p in m) if (p !== "default"
&& !Object.prototype.hasOwnProperty.call(o, p)) __createBinding(o, m, p);
}
export function __values(o) {
var s = typeof Symbol === "function" && Symbol.iterator, m = s && o[s], i = 0;
if (m) return
m.call(o);
if (o && typeof o.length === "number") return {
next: function () {
if (o && i
>= o.length) o = void 0;
return { value: o && o[i++], done: !o };
}
};
throw new TypeError(s ? "Object is not iterable."
: "Symbol.iterator is not defined.");
}
export function __read(o, n) {
var m = typeof Symbol ===
"function" && o[Symbol.iterator];
if (!m) return o;
var i = m.call(o), r, ar = [], e;
try {
while ((n === void 0 || n-- > 0) && !(r = i.next()).done) ar.push(r.value);
} catch (error) { e = { error:
error }; }
finally {
try {
if (r && !r.done && (m = i["return"])) m.call(i);
}
}
finally { if (e) throw e.error; }
return ar;
}
}
export function __spread() {
for (var ar = [], i = 0; i < arguments.length; i++)
ar = ar.concat(__read(arguments[i]));
return
ar;
}
export function __spreadArrays() {
for (var s = 0, i = 0, il =
arguments.length; i <
il; i++) s += arguments[i].length;
for (var r = Array(s), k = 0, i = 0; i < il; i++)
for (var a =
arguments[i], j = 0, jl = a.length; j < jl; j++, k++)
r[k] = a[j];
return r;
}
export function __spreadArray(to, from) {
for (var i = 0, il = from.length, j = to.length; i < il; i++, j++)
to[j] =
from[i];
return to;
}
export function __await(v) {
return this instanceof __await ? (this.v = v,
this) : new __await(v);
}
export function __asyncGenerator(thisArg, _arguments, generator) {
if
(!Symbol.asyncIterator) throw new TypeError("Symbol.asyncIterator is not defined.");
var g =
generator.apply(thisArg, _arguments || []), i, q = [];
return i = { }, verb("next"), verb("throw"),
verb("return"), i[Symbol.asyncIterator] = function () { return this; }, i;
function verb(n) { if (g[n]) i[n] =
function (v) { return new Promise(function (a, b) { q.push([n, v, a, b])
> 1 || resume(n, v); }); }); }
function resume(n, v) { try { step(g[n](v)); } catch (e) { settle(q[0][3], e); } }
function step(r) { r.value instanceof __await ? Promise.resolve(r.value.v).then(fulfill, reject) : settle(q[0][2], r); }
function fulfill(value) { resume("next", value); }
function reject(value) { resume("throw", value); }
function settle(f, v) { if (f(v), q.shift(), q.length) resume(q[0][0], q[0][1]); }
}
export function __asyncDelegator(o) {
var i, p;
return i = { }, verb("next"), verb("throw"), function (e) { throw e; },
verb("return"), i[Symbol.iterator] = function () { return this; }, i;
function verb(n, f) { i[n] = o[n] ? function
(v) { return (p = !p) ? { value: __await(o[n](v)), done: n === "return" } : f ? f(v) : v; } : f; }
}
export function __asyncValues(o) {
if (!Symbol.asyncIterator) throw new TypeError("Symbol.asyncIterator is not
defined.");
var m = o[Symbol.asyncIterator],
i;
return m ? m.call(o) : (o = typeof __values === "function" ? __values(o) : o[Symbol.iterator](), i = { },
verb("next"), verb("throw"), verb("return"), i[Symbol.asyncIterator] = function () { return this; }, i);
function verb(n) { i[n] = o[n] && function (v) { return new Promise(function (resolve, reject) { v = o[n](v),
settle(resolve, reject, v.done, v.value); }); }); }
}
function settle(resolve, reject, d, v) {
Promise.resolve(v).then(function(v) { resolve({ value: v, done: d }); }, reject);
}
}
export function __makeTemplateObject(cooked, raw) {
if (Object.defineProperty) { Object.defineProperty(cooked, "raw", {
value: raw }); } else { cooked.raw = raw; }
return cooked;
}
export var __setModuleDefault = Object.create
? (function(o, v) {
Object.defineProperty(o, "default", { enumerable: true, value: v });
}) : function(o, v) {
o["default"] = v;
}
export function __importStar(mod)

```

```

{\r\n if (mod && mod.__esModule) return mod;\r\n var result = {};\r\n if (mod != null) for (var k in mod) if
(k !== "default" && Object.prototype.hasOwnProperty.call(mod, k)) __createBinding(result, mod, k);\r\n
__setModuleDefault(result, mod);\r\n return result;\r\n}\r\n\r\nexport function __importDefault(mod) {\r\n
return (mod && mod.__esModule) ? mod : { default: mod };\r\n}\r\n\r\nexport function
__classPrivateFieldGet(receiver, state, kind, f) {\r\n if (kind === "a" && !f) throw new TypeError("\Private
accessor was defined without a getter");\r\n if (typeof state === "function" ? receiver !== state || !f :
!state.has(receiver)) throw new TypeError("\Cannot read private member from an object whose class did not declare
it");\r\n return kind === "m" ? f : kind === "a" ? f.call(receiver) : f ? f.value :
state.get(receiver);\r\n}\r\n\r\nexport function __classPrivateFieldSet(receiver, state, value, kind, f) {\r\n if (kind
=== "m") throw new
TypeError("\Private method is not writable");\r\n if (kind === "a" && !f) throw new TypeError("\Private
accessor was defined without a setter");\r\n if (typeof state === "function" ? receiver !== state || !f :
!state.has(receiver)) throw new TypeError("\Cannot write private member to an object whose class did not declare
it");\r\n return (kind === "a" ? f.call(receiver, value) : f ? f.value = value : state.set(receiver, value)),
value;\r\n}\r\n", "export const REGISTERED_ACTION_TYPES: { [actionType: string]: number } = {};\n\nexport
function resetRegisteredActionTypes() {\n for (const key of Object.keys(REGISTERED_ACTION_TYPES)) {\n
delete REGISTERED_ACTION_TYPES[key];\n }\n}\n", "import {\n Creator,\n ActionCreator,\n TypedAction,\n
FunctionWithParametersType,\n NotAllowedCheck,\n ActionCreatorProps,\n } from './models';\nimport {
REGISTERED_ACTION_TYPES } from './globals';\n\n// Action creators taken from ts-action library and modified
a bit to better\n/

fit current NgRx usage. Thank you Nicholas Jamieson (@cartant).\n\nexport function createAction<T extends
string>(\n type: T): ActionCreator<T, () => TypedAction<T>>;\nexport function createAction<T extends string,
P extends object>(\n type: T,\n config: ActionCreatorProps<P> & NotAllowedCheck<P>):\n ActionCreator<T,
(props: P & NotAllowedCheck<P>) => P & TypedAction<T>>;\nexport function createAction<\n T extends
string,\n P extends any[],\n R extends object>(\n type: T,\n creator: Creator<P, R & NotAllowedCheck<R>>):\n
FunctionWithParametersType<P, R & TypedAction<T>> & TypedAction<T>;\n/**\n * @description\n * Creates a
configured `Creator` function that, when called, returns an object in the shape of the `Action` interface.\n *\n *
Action creators reduce the explicitness of class-based action creators.\n *\n * @param type Describes the action that
will be dispatched\n * @param config Additional metadata needed for the handling of the action. See { @link
createAction#usage-notes
Usage Notes }.\n *\n * @usageNotes\n *\n * **Declaring an action creator**\n *\n * Without additional
metadata:\n * ```ts\n * export const increment = createAction('[Counter] Increment');\n * ```\n *\n * With additional
metadata:\n * ```ts\n * export const loginSuccess = createAction(\n * '[Auth/API] Login Success',\n * props<{\n
user: User }>()\n * );\n * ```\n *\n * With a function:\n * ```ts\n * export const loginSuccess = createAction(\n *
'[Auth/API] Login Success',\n * (response: Response) => response.user\n * );\n * ```\n *\n * **Dispatching an
action**\n *\n * Without additional metadata:\n * ```ts\n * store.dispatch(increment());\n * ```\n *\n * With additional
metadata:\n * ```ts\n * store.dispatch(loginSuccess({ user: newUser }));\n * ```\n *\n * **Referencing an action in a
reducer**\n *\n * Using a switch statement:\n * ```ts\n * switch (action.type) {\n * // ...\n * case
AuthApiActions.loginSuccess.type: {\n * return {\n * ...state,\n * user: action.user\n
* }; \n * }\n * }\n * ```\n *\n * Using a reducer creator:\n * ```ts\n * on(AuthApiActions.loginSuccess, (state, { user
}) => ({ ...state, user }));\n * ```\n *\n * **Referencing an action in an effect**\n *\n * ```ts\n * effectName$ =
createEffect(\n * () => this.actions$.pipe(\n * ofType(AuthApiActions.loginSuccess),\n * // ...)\n * );\n *
```
\n\nexport function createAction<T extends string, C extends Creator>(\n type: T,\n config?: { _as: 'props' } |
C):\n ActionCreator<T> {\n REGISTERED_ACTION_TYPES[type] = (REGISTERED_ACTION_TYPES[type] ||
0) + 1;\n if (typeof config === 'function') {\n return defineType(type, (...args: any[]) => ({\n
...config(...args),\n type,\n }));\n }\n }\n const as = config ? config._as : 'empty';\n switch (as) {\n case
'empty':\n return defineType(type, () => ({ type }));\n case 'props':\n return defineType(type, (props: object)
=> ({\n ...props,\n type,\n }));\n default:\n

```



```

    throw new Error('Unexpected config.');
```

}
 }
 export function props<P extends object>():
 ActionCreatorProps<P> {
 // eslint-disable-next-line @typescript-eslint/no-non-null-assertion, @typescript-
 eslint/naming-convention
 return { \_as: 'props', \_p: undefined! };
 }
 export function union<C extends {
 [key: string]: ActionCreator<string, Creator> }>(creators: C): ReturnType<C[keyof C]> {
 // eslint-disable-next-
 line @typescript-eslint/no-non-null-assertion
 return undefined!;
 }
 function defineType<T extends string>(
 type: T,
 creator: Creator): ActionCreator<T> {
 return Object.defineProperty(creator, 'type', {
 value:
 type,
 writable: false,
 }) as ActionCreator<T>;
 }
 "import { Injectable, OnDestroy, Provider } from
 '@angular/core';
 import { BehaviorSubject } from 'rxjs';
 import { Action } from './models';
 export const
 INIT = '@ngrx/store/init' as const;
 @Injectable()
 export class ActionsSubject
 extends
 BehaviorSubject<Action>
 implements OnDestroy {
 constructor() {
 super({ type: INIT });
 }
 override next(action: Action): void {
 if (typeof action === 'function') {
 throw new TypeError(`
 Dispatch expected an object, instead it
 received a function.
 If you're using the createAction function, make sure to invoke the function
 before
 dispatching the action. For example, someAction should be someAction().`);
 } else if (typeof action ===
 'undefined') {
 throw new TypeError(`
 Actions must be objects`);
 } else if (typeof action.type ===
 'undefined') {
 throw new TypeError(`
 Actions must have a type property`);
 }
 super.next(action);
 }
 override complete() {
 /\* noop \*/
 }
 ngOnDestroy() {
 super.complete();
 }
 }
 export const
 ACTIONS\_SUBJECT\_PROVIDERS: Provider[] = [ActionsSubject];
 "import { InjectionToken } from
 '@angular/core';
 import { RuntimeChecks, MetaReducer } from './models';
 export const
 \_ROOT\_STORE\_GUARD = new InjectionToken<void>(
 '@ngrx/store Internal Root Guard');
 export const
 \_INITIAL\_STATE = new InjectionToken(
 '@ngrx/store Internal Initial State');
 export const INITIAL\_STATE
 = new InjectionToken('@ngrx/store Initial State');
 export const REDUCER\_FACTORY = new InjectionToken(
 '@ngrx/store Reducer Factory');
 export const \_REDUCER\_FACTORY = new InjectionToken(
 '@ngrx/store
 Internal Reducer Factory Provider');
 export const INITIAL\_REDUCERS = new InjectionToken(
 '@ngrx/store
 Initial Reducers');
 export const \_INITIAL\_REDUCERS = new InjectionToken(
 '@ngrx/store Internal Initial
 Reducers');
 export const STORE\_FEATURES = new InjectionToken(
 '@ngrx/store Store Features');
 export
 const \_STORE\_REDUCERS = new InjectionToken(
 '@ngrx/store Internal Store Reducers');
 export const
 \_FEATURE\_REDUCERS = new InjectionToken(
 '@ngrx/store Internal Feature Reducers');
 export const
 \_FEATURE\_CONFIGS = new InjectionToken(
 '@ngrx/store
 Internal Feature Configs');
 export const \_STORE\_FEATURES = new InjectionToken(
 '@ngrx/store Internal
 Store Features');
 export const \_FEATURE\_REDUCERS\_TOKEN = new InjectionToken(
 '@ngrx/store
 Internal Feature Reducers Token');
 export const FEATURE\_REDUCERS = new InjectionToken(
 '@ngrx/store
 Feature Reducers');
 /\*\*
 \* User-defined meta reducers from StoreModule.forRoot()
 \*/
 export const
 USER\_PROVIDED\_META\_REDUCERS = new InjectionToken<MetaReducer[]>(
 '@ngrx/store User Provided
 Meta Reducers');
 /\*\*
 \* Meta reducers defined either internally by @ngrx/store or by library authors
 \*/
 export const
 META\_REDUCERS = new InjectionToken<MetaReducer[]>(
 '@ngrx/store Meta
 Reducers');
 /\*\*
 \* Concat the user provided meta reducers and the meta reducers provided on the multi
 \* injection token
 \*/
 export const \_RESOLVED\_META\_REDUCERS = new InjectionToken<MetaReducer>(
 '@ngrx/store Internal Resolved Meta Reducers');
 /\*\*
 \* Runtime checks
 \* defined by the user via an InjectionToken
 \*/
 \* Defaults to ` \_USER\_RUNTIME\_CHECKS `
 \*/
 export const
 USER\_RUNTIME\_CHECKS = new InjectionToken<RuntimeChecks>(
 '@ngrx/store User Runtime Checks
 Config');
 /\*\*
 \* Runtime checks defined by the user via forRoot()
 \*/
 export const
 \_USER\_RUNTIME\_CHECKS = new InjectionToken<RuntimeChecks>(
 '@ngrx/store Internal User Runtime
 Checks Config');
 /\*\*
 \* Runtime checks currently in use
 \*/
 export const
 ACTIVE\_RUNTIME\_CHECKS = new InjectionToken<RuntimeChecks>(
 '@ngrx/store Internal Runtime Checks');
 export const
 \_ACTION\_TYPE\_UNIQUENESS\_CHECK = new InjectionToken<void>(
 '@ngrx/store Check if Action types
 are unique');
 "import {
 Action,
 ActionReducer,
 ActionReducerFactory,
 ActionReducerMap,
 MetaReducer,
 InitialState,
 } from './models';
 export function combineReducers<T, V extends Action =

```

Action>(\n reducers: ActionReducerMap<T, V>,\n initialState?: Partial<T>)\n): ActionReducer<T, V>;\n/**\n *
  @description\n * Combines reducers for individual features into a single reducer.\n *\n * You can use this function
  to delegate handling of state transitions to multiple reducers, each acting on their\n *\n * own sub-state within the root
  state.\n *\n * @param reducers An object mapping keys of the root state to their corresponding feature reducer.\n *\n *
  @param initialState Provides a state value if the current state is `undefined`, as it is initially.\n *\n * @returns A reducer
  function.\n *\n * @usageNotes\n *\n * **Example combining two feature reducers into one `"root"` reducer**\n *\n *
  ```ts\n * export const reducer = combineReducers({\n *   featureA: featureAReducer,\n *   featureB:
  featureBReducer\n * });\n * ```\n *\n * You can also override the initial states of the sub-features:\n *\n *
  ```ts\n * export const reducer = combineReducers({\n *   featureA: featureAReducer,\n *   featureB: featureBReducer\n * },
  {\n *   featureA: { counterA: 13 },\n *   featureB: { counterB: 37 }\n * });\n * ```\n *
  */\nexport function combineReducers(\n reducers: any,\n initialState: any = {})\n): ActionReducer<any, Action>
{\n const reducerKeys = Object.keys(reducers);\n const finalReducers: any = {};\n\n for (let i = 0; i <
reducerKeys.length; i++) {\n const key = reducerKeys[i];\n if (typeof reducers[key] === 'function') {\n
finalReducers[key] = reducers[key];\n }\n }\n\n const finalReducerKeys = Object.keys(finalReducers);\n\n return
function combination(state, action) {\n state = state === undefined ? initialState : state;\n let hasChanged
= false;\n const nextState: any = {};\n for (let i = 0; i < finalReducerKeys.length; i++) {\n const key =
finalReducerKeys[i];\n const reducer: any = finalReducers[key];\n const previousStateForKey = state[key];\n
const nextStateForKey = reducer(previousStateForKey, action);\n\n nextState[key] = nextStateForKey;\n
hasChanged = hasChanged || nextStateForKey !== previousStateForKey;\n }\n\n return hasChanged ? nextState : state;\n
};\n}\n\nexport function omit<T extends { [key: string]: any }>(\n object: T,\n keyToRemove: keyof T)\n): Partial<T> {\n
return Object.keys(object)\n .filter((key) => key !==
keyToRemove)\n .reduce((result, key) => Object.assign(result, { [key]: object[key] }), {});\n}\n\nexport function
compose<A>(): (i: A) => A;\nexport function compose<A, B>(b: (i: A) => B): (i: A) => B;\nexport function
compose<A, B, C>(c: (i: B) => C, b: (i: A) => B): (i: A) => C;\nexport function compose<A, B, C, D>(\n d: (i: C)
=> D,\n c: (i: B) => C,\n b: (i: A) => B)\n): (i: A) => D;\nexport function compose<A, B, C, D, E>(\n e: (i: D) =>
E,\n d: (i: C) => D,\n c: (i: B) => C,\n b: (i: A) => B)\n): (i: A) => E;\nexport function compose<A, B, C, D, E,
F>(\n f: (i: E) => F,\n e: (i: D) => E,\n d: (i: C) => D,\n c: (i: B) => C,\n b: (i: A) => B)\n): (i: A) => F;\nexport
function compose<A = any, F = any>(...functions: any[]): (i: A) => F;\nexport function
compose(...functions: any[]) {\n return function (arg: any) {\n if (functions.length === 0) {\n return arg;\n
}\n\n const last = functions[functions.length - 1];\n const rest = functions.slice(0, -1);\n\n return
rest.reduceRight((composed, fn) => fn(composed), last(arg));\n };}\n}\n\nexport function createReducerFactory<T,
V extends Action = Action>(\n reducerFactory: ActionReducerFactory<T, V>,\n metaReducers?: MetaReducer<T,
V>[])\n): ActionReducerFactory<T, V> {\n if (Array.isArray(metaReducers) && metaReducers.length > 0) {\n
(reducerFactory as any) = compose.apply(null, [\n ...metaReducers,\n reducerFactory,\n ]);\n }\n}\n\n return
(reducers: ActionReducerMap<T, V>, initialState?: InitialState<T>) => {\n const reducer =
reducerFactory(reducers);\n return (state: T | undefined, action: V) => {\n state = state === undefined ?
(initialState as T) : state;\n return reducer(state, action);\n };}\n}\n}\n\nexport function
createFeatureReducerFactory<T,
V extends Action = Action>(\n metaReducers?: MetaReducer<T, V>[])\n): (reducer: ActionReducer<T, V>,
initialState?: T) => ActionReducer<T, V> {\n const reducerFactory =\n Array.isArray(metaReducers) &&
metaReducers.length > 0\n ? compose<ActionReducer<T, V>>(...metaReducers)\n : (r: ActionReducer<T,
V>) => r;\n\n return (reducer: ActionReducer<T, V>, initialState?: T) => {\n reducer =
reducerFactory(reducer);\n return (state: T | undefined, action: V) => {\n state = state === undefined ?
initialState : state;\n return reducer(state, action);\n };}\n};\n}\n\n","import { Inject, Injectable, OnDestroy,
Provider } from '@angular/core';\nimport { BehaviorSubject, Observable } from 'rxjs';\nimport { ActionsSubject }
from './actions_subject';\nimport {\n Action,\n ActionReducer,\n ActionReducerFactory,\n ActionReducerMap,\n
StoreFeature,\n} from './models';\nimport { INITIAL_REDUCERS, INITIAL_STATE, REDUCER_FACTORY }
from './tokens';\nimport

```

```

    {\n createFeatureReducerFactory,\n createReducerFactory,\n omit,\n } from './utils';\n\nexport abstract class
ReducerObservable extends Observable<\n ActionReducer<any, any>\n> {\n}\n\nexport abstract class
ReducerManagerDispatcher extends ActionsSubject {\n}\n\nexport const UPDATE = '@ngrx/store/update-reducers' as
const;\n\n@Inject()\n\nexport class ReducerManager\n extends BehaviorSubject<ActionReducer<any, any>>\n implements OnDestroy {\n get currentReducers(): ActionReducerMap<any, any> {\n return this.reducers;\n }\n\n constructor(\n private dispatcher: ReducerManagerDispatcher,\n @Inject(INITIAL_STATE) private initialState:
any,\n @Inject(INITIAL_REDUCERS) private reducers: ActionReducerMap<any, any>,\n @Inject(REDUCER_FACTORY)\n private reducerFactory: ActionReducerFactory<any, any>\n ) {\n
super(reducerFactory(reducers, initialState));\n }\n\n addFeature(feature: StoreFeature<any, any>) {\n
this.addFeatures([feature]);\n }\n\n addFeatures(features:
StoreFeature<any, any>[]) {\n const reducers = features.reduce(\n (\n reducerDict,\n { reducers,
reducerFactory, metaReducers, initialState, key }\n ) => {\n const reducer =\n typeof reducers ===
'function'\n ? createFeatureReducerFactory(metaReducers)(reducers, initialState)\n :
createReducerFactory(reducerFactory, metaReducers)(\n reducers,\n initialState\n );\n\n
reducerDict[key] = reducer;\n return reducerDict;\n },\n {} ) as { [key: string]: ActionReducer<any, any>
}\n );\n\n this.addReducers(reducers);\n }\n\n removeFeature(feature: StoreFeature<any, any>) {\n
this.removeFeatures([feature]);\n }\n\n removeFeatures(features: StoreFeature<any, any>[]) {\n
this.removeReducers(features.map((p) => p.key));\n }\n\n addReducer(key: string, reducer: ActionReducer<any,
any>) {\n this.addReducers({ [key]: reducer });\n
}\n\n addReducers(reducers: { [key: string]: ActionReducer<any, any> }) {\n this.reducers = { ...this.reducers,
...reducers }; \n this.updateReducers(Object.keys(reducers));\n }\n\n removeReducer(featureKey: string) {\n
this.removeReducers([featureKey]);\n }\n\n removeReducers(featureKeys: string[]) {\n
featureKeys.forEach((key) => {\n this.reducers = omit(this.reducers, key) /*TODO(#823)*/ as any;\n });\n
this.updateReducers(featureKeys);\n }\n\n private updateReducers(featureKeys: string[]) {\n
this.next(this.reducerFactory(this.reducers, this.initialState));\n this.dispatcher.next(<Action>{\n type:
UPDATE,\n features: featureKeys,\n });\n }\n\n ngOnDestroy() {\n this.complete();\n }\n\n\nexport const
REDUCER_MANAGER_PROVIDERS: Provider[] = [\n ReducerManager,\n { provide: ReducerObservable,
useExisting: ReducerManager },\n { provide: ReducerManagerDispatcher, useExisting: ActionsSubject
},\n];\n\n,"import { Injectable, OnDestroy,
Provider } from '@angular/core';\nimport { Subject } from 'rxjs';\nimport { Action } from
'./models';\n\n@Inject()\n\nexport class ScannedActionsSubject extends Subject<Action>\n implements
OnDestroy {\n ngOnDestroy() {\n this.complete();\n }\n}\n\n\nexport const
SCANNED_ACTIONS_SUBJECT_PROVIDERS: Provider[] = [\n ScannedActionsSubject,\n];\n\n,"import {
Inject, Injectable, OnDestroy, Provider } from '@angular/core';\nimport {\n BehaviorSubject,\n Observable,\n
queueScheduler,\n Subscription,\n } from 'rxjs';\nimport { observeOn, scan, withLatestFrom } from
'rxjs/operators';\nimport { ActionsSubject, INIT } from './actions_subject';\nimport { Action, ActionReducer }
from './models';\nimport { ReducerObservable } from './reducer_manager';\nimport { ScannedActionsSubject } from
'./scanned_actions_subject';\nimport { INITIAL_STATE } from './tokens';\n\nexport abstract class StateObservable
extends Observable<any> {\n}\n\n@Inject()\n\nexport class State<T> extends BehaviorSubject<any>\n
implements OnDestroy {\n static readonly INIT = INIT;\n\n private stateSubscription: Subscription;\n\n
constructor(\n actions$: ActionsSubject,\n reducer$: ReducerObservable,\n scannedActions:
ScannedActionsSubject,\n @Inject(INITIAL_STATE) initialState: any\n ) {\n super(initialState);\n\n const
actionsOnQueue$: Observable<Action> = actions$.pipe(\n observeOn(queueScheduler)\n );\n const
withLatestReducer$: Observable<[Action, ActionReducer<any, Action>]> =\n
actionsOnQueue$.pipe(withLatestFrom(reducer$));\n\n const seed: StateActionPair<T> = { state: initialState }; \n
const stateAndAction$: Observable<{\n state: any;\n action?: Action;\n }> = withLatestReducer$.pipe(\n
scan<[Action, ActionReducer<T, Action>], StateActionPair<T>>(\n reduceState,\n seed\n )\n );\n\n
this.stateSubscription = stateAndAction$.subscribe(({ state, action }) => {\n this.next(state);\n

```

```

scannedActions.next(action
  as Action);\n  });\n  }\n\n  ngOnDestroy() {\n    this.stateSubscription.unsubscribe();\n    this.complete();\n  }\n}\n\nexport type StateActionPair<T, V extends Action = Action> = {\n  state: T | undefined;\n  action?:\n  V;\n};\n\nexport function reduceState<T, V extends Action = Action>(\n  stateActionPair: StateActionPair<T, V> = {\n    state: undefined,\n  },\n  [action, reducer]: [V, ActionReducer<T, V>]\n): StateActionPair<T, V> {\n  const { state } =\n  stateActionPair;\n  return { state: reducer(state, action), action };\n}\n\nexport const STATE_PROVIDERS:\n  Provider[] = [\n    State,\n    {\n      provide: StateObservable,\n      useExisting: State,\n    },\n  ],\n  /* eslint-disable @typescript-eslint/naming-convention */\n  /* disabled because we have lowercase generics for `select` */\n  import { Injectable,\n  Provider } from '@angular/core';\n  import { Observable, Observer, Operator } from 'rxjs';\n  import {\n    distinctUntilChanged, map, pluck } from 'rxjs/operators';\n  import { ActionsSubject } from\n  './actions_subject';\n  import\n    {\n      Action, ActionReducer, FunctionIsNotAllowed } from './models';\n  import { ReducerManager } from\n  './reducer_manager';\n  import { StateObservable } from './state';\n\n  @Injectable()\n  export class Store<T = object>\n    extends Observable<T>\n      implements Observer<Action> {\n    constructor(\n      state$: StateObservable,\n      private\n        actionsObserver: ActionsSubject,\n      private\n        reducerManager: ReducerManager\n      ) {\n      super();\n\n      this.source\n        = state$;\n    }\n\n    select<K>(mapFn: (state: T) => K): Observable<K>;\n    /**\n     * @deprecated Selectors with\n    props are deprecated, for more info see { @link\n      https://github.com/ngrx/platform/issues/2980 Github Issue }\n    */\n    select<K, Props = any>(\n      mapFn: (state: T, props: Props) => K,\n      props: Props\n    ): Observable<K>;\n    select<a\n      extends keyof T>(\n      key: a\n    ): Observable<T[a]>;\n    select<a extends keyof T, b extends keyof T[a]>(\n      key1: a,\n      key2: b\n    ): Observable<T[a][b]>;\n    select<a extends keyof T, b extends keyof\n      T[a],\n      c extends keyof T[a][b]>(\n      key1: a,\n      key2: b,\n      key3: c\n    ): Observable<T[a][b][c]>;\n    select<\n      a extends keyof T,\n      b extends keyof T[a],\n      c extends keyof T[a][b],\n      d extends keyof T[a][b][c]\n    >(\n      key1: a,\n      key2: b,\n      key3: c,\n      key4: d\n    ): Observable<T[a][b][c][d]>;\n    select<\n      a extends keyof T,\n      b extends keyof T[a],\n      c extends keyof T[a][b],\n      d extends keyof T[a][b][c],\n      e extends keyof T[a][b][c][d]\n    >(\n      key1: a,\n      key2: b,\n      key3: c,\n      key4: d,\n      key5: e\n    ): Observable<T[a][b][c][d][e]>;\n    select<\n      a extends keyof T,\n      b extends keyof\n      T[a],\n      c extends keyof T[a][b],\n      d extends keyof T[a][b][c],\n      e extends keyof T[a][b][c][d],\n      f extends\n      keyof T[a][b][c][d][e]\n    >(\n      key1: a,\n      key2: b,\n      key3: c,\n      key4: d,\n      key5: e,\n      key6: f\n    ):\n    Observable<T[a][b][c][d][e][f]>;\n    select<\n      a extends keyof T,\n      b extends keyof T[a],\n      c extends keyof\n      T[a][b],\n      d extends\n      keyof T[a][b][c],\n      e extends\n      keyof T[a][b][c][d],\n      f extends\n      keyof T[a][b][c][d][e],\n      K = any\n    >(\n      key1: a,\n      key2: b,\n      key3: c,\n      key4: d,\n      key5: e,\n      key6: f,\n      ...paths: string[]\n    ): Observable<K>;\n    select<Props = any, K = any>(\n      pathOrMapFn: ((state: T, props?: Props) => K) | string,\n      ...paths: string[]\n    ): Observable<any> {\n      return\n      (select as any).call(null, pathOrMapFn, ...paths)(this);\n    }\n\n    override lift<R>(operator: Operator<T, R>):\n    Store<R> {\n      const store = new Store<R>(this, this.actionsObserver, this.reducerManager);\n      store.operator =\n      operator;\n      return store;\n    }\n\n    dispatch<V extends Action = Action>(\n      action: V &\n      FunctionIsNotAllowed<\n      V,\n      'Functions are not allowed to be dispatched. Did you forget to call the\n      action creator function?'\n      >\n    ) {\n      this.actionsObserver.next(action);\n    }\n\n    next(action: Action) {\n      this.actionsObserver.next(action);\n    }\n\n    error(err: any) {\n      this.actionsObserver.error(err);\n    }\n\n    complete() {\n      this.actionsObserver.complete();\n    }\n\n    addReducer<State, Actions extends Action =\n    Action>(\n      key: string,\n      reducer: ActionReducer<State, Actions>\n    ) {\n      this.reducerManager.addReducer(key, reducer);\n    }\n\n    removeReducer<Key extends Extract<keyof T,\n    string>>(\n      key: Key\n    ) {\n      this.reducerManager.removeReducer(key);\n    }\n  }\n\n  export const STORE_PROVIDERS:\n  Provider[] = [Store];\n\n  export function select<T, K>(\n    mapFn: (state: T) => K\n  ): (source$: Observable<T>) =>\n  Observable<K>;\n  /**\n   * @deprecated Selectors with\n  props are deprecated, for more info see { @link\n    https://github.com/ngrx/platform/issues/2980 Github Issue }\n  */\n  export function select<T, Props, K>(\n    mapFn:\n    (state: T, props: Props) => K,\n    props: Props\n  ): (source$: Observable<T>) => Observable<K>;\n\n  export function\n  select<T, a extends keyof T>(\n    key: a\n  ): (source$: Observable<T>) => Observable<T[a]>;\n\n  export function\n  select<T, a extends keyof

```

```

T, b extends keyof T[a]>(\n key1: a,\n key2: b\n): (source$: Observable<T>) => Observable<T[a][b]>;\nexport
function select<\n T,\n a extends keyof T,\n b extends keyof T[a],\n c extends keyof T[a][b]>\n>(\n key1: a,\n
key2: b,\n key3: c\n): (source$: Observable<T>) => Observable<T[a][b][c]>;\nexport function select<\n T,\n a
extends keyof T,\n b extends keyof T[a],\n c extends keyof T[a][b],\n d extends keyof T[a][b][c]>\n>(\n key1: a,\n
key2: b,\n key3: c,\n key4: d\n): (source$: Observable<T>) => Observable<T[a][b][c][d]>;\nexport function
select<\n T,\n a extends keyof T,\n b extends keyof T[a],\n c extends keyof T[a][b],\n d extends keyof
T[a][b][c],\n e extends keyof T[a][b][c][d]>\n>(\n key1: a,\n key2: b,\n key3: c,\n key4: d,\n key5: e\n): (source$:
Observable<T>) => Observable<T[a][b][c][d][e]>;\nexport function select<\n T,\n a extends keyof T,\n b extends
keyof T[a],\n c extends keyof T[a][b],\n d extends keyof T[a][b][c],\n e extends keyof
T[a][b][c][d],\n f extends keyof T[a][b][c][d][e]>\n>(\n key1: a,\n key2: b,\n key3: c,\n key4: d,\n key5: e,\n
key6: f\n): (source$: Observable<T>) => Observable<T[a][b][c][d][e][f]>;\nexport function select<\n T,\n a
extends keyof T,\n b extends keyof T[a],\n c extends keyof T[a][b],\n d extends keyof T[a][b][c],\n e extends
keyof T[a][b][c][d],\n f extends keyof T[a][b][c][d][e],\n K = any\n>(\n key1: a,\n key2: b,\n key3: c,\n key4:
d,\n key5: e,\n key6: f,\n ...paths: string[]\n): (source$: Observable<T>) => Observable<K>;\nexport function
select<T, Props, K>(\n pathOrMapFn: ((state: T, props?: Props) => any) | string,\n propsOrPath?: Props | string,\n
...paths: string[]\n) {\n return function selectOperator(source$: Observable<T>): Observable<K> {\n let mapped$:
Observable<any>;\n if (typeof pathOrMapFn === 'string') {\n const pathSlices = [<string>propsOrPath,
...paths].filter(Boolean);\n mapped$ = source$.pipe(pluck(pathOrMapFn, ...pathSlices));\n
} else if (typeof pathOrMapFn === 'function') {\n mapped$ = source$.pipe(\n map((source) =>
pathOrMapFn(source, <Props>propsOrPath))\n );\n } else {\n throw new TypeError(\n `Unexpected
type '${typeof pathOrMapFn}' in select operator,` +\n ` expected 'string' or 'function'\n );\n }\n return
mapped$.pipe(distinctUntilChanged());\n };\n}\n", "export function capitalize<T extends string>(text: T):
Capitalize<T> {\n return (text.charAt(0).toUpperCase() + text.substr(1)) as Capitalize<T>;\n}\n", "export const
RUNTIME_CHECK_URL =\n 'https://ngrx.io/guide/store/configuration/runtime-checks';\n\nexport function
isUndefined(target: any): target is undefined {\n return target === undefined;\n}\n\nexport function isNull(target:
any): target is null {\n return target === null;\n}\n\nexport function isArray(target: any): target is Array<any> {\n
return Array.isArray(target);\n}\n\nexport function isString(target: any): target
is string {\n return typeof target === 'string';\n}\n\nexport function isBoolean(target: any): target is boolean {\n
return typeof target === 'boolean';\n}\n\nexport function isNumber(target: any): target is number {\n return typeof
target === 'number';\n}\n\nexport function isObjectLike(target: any): target is object {\n return typeof target ===
'object' && target !== null;\n}\n\nexport function isObject(target: any): target is object {\n return
isObjectLike(target) && !isArray(target);\n}\n\nexport function isPlainObject(target: any): target is object {\n if
(!isObject(target)) {\n return false;\n }\n\n const targetPrototype = Object.getPrototypeOf(target);\n return
targetPrototype === Object.prototype || targetPrototype === null;\n}\n\nexport function isFunction(target: any):
target is () => void {\n return typeof target === 'function';\n}\n\nexport function isComponent(target: any) {\n
return isFunction(target) && target.hasOwnProperty('cmp');\n}\n\nexport function
hasOwnProperty(target: object, propertyName: string): boolean {\n return
Object.prototype.hasOwnProperty.call(target, propertyName);\n}\n\n", "let _ngrxMockEnvironment = false;\nexport
function setNgrxMockEnvironment(value: boolean): void {\n _ngrxMockEnvironment = value;\n}\n\nexport function
isNgrxMockEnvironment(): boolean {\n return _ngrxMockEnvironment;\n}\n\n", "import { Selector,
SelectorWithProps } from './models';\nimport { isDevMode } from '@angular/core';\nimport {
isNgrxMockEnvironment } from './flags';\n\nexport type AnyFn = (...args: any[]) => any;\n\nexport type
MemoizedProjection = {\n memoized: AnyFn;\n reset: () => void;\n setResult: (result?: any) => void;\n
clearResult: () => void;\n};\n\nexport type MemoizeFn = (t: AnyFn) => MemoizedProjection;\n\nexport type
ComparatorFn = (a: any, b: any) => boolean;\n\nexport type DefaultProjectorFn<T> = (...args: any[]) =>
T;\n\nexport interface MemoizedSelector<\n State,\n Result,\n ProjectorFn = DefaultProjectorFn<Result>\n>\n
extends Selector<State, Result> {\n release(): void;\n projector: ProjectorFn;\n setResult: (result?: Result) =>
void;\n clearResult: () => void;\n}\n\n/**\n * @deprecated Selectors with props are deprecated, for more info see

```

```

{ @link https://github.com/ngrx/platform/issues/2980 Github Issue}
MemoizedSelectorWithProps<State, Props, Result, ProjectorFn = DefaultProjectorFn<Result>>
extends SelectorWithProps<State, Props, Result> {
  release(): void;
  projector: ProjectorFn;
  setResult: (result?: Result) => void;
  clearResult: () => void;
}
export function isEqualCheck(a: any, b: any): boolean {
  return a === b;
}
function isArgumentsChanged(
  args: IArguments,
  lastArguments: IArguments,
  comparator: ComparatorFn
) {
  for (let i = 0; i < args.length; i++) {
    if (!comparator(args[i], lastArguments[i])) {
      return true;
    }
  }
  return false;
}
export function resultMemoize(
  projectionFn: AnyFn,
  isResultEqual: ComparatorFn
) {
  return defaultMemoize(projectionFn, isEqualCheck, isResultEqual);
}
export function defaultMemoize(
  projectionFn: AnyFn,
  isArgumentsEqual = isEqualCheck,
  isResultEqual = isEqualCheck
): MemoizedProjection {
  let lastArguments: null | IArguments = null;
  // eslint-disable-next-line @typescript-eslint/no-explicit-any, , , ,
  let lastResult: any = null;
  let overrideResult: any;
  function reset() {
    lastArguments = null;
    lastResult = null;
  }
  function setResult(result: any = undefined) {
    overrideResult = { result };
  }
  function clearResult() {
    overrideResult = undefined;
  }
  /* eslint-disable prefer-rest-params, prefer-spread */
  // disabled because of the use of `arguments`
  function memoized(): any {
    if (overrideResult !== undefined) {
      return overrideResult.result;
    }
    if (!lastArguments) {
      lastResult = projectionFn.apply(null, arguments as any);
    }
    lastArguments = arguments;
    return lastResult;
  }
  if (!isArgumentsChanged(arguments, lastArguments, isArgumentsEqual)) {
    return lastResult;
  }
  const newResult = projectionFn.apply(null, arguments as any);
  lastArguments = arguments;
  if (isResultEqual(lastResult, newResult)) {
    return lastResult;
  }
  lastResult = newResult;
  return newResult;
}
export function createSelector<State, S1, Result>(
  s1: Selector<State, S1>,
  projector: (s1: S1) => Result
): MemoizedSelector<State, Result>;
/**
 * @deprecated Selectors with props are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}
 */
export function createSelector<State, Props, S1, Result>(
  s1: SelectorWithProps<State, Props, S1>,
  projector: (s1: S1, props: Props) => Result
): MemoizedSelectorWithProps<State, Props, Result>;
export function createSelector<State, S1, Result>(
  selectors: [Selector<State, S1>],
  projector: (s1: S1) => Result
): MemoizedSelector<State, Result>;
/**
 * @deprecated Selectors with props are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}
 */
export function createSelector<State, Props, S1, Result>(
  selectors: [SelectorWithProps<State, Props, S1>],
  projector: (s1: S1, props: Props) => Result
): MemoizedSelectorWithProps<State, Props, Result>;
export function createSelector<State, S1, S2, Result>(
  s1: Selector<State, S1>,
  s2: Selector<State, S2>,
  projector: (s1: S1, s2: S2) => Result
): MemoizedSelector<State, Result>;
/**
 * @deprecated Selectors with props are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}
 */
export function createSelector<State, Props, S1, S2, Result>(
  s1: SelectorWithProps<State, Props, S1>,
  s2: SelectorWithProps<State, Props, S2>,
  projector: (s1: S1, s2: S2, props: Props) => Result
): MemoizedSelectorWithProps<State, Props, Result>;
export function createSelector<State, S1, S2, Result>(
  selectors: [Selector<State, S1>, Selector<State, S2>],
  projector: (s1: S1, s2: S2) => Result
): MemoizedSelector<State, Result>;
/**
 * @deprecated Selectors with props are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}
 */
export function createSelector<State, Props, S1, S2, Result>(
  selectors: [
    SelectorWithProps<State, Props, S1>,
    SelectorWithProps<State, Props, S2>
  ],
  projector: (s1: S1, s2: S2, props: Props) => Result
): MemoizedSelectorWithProps<State, Props, Result>;
export function createSelector<State, S1, S2, S3, Result>(
  s1: Selector<State, S1>,
  s2: Selector<State, S2>,
  s3: Selector<State, S3>,
  projector: (s1: S1, s2: S2, s3: S3) => Result
): MemoizedSelector<State, Result>;
/**
 * @deprecated Selectors with props are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}
 */
export function createSelector<State, Props, S1, S2, S3, Result>(
  s1: SelectorWithProps<State, Props, S1>,
  s2: SelectorWithProps<State, Props, S2>,
  s3: SelectorWithProps<State, Props, S3>,
  projector: (s1: S1, s2: S2, s3: S3, props: Props) => Result
): MemoizedSelectorWithProps<State, Props, Result>;

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SelectorWithProps<State, Props, S2>,\n s3: SelectorWithProps<State, Props, S3>,\n projector: (s1: S1, s2: S2, s3:
S3, props: Props) => Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function
createSelector<State, S1, S2, S3, Result>(\n selectors: [Selector<State, S1>, Selector<State, S2>, Selector<State,
S3>],\n projector: (s1: S1, s2: S2, s3: S3) => Result\n): MemoizedSelector<State, Result>;\n\n/**\n * @deprecated
Selectors with props are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github
Issue}\n */\n\nexport function createSelector<State, Props, S1, S2, S3, Result>(\n selectors: [\n
SelectorWithProps<State, Props, S1>,\n SelectorWithProps<State, Props, S2>,\n SelectorWithProps<State,
Props, S3>\n ],\n projector:
(s1: S1, s2: S2, s3: S3, props: Props) => Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport
function createSelector<State, S1, S2, S3, S4, Result>(\n s1: Selector<State, S1>,\n s2: Selector<State, S2>,\n s3:
Selector<State, S3>,\n s4: Selector<State, S4>,\n projector: (s1: S1, s2: S2, s3: S3, s4: S4) => Result\n):
MemoizedSelector<State, Result>;\n\n/**\n * @deprecated Selectors with props are deprecated, for more info see
{ @link https://github.com/ngrx/platform/issues/2980 Github Issue}\n */\n\nexport function createSelector<State,
Props, S1, S2, S3, S4, Result>(\n s1: SelectorWithProps<State, Props, S1>,\n s2: SelectorWithProps<State, Props,
S2>,\n s3: SelectorWithProps<State, Props, S3>,\n s4: SelectorWithProps<State, Props, S4>,\n projector: (s1: S1,
s2: S2, s3: S3, s4: S4, props: Props) => Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport
function createSelector<State, S1, S2, S3, S4, Result>(\n selectors: [\n Selector<State,
S1>,\n Selector<State, S2>,\n Selector<State, S3>,\n Selector<State, S4>\n ],\n projector: (s1: S1, s2: S2, s3:
S3, s4: S4) => Result\n): MemoizedSelector<State, Result>;\n\n/**\n * @deprecated Selectors with props are
deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}\n */\n\nexport
function createSelector<State, Props, S1, S2, S3, S4, Result>(\n selectors: [\n SelectorWithProps<State, Props,
S1>,\n SelectorWithProps<State, Props, S2>,\n SelectorWithProps<State, Props, S3>,\n SelectorWithProps<State,
Props, S4>\n ],\n projector: (s1: S1, s2: S2, s3: S3, s4: S4, props: Props) => Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function createSelector<State, S1, S2, S3, S4, S5,
Result>(\n s1: Selector<State, S1>,\n s2: Selector<State, S2>,\n s3: Selector<State, S3>,\n s4: Selector<State,
S4>,\n s5: Selector<State, S5>,\n projector: (s1: S1, s2: S2, s3: S3, s4: S4, s5: S5) => Result\n):
MemoizedSelector<State,
Result>;\n\n/**\n * @deprecated Selectors with props are deprecated, for more info see { @link
https://github.com/ngrx/platform/issues/2980 Github Issue}\n */\n\nexport function createSelector<State, Props, S1,
S2, S3, S4, S5, Result>(\n s1: SelectorWithProps<State, Props, S1>,\n s2: SelectorWithProps<State, Props, S2>,\n
s3: SelectorWithProps<State, Props, S3>,\n s4: SelectorWithProps<State, Props, S4>,\n s5:
SelectorWithProps<State, Props, S5>,\n projector: (s1: S1, s2: S2, s3: S3, s4: S4, s5: S5, props: Props) =>
Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function createSelector<State, S1, S2, S3,
S4, S5, Result>(\n selectors: [\n Selector<State, S1>,\n Selector<State, S2>,\n Selector<State, S3>,\n
Selector<State, S4>,\n Selector<State, S5>\n ],\n projector: (s1: S1, s2: S2, s3: S3, s4: S4, s5: S5) => Result\n):
MemoizedSelector<State, Result>;\n\n/**\n * @deprecated Selectors with props are deprecated, for more info see
{ @link
https://github.com/ngrx/platform/issues/2980 Github Issue}\n */\n\nexport function createSelector<State, Props, S1,
S2, S3, S4, S5, Result>(\n selectors: [\n SelectorWithProps<State, Props, S1>,\n SelectorWithProps<State,
Props, S2>,\n SelectorWithProps<State, Props, S3>,\n SelectorWithProps<State, Props, S4>,\n
SelectorWithProps<State, Props, S5>\n ],\n projector: (s1: S1, s2: S2, s3: S3, s4: S4, s5: S5, props: Props) =>
Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function createSelector<State, S1, S2, S3,
S4, S5, S6, Result>(\n s1: Selector<State, S1>,\n s2: Selector<State, S2>,\n s3: Selector<State, S3>,\n s4:
Selector<State, S4>,\n s5: Selector<State, S5>,\n s6: Selector<State, S6>,\n projector: (s1: S1, s2: S2, s3: S3, s4:
S4, s5: S5, s6: S6) => Result\n): MemoizedSelector<State, Result>;\n\n/**\n * @deprecated Selectors with props are
deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}\n */\n\nexport
function createSelector<State, Props, S1, S2, S3, S4, S5, S6, Result>(\n s1: SelectorWithProps<State,
Props, S1>,\n s2: SelectorWithProps<State, Props, S2>,\n s3: SelectorWithProps<State, Props, S3>,\n s4:

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SelectorWithProps<State, Props, S4>,\n s5: SelectorWithProps<State, Props, S5>,\n s6: SelectorWithProps<State,
Props, S6>,\n projector: (\n s1: S1,\n s2: S2,\n s3: S3,\n s4: S4,\n s5: S5,\n s6: S6,\n props: Props\n )
=> Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function createSelector<State, S1, S2,
S3, S4, S5, S6, Result>(\n selectors: [\n Selector<State, S1>,\n Selector<State, S2>,\n Selector<State, S3>,\n Selector<State, S4>,\n Selector<State, S5>,\n Selector<State, S6>\n ],\n projector: (s1: S1, s2: S2, s3: S3, s4:
S4, s5: S5, s6: S6) => Result\n): MemoizedSelector<State, Result>;\n\n/**\n * @deprecated Selectors with props are
deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980
Github Issue}\n *\nexport function createSelector<State, Props, S1, S2, S3, S4, S5, S6, Result>(\n selectors: [\n
SelectorWithProps<State, Props, S1>,\n SelectorWithProps<State, Props, S2>,\n SelectorWithProps<State,
Props, S3>,\n SelectorWithProps<State, Props, S4>,\n SelectorWithProps<State, Props, S5>,\n
SelectorWithProps<State, Props, S6>\n ],\n projector: (\n s1: S1,\n s2: S2,\n s3: S3,\n s4: S4,\n s5: S5,\n
s6: S6,\n props: Props\n ) => Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function
createSelector<State, S1, S2, S3, S4, S5, S6, S7, Result>(\n s1: Selector<State, S1>,\n s2: Selector<State, S2>,\n
s3: Selector<State, S3>,\n s4: Selector<State, S4>,\n s5: Selector<State, S5>,\n s6: Selector<State, S6>,\n s7:
Selector<State, S7>,\n projector: (s1: S1, s2: S2, s3: S3, s4: S4, s5: S5, s6: S6, s7: S7) => Result\n):
MemoizedSelector<State, Result>;\n\n/**\n * @deprecated Selectors with props
are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue}\n *\nexport
function createSelector<\n State,\n Props,\n S1,\n S2,\n S3,\n S4,\n S5,\n S6,\n S7,\n Result\n>(\n s1:
SelectorWithProps<State, Props, S1>,\n s2: SelectorWithProps<State, Props, S2>,\n s3: SelectorWithProps<State,
Props, S3>,\n s4: SelectorWithProps<State, Props, S4>,\n s5: SelectorWithProps<State, Props, S5>,\n s6:
SelectorWithProps<State, Props, S6>,\n s7: SelectorWithProps<State, Props, S7>,\n projector: (\n s1: S1,\n s2:
S2,\n s3: S3,\n s4: S4,\n s5: S5,\n s6: S6,\n s7: S7,\n props: Props\n ) => Result\n):
MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function createSelector<State, S1, S2, S3, S4, S5, S6,
S7, Result>(\n selectors: [\n Selector<State, S1>,\n Selector<State, S2>,\n Selector<State, S3>,\n
Selector<State, S4>,\n Selector<State, S5>,\n Selector<State, S6>,\n Selector<State, S7>\n ],\n
projector: (s1: S1, s2: S2, s3: S3, s4: S4, s5: S5, s6: S6, s7: S7) => Result\n): MemoizedSelector<State,
Result>;\n\n/**\n * @deprecated Selectors with props are deprecated, for more info see { @link
https://github.com/ngrx/platform/issues/2980 Github Issue}\n *\nexport function createSelector<\n State,\n
Props,\n S1,\n S2,\n S3,\n S4,\n S5,\n S6,\n S7,\n Result\n>(\n selectors: [\n SelectorWithProps<State, Props,
S1>,\n SelectorWithProps<State, Props, S2>,\n SelectorWithProps<State, Props, S3>,\n
SelectorWithProps<State, Props, S4>,\n SelectorWithProps<State, Props, S5>,\n SelectorWithProps<State,
Props, S6>,\n SelectorWithProps<State, Props, S7>\n ],\n projector: (\n s1: S1,\n s2: S2,\n s3: S3,\n s4:
S4,\n s5: S5,\n s6: S6,\n s7: S7,\n props: Props\n ) => Result\n): MemoizedSelectorWithProps<State, Props,
Result>;\n\nexport function createSelector<State, S1, S2, S3, S4, S5, S6, S7, S8, Result>(\n s1: Selector<State,
S1>,\n
s2: Selector<State, S2>,\n s3: Selector<State, S3>,\n s4: Selector<State, S4>,\n s5: Selector<State, S5>,\n s6:
Selector<State, S6>,\n s7: Selector<State, S7>,\n s8: Selector<State, S8>,\n projector: (\n s1: S1,\n s2: S2,\n
s3: S3,\n s4: S4,\n s5: S5,\n s6: S6,\n s7: S7,\n s8: S8\n ) => Result\n): MemoizedSelector<State,
Result>;\n\n/**\n * @deprecated Selectors with props are deprecated, for more info see { @link
https://github.com/ngrx/platform/issues/2980 Github Issue}\n *\nexport function createSelector<\n State,\n
Props,\n S1,\n S2,\n S3,\n S4,\n S5,\n S6,\n S7,\n S8,\n Result\n>(\n s1: SelectorWithProps<State, Props,
S1>,\n s2: SelectorWithProps<State, Props, S2>,\n s3: SelectorWithProps<State, Props, S3>,\n s4:
SelectorWithProps<State, Props, S4>,\n s5: SelectorWithProps<State, Props, S5>,\n s6: SelectorWithProps<State,
Props, S6>,\n s7: SelectorWithProps<State, Props, S7>,\n s8: SelectorWithProps<State, Props, S8>,\n projector:
(\n s1: S1,\n s2: S2,\n s3: S3,\n s4: S4,\n s5: S5,\n s6: S6,\n s7: S7,\n s8: S8,\n props: Props\n ) =>
Result\n): MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function createSelector<State, S1, S2, S3,
S4, S5, S6, S7, S8, Result>(\n selectors: [\n Selector<State, S1>,\n Selector<State, S2>,\n Selector<State,
S3>,\n Selector<State, S4>,\n Selector<State, S5>,\n Selector<State, S6>,\n Selector<State, S7>,\n

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Selector<State, S8>(n ], n projector: (n s1: S1, n s2: S2, n s3: S3, n s4: S4, n s5: S5, n s6: S6, n s7:
S7, n s8: S8(n ) => Result(n): MemoizedSelector<State, Result>;\n/**\n * @deprecated Selectors with props are
deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue }\n * \nexport
function createSelector<n State, n Props, n S1, n S2, n S3, n S4, n S5, n S6, n S7, n S8, n Result(n)>(n
selectors: [n SelectorWithProps<State, Props, S1>, n
SelectorWithProps<State, Props, S2>, n SelectorWithProps<State, Props, S3>, n SelectorWithProps<State,
Props, S4>, n SelectorWithProps<State, Props, S5>, n SelectorWithProps<State, Props, S6>, n
SelectorWithProps<State, Props, S7>, n SelectorWithProps<State, Props, S8>(n ], n projector: (n s1: S1, n
s2: S2, n s3: S3, n s4: S4, n s5: S5, n s6: S6, n s7: S7, n s8: S8, n props: Props(n ) => Result(n):
MemoizedSelectorWithProps<State, Props, Result>;\n\nexport function createSelector(n ...input: any[])(n:
MemoizedSelector<any, any> | MemoizedSelectorWithProps<any, any, any> {n return
createSelectorFactory(defaultMemoize)(...input);n }\n\nexport function defaultStateFn(n state: any, n selectors:
Selector<any, any>[] | SelectorWithProps<any, any, any>[], n props: any, n memoizedProjector:
MemoizedProjection(n): any {n if (props === undefined) {n const args = (<Selector<any,
any>[]>selectors).map((fn) => fn(state));n
return memoizedProjector.memoized.apply(null, args);n }n\n const args = (<SelectorWithProps<any, any,
any>[]>selectors).map((fn) => n fn(state, props)\n );n return memoizedProjector.memoized.apply(null, [...args,
props]);n }\n\nexport type SelectorFactoryConfig<T = any, V = any> = {n stateFn: (n state: T, n selectors:
Selector<any, any>[], n props: any, n memoizedProjector: MemoizedProjection(n ) => V;n };n\n\nexport
function createSelectorFactory<T = any, V = any>(n memoize: MemoizeFn(n): (...input: any[]) =>
MemoizedSelector<T, V>;\n\nexport function createSelectorFactory<T = any, V = any>(n memoize: MemoizeFn, n
options: SelectorFactoryConfig<T, V>(n): (...input: any[]) => MemoizedSelector<T, V>;\n/**\n * @deprecated
Selectors with props are deprecated, for more info see { @link https://github.com/ngrx/platform/issues/2980 Github
Issue }\n * \nexport function createSelectorFactory<T = any, Props = any, V = any>(n memoize: MemoizeFn(n):
(...input: any[]) =>
MemoizedSelectorWithProps<T, Props, V>;\n/**\n * @deprecated Selectors with props are deprecated, for more
info see { @link https://github.com/ngrx/platform/issues/2980 Github Issue }\n * \nexport function
createSelectorFactory<T = any, Props = any, V = any>(n memoize: MemoizeFn, n options:
SelectorFactoryConfig<T, V>(n): (...input: any[]) => MemoizedSelectorWithProps<T, Props, V>;\n/**\n * \n *
@param memoize The function used to memoize selectors\n * @param options Config Object that may include a
`stateFn` function defining how to return the selector's value, given the entire `Store`'s state, parent `Selector`'s,
`Props`, and a `MemoizedProjection`\n * \n * @usageNotes\n * \n * **Creating a Selector Factory Where Array
Order Does Not Matter**\n * \n * ``\n * function removeMatch(arr: string[], target: string): string[] {n * const
matchIndex = arr.indexOf(target);n * return [...arr.slice(0, matchIndex), ...arr.slice(matchIndex + 1)];n * }\n * \n *
function orderDoesNotMatterComparer(a:
any, b: any): boolean {n * if (!Array.isArray(a) || !Array.isArray(b)) {n * return a === b;n * }\n * if
(a.length !== b.length) {n * return false;n * }\n * let tempB = [...b];n * function
reduceToDetermineIfArraysContainSameContents(n * previousCallResult: boolean, n * arrayMember: any(n *
): boolean {n * if (previousCallResult === false) {n * return false;n * }\n * if
(tempB.includes(arrayMember)) {n * tempB = removeMatch(tempB, arrayMember);n * return true;n *
}\n * return false;n * }\n * return a.reduce(reduceToDetermineIfArraysContainSameContents, true);n * }\n *
\n * export const createOrderDoesNotMatterSelector = createSelectorFactory(n * (projectionFun) =>
defaultMemoize(n * projectionFun, n * orderDoesNotMatterComparer, n * orderDoesNotMatterComparer(n *
)\n * );n * \n * ``\n * \n * **Creating an Alternative Memoization Strategy**\n * \n * ``\n * function serialize(x:
any): string {n * return JSON.stringify(x);n * }\n * \n * export const createFullHistorySelector =
createSelectorFactory(n * (projectionFunction) => {n * const cache = {};\n * function memoized() {n *
const serializedArguments = serialize(...arguments);n * if (cache[serializedArguments] != null) {n *
cache[serializedArguments] = projectionFunction.apply(null, arguments);n * }\n * return

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State**\n *\n * ``\ts\n * const productsFeature = createFeature({\n * name: 'products',\n * reducer:
createReducer(initialState),\n * });\n *\n * const {\n * selectProductsState, // type:
MemoizedSelector<Record<string, any>, ProductsState>\n * selectProducts, // type:
MemoizedSelector<Record<string, any>, Product[]>\n * selectSelectedId,
// type: MemoizedSelector<Record<string, any, string | null>\n * } = productsFeature;\n * ``\n *\n\nexport function
createFeature<\n AppState extends Record<string, any>,\n FeatureName extends keyof AppState & string = keyof
AppState & string,\n FeatureState extends AppState[FeatureName] = AppState[FeatureName]\n>(\n featureConfig:
FeatureConfig<FeatureName, FeatureState> &\n NotAllowedFeatureStateCheck<FeatureState>)\n):
Feature<AppState, FeatureName, FeatureState> {\n const { name, reducer } = featureConfig;\n const
featureSelector = createFeatureSelector<FeatureState>(name);\n const nestedSelectors =
createNestedSelectors(featureSelector, reducer);\n\n return ({\n name,\n reducer,\n
[ `select${capitalize(name)}State` ]: featureSelector,\n ...nestedSelectors,\n } as unknown) as Feature<AppState,
FeatureName, FeatureState>;\n}\n\nfunction createNestedSelectors<\n AppState extends Record<string, any>,\n
FeatureState\n>(\n featureSelector: MemoizedSelector<AppState,
FeatureState>,\n reducer: ActionReducer<FeatureState>)\n): NestedSelectors<AppState, FeatureState> {\n const
initialState = getInitialState(reducer);\n const nestedKeys = (isPlainObject(initialState)\n ?
Object.keys(initialState)\n : []) as Array<keyof FeatureState & string>;\n\n return nestedKeys.reduce(\n
(nestedSelectors, nestedKey) => ({\n ...nestedSelectors,\n [ `select${capitalize(nestedKey)}` ]:
createSelector(\n featureSelector,\n (parentState) => parentState?.[nestedKey]\n ),\n },\n {} as
NestedSelectors<AppState, FeatureState>\n );\n}\n\nfunction getInitialState<FeatureState>(\n reducer:
ActionReducer<FeatureState>)\n): FeatureState {\n return reducer(undefined, { type: '@ngrx/feature/init'
});\n}\n\n", "import { ActionReducer, Action } from './models';\n\nimport { isFunction, hasOwnProperty, isObjectLike
} from './utils';\n\nexport function immutabilityCheckMetaReducer(\n reducer: ActionReducer<any, any>,\n
checks:
{ action: (action: Action) => boolean; state: () => boolean }\n): ActionReducer<any, any> {\n return function
(state, action) {\n const act = checks.action(action) ? freeze(action) : action;\n const nextState = reducer(state,
act);\n\n return checks.state() ? freeze(nextState) : nextState;\n };}\n\nfunction freeze(target: any) {\n
Object.freeze(target);\n\n const targetIsFunction = isFunction(target);\n\n
Object.getOwnPropertyNames(target).forEach((prop) => {\n // Ignore Ivy properties, ref:
https://github.com/ngrx/platform/issues/2109#issuecomment-582689060\n if (prop.startsWith("@")) {\n return;\n
}\n\n if (\n hasOwnProperty(target, prop) &&\n (targetIsFunction\n ? prop !== 'caller' && prop !==
'callee' && prop !== 'arguments'\n : true)\n ) {\n const propValue = target[prop];\n\n if (\n
(isObjectLike(propValue) || isFunction(propValue)) &&\n !Object.isFrozen(propValue)\n ) {\n
freeze(propValue);\n
}\n }\n });\n\n return target;\n}\n\n", "import { ActionReducer, Action } from './models';\n\nimport {\n
isPlainObject,\n isUndefined,\n isNull,\n isNumber,\n isBoolean,\n isString,\n isArray,\n
RUNTIME_CHECK_URL,\n isComponent,\n } from './utils';\n\nexport function serializationCheckMetaReducer(\n
reducer: ActionReducer<any, any>,\n checks: { action: (action: Action) => boolean; state: () => boolean }\n):
ActionReducer<any, any> {\n return function (state, action) {\n if (checks.action(action)) {\n const
unserializableAction = getUnserializable(action);\n throwIfUnserializable(unserializableAction, 'action');\n
}\n\n const nextState = reducer(state, action);\n\n if (checks.state()) {\n const unserializableState =
getUnserializable(nextState);\n throwIfUnserializable(unserializableState, 'state');\n }\n\n return nextState;\n
};}\n\nfunction getUnserializable(\n target?: any,\n path: string[] = [])\n): false |
{ path: string[]; value: any } {\n // Guard against undefined and null, e.g. a reducer that returns undefined\n if
((isUndefined(target) || isNull(target)) && path.length === 0) {\n return {\n path: ['root'],\n value: target,\n
};\n }\n\n const keys = Object.keys(target);\n return keys.reduce<false | { path: string[]; value: any }>((result, key)
=> {\n if (result) {\n return result;\n }\n\n const value = (target as any)[key];\n\n // Ignore Ivy
components\n if (isComponent(value)) {\n return result;\n }\n\n if (\n isUndefined(value) ||\n

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isNull(value) ||\n  isNumber(value) ||\n  isBoolean(value) ||\n  isString(value) ||\n  isArray(value)\n ) {\n  return false;\n }\n\n if (isPlainObject(value)) {\n  return getUnserializable(value, [...path, key]);\n }\n\n return {\n  path: [...path, key],\n  value,\n  }, false);\n}\n\nfunction throwIfUnserializable(\n  unserializable: false\n  | { path: string[]; value: any },\n  context: 'state' | 'action'\n) {\n  if (unserializable === false) {\n    return;\n  }\n\n  const unserializablePath = unserializable.path.join('.');\n  const error: any = new Error(\n    `Detected unserializable\n    ${context} at \"${unserializablePath}\". ${RUNTIME_CHECK_URL}#strict${context}serializability`\n  );\n  error.value = unserializable.value;\n  error.unserializablePath = unserializablePath;\n  throw error;\n}\n\n", "import *\n  as ngCore from '@angular/core';\n  import { Action, ActionReducer } from './models';\n  import {\n    RUNTIME_CHECK_URL } from './utils';\n  \n  export function inNgZoneAssertMetaReducer(\n    reducer:\n    ActionReducer<any, Action>,\n    checks: { action: (action: Action) => boolean }\n  ) {\n    return function (state: any,\n    action: Action) {\n      if (checks.action(action) && !ngCore.NgZone.isInAngularZone()) {\n        throw new Error(\n          `Action '${action.type}' running outside NgZone. ${RUNTIME_CHECK_URL}#strictactionwithinngzone`\n        );\n      }\n      return reducer(state, action);\n    };}\n  }\n\n  ", "import { isDevMode, Provider } from\n  '@angular/core';\n  import {\n    serializationCheckMetaReducer,\n    immutabilityCheckMetaReducer,\n    inNgZoneAssertMetaReducer,\n  } from './meta-reducers';\n  import { RuntimeChecks, MetaReducer, Action } from\n  './models';\n  import {\n    _USER_RUNTIME_CHECKS,\n    ACTIVE_RUNTIME_CHECKS,\n    META_REducers,\n    USER_RUNTIME_CHECKS,\n    _ACTION_TYPE_UNIQUENESS_CHECK,\n  } from\n  './tokens';\n  import { REGISTERED_ACTION_TYPES } from './globals';\n  import { RUNTIME_CHECK_URL }\n  from './meta-reducers/utils';\n  \n  export function createActiveRuntimeChecks(\n    runtimeChecks?:\n    Partial<RuntimeChecks>)\n  ): RuntimeChecks {\n    if (isDevMode()) {\n      return {\n        strictStateSerializability:\n        false,\n        strictActionSerializability: false,\n        strictStateImmutability: true,\n        strictActionImmutability: true,\n        strictActionWithinNgZone: false,\n        strictActionTypeUniqueness: false,\n        ...runtimeChecks,\n      };\n    }\n    return {\n      strictStateSerializability: false,\n      strictActionSerializability: false,\n      strictStateImmutability: false,\n      strictActionImmutability: false,\n      strictActionWithinNgZone: false,\n      strictActionTypeUniqueness: false,\n    };}\n  }\n\n  export function createSerializationCheckMetaReducer({\n    strictActionSerializability,\n    strictStateSerializability,\n  }: RuntimeChecks): MetaReducer {\n    return (reducer) =>{\n      strictActionSerializability || strictStateSerializability\n      ? serializationCheckMetaReducer(reducer, {\n        action: (action) =>{\n          strictActionSerializability && !ignoreNgrxAction(action),\n          state: () =>\n            strictStateSerializability,\n        })\n        : reducer;\n      }\n    }\n  }\n\n  export function createImmutabilityCheckMetaReducer({\n    strictActionImmutability,\n    strictStateImmutability,\n  }: RuntimeChecks): MetaReducer {\n    return (reducer) =>{\n      strictActionImmutability || strictStateImmutability\n      ? immutabilityCheckMetaReducer(reducer,\n        {\n          action: (action) =>{\n            strictActionImmutability && !ignoreNgrxAction(action),\n            state: () =>\n              strictStateImmutability,\n          })\n          : reducer;\n        }\n      }\n    }\n  }\n\n  function ignoreNgrxAction(action: Action) {\n    return\n    action.type.startsWith('@ngrx');\n  }\n\n  export function createInNgZoneCheckMetaReducer({\n    strictActionWithinNgZone,\n  }: RuntimeChecks): MetaReducer {\n    return (reducer) =>{\n      strictActionWithinNgZone\n      ? inNgZoneAssertMetaReducer(reducer, {\n        action: (action) =>{\n          strictActionWithinNgZone && !ignoreNgrxAction(action),\n        })\n        : reducer;\n      }\n    }\n  }\n\n  export function\n  provideRuntimeChecks(\n    runtimeChecks?: Partial<RuntimeChecks>)\n  ): Provider[] {\n    return [\n      {\n        provide: _USER_RUNTIME_CHECKS,\n        useValue: runtimeChecks,\n      },\n      {\n        provide:\n        USER_RUNTIME_CHECKS,\n        useFactory: _runtimeChecksFactory,\n        deps:\n        [_USER_RUNTIME_CHECKS],\n      },\n      {\n        provide: ACTIVE_RUNTIME_CHECKS,\n        deps: [USER_RUNTIME_CHECKS],\n        useFactory: createActiveRuntimeChecks,\n      },\n      {\n        provide:\n        META_REducers,\n        multi: true,\n        deps: [ACTIVE_RUNTIME_CHECKS],\n        useFactory:\n        createImmutabilityCheckMetaReducer,\n      },\n      {\n        provide: META_REducers,\n        multi: true,\n        deps:\n        [ACTIVE_RUNTIME_CHECKS],\n        useFactory:\n        createSerializationCheckMetaReducer,\n      },\n      {\n        provide: META_REducers,\n        multi: true,\n        deps: [ACTIVE_RUNTIME_CHECKS],\n        useFactory:\n        createInNgZoneCheckMetaReducer,\n      },\n    ];\n  }\n\n  export function checkForActionTypeUniqueness(): Provider[]

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{\n return [\n {\n provide: _ACTION_TYPE_UNIQUENESS_CHECK,\n multi: true,\n deps:
[ACTIVE_RUNTIME_CHECKS],\n useFactory: _actionTypeUniquenessCheck,\n },\n ];\n}\n\n\nexport
function _runtimeChecksFactory(\n runtimeChecks: RuntimeChecks\n): RuntimeChecks {\n return
runtimeChecks;\n}\n\n\nexport function _actionTypeUniquenessCheck(config:
RuntimeChecks): void {\n if (!config.strictActionTypeUniqueness) {\n return;\n }\n\n\nconst duplicates =
Object.entries(REGISTERED_ACTION_TYPES)\n .filter(([, registrations]) => registrations > 1)\n
.map(([, type]) => type);\n\n\nif (duplicates.length) {\n throw new Error(\n `Action types are registered more than
once, ${duplicates\n .map((type) => `\"${type}\"`)\n .join(', ')}.
${RUNTIME_CHECK_URL}#strictactiontypeuniqueness`
);\n }\n}\n\n\n",import {\n NgModule,\n Inject,\n
ModuleWithProviders,\n OnDestroy,\n InjectionToken,\n Injector,\n Optional,\n SkipSelf,\n } from
'@angular/core';\n\nimport {\n Action,\n ActionReducer,\n ActionReducerMap,\n ActionReducerFactory,\n
StoreFeature,\n InitialState,\n MetaReducer,\n RuntimeChecks,\n } from './models';\n\nimport { combineReducers,
createReducerFactory } from './utils';\n\nimport {\n INITIAL_STATE,\n INITIAL_REDUCERS,\n
_INITIAL_REDUCERS,\n REDUCER_FACTORY,\n _REDUCER_FACTORY,\n
STORE_FEATURES,\n _INITIAL_STATE,\n META_REDUCERS,\n _STORE_REDUCERS,\n
FEATURE_REDUCERS,\n _FEATURE_REDUCERS,\n _FEATURE_REDUCERS_TOKEN,\n
_STORE_FEATURES,\n _FEATURE_CONFIGS,\n USER_PROVIDED_META_REDUCERS,\n
_RESOLVED_META_REDUCERS,\n _ROOT_STORE_GUARD,\n ACTIVE_RUNTIME_CHECKS,\n
_ACTION_TYPE_UNIQUENESS_CHECK,\n } from './tokens';\n\nimport { ACTIONS_SUBJECT_PROVIDERS,
ActionsSubject } from './actions_subject';\n\nimport {\n REDUCER_MANAGER_PROVIDERS,\n
ReducerManager,\n ReducerObservable,\n } from './reducer_manager';\n\nimport {\n
SCANNED_ACTIONS_SUBJECT_PROVIDERS,\n ScannedActionsSubject,\n } from
'./scanned_actions_subject';\n\nimport { STATE_PROVIDERS } from './state';\n\nimport { STORE_PROVIDERS,
Store } from './store';\n\nimport {\n provideRuntimeChecks,\n checkForActionTypeUniqueness,\n } from
'./runtime_checks';\n\n\n@NgModule({})\n\nexport class StoreRootModule {\n constructor(\n actions$:
ActionsSubject,\n reducer$: ReducerObservable,\n scannedActions$: ScannedActionsSubject,\n
store: Store<any>,\n @Optional()\n @Inject(_ROOT_STORE_GUARD)\n guard: any,\n @Optional()\n
@Inject(_ACTION_TYPE_UNIQUENESS_CHECK)\n actionCheck: any\n ) {\n }\n\n\n@NgModule({})\n\nexport
class StoreFeatureModule implements OnDestroy {\n constructor(\n @Inject(_STORE_FEATURES) private
features: StoreFeature<any, any>[],\n @Inject(FEATURE_REDUCERS) private featureReducers:
ActionReducerMap<any>[],\n private reducerManager: ReducerManager,\n root: StoreRootModule,\n
@Optional()\n @Inject(_ACTION_TYPE_UNIQUENESS_CHECK)\n actionCheck: any\n ) {\n\n\nconst feats =
features.map((feature, index) => {\n const featureReducerCollection = featureReducers.shift();\n // eslint-
disable-next-line @typescript-eslint/no-non-null-assertion\n const reducers = featureReducerCollection!\n
/*TODO(#823)*/[index];\n\n return {\n ...feature,\n reducers,\n initialState:
_initialStateFactory(feature.initialState),\n
};\n });\n\n\nreducerManager.addFeatures(feats);\n }\n\n\n// eslint-disable-next-line @angular-
eslint/contextual-lifecycle\n\nngOnDestroy() {\n this.reducerManager.removeFeatures(this.features);\n
}\n}\n\n\nexport interface StoreConfig<T, V extends Action = Action> {\n initialState?: InitialState<T>;\n
reducerFactory?: ActionReducerFactory<T, V>;\n metaReducers?: MetaReducer<T, V>[];\n}\n\n\nexport interface
RootStoreConfig<T, V extends Action = Action>\n extends StoreConfig<T, V> {\n runtimeChecks?:
Partial<RuntimeChecks>;\n}\n\n\n/**\n * An object with the name and the reducer for the feature.\n */\n\nexport
interface FeatureSlice<T, V extends Action = Action> {\n name: string;\n reducer: ActionReducer<T,
V>;\n}\n\n\n@NgModule({})\n\nexport class StoreModule {\n static forRoot<T, V extends Action = Action>(\n
reducers: ActionReducerMap<T, V> | InjectionToken<ActionReducerMap<T, V>>,\n config?:
RootStoreConfig<T, V>\n ): ModuleWithProviders<StoreRootModule>;\n\n\nstatic
forRoot(\n reducers:\n | ActionReducerMap<any, any>\n | InjectionToken<ActionReducerMap<any,
any>>,\n config: RootStoreConfig<any, any> = {\n }): ModuleWithProviders<StoreRootModule> {\n return

```

```

{\n  ngModule: StoreRootModule,\n  providers: [\n    {\n      provide: _ROOT_STORE_GUARD,\n      useFactory: _provideForRootGuard,\n      deps: [[Store, new Optional(), new SkipSelf()]],\n    },\n    {\n      provide: _INITIAL_STATE, useValue: config.initialState },\n    {\n      provide: INITIAL_STATE,\n      useFactory: _initialStateFactory,\n      deps: [_INITIAL_STATE],\n    },\n    {\n      provide: _INITIAL_REDUCERS, useValue: reducers },\n    {\n      provide: _STORE_REDUCERS,\n      useExisting:\n        reducers instanceof InjectionToken ? reducers : _INITIAL_REDUCERS,\n    },\n    {\n      provide: INITIAL_REDUCERS,\n      deps: [Injector, _INITIAL_REDUCERS, [new\nInject(_STORE_REDUCERS)]],\n      useFactory: _createStoreReducers,\n    },\n    {\n      provide: USER_PROVIDED_META_REDUCERS,\n      useValue: config.metaReducers ? config.metaReducers : [],\n    },\n    {\n      provide: _RESOLVED_META_REDUCERS,\n      deps: [META_REDUCERS, USER_PROVIDED_META_REDUCERS],\n      useFactory: _concatMetaReducers,\n    },\n    {\n      provide: _REDUCER_FACTORY,\n      useValue: config.reducerFactory\n        ? config.reducerFactory\n        : combineReducers,\n    },\n    {\n      provide: REDUCER_FACTORY,\n      deps: [_REDUCER_FACTORY, _RESOLVED_META_REDUCERS],\n      useFactory: createReducerFactory,\n    },\n    ACTIONS_SUBJECT_PROVIDERS,\n    REDUCER_MANAGER_PROVIDERS,\n    SCANNED_ACTIONS_SUBJECT_PROVIDERS,\n    STATE_PROVIDERS,\n    STORE_PROVIDERS,\n    provideRuntimeChecks(config.runtimeChecks),\n    checkForActionTypeUniqueness(),\n  ],\n  }; \n  }\n  static forFeature<T, V extends Action = Action>(\n    featureName: string,\n    reducers: ActionReducerMap<T, V> | InjectionToken<ActionReducerMap<T, V>>,\n    config?: StoreConfig<T, V> | InjectionToken<StoreConfig<T, V>>\n  ): ModuleWithProviders<StoreFeatureModule>;\n  static forFeature<T, V extends Action = Action>(\n    featureName: string,\n    reducer: ActionReducer<T, V> | InjectionToken<ActionReducer<T, V>>,\n    config?: StoreConfig<T, V> | InjectionToken<StoreConfig<T, V>>\n  ): ModuleWithProviders<StoreFeatureModule>;\n  static forFeature<T, V extends Action = Action>(\n    slice: FeatureSlice<T, V>,\n    config?: StoreConfig<T, V> | InjectionToken<StoreConfig<T, V>>\n  ): ModuleWithProviders<StoreFeatureModule>;\n  static forFeature(\n    featureNameOrSlice: string | FeatureSlice<any, any>,\n    reducersOrConfig?:\n      | ActionReducerMap<any, any>\n      | InjectionToken<ActionReducerMap<any, any>>\n      | ActionReducer<any, any>\n      | InjectionToken<ActionReducer<any, any>>\n      | StoreConfig<any, any>\n      | InjectionToken<StoreConfig<any, any>>,\n    config: StoreConfig<any, any> | InjectionToken<StoreConfig<any, any>> = {} ):\n    ModuleWithProviders<StoreFeatureModule> {\n      return {\n        ngModule: StoreFeatureModule,\n        providers: [\n          {\n            provide: _FEATURE_CONFIGS,\n            multi: true,\n            useValue: featureNameOrSlice instanceof Object ? { } : config,\n          },\n          {\n            provide: STORE_FEATURES,\n            multi: true,\n            useValue: {\n              key:\n                featureNameOrSlice instanceof Object\n                  ? featureNameOrSlice.name\n                  : featureNameOrSlice,\n              reducerFactory:\n                !(config instanceof InjectionToken) && config.reducerFactory\n                ?\n                config.reducerFactory\n                : combineReducers,\n              metaReducers:\n                !(config instanceof InjectionToken) && config.metaReducers\n                ? config.metaReducers\n                : [],\n              initialState:\n                !(config instanceof InjectionToken) && config.initialState\n                ? config.initialState\n                : undefined,\n            },\n          },\n          {\n            provide: _STORE_FEATURES,\n            deps: [Injector, _FEATURE_CONFIGS, STORE_FEATURES],\n            useFactory: _createFeatureStore,\n          },\n          {\n            provide: _FEATURE_REDUCERS,\n            multi: true,\n            useValue:\n              featureNameOrSlice instanceof Object\n                ? featureNameOrSlice.reducer\n                : reducersOrConfig,\n          },\n          {\n            provide: _FEATURE_REDUCERS_TOKEN,\n            multi: true,\n            useExisting:\n              reducersOrConfig instanceof InjectionToken\n                ? reducersOrConfig\n                : _FEATURE_REDUCERS,\n          },\n          {\n            provide: FEATURE_REDUCERS,\n            multi: true,\n            deps: [\n              Injector,\n              _FEATURE_REDUCERS,\n              [new Inject(_FEATURE_REDUCERS_TOKEN)],\n            ],\n            useFactory: _createFeatureReducers,\n          },\n          checkForActionTypeUniqueness(),\n        ],\n      }; \n    }

```

```

}
}

export function _createStoreReducers(
  injector: Injector,
  reducers: ActionReducerMap<any, any>
) {
  return reducers instanceof InjectionToken ? injector.get(reducers) : reducers;
}

export function
_createFeatureStore(
  injector: Injector,
  configs: StoreConfig<any, any>[] | InjectionToken<StoreConfig<any,
  any>>[],
  featureStores: StoreFeature<any, any>[]
) {
  return featureStores.map((feat, index) => {
    if (
      configs[index] instanceof InjectionToken
    ) {
      const conf = injector.get(configs[index]);
      return {
        key:
          feat.key,
        reducerFactory:
          conf.reducerFactory
          ? conf.reducerFactory
          : combineReducers,
        metaReducers:
          conf.metaReducers
          ? conf.metaReducers
          : [],
        initialState:
          conf.initialState,
      };
    }
    return feat;
  });
}

export function _createFeatureReducers(
  injector: Injector,
  reducerCollection:
    ActionReducerMap<any, any>[]
) {
  const reducers =
    reducerCollection.map(
      (reducer) => {
        return
          reducer instanceof
            InjectionToken
            ? injector.get(
              reducer
            ) : reducer;
      }
    );
  return reducers;
}

export function
_initialStateFactory(
  initialState: any
): any {
  if (
    typeof initialState ===
    'function'
  ) {
    return
      initialState();
  }
  return
    initialState;
}

export function
_concatMetaReducers(
  metaReducers:
    MetaReducer[],
  userProvidedMetaReducers:
    MetaReducer[]
): MetaReducer[] {
  return
    metaReducers.concat(
      userProvidedMetaReducers
    );
}

export function
_provideForRootGuard(
  store:
    Store<any>
): any {
  if (
    store
  ) {
    throw
      new TypeError(
        `StoreModule.forRoot()
        called twice. Feature
        modules should use
        StoreModule.forFeature()
        instead.`
      );
  }
  return
    'guarded';
}

import {
  ActionCreator,
  ActionReducer,
  ActionType,
  Action
} from './models';

// Goes over the array of ActionCreators, pulls the action type out of each
// and returns the array of these action types.
type ExtractActionTypes<Creators extends readonly
ActionCreator[]> = {
  [Key in keyof Creators]:
  Creators[Key] extends
  ActionCreator<infer T>
  ? T
  :
  never;
};

/**
 * Return type of the `on` fn.
 * Contains the action reducer coupled to one or more action
 * types.
 */
export interface ReducerTypes<
  State,
  Creators extends readonly
  ActionCreator[]
> {
  reducer:
    OnReducer<State,
    Creators>;
  types:
    ExtractActionTypes<
    Creators>;
}

// Specialized Reducer that is aware
// of the Action type it needs to handle
export interface OnReducer<
  State,
  Creators extends readonly
  ActionCreator[]
> {
  (
    state: State,
    action:
      ActionType<
        Creators[number]>
      ): State;
}

/**
 * @description
 * Associates actions with a given state change function.
 * A state change function must be provided as the
 * last parameter.
 * @param args `ActionCreator`'s followed by a state change function.
 * @returns an
 * association of action types with a state change function.
 * @usageNotes
 * ```ts
 * on(
   AuthApiActions.loginSuccess,
   (state, { user }) => ({
     ...state,
     user
   })
 )
 */
export function on<
  State,
  Creators extends
  readonly
  ActionCreator[]
>(
  ...args: [
    ...creators:
    Creators,
    reducer:
    OnReducer<
      State,
      Creators>
  ]
): ReducerTypes<
  State,
  Creators> {
  // This could be refactored when
  // TS releases the version with this fix:
  // https://github.com/microsoft/TypeScript/pull/41544
  const
    reducer =
      args.pop() as
      OnReducer<
        any,
        Creators>;
  const
    types =
      (((args as
        unknown) as
        Creators).map(
        (creator) =>
          creator.type
      ) as
      unknown) as
      ExtractActionTypes<
        Creators>;
  return {
    reducer,
    types
  };
}

/**
 * @description
 * Creates a reducer function to handle state transitions.
 * Reducer creators reduce the
 * explicitness
 * of reducer functions with switch statements.
 * @param initialState Provides a state value if the current state is
 * `undefined`, as it is initially.
 * @param ons Associations between actions and state changes.
 * @returns A
 * reducer function.
 * @usageNotes
 * - Must be used with `ActionCreator`'s (returned by `createAction`).
 * Cannot be used with class-based action creators.
 * - The returned `ActionReducer` should additionally be wrapped
 * with another function, if you are using View Engine AOT.
 * In case you are using Ivy (or only JIT View Engine)
 * the extra wrapper function is not required.
 * **Declaring a reducer creator**
 * ```ts
 * export
   const
     reducer =
       createReducer(
         initialState,
         on(
           featureActions.actionOne,
           featureActions.actionTwo,
           (state, {
             updatedValue
           }) => ({
             ...state,
             prop:
             updatedValue
           })
         ),
         on(
           featureActions.actionThree,
           () =>
             initialState
         )
       );
 * **Declaring a reducer
 * creator using a wrapper function (Only needed if using View Engine AOT)**
 * ```ts
 * const
   featureReducer =
     createReducer(
       initialState,
       on(
         featureActions.actionOne,
         featureActions.actionTwo,
         (state, {
           updatedValue
         }) => ({
           ...state,
           prop:
           updatedValue
         })
       ),
       on(
         featureActions.actionThree,
         () =>
           initialState
       )
     );

```

```

initialState);\n * );\n *\n * export function reducer(state: State | undefined, action: Action) {\n *   return
featureReducer(state, action);\n * }\n * ```\n */\nexport function createReducer<S, A extends Action = Action>(\n
initialState: S,\n ...ons: ReducerTypes<S, readonly ActionCreator[]>[]): ActionReducer<S, A> {\n   const map =
new Map<string, OnReducer<S, ActionCreator[]>>();\n   for (const on of ons) {\n     for (const type of on.types) {\n
const existingReducer = map.get(type);\n     if (existingReducer) {\n       const newReducer: typeOf
existingReducer = (state, action) =>\n         on.reducer(existingReducer(state,
action), action);\n       map.set(type, newReducer);\n     } else {\n       map.set(type, on.reducer);\n     }\n   }\n }\n\n
return function (state: S = initialState, action: A): S {\n   const reducer = map.get(action.type);\n   return
reducer ? reducer(state, action) : state;\n };}\n\n","/**\n * DO NOT EDIT\n *\n * This file is automatically
generated at build\n */\nexport * from './public_api';\n","/**\n * Generated bundle index. Do not edit.\n
*/\nexport * from './index';\nexport { ACTIONS_SUBJECT_PROVIDERS as c } from
'./src/actions_subject';\nexport { StoreFeature as a } from './src/models';\nexport
{ REDUCER_MANAGER_PROVIDERS as d } from './src/reducer_manager';\nexport
{ _actionTypeUniquenessCheck as bg, _runtimeChecksFactory as bf, checkForActionTypeUniqueness as
be, createActiveRuntimeChecks as z, createImmutabilityCheckMetaReducer as
bb, createInNgZoneCheckMetaReducer as bc, createSerializationCheckMetaReducer as ba, provideRuntimeChecks as
bd } from './src/runtime_checks';\nexport
{ SCANNED_ACTIONS_SUBJECT_PROVIDERS as e } from './src/scanned_actions_subject';\nexport
{ isEqualCheck as f } from './src/selector';\nexport { STATE_PROVIDERS as g } from './src/state';\nexport
{ STORE_PROVIDERS as b } from './src/store';\nexport { _concatMetaReducers as x, _createFeatureReducers as
v, _createFeatureStore as u, _createStoreReducers as t, _initialStateFactory as w, _provideForRootGuard as y } from
'./src/store_module';\nexport { _ACTION_TYPE_UNIQUENESS_CHECK as s, _FEATURE_CONFIGS as
n, _FEATURE_REDUCERS as m, _FEATURE_REDUCERS_TOKEN as p, _INITIAL_REDUCERS as
k, _INITIAL_STATE as i, _REDUCER_FACTORY as j, _RESOLVED_META_REDUCERS as
q, _ROOT_STORE_GUARD as h, _STORE_FEATURES as o, _STORE_REDUCERS as
l, _USER_RUNTIME_CHECKS as r } from
'./src/tokens';\n"],"names":["BehaviorSubject", "Injectable", "InjectionToken", "Observable", "Inject", "Subject", "observe
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Module", "Optional", "SkipSelf", "Injector"], "mappings":":;,,,,,,;,,,,,,;,,,,,,;IAAA;,,,,,,;IAcA;IAEA,IAAI,aAAa
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C,CAAC,CAAC;IAC/B,CAAC,CAAC;aAEc,SAAS,CAAC,CAAC,EAAE,CAAC;QACiB,IAAI,OAAO,CAAC,K
AAK,UAAU,IAAI,CAAC,KAAK,IAAI;YACrC,MAAM,IAAI,SAAS,CAAC,sBAAsB,GAAG,MAAM,CAAC,CA
AC,CAAC,GAAG,+BAA+B,CAAC,CAAC;QAC9F,aAAa,CAAC,CAAC,EAAE,CAAC,CAAC,CAAC;QACpB,S
AAS,EAAE,KAAK,IAAI,CAAC,WAAW,GAAG,CAAC,CAAC,EAAE;QACvC,CAAC,CAAC,SAAS,GAAG,CA
AC,KAAK,IAAI,GAAG,MAAM,CAAC,MAAM,CAAC,CAAC,CAAC,IAAI,EAAE,CAAC,SAAS,GAAG,CAAC,
CAAC,SAAS,EAAE,IAAI,EAAE,EAAE,CAAC,CAAC;IACzF,CAAC;IAEM,IAAI,QAAQ,GAAG;QACiB,QAAQ
,GAAG,MAAM,CAAC,MAAM,IAAI,SAAS,QAAQ,CAAC,CAAC;YAC3C,KAAK,IAAI,CAAC,EAAE,CAAC,G
AAG,CAAC,EAAE,CAAC,GAAG,SAAS,CAAC,MAAM,EAAE,CAAC,GAAG,CAAC,EAAE,CAAC,EAAE,EA
AE;gBACjD,CAAC,GAAG,SAAS,CAAC,CAAC,CAAC,CAAC;gBACjB,KAAK,IAAI,CAAC,IAAI,CAAC;oBA
AE,IAAI,MAAM,CAAC,SAAS,CAAC,cAAc,CAAC,IAAI,CAAC,CAAC,EAAE,CAAC,CAAC;wBAAE,CAAC,C
AAC,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC,CAAC;aAChF;YACD,OAAO,CAAC,CAAC;SACZ,CA
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Found

in path(s):

\* /opt/cola/permits/1762774590\_1695958546.7276206/0/store-12-5-1-tgz/package/bundles/ngrx-store.umd.js.map  
No license file was found, but licenses were detected in source scan.

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```
* @license\n * Copyright Google Inc. All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {\n  Path,\n  join,\n  normalize,\n  relative,\n  strings,\n  basename,\n  extname,\n  dirname,\n} from '@angular-devkit/core';\nimport {\n  DirEntry, Tree } from '@angular-devkit/schematics';\nexport interface ModuleOptions {\n  module?: string;\n  name: string;\n  flat?: boolean;\n  path?: string;\n  skipImport?: boolean;\n}\n\n/**\n * Find the module referred by a set of options passed to the schematics.\n */\nexport function findModuleFromOptions(\n  host: Tree,\n  options: ModuleOptions\n): Path | undefined {\n  if (options.hasOwnProperty('skipImport')\n    && options.skipImport) {\n    return undefined;\n  }\n  if (!options.module) {\n    const pathToCheck =\n      (options.path || '') +\n      (options.flat ? '' : '/' + strings.dasherize(options.name));\n    return\n      normalize(findModule(host, pathToCheck));\n  } else {\n    const modulePath = normalize('/' + options.path + '/' +\n      options.module);\n    const moduleName = normalize(modulePath).split('/').pop();\n    if\n      (host.exists(modulePath)) {\n      return normalize(modulePath);\n    } else if (host.exists(modulePath + '.ts')) {\n      return\n        normalize(modulePath + '.ts');\n    } else if (host.exists(modulePath + '.module.ts')) {\n      return\n        normalize(modulePath + '.module.ts');\n    } else if (host.exists(modulePath + '/' + moduleName + '.module.ts')) {\n      return\n        normalize(modulePath + '/' + moduleName + '.module.ts');\n    } else {\n      throw new\n        Error(`Specified module path ${modulePath} does not exist`);\n    }\n  }\n}\n\n/**\n * Function to find the \"closest\" module to a generated file's path.\n */\nexport function findModule(host: Tree, generateDir: string): Path {\n  let dir: DirEntry | null = host.getDir('/' + generateDir);\n  const moduleRe = /^\\.\\.module\\.\\.ts$/;\n  const routingModuleRe = /^-routing\\.\\.module\\.\\.ts$/;\n  while (dir) {\n    const matches = dir.subfiles.filter(\n      (p)\n        => moduleRe.test(p) && !routingModuleRe.test(p)\n    );\n    if (matches.length === 1) {\n      return join(dir.path,\n        matches[0]);\n    } else if (matches.length > 1) {\n      throw new Error(\n        'More than one module matches. Use\n        skip-import option to skip importing '\n        +\n        'the component into the closest module.\n        ');\n    }\n    dir =\n      dir.parent;\n  }\n  throw new Error(\n    'Could not find an NgModule. Use the skip-import '\n    +\n    'option to skip\n    importing in NgModule.\n    ');\n}\n\n/**\n * Build a relative path from one file path to another file path.\n */\nexport\n  function buildRelativePath(\n    from: string,\n    to: string\n  ): string {\n    const {\n      path: fromPath,\n      filename: fromFileName,\n      directory: fromDirectory,\n    } =\n      parsePath(from);\n    const {\n      path: toPath,\n      filename: toFileName,\n      directory: toDirectory,\n    } =\n      parsePath(to);\n    const relativePath = relative(fromDirectory, toDirectory);\n    const fixedRelativePath =\n      relativePath.startsWith('.')\n        ? relativePath\n        : `.${relativePath}`;\n    return\n      !toFileName || toFileName ===\n      'index.ts'\n        ? fixedRelativePath\n        : `${\n            fixedRelativePath.endsWith('/')\n              ? fixedRelativePath\n            :\n              fixedRelativePath + '/'\n            }${convertToTypeScriptFileName(toFileName)}`;\n  }\n\n  function parsePath(\n    path: string\n  ) {\n    const pathNormalized = normalize(path) as Path;\n    const filename = extname(pathNormalized) ?\n      basename(pathNormalized) : '';\n    const directory = filename ?\n      dirname(pathNormalized) : pathNormalized;\n    return\n      {\n        path: pathNormalized,\n        filename,\n        directory,\n      };\n  }\n}\n\n/**\n * Strips the typescript extension and clears index filenames\n * foo.ts -> foo\n * index.ts -> empty\n */\nfunction\n  convertToTypeScriptFileName(\n    filename: string | undefined\n  ) {\n    return\n      filename ?\n        filename.replace(/(\\.ts)|(index\\.ts)$/, '') : '';\n  }\n}
```

Found in path(s):

\* /opt/cola/permits/1762774590\_1695958546.7276206/0/store-12-5-1-tgz/package/schematics-core/utility/find-

module.js.map

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```



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## 1.195 pure-uuid 1.6.2

### 1.195.1 Available under license :

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\* /opt/cola/permits/1762774491\_1691557579.6561856/0/pure-uuid-1-6-2-tgz/package/README.md

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\* /opt/cola/permits/1762774491\_1691557579.6561856/0/pure-uuid-1-6-2-tgz/package/Makefile

\* /opt/cola/permits/1762774491\_1691557579.6561856/0/pure-uuid-1-6-2-tgz/package/eslint.yaml

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* /opt/cola/permits/1762774491_1691557579.6561856/0/pure-uuid-1-6-2-tgz/package/uuid.js
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```
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```

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\*/

Found in path(s):

\* /opt/cola/permits/1762774491\_1691557579.6561856/0/pure-uuid-1-6-2-tgz/package/uuid.test.js  
\* /opt/cola/permits/1762774491\_1691557579.6561856/0/pure-uuid-1-6-2-tgz/package/Gruntfile.js

## 1.196 @types/node 14.14.36

### 1.196.1 Available under license :

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## 1.197 momentum-ui-icons 7.68.0

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## 1.198 ngrx-router-store 12.5.1

### 1.198.1 Available under license :

No license file was found, but licenses were detected in source scan.

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```

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```
* @license\n * Copyright Google Inc. All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-\n style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport {\n  Path,\n  join,\n  normalize,\n  relative,\n  strings,\n  basename,\n  extname,\n  dirname,\n} from '@angular-devkit/core';\nimport {\n  DirEntry, Tree } from '@angular-devkit/schematics';\n\nexport interface ComponentOptions {\n  component?:\n  string;\n  name: string;\n  flat?: boolean;\n  path?: string;\n  skipImport?: boolean;\n}\n\n/**\n * Find the component\n referred by a set of options passed to the schematics.\n *\nexport function findComponentFromOptions(\n  host:\n  Tree,\n  options: ComponentOptions\n): Path | undefined {\n  if (options.hasOwnProperty('skipImport') &&\n  options.skipImport)\n\n    {\n      return undefined;\n    }\n\n  if (!options.component) {\n    const pathToCheck =\n      (options.path || '') +\n      (options.flat ? '' : '/' + strings.dasherize(options.name));\n\n    return normalize(findComponent(host,\n      pathToCheck));\n  } else {\n    const componentPath = normalize(\n      '/' + options.path + '/' + options.component\n    );\n    const componentBaseName = normalize(componentPath).split('/').pop();\n\n    if\n      (host.exists(componentPath)) {\n        return normalize(componentPath);\n      } else if (host.exists(componentPath +\n      '.ts')) {\n        return normalize(componentPath + '.ts');\n      } else if (host.exists(componentPath + '.component.ts')) {\n        return normalize(componentPath + '.component.ts');\n      } else if (\n        host.exists(componentPath + '/' +\n        componentBaseName + '.component.ts')\n      ) {\n        return normalize(\n          componentPath + '/' +\n          componentBaseName + '.component.ts'\n        );\n      } else {\n        throw new Error(\n          `Specified\n component path ${componentPath} does not exist`\n        );\n      }\n    }\n  }\n}\n\n/**\n * Function to find the \"closest\"\n component to a generated file's path.\n *\nexport function findComponent(host: Tree, generateDir: string): Path {\n  let dir: DirEntry | null = host.getDir('/' + generateDir);\n\n  const componentRe = /\\.component\.ts$/;\n\n  while\n    (dir) {\n      const matches = dir.subfiles.filter((p) => componentRe.test(p));\n\n      if (matches.length === 1) {\n
```

```

return join(dir.path, matches[0]);\n } else if (matches.length > 1) {\n   throw new Error(\n     'More than one
component matches. Use skip-import option to skip importing ' +\n     'the component store into the closest
component.\n   );\n }\n\n dir = dir.parent;\n }\n\n throw new Error(\n   'Could not find an Component. Use
the skip-import ' +\n   'option to skip importing in Component.\n   );\n}\n\n/**\n * Build a relative path from one
file path to another file path.\n */\nexport function
buildRelativePath(from: string, to: string): string {\n  const {\n    path: fromPath,\n    filename: fromFileName,\n    directory: fromDirectory,\n  } = parsePath(from);\n  const {\n    path: toPath,\n    filename: toFileName,\n    directory: toDirectory,\n  } = parsePath(to);\n  const relativePath = relative(fromDirectory, toDirectory);\n  const
fixedRelativePath = relativePath.startsWith('.')\n    ? relativePath\n    : `.${relativePath}`;\n\n  return !toFileName ||
toFileName === 'index.ts'\n    ? fixedRelativePath\n    : `${\n      fixedRelativePath.endsWith('/')\n        ?
fixedRelativePath\n        : fixedRelativePath + '/'\n      }${convertToTypeScriptFileName(toFileName)}`;}\n\nfunction parsePath(path: string) {\n  const pathNormalized
= normalize(path) as Path;\n  const filename = extname(pathNormalized) ? basename(pathNormalized) : '';\n  const
directory = filename ? dirname(pathNormalized) : pathNormalized;\n  return {\n    path: pathNormalized,\n    filename,\n    directory,\n  };\n}\n\n/**\n * Strips the typescript extension and clears index filenames\n * foo.ts -> foo\n * index.ts -
> empty\n */\nfunction convertToTypeScriptFileName(filename: string | undefined) {\n  return filename ?
filename.replace(/(\\.ts)|(index\\.ts)$/, '') : '';\n}\n}

```

Found in path(s):

```

* /opt/cola/permits/1762774517_1695958552.1100726/0/router-store-12-5-1-tgz/package/schematics-
core/utility/find-component.js.map

```

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AAC,OAAK,YAAc,CAAC;IAExB,OAAO,CAAC,UAAU,IAAI,UAAU,KAAC,UAAU;QAC7C,CAAC,CAAC,iB
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B;YACnB,CAAC,CAAC,iBAAiB,GAAG,GAAG,IAC1B,2BAA2B,CAAC,UAAU,CAAG,CAAC;AACnD,CAAC;
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ACR,SAAS,WAAA;KACV,CAAC;AACJ,CAAC;AACD;;;GAIG;AACH,SAAS,2BAA2B,CAAC,QAA4B;IAC/D,
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CAAC,EAAE,CAAC;AACrE,CAAC", "sourcesContent":["/*\n
* @license\n * Copyright Google Inc. All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport {\n Path,\n join,\n normalize,\n relative,\n strings,\n basename,\n extname,\n dirname,\n } from '@angular-devkit/core';\nimport {
DirEntry, Tree } from '@angular-devkit/schematics';\nexport interface ModuleOptions {\n module?: string;\n
name: string;\n flat?: boolean;\n path?: string;\n skipImport?: boolean;\n}\n\n/**\n * Find the module referred by a
set of options passed to the schematics.\n *\nexport function findModuleFromOptions(\n host: Tree,\n options:
ModuleOptions\n): Path | undefined {\n if (options.hasOwnProperty('skipImport')
&& options.skipImport) {\n return undefined;\n }\n\n if (!options.module) {\n const pathToCheck =\n
(options.path || '') +\n (options.flat ? '' : '/' + strings.dasherize(options.name));\n\n return
normalize(findModule(host, pathToCheck));\n } else {\n const modulePath = normalize('/' + options.path + '/' +
options.module);\n const moduleName = normalize(modulePath).split('/').pop();\n\n if
(host.exists(modulePath)) {\n return normalize(modulePath);\n } else if (host.exists(modulePath + '.ts')) {\n
return normalize(modulePath + '.ts');\n } else if (host.exists(modulePath + '.module.ts')) {\n return
normalize(modulePath + '.module.ts');\n } else if (host.exists(modulePath + '/' + moduleName + '.module.ts'))
{\n return normalize(modulePath + '/' + moduleName + '.module.ts');\n } else {\n throw new
Error(`Specified module path ${modulePath} does not exist`);\n }\n }\n}\n\n/**\n
* Function to find the "closest" module to a generated file's path.\n *\nexport function findModule(host: Tree,
generateDir: string): Path {\n let dir: DirEntry | null = host.getDir('/' + generateDir);\n\n const moduleRe =
/\\.module\\.ts$/;\n const routingModuleRe = /-routing\\.module\\.ts/;\n\n while (dir) {\n const matches =
dir.subfiles.filter(\n (p) => moduleRe.test(p) && !routingModuleRe.test(p)\n );\n\n if (matches.length === 1)
{\n return join(dir.path, matches[0]);\n } else if (matches.length > 1) {\n throw new Error(\n 'More than
one module matches. Use skip-import option to skip importing ' +\n 'the component into the closest module.'
\n );\n }\n\n dir = dir.parent;\n }\n\n throw new Error(\n 'Could not find an NgModule. Use the skip-import '
+\n 'option to skip importing in NgModule.'
\n );\n}\n\n/**\n * Build a relative path from one file path to another
file path.\n *\nexport function buildRelativePath(from:
string, to: string): string {\n const {\n path: fromPath,\n filename: fromFileName,\n directory:
fromDirectory,\n } = parsePath(from);\n const {\n path: toPath,\n filename: toFileName,\n directory:
toDirectory,\n } = parsePath(to);\n const relativePath = relative(fromDirectory, toDirectory);\n const
fixedRelativePath = relativePath.startsWith('.')\n ? relativePath\n : `.${relativePath}`;\n\n return !toFileName ||
toFileName === 'index.ts'\n ? fixedRelativePath\n : `${\n fixedRelativePath.endsWith('/')\n ?
fixedRelativePath\n : fixedRelativePath + '/'\n

```

```
}`$`{convertToTypeScriptFileName(toFileName)}`;\n}\n\nfunction parsePath(path: string) {\n  const pathNormalized = normalize(path) as Path;\n  const filename = extname(pathNormalized) ? basename(pathNormalized) : "";\n  const directory = filename ? dirname(pathNormalized) : pathNormalized;\n  return {\n    path: pathNormalized,\n    filename,\n    directory,\n  };\n}\n\n/**\n
```

```
* Strips the typescript extension and clears index filenames\n * foo.ts -> foo\n * index.ts -> empty\n */\nfunction convertToTypeScriptFileName(filename: string | undefined) {\n  return filename ? filename.replace(/(\\.ts)|(index\\.ts)$/, "") : "";\n}
```

Found in path(s):

```
*/opt/cola/permits/1762774517_1695958552.1100726/0/router-store-12-5-1-tgz/package/schematics-core/utility/find-module.js.map
```

No license file was found, but licenses were detected in source scan.

```
{"version":3,"file":"change.js","sourceRoot":"","sources":["../../../../../modules/router-store/schematics-core/utility/change.ts"],"names":["mappings":";;;;;;;;;;AAgCA;;GAEG;AACH;IAAA;QACE,gBAAW,GAAG,eAAe,CAAC;QAC9B,UAAK,GAAG,QAAQ,CAAC;QACjB,SAAI,GAAG,IAAI,CAAC;IAId,CAAC;IAHC,0BAAK,GAAL;QACE,OAAO,OAAO,CAAC,OAAO,EAAE,CAAC;IAC3B,CAAC;IACH,iBAAC;AAAD,CAAC,AAPD,IAOC;AAPY,gCAAU;AASvB;;GAEG;AACH;IAIE,sBAAmB,IAAY,EAAS,GAAW,EAAS,KAAa;QAAtD,SAAI,GAAJ,IAAI,CAAQ;QAAS,QAAG,GAAG,CAAQ;QAAS,UAAK,GAAL,KAAK,CAAQ;QACvE,IAAI,GAAG,GAAG,CAAC,EAAE;YACX,MAAM,IAAI,KAAK,CAAC,gCAAgC,CAAC,CAAC;SACnD;QACD,IAAI,CAAC,WAAW,GAAG,cAAy,KAAK,uBAaKb,GAAG,YAAO,IAAM,CAAC;QACvE,IAAI,CAAC,KAAK,GAAG,GAAg,CAAC;IACnB,CAAC;IAED;;OAEg;IACH,4BAAK,GAAL,UAAM,IAAU;QAaHb,iBAOC;QANC,OAAO,IAAI,CAAC,IAAI,CAAC,IAAI,CAAC,IAAI,CAAC,IAAI,CAAC,IAAI,CAAC,UAAC,OAAO;YACvC,IAAM,MAAM,GAAg,OAAO,CAAC,SAAS,CAAC,CAAC,EAAE,KAAI,CAAC,GAAG,CAAC,CAAC;YAC9C,IAAM,MAAM,GAAG,OAAO,CAAC,SAAS,CAAC,KAAI,CAAC,GAAG,CAAC,CAAC;YAE3C,OAAO,IAAI,CAAC,KAAK,CAAC,KAAI,CAAC,IAAI,EAAE,KAAg,MAAM,GAAG,KAAI,CAAC,KAAK,GAAG,MAAQ,CAAC,CAAC;QACIE,C AAC,CAAC,CAAC;IACL,CAAC;IACH,mBAAC;AAAD,CAAC,AAvBD,IAuBC;AAvBY,oCAAY;AAyBzB;;GA EG;AACH;IAIE,sBAAmB,IAAY,EAAS,GAAW,EAAS,GAAW;QAAPD,SAAI,GAAJ,IAAI,CAAQ;QAAS,QAAG ,GAAH,GAAG,CAAQ;QAAS,QAAG,GAAH,GAAG,CAAQ;QACrE,IAAI,GAAG,GAAG,CAAC,IAAI,GAAG,G AAG,CAAC,EAAE;YACtB,MAAM,IAAI,KAAK,CAAC,gCAAgC,CAAC,CAAC;SACnD;QACD,IAAI,CAAC,W AAW,GAAG,8BAA4B,GAAG,YAAO,GAAG,YAAO,IAAM,CAAC;QACIE,IAAI,CAAC,KAAK,GAAG,GAAG, CAAC;IACnB,CAAC;IAED,4BAAK,GAAL,UAAM,IAAU;QAaHb,iBAQC;QAPC,OAAO,IAAI,CAAC,IAAI,CA AC,IAAI,CAAC,IAAI,CAAC,CAAC,IAAI,CAAC,UAAC,OAAO;YACvC,IAAM,MAAM,GAAG,OAAO,CAAC, SAAS,CAAC,CAAC,EAAE,KAAI,CAAC,GAAG,CAAC,CAAC;YAC9C,IAAM,MAAM,GAAG,OAAO,CAAC,S AAS,CAAC,KAAI,CAAC,GAAG,CAAC,CAAC;YAE3C,8DAA8D;YAC9D,OAAO,IAAI,CAAC,KAAK,CAAC, KAAI,CAAC,IAAI,EAAE,KAAg,MAAM,GAAG,MAAQ,CAAC,CAAC;QACrD,CAAC,CAAC,CAAC;IACL,CA AC;IACH,mBAAC;AAAD,CAAC,AArBD,IAqBC;AArBY,oCAAY;AAuBzB;;GAEG;AACH;IAIE,uBACS,IAAY, EACZ,GAAW,EACX,OAAe,EACf,OAAe;QAHf,SAAI,GAAJ,IAAI,CAAQ;QACZ,QAAG,GAAH,GAAG,CAAQ; QACX,YAAO,GAAP,OAAO,CAAQ;QACf,YAAO,GAAP,OAAO,CAAQ;QAEtB,IAAI,GAAG,GAAG,CAAC,EA AE;YACX,MAAM,IAAI,KAAK,CAAC,gCAAgC,CAAC,CAAC;SACnD;QACD,IAAI,CAAC,WAAW,GAAG,cA AY,OAAO,uBAaKb,GAAG,YAAO,IAAI,cAAS,OAAO,CAAC;QACzF,IAAI,CAAC,KAAK,GAAG,GAAG,CAA C;IACnB,CAAC;IAED,6BAAK,GAAL,UAAM,IAAU;QAaHb,iBAeC;QAdC,OAAO,IAAI,CAAC,IAAI,CAAC,I AAI,CAAC,IAAI,CAAC,CAAC,IAAI,CAAC,UAAC,OAAO;YACvC,IAAM,MAAM,GAAG,OAAO,CAAC,SAA S,CAAC,CAAC,EAAE,KAAI,CAAC,GAAG,CAAC,CAAC;YAC9C,IAAM,MAAM,GAAG,OAAO,CAAC,SAAS ,CAAC,KAAI,CAAC,GAAG,GAAG,KAAI,CAAC,OAAO,CAAC,MAAM,CAAC,CAAC;YACjE,IAAM,IAAI,G AAG,OAAO,CAAC,SAAS,CAAC,KAAI,CAAC,GAAG,EAAE,KAAI,CAAC,GAAG,GAAG,KAAI,CAAC,OAA O,CAAC,MAAM,CAAC,CAAC;YAEzE,IAAI,IAAI,KAAK,KAAI,CAAC,OAAO,EAAE;gBACzB,OAAO,OAAO ,CAAC,MAAM,CACnB,IAAI,KAAK,CAAC,wBAaQb,IAAI,gBAAS,KAAI,CAAC,OAAO,QAAl,CAAC,CAC9D
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tent":["import

```
* as ts from 'typescript';\nimport { Tree, UpdateRecorder } from '@angular-devkit/schematics';\nimport { Path }\nfrom '@angular-devkit/core';\n\n/* istanbul ignore file */\n\n * @license\n * Copyright Google Inc. All Rights Reserved.\n\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n\n\nexport interface Host {\n  write(path: string, content: string): Promise<void>;\n  read(path: string): Promise<string>;\n}\n\nexport interface Change {\n  apply(host: Host): Promise<void>;\n\n  // The file this change should be applied to. Some changes might not apply to\n  // a file (maybe the config).\n  readonly path: string | null;\n\n  // The order this change should be applied. Normally the position inside the file.\n  // Changes are applied from the bottom of a file to the top.\n  readonly order: number;\n\n  // The description of this change. This will be outputted in a dry or verbose run.\n  readonly description: string;\n}\n\n/**\n * An operation that does nothing.\n */\nexport class NoopChange implements Change {\n  description = 'No operation.';\n  order = Infinity;\n  path = null;\n  apply() {\n    return Promise.resolve();\n  }\n}\n\n/**\n * Will add text to the source code.\n */\nexport class InsertChange implements Change {\n  order: number;\n  description: string;\n\n  constructor(public path: string, public pos: number, public toAdd: string) {\n    if (pos < 0) {\n      throw new Error('Negative positions are invalid');\n    }\n    this.description = `Inserted ${toAdd} into position ${pos} of ${path}`;\n    this.order = pos;\n  }\n\n  /**\n   * This method does not insert spaces if there is none in the original string.\n   */\n  apply(host: Host) {\n    return host.read(this.path).then((content) => {\n      const prefix = content.substring(0, this.pos);\n      const suffix = content.substring(this.pos);\n\n      return host.write(this.path, `${prefix}${this.toAdd}${suffix}`);\n    });\n  }\n}\n\n/**\n * Will remove text from the source code.\n */\nexport class RemoveChange implements Change {\n  order: number;\n  description: string;\n\n  constructor(public path: string, public pos: number, public end: number) {\n    if (pos < 0 || end < 0) {\n      throw new Error('Negative positions are invalid');\n    }\n    this.description = `Removed text in position ${pos} to ${end} of ${path}`;\n    this.order = pos;\n  }\n\n  apply(host: Host): Promise<void> {\n    return host.read(this.path).then((content)\n=> {\n      const prefix = content.substring(0, this.pos);\n      const suffix = content.substring(this.end);\n\n      // TODO: throw error if toRemove doesn't match removed string.\n      return host.write(this.path,\n`${prefix}${suffix}`);\n    });\n  }\n}\n\n/**\n * Will replace text from the source code.\n */\nexport class ReplaceChange implements Change {\n  order: number;\n  description: string;\n\n  constructor(\n    public path:
```



```

string,\n public pos: number,\n public oldText: string,\n public newText: string\n ) {\n if (pos < 0) {\n
throw new Error('Negative positions are invalid');\n }\n this.description = `Replaced ${oldText} into position
${pos} of ${path} with ${newText}`;\n this.order = pos;\n }\n\n apply(host: Host): Promise<void> {\n return
host.read(this.path).then((content) => {\n const prefix = content.substring(0, this.pos);\n const suffix =
content.substring(this.pos + this.oldText.length);\n const text = content.substring(this.pos,
this.pos + this.oldText.length);\n\n if (text !== this.oldText) {\n return Promise.reject(\n new
Error('Invalid replace: \''${text}\` != \''${this.oldText}\`.')\n );\n }\n\n // TODO: throw error if oldText
doesn't match removed string.\n return host.write(this.path, `${prefix}${this.newText}${suffix}`);\n });\n
}\n\n\nexport function createReplaceChange(\n sourceFile: ts.SourceFile,\n node: ts.Node,\n oldText: string,\n
newText: string\n): ReplaceChange {\n return new ReplaceChange(\n sourceFile.fileName,\n
node.getStart(sourceFile),\n oldText,\n newText\n );\n}\n\n\nexport function createRemoveChange(\n sourceFile:
ts.SourceFile,\n node: ts.Node,\n from = node.getStart(sourceFile),\n to = node.getEnd()\n): RemoveChange {\n
return new RemoveChange(sourceFile.fileName, from, to);\n}\n\n\nexport function createChangeRecorder(\n tree:
Tree,\n path: string,\n changes: Change[]): UpdateRecorder {\n
const recorder = tree.beginUpdate(path);\n for (const change of changes) {\n if (change instanceof InsertChange)
{\n recorder.insertLeft(change.pos, change.toAdd);\n } else if (change instanceof RemoveChange) {\n
recorder.remove(change.pos, change.end - change.pos);\n } else if (change instanceof ReplaceChange) {\n
recorder.remove(change.pos, change.oldText.length);\n recorder.insertLeft(change.pos, change.newText);\n }
}\n return recorder;\n}\n\n\nexport function commitChanges(tree: Tree, path: string, changes: Change[]) {\n if
(changes.length === 0) {\n return false;\n }\n\n const recorder = createChangeRecorder(tree, path, changes);\n
tree.commitUpdate(recorder);\n return true;\n}\n\n"]

```

Found in path(s):

\* /opt/cola/permits/1762774517\_1695958552.1100726/0/router-store-12-5-1-tgz/package/schematics-core/utility/change.js.map

No license file was found, but licenses were detected in source scan.

```

{"version":3,"file":"ngrx-router-store.umd.js","sources":["../../../../modules/router-
store/src/actions.ts","../../../../modules/router-
store/src/reducer.ts","../../../../node_modules/tslib/tslib.es6.js","../../../../modules/router-
store/src/serializers/base.ts","../../../../modules/router-
store/src/serializers/default_serializer.ts","../../../../modules/router-
store/src/serializers/minimal_serializer.ts","../../../../modules/router-
store/src/router_store_module.ts","../../../../modules/router-store/src/router_selectors.ts","../../../../modules/router-
store/index.ts","../../../../modules/router-store/ngrx-router-store.ts"],"sourcesContent":["import {\n
NavigationCancel,\n NavigationEnd,\n NavigationError,\n NavigationStart,\n RoutesRecognized,\n } from
'@angular/router';\n\nimport { BaseRouterStoreState } from './serializers/base';\nimport {
SerializedRouterStateSnapshot } from './serializers/default_serializer';\nimport
{ createAction, props } from '@ngrx/store';\n\n/**\n * An action dispatched when a router navigation request is
fired.\n */\n\nexport const ROUTER_REQUEST = '@ngrx/router-store/request';\n\n/**\n * Payload of
ROUTER_REQUEST\n */\n\nexport type RouterRequestPayload<T extends BaseRouterStoreState =
SerializedRouterStateSnapshot> = {\n routerState: T;\n event: NavigationStart;\n};\n\n/**\n * An action
dispatched when a router navigation request is fired.\n */\n\nexport type RouterRequestAction<T extends
BaseRouterStoreState = SerializedRouterStateSnapshot> = {\n type: typeof ROUTER_REQUEST;\n payload:
RouterRequestPayload<T>;\n};\n\nexport const routerRequestAction = createAction(\n ROUTER_REQUEST,\n
props<{\n payload: RouterRequestPayload<SerializedRouterStateSnapshot>\n}>());\n\n/**\n * An action dispatched
when the router navigates.\n */\n\nexport const ROUTER_NAVIGATION = '@ngrx/router-store/navigation';\n\n/**\n
* Payload of ROUTER_NAVIGATION.\n */\n\nexport type RouterNavigationPayload<T

```

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T extends BaseRouterStoreState = SerializedRouterStateSnapshot\n> = {\n routerState: T;\n event:
RoutesRecognized;\n};\n\n/**\n * An action dispatched when the router navigates.\n */\nexport type
RouterNavigationAction<\n T extends BaseRouterStoreState = SerializedRouterStateSnapshot\n> = {\n type:
typeof ROUTER_NAVIGATION;\n payload: RouterNavigationPayload<T>;\n};\n\nexport const
routerNavigationAction = createAction<\n ROUTER_NAVIGATION,\n props<{\n payload:
RouterNavigationPayload<SerializedRouterStateSnapshot> }\n>()\n);\n\n/**\n * An action dispatched when the
router cancels navigation.\n */\nexport const ROUTER_CANCEL = '@ngrx/router-store/cancel';\n\n/**\n * Payload
of ROUTER_CANCEL.\n */\nexport type RouterCancelPayload<\n T,\n V extends BaseRouterStoreState =
SerializedRouterStateSnapshot\n> = {\n routerState: V;\n storeState: T;\n event: NavigationCancel;\n};\n\n/**\n *
An action dispatched when the router cancels navigation.\n */\nexport type RouterCancelAction<\n
T,\n V extends BaseRouterStoreState = SerializedRouterStateSnapshot\n> = {\n type: typeof
ROUTER_CANCEL;\n payload: RouterCancelPayload<T, V>;\n};\n\nexport const routerCancelAction =
createAction<\n ROUTER_CANCEL,\n props<{\n payload: RouterCancelPayload<SerializedRouterStateSnapshot>
}\n>()\n);\n\n/**\n * An action dispatched when the router errors.\n */\nexport const ROUTER_ERROR =
'@ngrx/router-store/error';\n\n/**\n * Payload of ROUTER_ERROR.\n */\nexport type RouterErrorPayload<\n T,\n
V extends BaseRouterStoreState = SerializedRouterStateSnapshot\n> = {\n routerState: V;\n storeState: T;\n
event: NavigationError;\n};\n\n/**\n * An action dispatched when the router errors.\n */\nexport type
RouterErrorAction<\n T,\n V extends BaseRouterStoreState = SerializedRouterStateSnapshot\n> = {\n type:
typeof ROUTER_ERROR;\n payload: RouterErrorPayload<T, V>;\n};\n\nexport const routerErrorAction =
createAction<\n ROUTER_ERROR,\n props<{\n payload: RouterErrorPayload<SerializedRouterStateSnapshot>
}\n>()\n);\n\n/**\n * An action dispatched after navigation has ended and new route is active.\n */\nexport const
ROUTER_NAVIGATED = '@ngrx/router-store/navigated';\n\n/**\n * Payload of ROUTER_NAVIGATED.\n */\nexport type
RouterNavigatedPayload<\n T extends BaseRouterStoreState = SerializedRouterStateSnapshot\n> =
{\n routerState: T;\n event: NavigationEnd;\n};\n\n/**\n * An action dispatched after navigation has ended and
new route is active.\n */\nexport type RouterNavigatedAction<\n T extends BaseRouterStoreState =
SerializedRouterStateSnapshot\n> = {\n type: typeof ROUTER_NAVIGATED;\n payload:
RouterNavigatedPayload<T>;\n};\n\nexport const routerNavigatedAction = createAction<\n
ROUTER_NAVIGATED,\n props<{\n payload: RouterNavigatedPayload<SerializedRouterStateSnapshot>
}\n>()\n);\n\n/**\n * A union type of router actions.\n */\nexport type RouterAction<\n T,\n V extends
BaseRouterStoreState = SerializedRouterStateSnapshot\n> =\n | RouterRequestAction<V>\n |
RouterNavigationAction<V>\n | RouterCancelAction<T, V>\n | RouterErrorAction<T, V>\n |
RouterNavigatedAction<V>;\n\n", "import { Action } from '@ngrx/store';\nimport {\n ROUTER_CANCEL,\n
ROUTER_ERROR,\n ROUTER_NAVIGATION,\n RouterAction,\n} from './actions';\nimport {\n
BaseRouterStoreState } from './serializers/base';\nimport { SerializedRouterStateSnapshot } from
'./serializers/default_serializer';\n\nexport type RouterReducerState<\n T extends BaseRouterStoreState =
SerializedRouterStateSnapshot\n> = {\n state: T;\n navigationId: number;\n};\n\nexport function routerReducer<\n
RouterState extends BaseRouterStoreState = SerializedRouterStateSnapshot,\n Result =
RouterReducerState<RouterState>\n>(state: Result | undefined, action: Action): Result {\n // Allow compilation
with strictFunctionTypes - ref: #1344\n const routerAction = action as RouterAction<any, RouterState>;\n switch
(routerAction.type) {\n case ROUTER_NAVIGATION:\n case ROUTER_ERROR:\n
case ROUTER_CANCEL:\n return ({\n state: routerAction.payload.routerState,\n navigationId:
routerAction.payload.event.id,\n } as unknown) as Result;\n default:\n return state as Result;\n }\n}\n\n", "/*!
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WARRANTIES OF MERCHANTABILITY\r\n\r\nAND FITNESS. IN NO EVENT SHALL THE AUTHOR BE
LIABLE FOR ANY SPECIAL, DIRECT,\r\n\r\nINDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY

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```
global Reflect, Promise
var extendStatics = function(d, b) {
  extendStatics =
Object.setPrototypeOf ||
  function(d, b) { for (var p in b) if (Object.prototype.hasOwnProperty.call(b, p)) d[p] = b[p]; } ||
  function(d, b) {
    if (typeof b !== "function" && b !== null)
      throw new TypeError("Class extends value " + String(b) + " is not a constructor or null");
    extendStatics(d, b);
    function __() { this.constructor = d; }
    d.prototype = b === null ? Object.create(b) :
    (__prototype = b.prototype, new __());
  }
  var __assign = function() {
    __assign = Object.assign ||
    function __assign(t) {
      for (var s, i = 1, n = arguments.length; i < n; i++) {
        s = arguments[i];
        for (var p in s) if (Object.prototype.hasOwnProperty.call(s, p)) t[p] = s[p];
      }
      return t;
    };
    return __assign.apply(this, arguments);
  }
  var __rest = function(s, e) {
    var t = {};
    for (var p in s) if (Object.prototype.hasOwnProperty.call(s, p) && e.indexOf(p) < 0) t[p] = s[p];
    if (s != null && typeof Object.getOwnPropertySymbols === "function")
      for (var i = 0, p = Object.getOwnPropertySymbols(s); i < p.length; i++)
        if (e.indexOf(p[i]) < 0 && Object.prototype.propertyIsEnumerable.call(s, p[i])) t[p[i]] = s[p[i]];
  }
  var __decorate = function(decorators, target, key, desc) {
    var c = arguments.length, r = c < 3 ? target : desc === null ? desc = Object.getOwnPropertyDescriptor(target, key) : desc, d;
    if (typeof Reflect === "object" && typeof Reflect.decorate === "function")
      r = Reflect.decorate(decorators, target, key, desc);
    else for (var i = decorators.length - 1; i >= 0; i--)
      if (d = decorators[i]) r = (c < 3 ? d(r) : c > 3 ? d(target, key, r) : d(target, key)) || r;
    return c > 3 && r && Object.defineProperty(target, key, r, r);
  }
  var __param = function(paramIndex, decorator) {
    return function(target, key) { decorator(target, key, paramIndex); }
  }
  var __metadata = function(metadataKey, metadataValue) {
    if (typeof Reflect === "object" && typeof Reflect.metadata === "function") return Reflect.metadata(metadataKey, metadataValue);
  }
  var __awaiter = function(thisArg, arguments, P, generator) {
    function adopt(value) { return value instanceof P ? value : new P(function(resolve) { resolve(value); }); }
    return new (P || (P = Promise))(function(resolve, reject) {
      function fulfilled(value) { try { step(generator.next(value)); } catch (e) { reject(e); } }
      function rejected(value) { try { step(generator["throw"](value)); } catch (e) { reject(e); } }
      function step(result) { result.done ? resolve(result.value) : adopt(result.value).then(fulfilled, rejected); }
      step((generator = generator.apply(thisArg, arguments || [])).next());
    });
  }
  var __generator = function(thisArg, body) {
    var _ = { label: 0, sent: function() { if (t[0] & 1) throw t[1]; return t[1]; }, trys: [], ops: [] }, f, y, t, g;
    return g = { next: verb(0), "throw": verb(1), "return": verb(2) }, typeof Symbol === "function" && (g[Symbol.iterator] = function() { return this; }), g;
    function verb(n) { return function(v) { return step([n, v]); }; }
    function step(op) {
      if (f) throw new TypeError("Generator is already executing.");
      while (true)
        try {
          if (f = 1, y && (t = op[0] & 2 ? y["return"] : op[0] ? y["throw"] || ((t = y["return"]) && t.call(y), 0) : y.next) && !(t = t.call(y, op[1])).done) return t;
          if (y = 0, t) op = [op[0] & 2, t.value];
          switch (op[0]) {
            case 0: case 1: t = op; break;
            case 4: _label++; return { value: op[1], done: false };
            case 5: _label++; y = op[1]; op = [0]; continue;
            case 7: op = _ops.pop(); _trys.pop(); continue;
            default:
              if (!(t = _trys, t = t.length > 0 && t[t.length - 1]) && (op[0] === 6 || op[0] === 2)) { _ = 0; continue; }
              if (op[0] === 3 && (!t || (op[1] > t[0] && op[1] < t[3]))) { _label = op[1]; break; }
              if (op[0] === 6 && _label < t[1]) { _label = t[1]; t = op; break; }
              if (t && _label < t[2]) { _label = t[2]; _ops.push(op); break; }
              if (t[2]) _ops.pop();
              _trys.pop();
              continue;
            }
          op = body.call(thisArg, _);
        } catch (e) { op = [4, e]; }
    }
  }
}
```

```

    } catch (e) { op = [6, e]; y = 0; } finally { f = t = 0; }
    if (op[0] & 5) throw op[1]; return { value: op[0] ?
op[1] : void 0, done: true };
}
export var __createBinding = Object.create ? (function(o, m, k, k2)
{
    if (k2 === undefined) k2 = k;
    Object.defineProperty(o, k2, { enumerable: true, get: function() { return
m[k]; } });
}): (function(o, m, k, k2) {
    if (k2 === undefined) k2 = k;
    o[k2] = m[k];
});
export function __exportStar(m, o) {
    for (var p in m) if (p !== "default" &&
!Object.prototype.hasOwnProperty.call(o, p)) __createBinding(o, m, p);
}
export function __values(o) {
    var s = typeof Symbol === "function" && Symbol.iterator, m = s && o[s], i = 0;
    if (m) return m.call(o);
    if (o && typeof o.length === "number") return {
        next: function () {
            if (o && i >= o.length) o =
void 0;
            return { value: o && o[i++], done: !o
};
        }
    };
    throw new TypeError(s ? "Object is not iterable." : "Symbol.iterator is not
defined.");
}
export function __read(o, n) {
    var m = typeof Symbol === "function" &&
o[Symbol.iterator];
    if (!m) return o;
    var i = m.call(o), r, ar = [], e;
    try {
        while ((n === void 0
|| n-- > 0) && !(r = i.next()).done) ar.push(r.value);
    } catch (error) { e = { error: error }; }
    finally {
        try {
            if (r && !r.done && (m = i["return"])) m.call(i);
        } finally {
            if (e) throw
e.error;
        }
    }
    return ar;
}
export function __spread() {
    for (var ar = [], i = 0; i < arguments.length; i++)
        ar = ar.concat(__read(arguments[i]));
    return ar;
}
export function __spreadArrays() {
    for (var s = 0, i = 0, il = arguments.length; i < il; i++) s
+= arguments[i].length;
    for (var r = Array(s), k = 0, i = 0; i < il; i++)
        for (var a = arguments[i], j = 0, jl = a.length; j < jl; j++,
k++)
            r[k] = a[j];
    return r;
}
export function __spreadArray(to, from) {
    for (var i = 0, il = from.length, j = to.length; i < il; i++, j++)
        to[j] = from[i];
    return to;
}
export function __await(v) {
    return this instanceof __await ? (this.v = v, this) : new __await(v);
}
export function __asyncGenerator(thisArg, _arguments, generator) {
    if (!Symbol.asyncIterator) throw new
TypeError("Symbol.asyncIterator is not defined.");
    var g = generator.apply(thisArg, _arguments || []), i, q =
[];
    return i = {
        verb("next"), verb("throw"), verb("return"),
        i[Symbol.asyncIterator] = function () { return
this; },
        i,
        function verb(n) {
            if (g[n]) i[n] = function (v) {
                return new Promise(function (a, b) {
                    q.push([n, v, a,
b]) > 1 || resume(n, v);
                });
            };
        }
    };
    function
resume(n, v) {
        try {
            step(g[n](v));
        } catch (e) {
            settle(q[0][3], e);
        }
        function step(r) {
            r.value instanceof
__await ? Promise.resolve(r.value.v).then(fulfill, reject) : settle(q[0][2], r);
            function fulfill(value) {
                resume("next", value);
            }
            function reject(value) {
                resume("throw", value);
            }
            function settle(f, v) {
                if (f(v), q.shift(), q.length) resume(q[0][0], q[0][1]);
            }
        }
    }
}
export function __asyncDelegator(o) {
    var i,
p;
    return i = {
        verb("next"), verb("throw"),
        function (e) { throw e; },
        verb("return"),
        i[Symbol.iterator] =
function () { return this; },
        i,
        function verb(n, f) {
            i[n] = o[n] ? function (v) {
                return (p = !p) ? { value:
__await(o[n](v)), done: n === "return" } : f ? f(v) : v;
            } : f;
        }
    };
}
export function __asyncValues(o) {
    if (!Symbol.asyncIterator) throw new
TypeError("Symbol.asyncIterator is not defined.");
    var m =
o[Symbol.asyncIterator], i;
    return m ? m.call(o)
: (o = typeof __values === "function" ? __values(o) : o[Symbol.iterator](), i = {
        verb("next"), verb("throw"),
        verb("return"),
        i[Symbol.asyncIterator] =
function () { return this; },
        i,
        function verb(n) {
            i[n] = o[n] &&
function (v) {
                return new Promise(function (resolve, reject) {
                    v = o[n](v), settle(resolve, reject, v.done, v.value);
                });
            };
        }
    };
}
}
function settle(resolve, reject, d, v) {
    Promise.resolve(v).then(function(v) {
        resolve({ value: v, done: d });
    }, reject);
}
export function __makeTemplateObject(cooked, raw) {
    if (Object.defineProperty) {
        Object.defineProperty(cooked, "raw", { value: raw });
    } else {
        cooked.raw = raw;
    }
    return
cooked;
}
export var __setModuleDefault = Object.create ? (function(o, v) {
    Object.defineProperty(o, "default", { enumerable: true, value: v });
}): function(o, v) {
    o["default"] = v;
}
export function __importStar(mod) {
    if (mod && mod.__esModule) return
mod;
    var result = {};
    if (mod != null) for (var k in mod) if (k !== "default" &&
Object.prototype.hasOwnProperty.call(mod, k)) __createBinding(result,
mod, k);
    __setModuleDefault(result,
mod);
    return result;
}
export function __importDefault(mod) {
    return (mod &&

```

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mod.__esModule) ? mod : { default: mod };\r\n\r\n\r\nexport function __classPrivateFieldGet(receiver, state, kind,
f) {\r\n  if (kind === "a" && !f) throw new TypeError("Private accessor was defined without a getter");\r\n  if
(typeof state === "function" ? receiver !== state || !f : !state.has(receiver)) throw new TypeError("Cannot read
private member from an object whose class did not declare it");\r\n  return kind === "m" ? f : kind === "a" ?
f.call(receiver) : f ? f.value : state.get(receiver);\r\n}\r\n\r\n\r\nexport function __classPrivateFieldSet(receiver, state,
value, kind, f) {\r\n  if (kind === "m") throw new TypeError("Private method is not writable");\r\n
  if (kind === "a" && !f) throw new TypeError("Private accessor was defined without a setter");\r\n  if (typeof
state === "function" ? receiver !== state || !f : !state.has(receiver)) throw new TypeError("Cannot write private
member to an object whose class did not declare it");\r\n  return (kind === "a" ? f.call(receiver, value) : f ?
f.value = value : state.set(receiver, value)), value;\r\n}\r\n\r\n", "import { RouterStateSnapshot } from
'@angular/router';\r\n\r\n**\r\n * Simple router state.\r\n * All custom router states / state serializers should have at least\r\n
* the properties of this interface.\r\n *^\r\nexport interface BaseRouterStoreState {\r\n  url: string;\r\n}\r\n\r\nexport abstract
class RouterStateSerializer<\r\n  T extends BaseRouterStoreState = BaseRouterStoreState\r\n> {\r\n  abstract
serialize(routerState: RouterStateSnapshot): T;\r\n}\r\n\r\n", "import { ActivatedRouteSnapshot, RouterStateSnapshot }
from '@angular/router';\r\nimport { BaseRouterStoreState, RouterStateSerializer
} from './base';\r\n\r\nexport interface SerializedRouterStateSnapshot extends BaseRouterStoreState {\r\n  root:
ActivatedRouteSnapshot;\r\n  url: string;\r\n}\r\n\r\nexport class DefaultRouterStateSerializer\r\n implements
RouterStateSerializer<SerializedRouterStateSnapshot> {\r\n  serialize(routerState: RouterStateSnapshot):
SerializedRouterStateSnapshot {\r\n    return {\r\n      root: this.serializeRoute(routerState.root),\r\n      url:
routerState.url,\r\n    };\r\n  }\r\n\r\n  private serializeRoute(\r\n    route: ActivatedRouteSnapshot\r\n  ):
ActivatedRouteSnapshot {\r\n    const children = route.children.map((c) => this.serializeRoute(c));\r\n    return {\r\n
      params: route.params,\r\n      paramMap: route.paramMap,\r\n      data: route.data,\r\n      url: route.url,\r\n      outlet:
route.outlet,\r\n      routeConfig: route.routeConfig\r\n      ? {\r\n          component: route.routeConfig.component,\r\n
          path: route.routeConfig.path,\r\n          pathMatch: route.routeConfig.pathMatch,\r\n          redirectTo:
route.routeConfig.redirectTo,\r\n          outlet: route.routeConfig.outlet,\r\n        } : null,\r\n      queryParams: route.queryParams,\r\n
      queryParamMap: route.queryParamMap,\r\n      fragment: route.fragment,\r\n      component: (route.routeConfig\r\n
? route.routeConfig.component\r\n      : undefined) as any,\r\n      root: undefined as any,\r\n      parent: undefined as
any,\r\n      firstChild: children[0],\r\n      pathFromRoot: undefined as any,\r\n      children,\r\n    };\r\n  }\r\n}\r\n\r\n", "import {
RouterStateSnapshot, ActivatedRouteSnapshot } from '@angular/router';\r\nimport { BaseRouterStoreState,
RouterStateSerializer } from './base';\r\n\r\nexport interface MinimalActivatedRouteSnapshot {\r\n  routeConfig:
ActivatedRouteSnapshot['routeConfig'];\r\n  url: ActivatedRouteSnapshot['url'];\r\n  params:
ActivatedRouteSnapshot['params'];\r\n  queryParams: ActivatedRouteSnapshot['queryParams'];\r\n  fragment:
ActivatedRouteSnapshot['fragment'];\r\n  data: ActivatedRouteSnapshot['data'];\r\n  outlet:
ActivatedRouteSnapshot['outlet'];\r\n  firstChild?: MinimalActivatedRouteSnapshot;\r\n  children: MinimalActivatedRouteSnapshot[];\r\n}\r\n\r\n\r\nexport
interface MinimalRouterStateSnapshot extends BaseRouterStoreState {\r\n  root: MinimalActivatedRouteSnapshot;\r\n
  url: string;\r\n}\r\n\r\nexport class MinimalRouterStateSerializer\r\n implements
RouterStateSerializer<MinimalRouterStateSnapshot> {\r\n  serialize(routerState: RouterStateSnapshot):
MinimalRouterStateSnapshot {\r\n    return {\r\n      root: this.serializeRoute(routerState.root),\r\n      url:
routerState.url,\r\n    };\r\n  }\r\n\r\n  private serializeRoute(\r\n    route: ActivatedRouteSnapshot\r\n  ):
MinimalActivatedRouteSnapshot {\r\n    const children = route.children.map((c) => this.serializeRoute(c));\r\n    return
{\r\n      params: route.params,\r\n      data: route.data,\r\n      url: route.url,\r\n      outlet: route.outlet,\r\n      routeConfig:
route.routeConfig\r\n      ? {\r\n          path: route.routeConfig.path,\r\n          pathMatch:
route.routeConfig.pathMatch,\r\n          redirectTo: route.routeConfig.redirectTo,\r\n          outlet: route.routeConfig.outlet,\r\n
        } : null,\r\n      queryParams: route.queryParams,\r\n      fragment: route.fragment,\r\n      firstChild: children[0],\r\n      children,\r\n    };\r\n  }\r\n}\r\n\r\n", "import {\r\n  Inject,\r\n  InjectionToken,\r\n  ModuleWithProviders,\r\n  NgModule,\r\n  ErrorHandler,\r\n

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isDevMode,\n} from '@angular/core';\nimport {\n  NavigationCancel,\n  NavigationError,\n  NavigationEnd,\n  Router,\n  RoutesRecognized,\n  NavigationStart,\n  Event,\n  RouterEvent,\n} from '@angular/router';\nimport {\n  isNgrxMockEnvironment,\n  RuntimeChecks,\n  select,\n  Selector,\n  Store,\n  ACTIVE_RUNTIME_CHECKS,\n} from '@ngrx/store';\nimport { withLatestFrom } from 'rxjs/operators';\nimport {\n  ROUTER_CANCEL,\n  ROUTER_ERROR,\n  ROUTER_NAVIGATED,\n  ROUTER_NAVIGATION,\n  ROUTER_REQUEST,\n} from './actions';\nimport { RouterReducerState } from './reducer';\nimport {\n  RouterStateSerializer,\n  BaseRouterStoreState,\n} from './serializers/base';\nimport {\n  DefaultRouterStateSerializer,\n  SerializedRouterStateSnapshot,\n} from './serializers/default_serializer';\nimport { MinimalRouterStateSerializer } from './serializers/minimal_serializer';\n\nexport type StateKeyOrSelector<T> = string | Selector<any, RouterReducerState<T>>;\n\n/**\n * Full = Serializes the router event with DefaultRouterStateSerializer\n * Minimal = Serializes the router event with MinimalRouterStateSerializer\n */\nexport const enum RouterState {\n  Full,\n  Minimal,\n}\n\nexport interface StoreRouterConfig<T> extends BaseRouterStoreState = SerializedRouterStateSnapshot {\n  stateKey?: StateKeyOrSelector<T>;\n  serializer?: new (...args: any[]) => RouterStateSerializer;\n  /**\n   * By default, ROUTER_NAVIGATION is dispatched before guards and resolvers run.\n   * Therefore, the action could run too soon, for example\n   * there may be a navigation cancel due to a guard saying the navigation is not allowed.\n   * To run ROUTER_NAVIGATION after guards and resolvers,\n   * set this property to NavigationActionTiming.PostActivation.\n   */\n  navigationActionTiming?: NavigationActionTiming;\n  /**\n   * Decides which router serializer should be used, if there is none provided, and the metadata on the dispatched @ngrx/router-store action payload.\n   * Set to `Full` to use the `DefaultRouterStateSerializer` and to set the angular router events as payload.\n   * Set to `Minimal` to use the `MinimalRouterStateSerializer` and to set a minimal router event with the navigation id and url as payload.\n   */\n  routerState?: RouterState;\n}\n\ninterface StoreRouterActionPayload {\n  event: RouterEvent;\n  routerState?: SerializedRouterStateSnapshot;\n  storeState?: any;\n}\n\nexport enum NavigationActionTiming {\n  PreActivation = 1,\n  PostActivation = 2,\n}\n\nexport const _ROUTER_CONFIG = new InjectionToken<@ngrx/router-store Internal Configuration>(\n  '@ngrx/router-store Configuration'\n);\n\nexport const DEFAULT_ROUTER_FEATURENAME = 'router';\n\nexport function _createRouterConfig(\n  config: StoreRouterConfig\n): StoreRouterConfig {\n  return {\n    stateKey: DEFAULT_ROUTER_FEATURENAME,\n    serializer: MinimalRouterStateSerializer,\n    navigationActionTiming: NavigationActionTiming.PreActivation,\n    ...config,\n  };\n}\n\nenum RouterTrigger {\n  NONE = 1,\n  ROUTER = 2,\n  STORE = 3,\n}\n\n/**\n * Connects RouterModule with StoreModule.\n */\n\nDuring the navigation, before any guards or resolvers run, the router will dispatch\n * a ROUTER_NAVIGATION action, which has the following signature:\n * export type RouterNavigationPayload = {\n *   routerState: SerializedRouterStateSnapshot,\n *   event: RoutesRecognized\n * }\n * Either a reducer or an effect can be invoked in response to this action.\n * If the invoked reducer throws, the navigation will be canceled.\n * If navigation gets canceled because of a guard, a ROUTER_CANCEL action will be\n * dispatched. If navigation results in an error, a ROUTER_ERROR action will be dispatched.\n * Both ROUTER_CANCEL and ROUTER_ERROR contain the store state before the navigation\n * which can be used to restore the consistency of the store.\n * Usage:\n * typescript\n * @NgModule({\n *   declarations: [AppCmp, SimpleCmp],\n *   imports: [\n *     BrowserModule,\n *     StoreModule.forRoot(mapOfReducers),\n *     RouterModule.forRoot([\n *       { path: '', component: SimpleCmp },\n *       { path: 'next', component: SimpleCmp }\n *     ]),\n *     StoreRouterConnectingModule.forRoot(),\n *   ],\n *   bootstrap: [AppCmp]\n * })\n * export class AppModule {\n * }\n * \n * @NgModule({\n * })\n * export class StoreRouterConnectingModule {\n *   private lastEvent: Event | null = null;\n *   private routerState: SerializedRouterStateSnapshot | null = null;\n *   private storeState: any;\n *   private trigger = RouterTrigger.NONE;\n *   private readonly stateKey: StateKeyOrSelector;\n *   static forRoot<T> extends BaseRouterStoreState = SerializedRouterStateSnapshot\n * }(\n  config:

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StoreRouterConfig<T> = {} \n ): ModuleWithProviders<StoreRouterConnectingModule> { \n return { \n
ngModule: StoreRouterConnectingModule, \n providers: [ \n { provide: _ROUTER_CONFIG, useValue:
config }, \n { \n provide: ROUTER_CONFIG, \n useFactory: _createRouterConfig, \n deps:
[_ROUTER_CONFIG], \n }, \n { \n provide: RouterStateSerializer, \n useClass: config.serializer \n
? config.serializer \n : config.routerState === RouterState.Full \n ? DefaultRouterStateSerializer \n
: MinimalRouterStateSerializer, \n }, \n ], \n }; \n } \n \n constructor( \n private store: Store<any>, \n
private router: Router, \n private serializer: RouterStateSerializer<SerializedRouterStateSnapshot>, \n
private errorHandler: ErrorHandler, \n @Inject(ROUTER_CONFIG) private readonly config:
StoreRouterConfig, \n @Inject(ACTIVE_RUNTIME_CHECKS) \n private readonly activeRuntimeChecks:
RuntimeChecks \n ) { \n this.stateKey = this.config.stateKey as StateKeyOrSelector; \n \n if ( \n
!isNgrxMockEnvironment() && \n isDevMode() && \n (activeRuntimeChecks?.strictActionSerializability || \n
activeRuntimeChecks?.strictStateSerializability) && \n this.serializer instanceof
DefaultRouterStateSerializer \n ) { \n console.warn( \n '@ngrx/router-store: The serializability runtime
checks cannot be enabled ' + \n 'with the DefaultRouterStateSerializer. The default serializer ' + \n
'has an unserializable router state and actions that are not serializable. ' + \n
'To use the serializability runtime checks
either use ' + \n 'the MinimalRouterStateSerializer or implement a custom router state
serializer. ' + \n 'This also applies to Ivy with immutability runtime checks.' \n ); \n } \n \n
this.setUpStoreStateListener(); \n this.setUpRouterEventsListener(); \n } \n \n private setUpStoreStateListener():
void { \n this.store \n .pipe(select(this.stateKey as any), withLatestFrom(this.store)) \n
.subscribe(([routerStoreState, storeState]) => { \n this.navigateIfNeeded(routerStoreState, storeState); \n
}); \n } \n \n private navigateIfNeeded( \n routerStoreState: RouterReducerState, \n storeState: any \n ): void { \n if
(!routerStoreState || !routerStoreState.state) { \n return; \n } \n if (this.trigger === RouterTrigger.ROUTER) { \n
return; \n } \n if (this.lastEvent instanceof NavigationStart) { \n return; \n } \n \n const url =
routerStoreState.state.url; \n if (!isSameUrl(this.router.url, url)) { \n this.storeState = storeState; \n this.trigger
= RouterTrigger.STORE; \n this.router.navigateByUrl(url).catch((error)
=> { \n this.errorHandler.handleError(error); \n }); \n } \n } \n \n private setUpRouterEventsListener(): void
{ \n const dispatchNavLate = \n this.config.navigationActionTiming === \n
NavigationActionTiming.PostActivation; \n let routesRecognized: RoutesRecognized; \n \n this.router.events \n
.pipe(withLatestFrom(this.store)) \n .subscribe((event, storeState) => { \n this.lastEvent = event; \n \n if
(event instanceof NavigationStart) { \n this.routerState = this.serializer.serialize( \n
this.router.routerState.snapshot \n ); \n if (this.trigger !== RouterTrigger.STORE) { \n this.storeState
= storeState; \n this.dispatchRouterRequest(event); \n } \n } else if (event instanceof
RoutesRecognized) { \n routesRecognized = event; \n \n if (!dispatchNavLate && this.trigger !==
RouterTrigger.STORE) { \n this.dispatchRouterNavigation(event); \n
} \n } else if (event instanceof NavigationCancel) { \n this.dispatchRouterCancel(event); \n
this.reset(); \n } else if (event instanceof NavigationError) { \n this.dispatchRouterError(event); \n
this.reset(); \n } else if (event instanceof NavigationEnd) { \n if (this.trigger !== RouterTrigger.STORE) { \n
if (dispatchNavLate) { \n this.dispatchRouterNavigation(routesRecognized); \n } \n
this.dispatchRouterNavigated(event); \n } \n this.reset(); \n } \n }); \n } \n \n private
dispatchRouterRequest(event: NavigationStart): void { \n this.dispatchRouterAction(ROUTER_REQUEST, {
event }); \n } \n \n private dispatchRouterNavigation( \n lastRoutesRecognized: RoutesRecognized \n ): void { \n
const nextRouterState = this.serializer.serialize( \n lastRoutesRecognized.state \n ); \n
this.dispatchRouterAction(ROUTER_NAVIGATION, { \n routerState:
nextRouterState, \n event: new RoutesRecognized( \n lastRoutesRecognized.id, \n
lastRoutesRecognized.url, \n lastRoutesRecognized.urlAfterRedirects, \n nextRouterState \n ), \n }); \n
} \n \n private dispatchRouterCancel(event: NavigationCancel): void { \n
this.dispatchRouterAction(ROUTER_CANCEL, { \n storeState: this.storeState, \n event, \n }); \n } \n \n
private dispatchRouterError(event: NavigationError): void { \n this.dispatchRouterAction(ROUTER_ERROR, { \n

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storeState: this.storeState,\n  event: new NavigationError(event.id, event.url, `${event}`),\n  });\n }\n\nprivate dispatchRouterNavigated(event: NavigationEnd): void {\n  const routerState = this.serializer.serialize(\n    this.router.routerState.snapshot\n  );\n  this.dispatchRouterAction(ROUTER_NAVIGATED, { event, routerState\n  });\n }\n\nprivate dispatchRouterAction(\n  type: string,\n  payload: StoreRouterActionPayload\n ): void {\n  this.trigger\n    = RouterTrigger.ROUTER;\n  try {\n    this.store.dispatch({\n      type,\n      payload: {\n        routerState:\n        this.routerState,\n        ...payload,\n        event:\n        this.config.routerState === RouterState.Full\n        ?\n        payload.event\n        : {\n            id: payload.event.id,\n            url: payload.event.url,\n            // safe,\n            as it will just be `undefined` for non-NavigationEnd router events\n            urlAfterRedirects: (payload.event as\n            NavigationEnd)\n            .urlAfterRedirects,\n          },\n        },\n      });\n    } finally {\n      this.trigger =\n      RouterTrigger.NONE;\n    }\n  }\n\n  private reset() {\n    this.trigger = RouterTrigger.NONE;\n    this.storeState =\n    null;\n    this.routerState = null;\n  }\n}\n\n/**\n * Check if the URLs are matching. Accounts for the possibility of\n * trailing `\\` in url.\n */\nfunction isSameUrl(first: string, second: string): boolean {\n  return\n  stripTrailingSlash(first) === stripTrailingSlash(second);\n}\n\nfunction stripTrailingSlash(text: string): string {\n  (text?.length > 0 && text[text.length - 1] === '/')\n  ?\n  return text.substring(0, text.length - 1);\n  :\n  return\n  text;\n}\n\n\"import {\n  createFeatureSelector,\n  createSelector,\n  MemoizedSelector,\n} from\n '@ngrx/store';\nimport { RouterStateSelectors } from './models';\nimport { RouterReducerState } from\n './reducer';\nimport { DEFAULT_ROUTER_FEATURENAME } from './router_store_module';\n\nexport function\n  createRouterSelector<State extends Record<string, any>>(): MemoizedSelector<\n  State,\n  RouterReducerState\n> {\n  return createFeatureSelector(DEFAULT_ROUTER_FEATURENAME);\n}\n\nexport\n  function getSelectors<V>(\n    selectState: (state: V) => RouterReducerState<any> = createRouterSelector<V>()\n  ): RouterStateSelectors<V> {\n    const selectRouterState = createSelector(\n      selectState,\n      (router) => router &&\n      router.state\n    );\n    const selectRootRoute = createSelector(\n      selectRouterState,\n      (routerState) => routerState && routerState.root\n    );\n    const selectCurrentRoute =\n    createSelector(selectRootRoute, (rootRoute) => {\n      if (!rootRoute) {\n        return undefined;\n      }\n      let route =\n      rootRoute;\n      while (route.firstChild) {\n        route = route.firstChild;\n      }\n      return route;\n    });\n    const\n    selectFragment = createSelector(\n      selectRootRoute,\n      (route) => route && route.fragment\n    );\n    const\n    selectQueryParams = createSelector(\n      selectRootRoute,\n      (route) => route && route.queryParams\n    );\n    const\n    selectQueryParam = (param: string) =>\n    createSelector(selectQueryParams, (params) => params &&\n    params[param]);\n    const selectRouteParams = createSelector(\n      selectCurrentRoute,\n      (route) => route &&\n      route.params\n    );\n    const selectRouteParam = (param: string) =>\n    createSelector(selectRouteParams, (params)\n    => params && params[param]);\n    const selectRouteData = createSelector(\n      selectCurrentRoute,\n      (route) => route && route.data\n    );\n    const selectUrl = createSelector(\n      selectRouterState,\n      (routerState)\n    => routerState && routerState.url\n    );\n\n    return {\n      selectCurrentRoute,\n      selectFragment,\n      selectQueryParams,\n      selectQueryParam,\n      selectRouteParams,\n      selectRouteParam,\n      selectRouteData,\n      selectUrl,\n    };\n  }\n}\n\n\"/**\n * DO NOT EDIT\n */\n * This file is automatically generated at build\n */\n\nexport *\n from './public_api';\n\"/**\n * Generated bundle index. Do not edit.\n */\n\nexport * from './index';\n\nexport\n  { _ROUTER_CONFIG as a,\n  createRouterConfig as b }\n from\n  './src/router_store_module';\n\"names\": [\"createAction\", \"props\", \"NavigationActionTiming\", \"InjectionToken\", \"store\", \"isNgRxMockEnvironment\", \"isDevMode\", \"select\", \"withLatestFrom\", \"NavigationStart\", \"RoutesRecognized\", \"NavigationCancel\", \"NavigationError\", \"NavigationEnd\", \"NgModule\", \"Store\", \"Router\", \"ErrorHandler\", \"Inject\", \"ACTIVE_RUNTIME_CHECKS\", \"createFeatureSelector\", \"createSelector\"], \"mappings\": \":::;IAYA::;QAGa,cAAc,GAAG,6BAA6B;QAsB9C,mBAAmB,GAAGA,kBAAY,CAC7C,cAAc,EACdC,WAAK,EAAoE,EACzE;IACF::;QAGa,iBA AiB,GAAG,gCAAGC;QAsBpD,sBAAsB,GAAGD,kBAAY,CACChD,iBAAiB,EACjBC,WAAK,EAAuE,EAC5E;IA EF::;QAGa,aAAa,GAAG,4BAA4B;QAYB5C,kBAAkB,GAAGD,kBAAY,CAC5C,aAAa,EACbC,WAAK,EAAmE, EACxE;IAEF::;QAGa,YAA Y,GAAG,2BAA2B;QAYB1C,iBAAiB,GAAGD,kBAAY,CAC3C,YAA Y,EACZC,WA AK,EAAkE,EACvE;IAEF::;QAGa,gBAAGB,GAAG,+BAA+B;QAsBID,qBAAqB,GAAGD,kBAAY,CAC/C,gBA AgB,EACChBC,WAAK,EAASe;;aCnJ7D,aAAa,CAG3B,KAAyB,EAAE,MAAc;;QAEzC,IAAM,YAA Y,GAAG,M
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No license file was found, but licenses were detected in source scan.

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CAAC,IAAI,KAAK,YAAY;QAF/B,CAE+B,CACIC,CACF,CAAC;AACJ,CAAC;AAbD,4CAaC", "sourcesContent  
":["/\*

```
istanbul ignore file */\n/**\n * @license\n * Copyright Google Inc. All Rights Reserved.\n * Use of this source  
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n */\nimport * as ts from 'typescript';\nimport {\n  Change,\n  InsertChange,\n  NoopChange,\n  createReplaceChange,\n  ReplaceChange,\n  RemoveChange,\n  createRemoveChange,\n} from './change';\nimport {\n  Path\n} from '@angular-devkit/core';\n\n/**\n * Find all nodes from the AST in the subtree of node of SyntaxKind  
kind.\n * @param node\n * @param kind\n * @param max The maximum number of items to return.\n * @return  
all nodes of kind, or [] if none is found\n */\nexport function findNodes(\n  node: ts.Node,\n  kind: ts.SyntaxKind,\n  max = Infinity): ts.Node[] {\n  if (!node || max === 0) {\n    return [];\n  }\n  const arr: ts.Node[] = [];\n  if (node.kind === kind) {\n    arr.push(node);\n    max--;\n  }\n  if (max > 0) {\n    for (const child of\n      node.getChildren()) {\n      findNodes(child, kind, max).forEach((node) => {\n        if (max > 0) {\n          arr.push(node);\n        }\n        max--;\n      });\n    }\n    if (max <= 0) {\n      break;\n    }\n  }\n  return\n  arr;\n}\n\n/**\n * Get all the nodes from a source.\n * @param sourceFile The source file object.\n * @returns  
{Observable<ts.Node>} An observable of all the nodes in the source.\n */\nexport function\n  getSourceNodes(sourceFile: ts.SourceFile): ts.Node[] {\n  const nodes: ts.Node[] = [sourceFile];\n  const result =\n  [];\n  while (nodes.length > 0) {\n    const node = nodes.shift();\n    if (node) {\n      result.push(node);\n      if\n      (node.getChildCount(sourceFile) >= 0) {\n        nodes.unshift(...node.getChildren());\n      }\n    }\n  }\n  return result;\n}\n\n/**\n * Helper for sorting nodes.\n * @return function to sort nodes in  
increasing order of position in sourceFile\n */\nfunction nodesByPosition(first: ts.Node, second: ts.Node): number {\n  return first.pos - second.pos;\n}\n\n/**\n * Insert `toInsert` after the last occurrence of  
`ts.SyntaxKind[nodes[i].kind]` or after the last of occurrence of `syntaxKind` if the last occurrence is a sub child\n * of ts.SyntaxKind[nodes[i].kind] and save the changes in file.\n * @param nodes insert after the last occurrence  
of nodes\n * @param toInsert string to insert\n * @param file file to insert changes into\n * @param fallbackPos
```

```

position to insert if toInsert happens to be the first occurrence\n * @param syntaxKind the ts.SyntaxKind of the
subchildren to insert after\n * @return Change instance\n * @throw Error if toInsert is first occurrence but fall back
is not set\n */\nexport function insertAfterLastOccurrence(\n nodes: ts.Node[],\n toInsert: string,\n
file: string,\n fallbackPos: number,\n syntaxKind?: ts.SyntaxKind\n): Change {\n let lastItem =
nodes.sort(nodesByPosition).pop();\n if (!lastItem) {\n throw new Error();\n }\n if (syntaxKind) {\n lastItem =
findNodes(lastItem, syntaxKind).sort(nodesByPosition).pop();\n }\n if (!lastItem && fallbackPos === undefined)\n {\n throw new Error(\n `tried to insert ${toInsert} as first occurrence with no fallback position`\n );\n }\n
const lastItemPosition: number = lastItem ? lastItem.end : fallbackPos;\n\n return new InsertChange(file,\n
lastItemPosition, toInsert);\n}\n\nexport function getContentOfKeyLiteral(\n _source: ts.SourceFile,\n node:
ts.Node\n): string | null {\n if (node.kind === ts.SyntaxKind.Identifier) {\n return (node as ts.Identifier).text;\n }
else if (node.kind === ts.SyntaxKind.StringLiteral) {\n return (node as ts.StringLiteral).text;\n } else {\n return
null;\n }\n}\n\nfunction _angularImportsFromNode(\n node: ts.ImportDeclaration,\n
_sourceFile: ts.SourceFile\n): { [name: string]: string } {\n const ms = node.moduleSpecifier;\n let modulePath:
string;\n switch (ms.kind) {\n case ts.SyntaxKind.StringLiteral:\n modulePath = (ms as ts.StringLiteral).text;\n
break;\n default:\n return {};\n }\n\n if (!modulePath.startsWith('@angular/')) {\n return {};\n }\n\n if
(node.importClause) {\n if (node.importClause.name) {\n // This is of the form `import Name from 'path`.\n
Ignore.\n return {};\n } else if (node.importClause.namedBindings) {\n const nb =
node.importClause.namedBindings;\n if (nb.kind === ts.SyntaxKind.NamespaceImport) {\n // This is of the
form `import * as name from 'path`. Return `name`.\n return {\n [(nb as ts.NamespaceImport).name.text
+ '.']: modulePath,\n }; \n } else {\n // This is of the form `import {a,b,c} from 'path`\n const
namedImports = nb as ts.NamedImports;\n return namedImports.elements\n
.map((is: ts.ImportSpecifier) =>\n is.propertyName ? is.propertyName.text : is.name.text\n
)\n
.reduce((acc: { [name: string]: string }, curr: string) => {\n acc[curr] = modulePath;\n\n return acc;\n
}, {});\n }\n }\n\n return {};\n } else {\n // This is of the form `import 'path';`. Nothing to do.\n return
{};\n }\n}\n\nexport function getDecoratorMetadata(\n source: ts.SourceFile,\n identifier: string,\n module:
string\n): ts.Node[] {\n const angularImports: { [name: string]: string } = findNodes(\n source,\n
ts.SyntaxKind.ImportDeclaration\n )\n .map((node) =>\n _angularImportsFromNode(node as
ts.ImportDeclaration, source)\n )\n .reduce(\n (\n acc: { [name: string]: string },\n current: { [name:
string]: string }\n ) => {\n for (const key of Object.keys(current)) {\n acc[key] = current[key];\n
}\n\n
return acc;\n },\n {},\n {})\n );\n\n return getSourceNodes(source)\n .filter((node) => {\n return (\n
node.kind === ts.SyntaxKind.Decorator &&\n (node as ts.Decorator).expression.kind ===
ts.SyntaxKind.CallExpression\n );\n })\n .map((node) => (node as ts.Decorator).expression as
ts.CallExpression)\n .filter((expr) => {\n if (expr.expression.kind === ts.SyntaxKind.Identifier) {\n const id
= expr.expression as ts.Identifier;\n return (\n id.getFullText(source) === identifier &&\n
angularImports[id.getFullText(source)] === module\n );\n } else if (\n expr.expression.kind ===
ts.SyntaxKind.PropertyAccessExpression\n ) {\n // This covers foo.NgModule when importing * as foo.\n
const paExpr = expr.expression as ts.PropertyAccessExpression;\n // If the left expression is not an identifier,\n
just give up at that point.\n if (paExpr.expression.kind !== ts.SyntaxKind.Identifier)\n {\n return false;\n }\n\n const id = paExpr.name.text;\n const moduleId = (paExpr.expression as
ts.Identifier).getText(source);\n return id === identifier && angularImports[moduleId + '.'] === module;\n
}\n\n return false;\n })\n .filter(\n (expr) =>\n expr.arguments[0] &&\n expr.arguments[0].kind
=== ts.SyntaxKind.ObjectLiteralExpression\n )\n .map((expr) => expr.arguments[0] as
ts.ObjectLiteralExpression);\n}\n\nfunction _addSymbolToNgModuleMetadata(\n source: ts.SourceFile,\n
ngModulePath: string,\n metadataField: string,\n symbolName: string,\n importPath: string\n): Change[] {\n const
nodes = getDecoratorMetadata(source, 'NgModule', '@angular/core');\n let node: any = nodes[0]; // eslint-disable-
line @typescript-eslint/no-explicit-any\n\n // Find the decorator declaration.\n if (!node) {\n return [];\n }\n\n //
Get all the children property assignment of object literals.\n

```

```

    const matchingProperties: ts.ObjectLiteralElement[] = (node as ts.ObjectLiteralExpression).properties\n
    .filter((prop) => prop.kind === ts.SyntaxKind.PropertyAssignment)\n // Filter out every fields that's not\n
    \"metadataField\". Also handles string literals\n // (but not expressions).\n .filter((prop: any) => {\n    const\n
    name = prop.name;\n    switch (name.kind) {\n        case ts.SyntaxKind.Identifier:\n            return (name as\n
    ts.Identifier).getText(source) === metadataField;\n        case ts.SyntaxKind.StringLiteral:\n            return (name as\n
    ts.StringLiteral).text === metadataField;\n    }\n\n    return false;\n });\n\n // Get the last node of the array\n
literal.\n if (!matchingProperties) {\n    return [];\n }\n if (matchingProperties.length === 0) {\n // We haven't\n
found the field in the metadata declaration. Insert a new field.\n    const expr = node as ts.ObjectLiteralExpression;\n
    let position: number;\n    let toInsert: string;\n    if (expr.properties.length\n
    === 0) {\n        position = expr.getEnd() - 1;\n        toInsert = ` ${metadataField}: [${symbolName}]\n`;\n    } else {\n
    node = expr.properties[expr.properties.length - 1];\n        position = node.getEnd();\n // Get the indentation of the\n
last element, if any.\n        const text = node.getFullText(source);\n        const matches = text.match(/^\r?\n\s*/);\n
if (matches.length > 0) {\n            toInsert = ` ${matches[0]}${metadataField}: [${symbolName}]\n`;\n        } else {\n
toInsert = ` ${metadataField}: [${symbolName}]\n`;\n        }\n    }\n\n    const newMetadataProperty = new\n
InsertChange(\n        ngModulePath,\n        position,\n        toInsert\n    );\n    const newMetadataImport =\n
insertImport(\n        source,\n        ngModulePath,\n        symbolName.replace(/\\.*/g, \"\"),\n        importPath\n    );\n
return [newMetadataProperty, newMetadataImport];\n }\n\n    const assignment = matchingProperties[0] as\n
ts.PropertyAssignment;\n\n // If it's not an array,\n
nothing we can do really.\n if (assignment.initializer.kind !== ts.SyntaxKind.ArrayLiteralExpression) {\n    return\n
[];\n }\n\n    const arrLiteral = assignment.initializer as ts.ArrayLiteralExpression;\n if (arrLiteral.elements.length ===\n
0) {\n // Forward the property.\n        node = arrLiteral;\n    } else {\n        node = arrLiteral.elements;\n    }\n\n if (!node)\n
{\n    console.log(\n        \"No app module found. Please add your new class to your component.\"\n    );\n\n    return\n
[];\n }\n\n if (Array.isArray(node)) {\n    const nodeArray = (node as {}) as Array<ts.Node>;\n    const\n
symbolsArray = nodeArray.map((node) => node.getText());\n    if (symbolsArray.includes(symbolName)) {\n\n
return [];\n    }\n\n    node = node[node.length - 1];\n\n    const effectsModule = nodeArray.find(\n        (node) =>\n
(node.getText().includes('EffectsModule.forRoot') &&\n        symbolName.includes('EffectsModule.forRoot')) ||\n
(node.getText().includes('EffectsModule.forFeature')\n
        &&\n        symbolName.includes('EffectsModule.forFeature'))\n    );\n\n if (effectsModule &&\n
symbolName.includes('EffectsModule')) {\n        const effectsArgs = (effectsModule as any).arguments.shift();\n\n
if (\n        effectsArgs &&\n        effectsArgs.kind === ts.SyntaxKind.ArrayLiteralExpression\n    ) {\n        const\n
effectsElements = (effectsArgs as ts.ArrayLiteralExpression)\n        .elements;\n        const [, effectsSymbol] =\n
(<any>symbolName).match(/\\[(.*)\\]/);\n\n        let epos;\n        if (effectsElements.length === 0) {\n            epos =\n
effectsArgs.getStart() + 1;\n            return [new InsertChange(ngModulePath, epos, effectsSymbol)];\n        } else {\n
            const lastEffect = effectsElements[\n                effectsElements.length - 1\n            ] as ts.Expression;\n
            epos =\n
lastEffect.getEnd();\n // Get the indentation of the last element, if any.\n            const text: any =\n
lastEffect.getFullText(source);\n\n            let effectInsert:\n
string;\n            if (text.match(/^\r?\r?\n')) {\n                effectInsert =\n
`${text.match(/^\r?\n\s+/)[0]}${effectsSymbol}`;\n            } else {\n                effectInsert = ` ${effectsSymbol}`;\n
            }\n\n            return [new InsertChange(ngModulePath, epos, effectInsert)];\n        }\n    } else {\n        return\n
[];\n    }\n\n }\n\n }\n\n let toInsert: string;\n let position = node.getEnd();\n if (node.kind ===\n
ts.SyntaxKind.ObjectLiteralExpression) {\n // We haven't found the field in the metadata declaration. Insert a\n
new\n // field.\n        const expr = node as ts.ObjectLiteralExpression;\n        if (expr.properties.length === 0) {\n
            position = expr.getEnd() - 1;\n            toInsert = ` ${metadataField}: [${symbolName}]\n`;\n        } else {\n
            node = expr.properties[expr.properties.length - 1];\n            position = node.getEnd();\n // Get the indentation of the last\n
element, if any.\n            const text = node.getFullText(source);\n            if (text.match(/^\r?\r?\n'))\n
{\n                toInsert = ` ${\n                text.match(/^\r?\n\s+/)[0]\n            }${metadataField}: [${symbolName}]\n`;\n
            } else {\n                toInsert = ` ${metadataField}: [${symbolName}]\n`;\n            }\n        }\n    } else if (node.kind ===\n
ts.SyntaxKind.ArrayLiteralExpression) {\n // We found the field but it's empty. Insert it just before the `]\n

```

```

position--; \n   toInsert = `${symbolName}`; \n   } else { \n   // Get the indentation of the last element, if any. \n
const text = node.getFullText(source); \n   if (text.match(/^\\r?\\n/) ) { \n   toInsert =
`${text.match(/^\\r?\\n(\\r?)\\s+/)[0]}${symbolName}`; \n   } else { \n   toInsert = ` `; \n   } \n   } \n
const insert = new InsertChange(ngModulePath, position, toInsert); \n   const importInsert: Change = insertImport(\n
source, \n   ngModulePath, \n   symbolName.replace(/\\.*$/, ""), \n   importPath \n ); \n   \n   return [insert,
importInsert]; \n   } \n
function _addSymbolToComponentMetadata(\n
source: ts.SourceFile, \n   componentPath: string, \n   metadataField: string, \n   symbolName: string, \n   importPath:
string \n): Change[] { \n   const nodes = getDecoratorMetadata(source, 'Component', '@angular/core'); \n   let node: any
= nodes[0]; // eslint-disable-line @typescript-eslint/no-explicit-any \n   \n   // Find the decorator declaration. \n   if
(!node) { \n   return []; \n   } \n   \n   // Get all the children property assignment of object literals. \n   const
matchingProperties: ts.ObjectLiteralElement[] = (node as ts.ObjectLiteralExpression).properties \n   .filter((prop) =>
prop.kind == ts.SyntaxKind.PropertyAssignment) \n   // Filter out every fields that's not "metadataField". Also
handles string literals \n   // (but not expressions). \n   .filter((prop: any) => { \n   const name = prop.name; \n
switch (name.kind) { \n   case ts.SyntaxKind.Identifier: \n   return (name as ts.Identifier).getText(source) ==
metadataField; \n   case ts.SyntaxKind.StringLiteral: \n
return (name as ts.StringLiteral).text == metadataField; \n   } \n   } \n   } \n   \n   // Get the last node
of the array literal. \n   if (!matchingProperties) { \n   return []; \n   } \n   if (matchingProperties.length == 0) { \n   // We
haven't found the field in the metadata declaration. Insert a new field. \n   const expr = node as
ts.ObjectLiteralExpression; \n   let position: number; \n   let toInsert: string; \n   if (expr.properties.length == 0) { \n
position = expr.getEnd() - 1; \n   toInsert = ` ${metadataField}: [${symbolName}]\n`; \n   } else { \n   node =
expr.properties[expr.properties.length - 1]; \n   position = node.getEnd(); \n   // Get the indentation of the last
element, if any. \n   const text = node.getFullText(source); \n   const matches = text.match(/^\\r?\\n\\s*/); \n   if
(matches.length > 0) { \n   toInsert = `${matches[0]}${metadataField}: [${symbolName}]\n`; \n   } else { \n
toInsert = ` ${metadataField}: [${symbolName}]\n`; \n
} \n   } \n   \n   const newMetadataProperty = new InsertChange(\n   componentPath, \n   position, \n   toInsert \n
); \n   const newMetadataImport = insertImport(\n   source, \n   componentPath, \n
symbolName.replace(/\\.*$/, ""), \n   importPath \n ); \n   \n   return [newMetadataProperty, newMetadataImport]; \n
} \n   \n   const assignment = matchingProperties[0] as ts.PropertyAssignment; \n   \n   // If it's not an array, nothing we can
do really. \n   if (assignment.initializer.kind !== ts.SyntaxKind.ArrayLiteralExpression) { \n   return []; \n   } \n   \n   const
arrLiteral = assignment.initializer as ts.ArrayLiteralExpression; \n   if (arrLiteral.elements.length == 0) { \n   //
Forward the property. \n   node = arrLiteral; \n   } else { \n   node = arrLiteral.elements; \n   } \n   \n   if (!node) { \n
console.log(\n   'No component found. Please add your new class to your component. \n   '); \n   \n   return []; \n
} \n   \n   if (Array.isArray(node)) { \n   const nodeArray = (node
as { }) as Array<ts.Node>; \n   const symbolsArray = nodeArray.map((node) => node.getText()); \n   if
(symbolsArray.includes(symbolName)) { \n   return []; \n   } \n   \n   node = node[node.length - 1]; \n   } \n   \n   let
toInsert: string; \n   let position = node.getEnd(); \n   if (node.kind == ts.SyntaxKind.ObjectLiteralExpression) { \n   //
We haven't found the field in the metadata declaration. Insert a new \n   // field. \n   const expr = node as
ts.ObjectLiteralExpression; \n   if (expr.properties.length == 0) { \n   position = expr.getEnd() - 1; \n   toInsert = `
${metadataField}: [${symbolName}]\n`; \n   } else { \n   node = expr.properties[expr.properties.length - 1]; \n
position = node.getEnd(); \n   // Get the indentation of the last element, if any. \n   const text =
node.getFullText(source); \n   if (text.match(/^\\r?\\n/)) { \n   toInsert = ` ${\n
text.match(/^\\r?\\n(\\r?)\\s+/)[0]} ${metadataField}: [${symbolName}]\n`; \n   } else { \n
toInsert = ` ${metadataField}: [${symbolName}]\n`; \n   } \n   } \n   } \n   else if (node.kind ==
ts.SyntaxKind.ArrayLiteralExpression) { \n   // We found the field but it's empty. Insert it just before the ` ` \n
position--; \n   toInsert = `${symbolName}`; \n   } else { \n   // Get the indentation of the last element, if any. \n
const text = node.getFullText(source); \n   if (text.match(/^\\r?\\n/) ) { \n   toInsert =
`${text.match(/^\\r?\\n(\\r?)\\s+/)[0]}${symbolName}`; \n   } else { \n   toInsert = ` `; \n   } \n   } \n   } \n
const insert = new InsertChange(componentPath, position, toInsert); \n   const importInsert: Change = insertImport(\n

```



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    source,\n    componentPath,\n    symbolName.replace(/\\.*$/, ''),\n    importPath\n );\n\n return [insert,\n importInsert];\n}\n\n/**\n * Custom function to insert a declaration (component, pipe, directive)\n * into NgModule\n declarations. It also imports the component.\n */\nexport function addDeclarationToModule(\n    source:\n    ts.SourceFile,\n    modulePath: string,\n    classifiedName: string,\n    importPath: string\n): Change[] {\n    return\n    _addSymbolToNgModuleMetadata(\n        source,\n        modulePath,\n        'declarations',\n        classifiedName,\n        importPath\n    );\n}\n\n/**\n * Custom function to insert a declaration (component, pipe, directive)\n * into\n NgModule declarations. It also imports the component.\n */\nexport function addImportToModule(\n    source:\n    ts.SourceFile,\n    modulePath: string,\n    classifiedName: string,\n    importPath: string\n): Change[] {\n    return\n    _addSymbolToNgModuleMetadata(\n        source,\n        modulePath,\n        'imports',\n        classifiedName,\n        importPath\n    );\n}\n\n/**\n * Custom function to insert a provider into NgModule. It also imports it.\n */\nexport function\n addProviderToModule(\n    source: ts.SourceFile,\n    modulePath: string,\n    classifiedName: string,\n    importPath:\n    string\n): Change[] {\n    return _addSymbolToNgModuleMetadata(\n        source,\n        modulePath,\n        'providers',\n        classifiedName,\n        importPath\n    );\n}\n\n/**\n * Custom function to insert a provider into Component. It also imports it.\n */\nexport function\n addProviderToComponent(\n    source: ts.SourceFile,\n    componentPath: string,\n    classifiedName: string,\n    importPath: string\n): Change[] {\n    return _addSymbolToComponentMetadata(\n        source,\n        componentPath,\n        'providers',\n        classifiedName,\n        importPath\n    );\n}\n\n/**\n * Custom function\n to insert an export into NgModule. It also imports it.\n */\nexport function\n addExportToModule(\n    source:\n    ts.SourceFile,\n    modulePath: string,\n    classifiedName: string,\n    importPath: string\n): Change[] {\n    return\n    _addSymbolToNgModuleMetadata(\n        source,\n        modulePath,\n        'exports',\n        classifiedName,\n        importPath\n    );\n}\n\n/**\n * Custom function to insert an export into NgModule. It also imports it.\n */\nexport function\n addBootstrapToModule(\n    source: ts.SourceFile,\n    modulePath: string,\n    classifiedName: string,\n    importPath:\n    string\n): Change[] {\n    return _addSymbolToNgModuleMetadata(\n        source,\n        modulePath,\n        'bootstrap',\n        classifiedName,\n        importPath\n    );\n}\n\n/**\n * Add Import `import { symbolName } from fileName` if the\n import doesn't exist\n * already. Assumes fileToEdit can be resolved and accessed.\n * @param fileToEdit (file we\n want to add import to)\n * @param symbolName (item to import)\n * @param fileName (path to the file)\n * @param isDefault (if true, import follows style for importing default exports)\n * @return Change\n */\nexport\n function insertImport(\n    source: ts.SourceFile,\n    fileToEdit: string,\n    symbolName: string,\n    fileName: string,\n    isDefault = false\n): Change {\n    const rootNode = source;\n    const allImports = findNodes(rootNode,\n    ts.SyntaxKind.ImportDeclaration);\n\n    // get nodes that map to import statements from the file fileName\n    const\n    relevantImports = allImports.filter((node) => {\n        // StringLiteral of the ImportDeclaration is the import\n        file (fileName in this case).\n        const importFiles = node\n            .getChildren()\n            .filter((child) => child.kind ===\n            ts.SyntaxKind.StringLiteral)\n            .map((n) => (n as ts.StringLiteral).text);\n\n        return importFiles.filter((file) =>\n            file === fileName).length === 1;\n    });\n\n    if (relevantImports.length > 0) {\n        let importsAsterisk = false; //\n        imports from import file\n        const imports: ts.Node[] = [];\n        relevantImports.forEach((n) => {\n            Array.prototype.push.apply(\n                imports,\n                findNodes(n, ts.SyntaxKind.Identifier)\n            );\n            if\n            (findNodes(n, ts.SyntaxKind.AsteriskToken).length > 0) {\n                importsAsterisk = true;\n            }\n        });\n\n        // if\n        imports * from fileName, don't add symbolName\n        if (importsAsterisk) {\n            return new NoopChange();\n        }\n\n        const importTextNodes = imports.filter(\n            (n) => (n as ts.Identifier).text === symbolName\n        );\n\n        //\n        insert import if it's not there\n        if (importTextNodes.length\n            === 0) {\n            const fallbackPos =\n                findNodes(\n                    relevantImports[0],\n                    ts.SyntaxKind.CloseBraceToken\n                )[0].getStart() ||\n                findNodes(relevantImports[0],\n                    ts.SyntaxKind.FromKeyword)[0].getStart();\n\n            return insertAfterLastOccurrence(\n                imports,\n                `,\n                `${symbolName}`,\n                fileToEdit,\n                fallbackPos\n            );\n        }\n\n        return new NoopChange();\n    }\n\n    // no\n    such import declaration exists\n    const useStrict = findNodes(rootNode, ts.SyntaxKind.StringLiteral).filter(\n        (n)\n        => n.getText() === 'use strict'\n    );\n    let fallbackPos = 0;\n    if (useStrict.length > 0) {\n        fallbackPos =\n            useStrict[0].end;\n    }\n    const open = isDefault ? "' : '{ ' : ' ' ;\n    const close = isDefault ? "' : ' ' ;\n    // if there are no

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imports or 'use strict' statement, insert import at beginning of file\n
const insertAtBeginning = allImports.length
=== 0 && useStrict.length === 0;\n
const separator = insertAtBeginning ? " : ";;\n\n\n
const
toInsert =\n ` ${separator}import ${open}${symbolName}${close}` +\n ` from
'${fileName}'${insertAtBeginning ? ';\n' : ''};\n\n
return insertAfterLastOccurrence(\n
allImports,\n
toInsert,\n
fileToEdit,\n
fallbackPos,\n
ts.SyntaxKind.StringLiteral\n
);\n\n\n
export function replaceImport(\n
sourceFile: ts.SourceFile,\n
path: Path,\n
importFrom: string,\n
importAsIs: string,\n
importToBe: string\n):
(ReplaceChange | RemoveChange)[] {\n
const imports = sourceFile.statements\n
.filter(ts.isImportDeclaration)\n
.filter(\n
({ moduleSpecifier }) =>\n
moduleSpecifier.getText(sourceFile) === ` ${importFrom}` ||\n
moduleSpecifier.getText(sourceFile) === ` "${importFrom}"`\n
);\n\n
if (imports.length === 0) {\n
return [];\n
}\n\n
const importText = (specifier: ts.ImportSpecifier) => {\n
if (specifier.name.text) {\n
return
specifier.name.text;\n
}\n\n
// if import is renamed\n
if (specifier.propertyName &&&
specifier.propertyName.text)
{\n
return specifier.propertyName.text;\n
}\n\n
return ";\n
};\n\n
const changes = imports.map((p) => {\n
const namedImports = p?.importClause?.namedBindings as ts.NamedImports;\n
if (!namedImports) {\n
return
[];\n
}\n\n
const importSpecifiers = namedImports.elements;\n
const isAlreadyImported = importSpecifiers\n
.map(importText)\n
.includes(importToBe);\n\n
const importChanges = importSpecifiers.map((specifier,
index) => {\n
const text = importText(specifier);\n\n
// import is not the one we're looking for, can be
skipped\n
if (text !== importAsIs) {\n
return undefined;\n
}\n\n
// identifier has not been imported,
simply replace the old text with the new text\n
if (!isAlreadyImported) {\n
return createReplaceChange(\n
sourceFile,\n
specifier,\n
importAsIs,\n
importToBe\n
);\n
}\n\n
const nextIdentifier =
importSpecifiers[index
+ 1];\n
// identifier is not the last, also clean up the comma\n
if (nextIdentifier) {\n
return
createRemoveChange(\n
sourceFile,\n
specifier,\n
specifier.getStart(sourceFile),\n
nextIdentifier.getStart(sourceFile)\n
);\n
}\n\n
// there are no imports following, just remove it\n
return
createRemoveChange(\n
sourceFile,\n
specifier,\n
specifier.getStart(sourceFile),\n
specifier.getEnd()\n
);\n
});\n\n
return importChanges.filter(Boolean) as (ReplaceChange |
RemoveChange)[];\n
});\n\n
return changes.reduce((imports, curr) => imports.concat(curr), []);\n\n\n
export
function containsProperty(\n
objectLiteral: ts.ObjectLiteralExpression,\n
propertyName: string\n) {\n
return (\n
objectLiteral &&&\n
objectLiteral.properties.some(\n
(prop) =>\n
ts.isPropertyAssignment(prop) &&&\n
ts.isIdentifier(prop.name) &&&\n
prop.name.text === propertyName\n
)\n
);\n
}\n
}

```

Found in path(s):

\* /opt/cola/permits/1762774517\_1695958552.1100726/0/router-store-12-5-1-tgz/package/schematics-core/utility/ast-utils.js.map

No license file was found, but licenses were detected in source scan.

# @ngrx/router-store

The sources for this package are in the main [NgRx](https://github.com/ngrx/platform) repo. Please file issues and pull requests against that repo.

License: MIT

Found in path(s):

\* /opt/cola/permits/1762774517\_1695958552.1100726/0/router-store-12-5-1-tgz/package/README.md

No license file was found, but licenses were detected in source scan.

```
 {"version":3,"file":"strings.js","sourceRoot":"","sources":["../.././../modules/router-store/schematics-  
core/utility/strings.ts"],"names":[],"mappings":":;AAAA;::;GAMG;AACH,IAAM,uBAAuB,GAAG,OAAO,CAA  
C;AACxC,IAAM,wBAAwB,GAAG,mBAAmB,CAAC;AACrD,IAAM,sBAAsB,GAAG,mBAAmB,CAAC;AACn  
D,IAAM,0BAA0B,GAAG,oBAAoB,CAAC;AACxD,IAAM,0BAA0B,GAAG,QAAQ,CAAC;AAE5C;::;GASG;  
AACH,SAAGB,UAAU,CAAC,GAAW;IACpC,OAAO,GAAG,CAAC,OAAO,CAAC,wBAAwB,EAAE,OAAO,CA  
AC,CAAC,WAAW,EAAE,CAAC;AACtE,CAAC;AAFD,gCAEC;AAED;::;GASG;AACH,SAAGB,SAAS,CAA  
C,GAAY;IACpC,OAAO,UAAU,CAAC,GAAG,IAAI,EAAE,CAAC,CAAC,OAAO,CAAC,uBAAuB,EAAE,GAA  
G,CAAC,CAAC;AACrE,CAAC;AAFD,8BAEC;AAED;::;GAUG;AACH,SAAGB,QAAQ,CAAC,GAAW;IACl  
C,OAAO,GAAG;SACP,OAAO,CACN,sBAAsB,EACtB,UAAc,MAAc,EAAE,UAAkB,EAAE,GAAW;QAC9C,O  
AAO,GAAG,CAAC,CAAC,CAAC,GAAG,CAAC,WAAW,EAAE,CAAC,CAAC,CAAC,EAAE,CAAC;IACtC,CA  
AC,CACf;SACA,OAAO,CAAC,UAAU,EAAE,UAAc,KAAa,IAAK,OAAA,KAAK,CAAC,WAAW,EAAE,EAAn  
B,CAAmB,CAAC,CAAC;AACjE,CAAC;AATD,4BASC;AAED;::;GASG;AACH,SAAGB,QAAQ,CAAC,GAA  
W;IACiC,OAAO,GAAG;SACP,KAAK,CAAC,GAAG,CAAC;SACV,GAAG,CAAC,UAAc,IAAI,IAAK,OAAA,U  
AAU,CAAC,QAAQ,CAAC,IAAI,CAAC,CAAC,EAA1B,CAA0B,CAAC;SACzC,IAAI,CAAC,GAAG,CAAC,CA  
AC;AACf,CAAC;AALD,4BAKC;AAED;::;GAUG;AACH,SAAGB,UAAU,CAAC,GAAW;IACpC,OAAO,GA  
AG;SACP,OAAO,CAAC,0BAA0B,EAAE,OAAO,CAAC;SAC5C,OAAO,CAAC,0BAA0B,EAAE,GAAG,CAAC;  
SACxC,WAAW,EAAE,CAAC;AACnB,CAAC;AALD,gCAKC;AAED;::;GASG;AACH,SAAGB,UAAU,CAAC  
,GAAW;IACpC,OAAO,GAAG,CAAC,MAAM,CAAC,CAAC,CAAC,WAAW,EAAE,GAAG,GAAG,CAA  
C,MAAM,CAAC,CAAC,CAAC;AACrD,CAAC;AAFD,gCAEC;AAED;::;GAUG;AACH,SAAGB,SA  
S,CAAC,GAAW;IACnC,OAAO,QAAQ,CACb,CAAC,cAAc,EAAE,QAAQ,EAAE,0BAA0B,CAAC,CAAC,GAA  
G,CACxD,UAAc,CAAC,EAAE,CAAC,IAAK,OAAA,CAAC,GAAG,GAAG,GAAG,CAAC,OAAO,CAAC,CAA  
C,EAAE,QAAK,IAAI,CAAC,CAAC,IAAI,EAAE,OAAO,CAAC,CAAC,EAA7C,CAA6C,CACxD,IAAI,G  
AAG,GAAG,GAAG,CACf,CAAC;AACJ,CAAC;AAND,8BAMC;AAED,SAAGB,KAAK,CAAC,IAAY,EAAE,KA  
AyB;IAC3D,OAAO,KAAK,CAAC,CAAC,CAAI,KAAK,SAAI,IAAM,CAAC,CAAC,CAAC,IAAI,CAAC;AAC3  
C,CAAC;AAFD,sBAEC;AAED,SAAGB,WAAW,CACzB,KAA0B,EAC1B,IAAyB,EACzB,IAAY,EACZ,IAAY;IA  
EZ,IAAI,KAAK,IAAI,CAAC,IAAI,EAAE;QACiB,OAAO,WAAS,IAAI,SAAI,IAAI,MAAG,CAAC;KACjC;IAED  
,OAAO,KAAK,CAAC,CAAC,CAAC,QAAM,IAAI,MAAG,CAAC,CAAC,CAAC,IAAI,CAAC;AACtC,CAAC;A  
AXD,kCAWC","sourcesContent":["/**\n
```

```
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style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nconst
```

```
STRING_DASHERIZE_REGEXP = /[ _]/g;\nconst STRING_DECAMELIZE_REGEXP = /([a-z\\d])([A-  
Z])/g;\nconst STRING_CAMELIZE_REGEXP = /(-_|\\.|\\s)+(?)/g;\nconst STRING_UNDERSCORE_REGEXP_1  
= /([a-z\\d])([A-Z]+)/g;\nconst STRING_UNDERSCORE_REGEXP_2 = /-|\\s+/g;\n\n * Converts a camelized  
string into all lower case separated by underscores.\n\n```\njavascript\n decamelize('innerHTML'); //  
'inner_html'\n decamelize('action_name'); // 'action_name'\n decamelize('css-class-name'); //  
'css-class-name'\n decamelize('my favorite items'); // 'my favorite items'\n\n *\n\nexport function decamelize(str:  
string): string {\n  return str.replace(STRING_DECAMELIZE_REGEXP, '$1_$2').toLowerCase();\n}\n\n *  
Replaces underscores, spaces, or camelCase with dashes.\n\n```\njavascript\n dasherize('innerHTML'); // 'inner-  
html'\n dasherize('action_name'); // 'action-name'\n dasherize('css-class-name'); // 'css-class-name'\n dasherize('my favorite items'); // 'my-favorite-items'\n\n *\n\nexport function dasherize(str?: string): string {\n  return decamelize(str || '').replace(STRING_DASHERIZE_REGEXP, '-');\n}\n\n *  
Returns the lowerCamelCase  
form of a string.\n\n```\njavascript\n camelize('innerHTML'); // 'innerHTML'\n camelize('action_name'); //  
'actionName'\n camelize('css-class-name'); // 'cssClassName'\n camelize('my favorite items'); //  
'myFavoriteItems'\n camelize('My Favorite Items'); // 'myFavoriteItems'\n\n *\n\nexport function  
camelize(str: string): string {\n  return str\n    .replace(\n      STRING_CAMELIZE_REGEXP,\n      (_match: string,  
_separator: string, chr: string) => {\n        return chr ? chr.toUpperCase() : '';\n      })\n    .replace(/^[A-Z]/,\n      (match: string) => match.toLowerCase());\n}\n\n *  
Returns the UpperCamelCase form of a string.\n\n```\njavascript\n 'innerHTML'.classify(); // 'InnerHTML'\n 'action_name'.classify(); // 'ActionName'\n 'css-
```

```

class-name'.classify(); // 'CssClassName\n 'my favorite items'.classify(); // 'MyFavoriteItems\n ``\n *\nexport
function classify(str: string): string {\n return str\n .split('.')\n .map((part) => capitalize(camelize(part)))\n
.join('.');\n}\n\n/**\n More general than decamelize. Returns the lower\_case\_and\_underscored\n form of a
string.\n\n ``\n javascript\n 'innerHTML'.underscore(); // 'inner_html\n 'action_name'.underscore(); //
'action_name\n 'css-class-name'.underscore(); //
'css_class_name\n 'my favorite items'.underscore(); // 'my_favorite_items\n ``\n *\nexport function
underscore(str: string): string {\n return str\n .replace(STRING_UNDERSCORE_REGEXP_1, '$1_$2')\n
.replace(STRING_UNDERSCORE_REGEXP_2, '_')\n .toLowerCase();\n}\n\n/**\n Returns the Capitalized form
of a string\n\n ``\n javascript\n 'innerHTML'.capitalize() // 'InnerHTML\n 'action_name'.capitalize() //
'Action_name\n 'css-class-name'.capitalize() // 'Css-class-name\n 'my favorite items'.capitalize() // 'My favorite
items\n ``\n *\nexport function capitalize(str: string): string {\n return str.charAt(0).toUpperCase() +
str.substr(1);\n}\n\n/**\n Returns the plural form of a string\n\n ``\n javascript\n 'innerHTML'.pluralize() //
'innerHTMLs\n 'action_name'.pluralize() // 'actionNames\n 'css-class-name'.pluralize() // 'cssClassNames\n
'regex'.pluralize() // 'regexes\n 'user'.pluralize() // 'users\n ``\n *\nexport
function pluralize(str: string): string {\n return camelize(\n [/(^[^aeiou])y$/, /()fe?$/,
/([^\u005Caeiouo][sxz][cs]h)$/].map(\n (c, i) => (str = str.replace(c, ` $1${'iv'[i] || ''}e`))\n )
) && str + 's'\n
);\n}\n\nexport function group(name: string, group: string | undefined) {\n return group ? `${group}/${name}` :
name;\n}\n\nexport function featurePath(\n group: boolean | undefined,\n flat: boolean | undefined,\n path:
string,\n name: string)\n {\n if (group && !flat) {\n return `../${path}/${name}/`; \n } \n\n return group ?
`../${path}/^ : './;\n}\n"}

```

Found in path(s):

```
* /opt/cola/permits/1762774517_1695958552.1100726/0/router-store-12-5-1-tgz/package/schematics-core/utility/strings.js.map
```

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```
/*! *****
```

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```
***** */
```

Found in path(s):

```
* /opt/cola/permits/1762774517_1695958552.1100726/0/router-store-12-5-1-tgz/package/bundles/ngrx-router-store.umd.js
```

# 1.199 tslib 2.6.2

## 1.199.1 Available under license :

```
*****
```

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```
***** */
```

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# 1.200 angular-router 14.3.0

## 1.200.1 Available under license :

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```
/**
```

```
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*/
```

```
/**
```

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* found in the LICENSE file at https://angular.io/license
```

\*/

Found in path(s):

\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2015/upgrade.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2015/testing.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2020/upgrade.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2020/router.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2015/router.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2020/testing.mjs  
No license file was found, but licenses were detected in source scan.

```
{"version":3,"file":"upgrade.mjs","sources":["../../../../../packages/router/upgrade/src/upgrade.ts","../../../../../packages/router/upgrade/public_api.ts","../../../../../packages/router/upgrade/index.ts","../../../../../packages/router/upgrade/upgrade.ts"],"sourcesContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n *\n\nimport {Location} from '@angular/common';\nimport\n{APP_BOOTSTRAP_LISTENER, ComponentRef, InjectionToken} from '@angular/core';\nimport {Router,\nRestoredState as RestoredState} from '@angular/router';\nimport {UpgradeModule} from\n '@angular/upgrade/static';\n\n\n * Creates an initializer that sets up `ngRoute` integration\n * along with setting\n up the Angular router.\n *\n * @usageNotes\n *\n * <code-example language=\\\"typescript\\\">\n * @NgModule({\n *   imports: [\n *     RouterModule.forRoot(SOME_ROUTES),\n *     UpgradeModule\n *   ],\n *   providers: [\n *     RouterUpgradeInitializer\n *   ]\n * })\n * export class AppModule {\n *   ngDoBootstrap() {\n *   }\n * }\n * </code-example>\n *\n * @publicApi\n *\n\nexport const RouterUpgradeInitializer = {\n  provide:\n  APP_BOOTSTRAP_LISTENER,\n  multi: true,\n  useFactory: locationSyncBootstrapListener as (ngUpgrade:\n  UpgradeModule) => () => void,\n  deps: [UpgradeModule]\n};\n\n\n * @internal\n *\n\nexport function\n  locationSyncBootstrapListener(ngUpgrade: UpgradeModule) {\n  return () => {\n\n  setUpLocationSync(ngUpgrade);\n  };\n}\n\n\n * Sets up a location change listener to trigger\n `history.pushState`.\n *\n * Works around the problem that `onPopState` does not trigger `history.pushState`.\n *\n * Must be called *after* calling `UpgradeModule.bootstrap`.\n *\n * @param ngUpgrade The upgrade NgModule.\n *\n * @param urlType The location strategy.\n *\n * @see `HashLocationStrategy`\n *\n * @see `PathLocationStrategy`\n *\n *\n * @publicApi\n *\n\nexport function setUpLocationSync(ngUpgrade:\n  UpgradeModule, urlType: 'path'|'hash' = 'path') {\n  if (!ngUpgrade.$injector) {\n    throw new Error(`\n  RouterUpgradeInitializer can be used only after UpgradeModule.bootstrap has been called.\n    Remove\n  RouterUpgradeInitializer and call setUpLocationSync after UpgradeModule.bootstrap.\n    `);\n  }\n\n  const router:\n  Router = ngUpgrade.injector.get(Router);\n  const location: Location = ngUpgrade.injector.get(Location);\n\n  ngUpgrade.$injector.get('$rootScope')\n    .$on(\n      '$locationChangeStart',\n      (event: any, newUrl: string,\n  oldUrl: string,\n      newState?: {[k: string]: unknown})|RestoredState,\n      oldState?: {[k: string]:\n  unknown})|RestoredState) => {\n      // Navigations coming from Angular router have a navigationId state\n      // property. Don't trigger Angular router navigation again if it is\n      // caused\n      by a URL change from the current Angular router\n      // navigation.\n      const currentNavigationId =\n  router.getCurrentNavigation()?.id;\n      const newStateNavigationId = newState?.navigationId;\n      if\n  (newStateNavigationId !== undefined &&\n      newStateNavigationId === currentNavigationId) {\n        return;\n      }\n      let url;\n      if (urlType === 'path') {\n        url = resolveUrl(newUrl);\n      }\n      else if (urlType === 'hash') {\n        // Remove the first hash from the URL\n        const hashIdx =\n  newUrl.indexOf('#');\n        url = resolveUrl(newUrl.substring(0, hashIdx) + newUrl.substring(hashIdx + 1));\n      }\n      else {\n        throw 'Invalid URLType passed to setUpLocationSync: ' + urlType;\n      }\n      const\n  path = location.normalize(url.pathname);\n      router.navigateByUrl(path + url.search + url.hash);\n    });\n}\n\n\n * Normalizes
```

and parses a URL.  
- Normalizing means that a relative URL will be resolved into an absolute URL in the context of the application document.  
- Parsing means that the anchor's `protocol`, `hostname`, `port`, `pathname` and related properties are all populated to reflect the normalized URL.  
While this approach has wide compatibility, it doesn't work as expected on IE. On IE, normalizing happens similar to other browsers, but the parsed components will not be set. (E.g. if you assign `a.href = 'foo'`, then `a.protocol`, `a.host`, etc. will not be correctly updated.)  
We work around that by performing the parsing in a 2nd step by taking a previously normalized URL and assigning it again. This correctly populates all properties.  
See

<https://github.com/angular/angular.js/blob/2c7400e7d07b0f6cec1817dab40b9250ce8ebce6/src/ng/urlUtils.js#L26-L33> for more info.

```
function resolveUrl(anchor: HTMLAnchorElement): string {
  if (!anchor) return document.createElement('a').href;
  anchor.setAttribute('href', url);
  anchor.setAttribute('href', anchor.href);
  return anchor.pathname;
}
```

```
function resolveUrl(url: string): {
  pathname: string,
  search: string,
  hash: string
} {
  if (!url) return document.createElement('a').href;
  url = url.replace(/^\/+/, '');
  return {
    pathname: url.split('#')[0].split('?')[0],
    search: url.split('?')[1] || '',
    hash: url.split('#')[1] || ''
  };
}
```

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@module  
@description  
Entry point for all public APIs of this package.  
export \* from './src/upgrade';  
This file only reexports content of the `src` folder. Keep it that way.  
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file at <https://angular.io/license>. This file is not used to build this module. It is only used during editing by the TypeScript language service and during build for verification. `ngc` replaces this file with production index.ts when it rewrites private symbol names.  
export \* from './public\_api';  
Generated bundle index. Do not edit.  
export \* from

```
./index';
names: [],
mappings: ";;;;;;;;;AAAA;;;;;;;;;AAMG;AAOH;;;;;;;;;AAsBG;AACU,MAAA,wBAAwB,GAAG;AACtC,IAAA,OAAO,EAAE,sBAAsB;AAC/B,IAAA,KAAK,EAAE,IAAI;AACX,IAAA,UAAU,EAAE,6BAAYE;IACtF,IAAI,EAAE,CAAC,aAAa,CAAC;EACrB;AAEF;;AAEG;AACG,SAAU,6BAA6B,CAAC,SAAwB,EAAA;AACpE,IAAA,OAAO,MAAK;QACV,iBAAiB,CAAC,SAAS,CAAC,CAAC;AAC/B,KAAK,CAAC;AACJ,CAAC;AAED;;;;;;;;;AAWG;SACa,iBAAiB,CAAC,SAAwB,EAAE,UAAyB,MAAM,EAAA;AACzF,IAAA,IAAI,CAAC,SAAS,CAAC,SAAS,EAAE;QACxB,MAAM,IAAI,KAAK,CAAC,CAAA;;AAGb,MAAA,CAAA,CAAC,CAAC;AACN,KAAA;IAED,MAAM,MAAM,GAAW,SAAS,CAAC,QAAQ,CAAC,GAAG,CAAC,MAAM,CAAC,CAAC;IACtD,MAAM,QAAQ,GAAa,SAAS,CAAC,QAAQ,CAAC,GAAG,CAAC,QAAQ,CAAC,CAAC;AAE5D,IAAA,SAAS,CAAC,SAAS,CAAC,GAAG,CAAC,YAAY,CAAC;AACChC,SAAS,GAAG,CACA,sBAAsB,EACtB,CAAC,KAAU,EAAE,MAAc,EAAE,MAAc,EACiC,QAA+C,EAC/C,QAA+C,KAAI;;;QAKID,MAAM,mBAAMb,GAAG,CAAA,EAAA,GAAA,MAAM,CAAC,oBAAoB,EAAE,MAAE,IAAA,IAAA,EAAA,KAAA,KAAA,CAAA,GAAA,KAAA,CAAA,GAAA,EAAA,CAAA,EAAE,CAAC;QAC9D,MAAM,oBAAoB,GAAG,QAAQ,KAAA,IAAA,IAAR,QAAQ,KAAK,KAAA,CAAA,GAAA,KAAA,CAAA,GAAA,QAAQ,CAAE,YAAY,CAAC;QACpD,IAAI,oBAAoB,KAAK,SAAS;YACiC,oBAAoB,KAAK,mBAAMb,EAAE;YAChD,OAAO;AACR,SAAS;AAED,QAAA,IAAI,GAAG,CAAC;QACR,IAAI,OAAO,KAAK,MAAM,EAAE;AACtB,YAAA,GAAG,GAAG,UAAU,CAAC,MAAM,CAAC,CAAC;AACiB,SAAS;aAAM,IAAI,OAAO,KAAK,MAAM,EAAE;;YAE7B,MAAM,OAAO,GAAG,MAAM,CAAC,OAAO,CAAC,GAAG,CAAC,CAAC;YACpC,GAAG,GAAG,UAAU,CAAC,MAAM,CAAC,SAAS,CAAC,CAAC,EAAE,OAAO,CAAC,GAAG,MAAM,CAAC,SAAS,CAAC,OAAO,GAAG,CAAC,CAAC,CAAC;AACChF,SAAS;AAAM,aAAA;YACL,MAAM,+CAA+C,GAAG,OAAO,CAAC;AACjE,SAAS;QACD,MAAM,IAAI,GAAG,QAAQ,CAAC,SAAS,CAAC,GAAG,CAAC,QAAQ,CAAC,CAAC;AAC9C,QAAA,MAAM,CAAC,aAAa,CAAC,IAAI,GAAG,GAAG,CAAC,MAAM,GAAG,GAAG,CAAC,IAAI,CAAC,CAAC;AACrD,KAAK,CAAC,CAAC;AACb,CAAC;AAED;;;;;;;;;AAiBG;AACH,IAAI,MAAMc,CAAC;AACxC,SAAS,UAAU,CAAC,GAAW,EAAA;IAC7B,IAAI,CAAC,MAAM,EAAE;AACX,QAAA,MAAM,GAAG,QAAQ,CAAC,aAAa,CAAC,GAAG,CAAC,CAAC;AACtC,KAAA;AAED,IAAA,MAAM,CAAC,YAAY,CAAC,MAAM,EAAE,GAAG,CAAC,CAAC;IACjC,MAAM,CAAC,YAAY,CAAC,MAAM,EAAE,MAAM,CAAC,IAAI,CAAC,CAA
```

```
C;IAEzC,OAAO;;AAEL,QAAA,QAAQ,EAAE,CAAA,CAAA,EAAI,MAAM,CAAC,QAAQ,CAAC,OAAO,CAA  
C,KAAK,EAAE,EAAE,CAAC,CAAE,CAAA;QACID,MAAM,EAAE,MAAM,CAAC,MAAM;QACrB,IAAI,EAA  
E,MAAM,CAAC,IAAI;KACIB,CAAC;AACJ;;AC5IA;;;;;AAMG;AASH;;ACfA;;;;;AAMG;;ACNH;;AAEG;;;;;" }
```

Found

in path(s):

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2015/upgrade.mjs.map
```

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```

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```

```
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```

```
*
```

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```

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```

```
*/
```

Found in path(s):

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/testing/src/router_testing_module.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/testing/src/provide_router_for_testing.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/utis/tree.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/create_router_state.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/route_reuse_strategy.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/index.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/operators/prioritized_guard_value.mjs
```

```
*
```

```
/opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/utis/config.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/utis/preactivation.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/operators/apply_redirects.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/provide_router.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/directives/router_link.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/router_outlet_context.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/operators/resolve_data.mjs
```

```
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/recognize.mjs
```

```
*
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```
/opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/operators/switch_tap.mjs
```



\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/router\_scroller.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/router.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/router\_config\_loader.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/utils/config\_matching.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/create\_url\_tree.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/upgrade/index.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/operators/activate\_routes.mjs  
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\*  
/opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/page\_title\_strategy.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/url\_tree.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/operators/check\_guards.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/shared.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/testing/index.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/models.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/apply\_redirects.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/router\_config.mjs  
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\*  
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\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/directives/router\_outlet.mjs  
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\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/public\_api.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/events.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/index.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/router\_module.mjs  
\*  
/opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/router\_preloader.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-

tgz/package/esm2020/src/utils/type\_guards.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/testing/src/extra\_router\_testing\_providers.mjs  
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tgz/package/esm2020/src/navigation\_canceling\_error.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-  
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\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/testing/src/testing.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/version.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/url\_handling\_strategy.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/esm2020/src/router\_state.mjs  
\*  
/opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/components/empty\_outlet.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/src/patchable\_relative\_link\_resolution.mjs  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-  
tgz/package/esm2020/testing/public\_api.mjs  
No license file was found, but licenses were detected in source scan.

```
/**  
* @license Angular v14.3.0  
* (c) 2010-2022 Google LLC. https://angular.io/  
* License: MIT  
*/
```

Found in path(s):

\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/index.d.ts  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/testing/index.d.ts  
\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/upgrade/index.d.ts  
No license file was found, but licenses were detected in source scan.

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", "../..../..../packages/router/src/events.ts", "../..../..../packages/router/src/utils/tree.ts", "../..../..../packages/rout  
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directives/router_outlet.ts", "../..../..../packages/router/src/components/empty_outlet.ts", "../..../..../packages/rout  
er/src/utils/config.ts", "../..../..../packages/router/src/operators/activate_routes.ts", "../..../..../packages/router/src/  
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c/operators/apply_redirects.ts", "../..../..../packages/router/src/recognize.ts", "../..../..../packages/router/src/operat  
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_relative_link_resolution.ts", "../..../..../packages/router/src/route_reuse_strategy.ts", "../..../..../packages/router/s
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rc/router_config.ts", "../..../..../packages/router/src/router_config_loader.ts", "../..../..../packages/router/src/url_h
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er/src/private_export.ts", "../..../..../packages/router/src/index.ts", "../..../..../packages/router/public_api.ts", "../..
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 * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\nimport
 {Route, UrlMatchResult} from './models';\nimport {UrlSegment, UrlSegmentGroup} from './url_tree';\n\n/**\n *
The primary routing outlet.\n * \n * @publicApi\n * \n\nexport const PRIMARY_OUTLET = 'primary';\n\n/**\n * A
private symbol used to store the value of `Route.title` inside the `Route.data` if it is a\n * static string or
`Route.resolve` if anything else. This allows us to reuse the existing route\n * data/resolvers to support the title
feature without new instrumentation in the `Router` pipeline.\n * \n\nexport const RouteTitleKey =
Symbol('RouteTitle');\n\n/**\n * A collection of matrix and query URL parameters.\n * \n * @see
`convertToParamMap`\n * \n * @see `ParamMap`\n * \n * @publicApi\n * \n\nexport type Params = {\n [key: string]:
any;\n};\n\n/**\n * A map that provides access to the required and optional parameters\n * specific to a route.\n *
The map supports retrieving a single value with `get()`\n * or multiple values with `getAll()`.\n * \n * @see
[URLSearchParams](https://developer.mozilla.org/en-US/docs/Web/API/URLSearchParams)\n
 * \n * @publicApi\n * \n\nexport interface ParamMap {\n /**\n * Reports whether the map contains a given
parameter.\n * \n * @param name The parameter name.\n * \n * @returns True if the map contains the given parameter,
false otherwise.\n * \n * has(name: string): boolean;\n /**\n * Retrieves a single value for a parameter.\n *
 * @param name The parameter name.\n * \n * @return The parameter's single value,\n * or the first value if the
parameter has multiple values,\n * or `null` when there is no such parameter.\n * \n * get(name: string):
string|null;\n /**\n * Retrieves multiple values for a parameter.\n * \n * @param name The parameter name.\n *
 * @return An array containing one or more values,\n * or an empty array if there is no such parameter.\n * \n *
 * \n * getAll(name: string): string[];\n\n /**\n * Names of the parameters in the map. *\n * readonly keys: string[];\n}\n\nclass
ParamsAsMap implements ParamMap {\n
  private params: Params;\n\n  constructor(params: Params) {\n    this.params = params || {};\n  }\n\n  has(name:
string): boolean {\n    return Object.prototype.hasOwnProperty.call(this.params, name);\n  }\n\n  get(name: string):
string|null {\n    if (this.has(name)) {\n      const v = this.params[name];\n      return Array.isArray(v) ? v[0] : v;\n
    }\n    return null;\n  }\n\n  getAll(name: string): string[] {\n    if (this.has(name)) {\n      const v =
this.params[name];\n      return Array.isArray(v) ? v : [v];\n    }\n    return [];\n  }\n\n  get keys(): string[] {\n
    return Object.keys(this.params);\n  }\n}\n\n/**\n * Converts a `Params` instance to a `ParamMap`.\n * \n * @param
params The instance to convert.\n * \n * @returns The new map instance.\n * \n * @publicApi\n * \n\nexport function
convertToParamMap(params: Params): ParamMap {\n  return new ParamsAsMap(params);\n}\n\n/**\n * Matches
the route configuration (`route`) against the actual URL (`segments`).\n * \n * \n * When no matcher
is defined on a `Route`, this is the matcher used by the Router by default.\n * \n * \n * @param segments The remaining
unmatched segments in the current navigation\n * \n * @param segmentGroup The current segment group being
matched\n * \n * @param route The `Route` to match against.\n * \n * \n * @see UrlMatchResult\n * \n * @see Route\n * \n
 * \n * @returns The resulting match information or `null` if the `route` should not match.\n * \n * @publicApi\n * \n\nexport
function defaultUrlMatcher(\n  segments: UrlSegment[], segmentGroup: UrlSegmentGroup, route: Route):
UrlMatchResult|null {\n  const parts = route.path!.split('/');\n\n  if (parts.length > segments.length) {\n    // The
actual URL is shorter than the config, no match\n    return null;\n  }\n\n  if (route.pathMatch === 'full' &&\n
(segmentGroup.hasChildren() || parts.length < segments.length)) {\n    // The config is longer than the actual URL
but we are looking for a full match, return null\n    return null;\n  }\n\n  const posParams: {[key: string]:
UrlSegment}

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= {};\n\n // Check each config part against the actual URL\n for (let index = 0; index < parts.length; index++) {\n
const part = parts[index];\n  const segment = segments[index];\n  const isParameter = part.startsWith(':');\n  if
(isParameter) {\n    posParams[part.substring(1)] = segment;\n  } else if (part !== segment.path) {\n    // The
actual URL part does not match the config, no match\n    return null;\n  }\n }\n\n return {consumed:
segments.slice(0, parts.length), posParams};\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {isObservable as isObservable, isPromise as isPromise}
from '@angular/core';\nimport {from, Observable, of} from 'rxjs';\nimport {Params} from './shared';\n\nexport
function shallowEqualArrays(a: any[], b: any[]): boolean {\n  if (a.length !== b.length)\n    return false;\n  for (let i = 0; i < a.length; ++i) {\n    if (!shallowEqual(a[i], b[i])) return false;\n  }\n  return
true;\n}\n\nexport function shallowEqual(a: Params, b: Params): boolean {\n  // While `undefined` should never be
possible, it would sometimes be the case in IE 11\n  // and pre-chromium Edge. The check below accounts for this
edge case.\n  const k1 = a ? Object.keys(a) : undefined;\n  const k2 = b ? Object.keys(b) : undefined;\n  if (!k1 || !k2
|| k1.length !== k2.length) {\n    return false;\n  }\n  let key: string;\n  for (let i = 0; i < k1.length; i++) {\n    key =
k1[i];\n    if (!equalArraysOrString(a[key], b[key])) {\n      return false;\n    }\n  }\n  return true;\n}\n\n/**\n * Test
equality for arrays of strings or a string.\n */\n\nexport function equalArraysOrString(a: string|string[], b:
string|string[]) {\n  if (Array.isArray(a) && Array.isArray(b)) {\n    if (a.length !== b.length) return false;\n    const
aSorted = [...a].sort();\n    const bSorted =
[...b].sort();\n    return aSorted.every((val, index) => bSorted[index] === val);\n  } else {\n    return a === b;\n
}\n}\n\n/**\n * Flattens single-level nested arrays.\n */\n\nexport function flatten<T>(arr: T[][]): T[] {\n  return
Array.prototype.concat.apply([], arr);\n}\n\n/**\n * Return the last element of an array.\n */\n\nexport function
last<T>(a: T[]): T|null {\n  return a.length > 0 ? a[a.length - 1] : null;\n}\n\n/**\n * Verifys all booleans in an array
are `true`.\n */\n\nexport function and(bools: boolean[]): boolean {\n  return !bools.some(v => !v);\n}\n\nexport
function forEach<K, V>(map: {[key: string]: V}, callback: (v: V, k: string) => void): void {\n  for (const prop in
map) {\n    if (map.hasOwnProperty(prop)) {\n      callback(map[prop], prop);\n    }\n  }\n}\n\nexport function
wrapIntoObservable<T>(value: T|Promise<T>|Observable<T>): Observable<T> {\n  if (isObservable(value)) {\n    return
value;\n  }\n  if (isPromise(value)) {\n    // Use `Promise.resolve()` to wrap
promise-like instances.\n    // Required ie when a Resolver returns a AngularJS `$q` promise to correctly trigger
the\n    // change detection.\n    return from(Promise.resolve(value));\n  }\n  return of(value);\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Injectable,
RuntimeError as RuntimeError} from '@angular/core';\nimport {RuntimeErrorCode} from './errors';\nimport
{convertToParamMap, ParamMap, Params, PRIMARY_OUTLET} from './shared';\nimport {equalArraysOrString,
forEach, shallowEqual} from './utils/collection';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
ngDevMode;\n\nexport function createEmptyUrlTree() {\n  return new UrlTree(new UrlSegmentGroup([], {}), {},
null);\n}\n\n/**\n * A set of options which specify how to determine if a `UrlTree` is active, given the `UrlTree`\n *
for
the current router state.\n *\n * @publicApi\n *\n * @see Router.isActive\n */\n\nexport interface IsActiveMatchOptions
{\n  /**\n   * Defines the strategy for comparing the matrix parameters of two `UrlTree`s.\n   *\n   * The matrix
parameter matching is dependent on the strategy for matching the\n   * segments. That is, if the `paths` option is set
to `subset`, only\n   * the matrix parameters of the matching segments will be compared.\n   *\n   * - `exact`:
Requires that matching segments also have exact matrix parameter\n   * matches.\n   * - `subset`: The matching
segments in the router's active `UrlTree` may contain\n   * extra matrix parameters, but those that exist in the
`UrlTree` in question must match.\n   * - `ignored`: When comparing `UrlTree`s, matrix params will be ignored.\n
*/\n  matrixParams: 'exact'|'subset'|'ignored';\n  /**\n   * Defines the strategy for comparing the query parameters of
two `UrlTree`s.\n   *\n   * - `exact`: the query parameters must match
exactly.\n   * - `subset`: the active `UrlTree` may contain extra parameters,\n   * but must match the key and value
of any that exist in the `UrlTree` in question.\n   * - `ignored`: When comparing `UrlTree`s, query params will be

```

```

ignored.\n */\n queryParams: 'exact'|'subset'|'ignored';\n /**\n * Defines the strategy for comparing the
`UrlSegment`s of the `UrlTree`s.\n */\n * - `exact`: all segments in each `UrlTree` must match.\n * - `subset`: a
`UrlTree` will be determined to be active if it\n * is a subtree of the active route. That is, the active route may
contain extra\n * segments, but must at least have all the segments of the `UrlTree` in question.\n */\n paths:
'exact'|'subset';\n /**\n * - `exact`: indicates that the `UrlTree` fragments must be equal.\n * - `ignored`: the
fragments will not be compared when determining if a\n * `UrlTree` is active.\n */\n fragment:
'exact'|'ignored';\n\n\ntype ParamMatchOptions = 'exact'|'subset'|'ignored';\n\ntype
PathCompareFn =\n (container: UrlSegmentGroup, containee: UrlSegmentGroup, matrixParams:
ParamMatchOptions) =>\n boolean;\ntype ParamCompareFn = (container: Params, containee: Params) =>
boolean;\n\nconst pathCompareMap: Record<IsActiveMatchOptions['paths'], PathCompareFn> = {\n 'exact':
equalSegmentGroups,\n 'subset': containsSegmentGroup,\n};\nconst paramCompareMap:
Record<ParamMatchOptions, ParamCompareFn> = {\n 'exact': equalParams,\n 'subset': containsParams,\n
'ignored': () => true,\n};\n\nexport function containsTree(\n container: UrlTree, containee: UrlTree, options:
IsActiveMatchOptions): boolean {\n return pathCompareMap[options.paths](container.root, containee.root,
options.matrixParams) &&\n paramCompareMap[options.queryParams](container.queryParams,
containee.queryParams) &&\n !(options.fragment === 'exact' && container.fragment !==
containee.fragment);\n}\n\nfunction equalParams(container: Params, containee: Params): boolean {\n
// TODO: This does not handle array params correctly.\n return shallowEqual(container,
containee);\n}\n\nfunction equalSegmentGroups(\n container: UrlSegmentGroup, containee: UrlSegmentGroup,\n
matrixParams: ParamMatchOptions): boolean {\n if (!equalPath(container.segments, containee.segments)) return
false;\n if (!matrixParamsMatch(container.segments, containee.segments, matrixParams)) {\n return false;\n }\n
if (container.numberOfChildren !== containee.numberOfChildren) return false;\n for (const c in containee.children)
{\n if (!container.children[c]) return false;\n if (!equalSegmentGroups(container.children[c],
containee.children[c], matrixParams))\n return false;\n }\n return true;\n}\n\nfunction containsParams(container:
Params, containee: Params): boolean {\n return Object.keys(containee).length <= Object.keys(container).length
&&\n Object.keys(containee).every(key => equalArraysOrString(container[key],
containee[key]));\n}\n\nfunction containsSegmentGroup(\n
container: UrlSegmentGroup, containee: UrlSegmentGroup,\n matrixParams: ParamMatchOptions): boolean
{\n return containsSegmentGroupHelper(container, containee, containee.segments, matrixParams);\n}\n\nfunction
containsSegmentGroupHelper(\n container: UrlSegmentGroup, containee: UrlSegmentGroup, containeePaths:
UrlSegment[],\n matrixParams: ParamMatchOptions): boolean {\n if (container.segments.length >
containeePaths.length) {\n const current = container.segments.slice(0, containeePaths.length);\n if
(!equalPath(current, containeePaths)) return false;\n if (containee.hasChildren()) return false;\n if
(!matrixParamsMatch(current, containeePaths, matrixParams)) return false;\n return true;\n\n } else if
(container.segments.length === containeePaths.length) {\n if (!equalPath(container.segments, containeePaths))
return false;\n if (!matrixParamsMatch(container.segments, containeePaths, matrixParams)) return false;\n for
(const c in
containee.children) {\n if (!container.children[c]) return false;\n if
(!containsSegmentGroup(container.children[c], containee.children[c], matrixParams)) {\n return false;\n }
}\n return true;\n\n } else {\n const current = containeePaths.slice(0, container.segments.length);\n const next
= containeePaths.slice(container.segments.length);\n if (!equalPath(container.segments, current)) return false;\n
if (!matrixParamsMatch(container.segments, current, matrixParams)) return false;\n if
(!container.children[PRIMARY_OUTLET]) return false;\n return containsSegmentGroupHelper(\n
container.children[PRIMARY_OUTLET], containee, next, matrixParams);\n }\n}\n\nfunction
matrixParamsMatch(\n containerPaths: UrlSegment[], containeePaths: UrlSegment[], options:
ParamMatchOptions) {\n return containeePaths.every((containeeSegment, i) => {\n return
paramCompareMap[options](containerPaths[i].parameters, containeeSegment.parameters);\n });\n}\n\n/**\n

```

```

* @description\n *\n * Represents the parsed URL.\n *\n * Since a router state is a tree, and the URL is nothing but
a serialized state, the URL is a\n * serialized tree.\n * UrlTree is a data structure that provides a lot of affordances in
dealing with URLs\n *\n * @usageNotes\n * ### Example\n *\n * ```\n *
@Component({templateUrl:'template.html'})\n * class MyComponent {\n *   constructor(router: Router) {\n *
const tree: UrlTree =\n *     router.parseUrl('/team/33/(user/victor//support:help)?debug=true#fragment');\n *
const f = tree.fragment; // return 'fragment'\n *   const q = tree.queryParams; // returns {debug: 'true'}\n *   const
g: UrlSegmentGroup = tree.root.children[PRIMARY_OUTLET];\n *   const s: UrlSegment[] = g.segments; //
returns 2 segments 'team' and '33'\n *     g.children[PRIMARY_OUTLET].segments; // returns 2 segments 'user' and
'victor'\n *     g.children['support'].segments; // return 1 segment 'help'\n *   }\n * }\n * ```\n *\n * @publicApi\n
*\n * ^\n * export class UrlTree {\n *   /** @internal */\n *   // TODO(issue/24571): remove '!.\n *   _queryParamMap!:
ParamMap;\n * }\n * }\n * /** @internal */\n * constructor(\n *   /** The root segment group of the URL tree */\n *   public
root: UrlSegmentGroup,\n *   /** The query params of the URL */\n *   public queryParams: Params,\n *   /** The
fragment of the URL */\n *   public fragment: string|null) {} \n *   get queryParamMap(): ParamMap {\n *     if
(!this._queryParamMap) {\n *       this._queryParamMap = convertToParamMap(this.queryParams);\n *     }\n *     return
this._queryParamMap;\n *   }\n *   /** @docsNotRequired */\n *   toString(): string {\n *     return
DEFAULT_SERIALIZER.serialize(this);\n *   }\n * }\n * }\n *\n * @description\n *\n * Represents the parsed URL
segment group.\n *\n * See `UrlTree` for more information.\n *\n * @publicApi\n *\n * ^\n * export class
UrlSegmentGroup {\n *   /** @internal */\n *   _sourceSegment?: UrlSegmentGroup;\n *   /** @internal */\n *
_segmentIndexShift?: number;\n * }\n * }\n * /**\n * *\n * @internal\n
*\n * *\n * Used only in dev mode to detect if application relies on `relativeLinkResolution: 'legacy'`\n * Should be
removed in when `relativeLinkResolution` is removed.\n * }\n * }\n * _segmentIndexShiftCorrected?: number;\n * /** The
parent node in the url tree */\n * parent: UrlSegmentGroup|null = null;\n * }\n * }\n * constructor(\n *   /** The URL segments
of this group. See `UrlSegment` for more information */\n *   public segments: UrlSegment[],\n *   /** The list of
children of this group */\n *   public children: {[key: string]: UrlSegmentGroup}) {\n *     forEach(children, (v: any, k:
any) => v.parent = this);\n *   }\n * }\n * /** Whether the segment has child segments */\n * hasChildren(): boolean {\n *
return this.numberOfChildren > 0;\n * }\n * }\n * /** Number of child segments */\n * get numberOfChildren(): number
{\n *   return Object.keys(this.children).length;\n * }\n * }\n * /** @docsNotRequired */\n * toString(): string {\n *
return
serializePaths(this);\n * }\n * }\n * }\n *\n * @description\n *\n * Represents
a single URL segment.\n *\n * A UrlSegment is a part of a URL between the two slashes. It contains a path and the
matrix\n * parameters associated with the segment.\n *\n * @usageNotes\n * ### Example\n *\n * ```\n *
@Component({templateUrl:'template.html'})\n * class MyComponent {\n *   constructor(router: Router) {\n *
const tree: UrlTree = router.parseUrl('/team?id=33');\n *   const g: UrlSegmentGroup =
tree.root.children[PRIMARY_OUTLET];\n *   const s: UrlSegment[] = g.segments;\n *   s[0].path; // returns
'team'\n *   s[0].parameters; // returns {id: 33}\n *   }\n * }\n * ```\n *\n * @publicApi\n *\n * ^\n * export class
UrlSegment {\n *   /** @internal */\n *   // TODO(issue/24571): remove '!.\n *   _parameterMap!: ParamMap;\n * }\n * }\n *
constructor(\n *   /** The path part of a URL segment */\n *   public path: string,\n *   /** The matrix parameters
associated with a segment */\n *   public parameters: {[name: string]: string}) {} \n *   get parameterMap():
ParamMap {\n *     if
(!this._parameterMap) {\n *       this._parameterMap = convertToParamMap(this.parameters);\n *     }\n *     return
this._parameterMap;\n *   }\n *   /** @docsNotRequired */\n *   toString(): string {\n *     return
serializePath(this);\n *   }\n * }\n * }\n *\n * export function equalSegments(as: UrlSegment[], bs: UrlSegment[]): boolean {\n *
return equalPath(as, bs)
&& as.every((a, i) => shallowEqual(a.parameters, bs[i].parameters));\n * }\n * }\n *\n * export function equalPath(as:
UrlSegment[], bs: UrlSegment[]): boolean {\n *   if (as.length !== bs.length) return false;\n *   return as.every((a, i) =>
a.path === bs[i].path);\n * }\n * }\n *\n * export function mapChildrenIntoArray<T>(\n *   segment: UrlSegmentGroup, fn: (v:
UrlSegmentGroup, k: string) => T[]): T[] {\n *   let res: T[] = [];\n *   forEach(segment.children, (child:
UrlSegmentGroup, childOutlet: string) => {\n *     if (childOutlet === PRIMARY_OUTLET) {\n *       res =
res.concat(fn(child, childOutlet));\n *     }\n *   });\n *   forEach(segment.children, (child: UrlSegmentGroup, childOutlet:
string) => {\n

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    if (childOutlet !== PRIMARY_OUTLET) {
      res = res.concat(fn(child, childOutlet));
    }
  }
  return res;
}

/**
 * @description
 * Serializes and deserializes a URL string into a URL tree.
 * The url serialization strategy is customizable. You can
 * make all URLs case insensitive by providing a custom
 * UrlSerializer.
 * See `DefaultUrlSerializer` for an example of a URL serializer.
 * @publicApi
 */
@injectable({providedIn: 'root', useFactory: () => new DefaultUrlSerializer()})
export abstract class UrlSerializer {
  /** Parse a url into a `UrlTree` */
  abstract parse(url: string): UrlTree;
  /** Converts a `UrlTree` into a url */
  abstract serialize(tree: UrlTree): string;
}

/**
 * @description
 * A default implementation of the `UrlSerializer`.
 * Example URLs:
 * `` /inbox/33(popup:compose)
 * /inbox/33;open=true/messages/44
 * ``
 * DefaultUrlSerializer uses parentheses to serialize secondary
 * segments
 * (e.g., popup:compose), the
 * colon syntax to specify the outlet, and the
 * ;parameter=value syntax (e.g., open=true)
 * to
 * specify route specific parameters.
 * @publicApi
 */
export class DefaultUrlSerializer implements UrlSerializer {
  /** Parses a url into a `UrlTree` */
  parse(url: string): UrlTree {
    const p = new UrlParser(url);
    return new UrlTree(p.parseRootSegment(), p.parseQueryParams(), p.parseFragment());
  }

  /** Converts a `UrlTree` into a url */
  serialize(tree: UrlTree): string {
    const segment = `${serializeSegment(tree.root, true)}`;
    const query = serializeQueryParams(tree.queryParams);
    const fragment =
      typeof tree.fragment === 'string' ? `#${encodeURIComponent(tree.fragment)} ` : '';
    return `${segment}${query}${fragment}`;
  }
}

const DEFAULT_SERIALIZER = new DefaultUrlSerializer();

export function serializePaths(segment: UrlSegmentGroup): string {
  return segment.segments.map(p => serializePath(p)).join('/');
}

function serializeSegment(segment: UrlSegmentGroup, root: boolean): string {
  if (!segment.hasChildren()) {
    return serializePaths(segment);
  }
  if (root) {
    const primary = segment.children[PRIMARY_OUTLET] ?
      serializeSegment(segment.children[PRIMARY_OUTLET], false) :
      '';
    const children: string[] = [];
    forEach(segment.children, (v: UrlSegmentGroup, k: string) => {
      if (k !== PRIMARY_OUTLET) {
        children.push(`${k}:${serializeSegment(v, false)}`);
      }
    });
    return children.length > 0 ?
      `${primary}${children.join('/')}` :
      primary;
  } else {
    const children = mapChildrenIntoArray(segment, (v: UrlSegmentGroup, k: string) => {
      if (k === PRIMARY_OUTLET) {
        return [serializeSegment(segment.children[PRIMARY_OUTLET], false)];
      }
      return [`${k}:${serializeSegment(v, false)}`];
    });
    // use no parenthesis if the only child is a primary outlet route
    if (Object.keys(segment.children).length === 1 && segment.children[PRIMARY_OUTLET] != null) {
      return `${serializePaths(segment)}/${children[0]}`;
    }
    return `${serializePaths(segment)}/${children.join('/')}`;
  }
}

/**
 * Encodes a URI string with the default encoding. This function will only ever be called from
 * `encodeURIComponent` or `encodeURIComponent` as it's the base set of encodings to be used. We need
 * a custom encoding because encodeURIComponent is too aggressive and encodes stuff that doesn't
 * have to be encoded per https://url.spec.whatwg.org.
 */
function encodeURIComponent(s: string): string {
  return encodeURIComponent(s)
    .replace(/%40/g, '@')
    .replace(/%3A/gi, ':')
    .replace(/%24/g, '$')
    .replace(/%2C/gi, ',');
}

/**
 * This function should be used to encode both keys and values in a query string key/value. In
 * the following URL, you need to call encodeURIComponent on "k" and "v":
 * http://www.site.org/html;mk=mv?k=v#f
 */
export function encodeURIComponent(s: string): string {
  return encodeURIComponent(s).replace(/%3B/gi, ';');
}

/**
 * This function should be used to encode a URL fragment. In the following URL, you need to call
 * encodeURIComponent on "f":
 * http://www.site.org/html;mk=mv?k=v#f
 */
export function encodeURIComponent(s: string): string {
  return encodeURIComponent(s);
}

/**
 * This function should be run on any URI segment as well as the key and value in a key/value
 * pair for matrix params. In the following URL, you need to call encodeURIComponent on "html",
 * "mk", and "mv":
 * http://www.site.org/html;mk=mv?k=v#f
 */
export function encodeURIComponent(s: string): string {
  return encodeURIComponent(s).replace(/%/g, '%28').replace(/%/g, '%29').replace(/%/gi, '%&');
}

export function decode(s: string): string {
  return decodeURIComponent(s);
}

// Query keys/values should have the "+" replaced first, as "+" in a query string

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is \" \".\n// decodeURIComponent function will not decode "+" as a space.\nexport function decodeQuery(s:
string): string {\n  return decode(s.replace(/\\+/g, '%20'));\n}\n\nexport function serializePath(path: UrlSegment):
string {\n  return `${encodeURIComponent(path.path)}${serializeMatrixParams(path.parameters)}`;\n}\n\nfunction
serializeMatrixParams(params: {[key: string]: string}): string {\n  return Object.keys(params)\n    .map(key =>
`:${encodeURIComponent(key)}=${encodeURIComponent(params[key])}`)\n    .join(");\n}\n\nfunction
serializeQueryParams(params: {[key: string]: any}): string {\n  const strParams: string[] =\n    Object.keys(params)\n      .map((name) => {\n        const value = params[name];\n        return
Array.isArray(value) ?\n          value.map(v => `${encodeURIComponent(name)}=${encodeURIComponent(v)}`).join('&')
:\n          `${encodeURIComponent(name)}=${encodeURIComponent(value)}`;\n      })\n      .filter(s => !!s);\n\n  return
strParams.length
  ? `?${strParams.join('&')}` : ";\n}\n\nconst SEGMENT_RE = /^[^\\|()/?;=#]+/;\nfunction matchSegments(str:
string): string {\n  const match = str.match(SEGMENT_RE);\n  return match ? match[0] : ";\n}\n\nconst
QUERY_PARAM_RE = /^[^=?&#]+/;\n// Return the name of the query param at the start of the string or an empty
string\nfunction matchQueryParams(str: string): string {\n  const match = str.match(QUERY_PARAM_RE);\n
return match ? match[0] : ";\n}\n\nconst QUERY_PARAM_VALUE_RE = /^[^&#]+/;\n// Return the value of the
query param at the start of the string or an empty string\nfunction matchUrlQueryParamValue(str: string): string {\n
const match = str.match(QUERY_PARAM_VALUE_RE);\n  return match ? match[0] : ";\n}\n\nclass UriParser {\n
private remaining: string;\n\n  constructor(private url: string) {\n    this.remaining = url;\n  }\n\n
parseRootSegment(): UrlSegmentGroup {\n    this.consumeOptional('/');\n\n    if (this.remaining === "" ||
this.peekStartsWith('?') ||
this.peekStartsWith('#')) {\n      return new UrlSegmentGroup([], {});\n    }\n\n    // The root segment group never
has segments\n    return new UrlSegmentGroup([], this.parseChildren());\n  }\n\n  parseQueryParams(): Params {\n
const params: Params = {};\n  if (this.consumeOptional('?')) {\n    do {\n      this.parseQueryParam(params);\n
} while (this.consumeOptional('&'));\n  }\n  return params;\n}\n\n  parseFragment(): string|null {\n  return
this.consumeOptional('#') ? decodeURIComponent(this.remaining) : null;\n}\n\n  private parseChildren(): {[outlet:
string]: UrlSegmentGroup} {\n    if (this.remaining === "") {\n      return {};\n    }\n\n    this.consumeOptional('/');\n\n    const segments: UrlSegment[] = [];\n    if (!this.peekStartsWith('(')) {\n
segments.push(this.parseSegment());\n    }\n\n    while (this.peekStartsWith('/') && !this.peekStartsWith('/*') &&
!this.peekStartsWith('(')) {\n      this.capture('/');\n      segments.push(this.parseSegment());\n
}\n\n    let children: {[outlet: string]: UrlSegmentGroup} = {};\n    if (this.peekStartsWith('(')) {\n
this.capture('(');\n    children = this.parseParens(true);\n    }\n\n    let res: {[outlet: string]: UrlSegmentGroup} =
{};\n    if (this.peekStartsWith('(')) {\n      res = this.parseParens(false);\n    }\n\n    if (segments.length > 0 ||
Object.keys(children).length > 0) {\n      res[PRIMARY_OUTLET] = new UrlSegmentGroup(segments, children);\n
}\n\n    return res;\n  }\n\n  // parse a segment with its matrix parameters\n  // ie `name;k1=v1;k2`\n  private
parseSegment(): UrlSegment {\n    const path = matchSegments(this.remaining);\n    if (path === "" &&
this.peekStartsWith(';')) {\n      throw new RuntimeError(\n
RuntimeErrorCode.EMPTY_PATH_WITH_PARAMS,\n      NG_DEV_MODE && `Empty path url segment
cannot have parameters: '${this.remaining}'`);\n    }\n\n    this.capture(path);\n    return new
UrlSegment(decode(path), this.parseMatrixParams());\n  }\n\n  private parseMatrixParams(): {[key: string]: string} {\n
const params: {[key: string]: string} = {};\n  while (this.consumeOptional(';')) {\n    this.parseParam(params);\n
}\n  return params;\n}\n\n  private
parseParam(params: {[key: string]: string}): void {\n    const key = matchSegments(this.remaining);\n    if (!key) {\n
return;\n    }\n    this.capture(key);\n    let value: any = ";\n    if (this.consumeOptional('=')) {\n      const
valueMatch = matchSegments(this.remaining);\n      if (valueMatch) {\n        value = valueMatch;\n
this.capture(value);\n      }\n    }\n\n    params[decode(key)] = decode(value);\n  }\n\n  // Parse a single query
parameter `name[=value]`\n  private parseQueryParam(params: Params): void {\n    const key =
matchQueryParams(this.remaining);\n    if (!key) {\n      return;\n    }\n    this.capture(key);\n    let value: any = ";\n
if (this.consumeOptional('=')) {\n      const valueMatch = matchUrlQueryParamValue(this.remaining);\n

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    if (valueMatch) {\n      value = valueMatch;\n      this.capture(value);\n    }\n  }\n\n  const decodedKey =
decodeQuery(key);\n  const decodedVal = decodeQuery(value);\n\n  if (params.hasOwnProperty(decodedKey))
{\n    // Append to existing values\n    let currentVal = params[decodedKey];\n    if (!Array.isArray(currentVal))
{\n      currentVal = [currentVal];\n      params[decodedKey] = currentVal;\n    }\n    currentVal.push(decodedVal);\n  } else {\n    // Create a new value\n    params[decodedKey] = decodedVal;\n  }\n}\n\n// parse `(a/b//outlet_name:c/d)`\nprivate parseParens(allowPrimary: boolean): {[outlet: string]:
UrlSegmentGroup} {\n  const segments: {[key: string]: UrlSegmentGroup} = {};\n  this.capture('(');\n\n  while
(!this.consumeOptional(',') && this.remaining.length > 0) {\n    const path = matchSegments(this.remaining);\n    const next = this.remaining[path.length];\n\n    // if it is
not one of these characters, then the segment was unescaped\n    // or the group was not closed\n    if (next !== '/'
&& next !== ')' && next !== ';') {\n      throw new RuntimeError(\n
RuntimeErrorCode.UNPARSABLE_URL, NG_DEV_MODE && `Cannot parse url '${this.url}'`);\n    }\n\n    let
outletName: string = undefined;\n    if (path.indexOf('.') > -1) {\n      outletName = path.slice(0,
path.indexOf('.'));\n      this.capture(outletName);\n      this.capture('.');\n    } else if (allowPrimary) {\n
outletName = PRIMARY_OUTLET;\n    }\n\n    const children = this.parseChildren();\n    segments[outletName] = Object.keys(children).length === 1 ? children[PRIMARY_OUTLET] :\n
      new UrlSegmentGroup([], children);\n    this.consumeOptional('/');\n  }\n\n  return
segments;\n}\n\nprivate peekStartsWith(str: string): boolean {\n  return this.remaining.startsWith(str);\n}\n\n//
Consumes the prefix when it is present and returns whether it has been consumed\nprivate consumeOptional(str:
string): boolean {\n  if (this.peekStartsWith(str)) {\n    this.remaining = this.remaining.substring(str.length);\n
return true;\n  }\n  return false;\n}\n\nprivate capture(str: string): void {\n  if (!this.consumeOptional(str)) {\n
throw new RuntimeError(\n    RuntimeErrorCode.UNEXPECTED_VALUE_IN_URL, NG_DEV_MODE &&
`Expected \"${str}\"`);\n  }\n}\n\nexport function createRoot(rootCandidate: UrlSegmentGroup) {\n  return
rootCandidate.segments.length > 0 ?\n    new UrlSegmentGroup([], {[PRIMARY_OUTLET]: rootCandidate}) :\n
    rootCandidate;\n}\n\n/**\n * Recursively merges primary segment children into their parents and also drops empty
children\n * (those which have no segments and no children themselves). The latter prevents serializing a\n * group
into something like `(aux)`, where `aux` is an empty child segment.\n */\nexport
function squashSegmentGroup(segmentGroup: UrlSegmentGroup): UrlSegmentGroup {\n  const newChildren = {}
as any;\n  for (const childOutlet of Object.keys(segmentGroup.children)) {\n    const child =
segmentGroup.children[childOutlet];\n    const childCandidate = squashSegmentGroup(child);\n    // don't add
empty children\n    if (childCandidate.segments.length > 0 || childCandidate.hasChildren()) {\n
newChildren[childOutlet] = childCandidate;\n    }\n  }\n  const s = new UrlSegmentGroup(segmentGroup.segments,
newChildren);\n  return mergeTrivialChildren(s);\n}\n\n/**\n * When possible, merges the primary outlet child into
the parent `UrlSegmentGroup`.\n * When a segment group has only one child which is a primary outlet, merges
that child into the\n * parent. That is, the child segment group's segments are merged into the `s` and the child's\n *
children become the children of `s`. Think of this like a 'squash', merging the child segment\n * group into the
parent.\n */\nfunction
mergeTrivialChildren(s: UrlSegmentGroup): UrlSegmentGroup {\n  if (s.numberOfChildren === 1 &&
s.children[PRIMARY_OUTLET]) {\n    const c = s.children[PRIMARY_OUTLET];\n    return new
UrlSegmentGroup(s.segments.concat(c.segments), c.children);\n  }\n  return s;\n}\n\nexport function isUrlTree(v:
any): v is UrlTree {\n  return v instanceof UrlTree;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {RuntimeError as RuntimeError} from
'@angular/core';\nimport {RuntimeErrorCode} from './errors';\nimport {ActivatedRoute,
ActivatedRouteSnapshot} from './router_state';\nimport {Params, PRIMARY_OUTLET} from './shared';\nimport
{createRoot, squashSegmentGroup, UrlSegment, UrlSegmentGroup, UrlTree} from './url_tree';\nimport {forEach,
last, shallowEqual} from './utils/collection';\n\nconst NG_DEV_MODE = typeof ngDevMode

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=== 'undefined' || ngDevMode;\n\n**\n * Creates a `UrlTree` relative to an `ActivatedRouteSnapshot`.\n *\n * @publicApi\n *\n * @param relativeTo The `ActivatedRouteSnapshot` to apply the commands to\n *\n * @param commands An array of URL fragments with which to construct the new URL tree.\n *\n * If the path is static, can be the literal URL string. For a dynamic path, pass an array of path\n *\n * segments, followed by the parameters for each segment.\n *\n * The fragments are applied to the one provided in the `relativeTo` parameter.\n *\n * @param queryParams The query parameters for the `UrlTree`. `null` if the `UrlTree` does not have\n *\n * any query parameters.\n *\n * @param fragment The fragment for the `UrlTree`. `null` if the `UrlTree` does not have a fragment.\n *\n * @usageNotes\n *\n * ```\n * // create /team/33/user/11\n * createUrlTreeFromSnapshot(snapshot, ['/team', 33, 'user', 11]);\n *\n * // create /team/33;expand=true/user/11\n * createUrlTreeFromSnapshot(snapshot, ['/team', 33, {expand: true}, 'user', 11]);\n *\n * // you can collapse static segments like this (this works only with the first passed-in value):\n * createUrlTreeFromSnapshot(snapshot, ['/team/33/user', userId]);\n *\n * // If the first segment can contain slashes, and you do not want the router to split it,\n * // you can do the following:\n * createUrlTreeFromSnapshot(snapshot, [{segmentPath: '/one/two'}]);\n *\n * // create /team/33/(user/11/right:chat)\n * createUrlTreeFromSnapshot(snapshot, ['/team', 33, {outlets: {primary: 'user/11', right: '\n * 'chat'}}], null, null);\n *\n * // remove the right secondary node\n * createUrlTreeFromSnapshot(snapshot, ['/team', 33, {outlets: {primary: 'user/11', right: null}}]);\n *\n * // For the examples below, assume the current URL is for the `team/33/user/11` and the\n * `ActivatedRouteSnapshot` points to `user/11`.\n *\n * // navigate to /team/33/user/11/details\n * createUrlTreeFromSnapshot(snapshot, ['details']);\n *\n * // navigate to /team/33/user/22\n * createUrlTreeFromSnapshot(snapshot, ['./22']);\n *\n * // navigate to /team/44/user/22\n * createUrlTreeFromSnapshot(snapshot, ['./../team/44/user/22']);\n * ```\n */\n\nexport function createUrlTreeFromSnapshot(\n  relativeTo: ActivatedRouteSnapshot, commands: any[], queryParams: Params|null = null,\n  fragment: string|null = null): UrlTree {\n  const relativeToUrlSegmentGroup = createSegmentGroupFromRoute(relativeTo);\n  return createUrlTreeFromSegmentGroup(relativeToUrlSegmentGroup, commands, queryParams, fragment);\n}\n\nfunction createSegmentGroupFromRoute(route: ActivatedRouteSnapshot): UrlSegmentGroup {\n  let targetGroup: UrlSegmentGroup|undefined;\n\n  function createSegmentGroupFromRouteRecursive(currentRoute: ActivatedRouteSnapshot) {\n    const childOutlets: {[outlet: string]: UrlSegmentGroup} = {};\n    for (const childSnapshot of currentRoute.children) {\n      const root = createSegmentGroupFromRouteRecursive(childSnapshot);\n      childOutlets[childSnapshot.outlet] = root;\n    }\n    const segmentGroup = new UrlSegmentGroup(currentRoute.url, childOutlets);\n    if (currentRoute === route) {\n      targetGroup = segmentGroup;\n    }\n    return segmentGroup;\n  }\n  const rootCandidate = createSegmentGroupFromRouteRecursive(route.root);\n  const rootSegmentGroup = createRoot(rootCandidate);\n  return targetGroup ?? rootSegmentGroup;\n}\n\nexport function createUrlTreeFromSegmentGroup(\n  relativeTo: UrlSegmentGroup, commands: any[], queryParams: Params|null, fragment: string|null): UrlTree {\n  let root = relativeTo;\n  while (root.parent) {\n    root = root.parent;\n  }\n  // There are no commands so the `UrlTree` goes to the same path as the one created from the\n  // `UrlSegmentGroup`. All we need to do is update the `queryParams` and `fragment` without\n  // applying any other logic.\n  if (commands.length === 0) {\n    return tree(root, root, root, queryParams, fragment);\n  }\n  const nav = computeNavigation(commands);\n  if (nav.toRoot()) {\n    return tree(root, root, new UrlSegmentGroup([], {}), queryParams, fragment);\n  }\n  const position = findStartingPositionForTargetGroup(nav, root, relativeTo);\n  const newSegmentGroup = position.processChildren ?\n    updateSegmentGroupChildren(position.segmentGroup, position.index, nav.commands) :\n    updateSegmentGroup(position.segmentGroup, position.index, nav.commands);\n  return tree(root, position.segmentGroup, newSegmentGroup, queryParams, fragment);\n}\n\nexport function createUrlTree(\n  route: ActivatedRoute, urlTree: UrlTree, commands: any[], queryParams: Params|null, fragment: string|null): UrlTree {\n  if (commands.length === 0) {\n    return tree(urlTree.root, urlTree.root, urlTree.root, queryParams, fragment);\n  }\n  const nav = computeNavigation(commands);\n  if (nav.toRoot()) {\n    return tree(urlTree.root, urlTree.root, new UrlSegmentGroup([], {}), queryParams, fragment);\n  }\n  function createTreeUsingPathIndex(lastPathIndex:

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number) {\n  const startingPosition =\n    findStartingPosition(nav, urlTree, route.snapshot?._urlSegment,
lastPathIndex);\n  const segmentGroup = startingPosition.processChildren ?\n  updateSegmentGroupChildren(\n    startingPosition.segmentGroup, startingPosition.index, nav.commands) :\n    updateSegmentGroup(startingPosition.segmentGroup, startingPosition.index, nav.commands);\n  return
tree(urlTree.root, startingPosition.segmentGroup, segmentGroup, queryParams, fragment);\n } \n // Note: The types
should disallow `snapshot` from being `undefined` but due to test mocks, this\n // may be the case. Since we try to
access it at an earlier point before the refactor to add the\n // warning for `relativeLinkResolution: 'legacy'`, this may
cause failures in tests where it\n // didn't before.\n  const result =
createTreeUsingPathIndex(route.snapshot?._lastPathIndex);\n  // Check if application is relying on
`relativeLinkResolution: 'legacy'`\n
  if (typeof ngDevMode === 'undefined' || !ngDevMode) {\n    const correctedResult =
createTreeUsingPathIndex(route.snapshot?._correctedLastPathIndex);\n    if (correctedResult.toString() !==
result.toString()) {\n      console.warn(\n        `relativeLinkResolution: 'legacy' is deprecated and will be removed in
a future version of Angular. The link to ${\n          result.toString()} will change to ${\n
correctedResult.toString()} if the code is not updated before then.`);\n    } \n } \n\n return result;\n}\n\nfunction
isMatrixParams(command: any): boolean {\n  return typeof command === 'object' && command != null &&
!command.outlets && !command.segmentPath;\n}\n\n/**\n * Determines if a given command has an `outlets` map.
When we encounter a command\n * with an outlets k/v map, we need to apply each outlet individually to the
existing segment.\n */\nfunction isCommandWithOutlets(command: any): command is {outlets: {[key: string]:
any}} {\n  return typeof command
=== 'object' && command != null && command.outlets;\n}\n\nfunction tree(\n  oldRoot: UrlSegmentGroup,
oldSegmentGroup: UrlSegmentGroup, newSegmentGroup: UrlSegmentGroup,\n  queryParams: Params|null,
fragment: string|null): UrlTree {\n  let qp: any = {};\n  if (queryParams) {\n    forEach(queryParams, (value: any,
name: any) => {\n      qp[name] = Array.isArray(value) ? value.map((v: any) => `${v}`) : `${value}`;\n    });\n  }\n\n  let rootCandidate: UrlSegmentGroup;\n  if (oldRoot === oldSegmentGroup) {\n    rootCandidate =
newSegmentGroup;\n  } else {\n    rootCandidate = replaceSegment(oldRoot, oldSegmentGroup,
newSegmentGroup);\n  }\n\n  const newRoot = createRoot(squashSegmentGroup(rootCandidate));\n  return new
UrlTree(newRoot, qp, fragment);\n}\n\n/**\n * Replaces the `oldSegment` which is located in some child of the
`current` with the `newSegment`.\n * This also has the effect of creating new `UrlSegmentGroup` copies to update
references. This\n * shouldn't be necessary but
the fallback logic for an invalid ActivatedRoute in the creation uses\n * the Router's current url tree. If we don't
create new segment groups, we end up modifying that\n * value.\n */\nfunction replaceSegment(\n  current:
UrlSegmentGroup, oldSegment: UrlSegmentGroup,\n  newSegment: UrlSegmentGroup): UrlSegmentGroup {\n  const
children: {[key: string]: UrlSegmentGroup} = {};\n  forEach(current.children, (c: UrlSegmentGroup,
outletName: string) => {\n    if (c === oldSegment) {\n      children[outletName] = newSegment;\n    } else {\n
children[outletName] = replaceSegment(c, oldSegment, newSegment);\n    } \n });\n  return new
UrlSegmentGroup(current.segments, children);\n}\n\nclass Navigation {\n  constructor(\n    public isAbsolute:
boolean, public numberOfDoubleDots: number, public commands: any[]) {\n    if (isAbsolute && commands.length
> 0 && isMatrixParams(commands[0])) {\n      throw new RuntimeError(\n
RuntimeErrorCode.ROOT_SEGMENT_MATRIX_PARAMS,\n
      NG_DEV_MODE && 'Root segment cannot have matrix parameters');\n    } \n\n    const cmdWithOutlet =
commands.find(isCommandWithOutlets);\n    if (cmdWithOutlet && cmdWithOutlet !== last(commands)) {\n
throw new RuntimeError(\n      RuntimeErrorCode.MISPLACED_OUTLETS_COMMAND,\n
      NG_DEV_MODE && '{outlets: {}} has to be the last command');\n    } \n } \n\n    public toRoot(): boolean {\n
return this.isAbsolute && this.commands.length === 1 && this.commands[0] === '/';\n } \n\n\n\n/** Transforms
commands to a normalized `Navigation` */\nfunction computeNavigation(commands: any[]): Navigation {\n  if
((typeof commands[0] === 'string') && commands.length === 1 && commands[0] === '/') {\n    return new
Navigation(true, 0, commands);\n  } \n\n  let numberOfDoubleDots = 0;\n  let isAbsolute = false;\n\n  const res:

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any[] = commands.reduce((res, cmd, cmdIdx) => {\n  if (typeof cmd === 'object' && cmd != null) {\n    if
(cmd.outlets) {\n      const outlets: {[k: string]: any}
= {};\n      forEach(cmd.outlets, (commands: any, name: string) => {\n        outlets[name] = typeof commands
=== 'string' ? commands.split("/") : commands;\n      });\n      return [...res, {outlets}];\n    }\n    if
(cmd.segmentPath) {\n      return [...res, cmd.segmentPath];\n    }\n    if (!(typeof cmd === 'string')) {\n
return [...res, cmd];\n    }\n    if (cmdIdx === 0) {\n      cmd.split("/").forEach((urlPart, partIndex) => {\n
if
(partIndex === 0 && urlPart === '.') {\n        // skip './a'\n      } else if (partIndex === 0 && urlPart === "") { // '/a'\n
isAbsolute = true;\n      } else if (urlPart === '..') { // './a'\n        numberOfDoubleDots++;\n      } else if
(urlPart != "") {\n        res.push(urlPart);\n      }\n    });\n    return res;\n  }\n  return [...res, cmd];\n
}, []);\n  return new Navigation(isAbsolute, numberOfDoubleDots, res);\n}\n\nclass Position {\n  constructor(\n
public
segmentGroup: UrlSegmentGroup, public processChildren: boolean, public index: number) {\n  }\n}\n\nfunction
findStartingPositionForTargetGroup(\n  nav: Navigation, root: UrlSegmentGroup, target: UrlSegmentGroup):
Position {\n  if (nav.isAbsolute) {\n    return new Position(root, true, 0);\n  }\n  if (!target) {\n    // `NaN` is used
only to maintain backwards compatibility with incorrectly mocked\n    // `ActivatedRouteSnapshot` in tests. In prior
versions of this code, the position here was\n    // determined based on an internal property that was rarely mocked,
resulting in `NaN`. In\n    // reality, this code path should _never_ be touched since `target` is not allowed to be
falsey.\n    return new Position(root, false, NaN);\n  }\n  if (target.parent === null) {\n    return new Position(target,
true, 0);\n  }\n  const modifier = isMatrixParams(nav.commands[0]) ? 0 : 1;\n  const index =
target.segments.length - 1 + modifier;\n  return createPositionApplyingDoubleDots(target,
index, nav.numberOfDoubleDots);\n}\n\nfunction findStartingPosition(\n  nav: Navigation, tree: UrlTree,
segmentGroup: UrlSegmentGroup, lastPathIndex: number): Position {\n  if (nav.isAbsolute) {\n    return new
Position(tree.root, true, 0);\n  }\n  if (lastPathIndex === -1) {\n    // Pathless ActivatedRoute has _lastPathIndex
=== -1 but should not process children\n    // see issue #26224, #13011, #35687\n    // However, if the
ActivatedRoute is the root we should process children like above.\n    const processChildren = segmentGroup ===
tree.root;\n    return new Position(segmentGroup, processChildren, 0);\n  }\n  const modifier =
isMatrixParams(nav.commands[0]) ? 0 : 1;\n  const index = lastPathIndex + modifier;\n  return
createPositionApplyingDoubleDots(segmentGroup, index, nav.numberOfDoubleDots);\n}\n\nfunction
createPositionApplyingDoubleDots(\n  group: UrlSegmentGroup, index: number, numberOfDoubleDots: number):
Position {\n  let g = group;\n  let ci = index;\n  let
dd = numberOfDoubleDots;\n  while (dd > ci) {\n    dd -= ci;\n    g = g.parent!;\n    if (!g) {\n      throw new
RuntimeError(\n        RuntimeErrorCode.INVALID_DOUBLE_DOTS, NG_DEV_MODE && 'Invalid number of
\\'.^\\');\n    }\n    ci = g.segments.length;\n  }\n  return new Position(g, false, ci - dd);\n}\n\nfunction
getOutlets(commands: unknown[]): {[k: string]: unknown[]|string} {\n  if (isCommandWithOutlets(commands[0]))
{\n    return commands[0].outlets;\n  }\n  return {[PRIMARY_OUTLET]: commands};\n}\n\nfunction
updateSegmentGroup(\n  segmentGroup: UrlSegmentGroup, startIndex: number, commands: any[]):
UrlSegmentGroup {\n  if (!segmentGroup) {\n    segmentGroup = new UrlSegmentGroup([], {});\n  }\n  if
(segmentGroup.segments.length === 0 && segmentGroup.hasChildren()) {\n    return
updateSegmentGroupChildren(segmentGroup, startIndex, commands);\n  }\n  const m =
prefixedWith(segmentGroup, startIndex, commands);\n  const slicedCommands =
commands.slice(m.commandIndex);\n  if (m.match && m.pathIndex < segmentGroup.segments.length) {\n    const g = new
UrlSegmentGroup(segmentGroup.segments.slice(0, m.pathIndex), {});\n    g.children[PRIMARY_OUTLET] =\n    new UrlSegmentGroup(segmentGroup.segments.slice(m.pathIndex), segmentGroup.children);\n    return
updateSegmentGroupChildren(g, 0, slicedCommands);\n  } else if (m.match && slicedCommands.length === 0) {\n
return new UrlSegmentGroup(segmentGroup.segments, {});\n  } else if (m.match &&
!segmentGroup.hasChildren()) {\n    return createNewSegmentGroup(segmentGroup, startIndex, commands);\n  }
else if (m.match) {\n    return updateSegmentGroupChildren(segmentGroup, 0, slicedCommands);\n  } else {\n

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return createNewSegmentGroup(segmentGroup, startIndex, commands);\n }\n}\n\nfunction
updateSegmentGroupChildren(\n  segmentGroup: UrlSegmentGroup, startIndex: number, commands: any[]):
UrlSegmentGroup {\n  if (commands.length === 0) {\n    return new UrlSegmentGroup(segmentGroup.segments,
  {});\n  }
  else {\n    const outlets = getOutlets(commands);\n    const children: {[key: string]: UrlSegmentGroup} = {};\n\n    forEach(outlets, (commands, outlet) => {\n      if (typeof commands === 'string') {\n        commands =
[commands];\n      }\n      if (commands !== null) {\n        children[outlet] =
updateSegmentGroup(segmentGroup.children[outlet], startIndex, commands);\n      }\n    });\n\n    forEach(segmentGroup.children, (child: UrlSegmentGroup, childOutlet: string) => {\n      if (outlets[childOutlet]
=== undefined) {\n        children[childOutlet] = child;\n      }\n    });\n    return new
UrlSegmentGroup(segmentGroup.segments, children);\n  }\n}\n\nfunction prefixedWith(segmentGroup:
UrlSegmentGroup, startIndex: number, commands: any[]) {\n  let currentCommandIndex = 0;\n  let
currentPathIndex = startIndex;\n\n  const noMatch = {match: false, pathIndex: 0, commandIndex: 0};\n  while
(currentPathIndex < segmentGroup.segments.length) {\n    if (currentCommandIndex >= commands.length)
return noMatch;\n    const path = segmentGroup.segments[currentPathIndex];\n    const command =
commands[currentCommandIndex];\n    // Do not try to consume command as part of the prefixing if it has outlets
because it can\n    // contain outlets other than the one being processed. Consuming the outlets command would\n
// result in other outlets being ignored.\n    if (isCommandWithOutlets(command)) {\n      break;\n    }\n    const curr
= `${command}`;\n    const next =\n      currentCommandIndex < commands.length - 1 ?
commands[currentCommandIndex + 1] : null;\n\n    if (currentPathIndex > 0 && curr === undefined) break;\n\n    if
(curr && next && (typeof next === 'object') && next.outlets === undefined) {\n      if (!compare(curr, next, path))
return noMatch;\n      currentCommandIndex += 2;\n    } else {\n      if (!compare(curr, {}, path)) return noMatch;\n
      currentCommandIndex++;\n    }\n    currentPathIndex++;\n  }\n\n  return {match: true, pathIndex:
currentPathIndex,
  commandIndex: currentCommandIndex};\n}\n\nfunction createNewSegmentGroup(\n  segmentGroup:
UrlSegmentGroup, startIndex: number, commands: any[]): UrlSegmentGroup {\n  const paths =
segmentGroup.segments.slice(0, startIndex);\n\n  let i = 0;\n  while (i < commands.length) {\n    const command =
commands[i];\n    if (isCommandWithOutlets(command)) {\n      const children =
createNewSegmentChildren(command.outlets);\n      return new UrlSegmentGroup(paths, children);\n    }\n\n    // if
we start with an object literal, we need to reuse the path part from the segment\n    if (i === 0 &&
isMatrixParams(commands[0])) {\n      const p = segmentGroup.segments[startIndex];\n      paths.push(new
UrlSegment(p.path, stringify(commands[0]));\n      i++;\n      continue;\n    }\n\n    const curr =
isCommandWithOutlets(command) ? command.outlets[PRIMARY_OUTLET] : `${command}`;\n    const next = (i
< commands.length - 1) ? commands[i + 1] : null;\n    if (curr && next && isMatrixParams(next))
{\n      paths.push(new UrlSegment(curr, stringify(next));\n      i += 2;\n    } else {\n      paths.push(new
UrlSegment(curr, {}));\n      i++;\n    }\n  }\n  return new UrlSegmentGroup(paths, {});\n}\n\nfunction
createNewSegmentChildren(outlets: {[name: string]: unknown[]|string}):\n  {[outlet: string]: UrlSegmentGroup}
{\n  const children: {[outlet: string]: UrlSegmentGroup} = {};\n  forEach(outlets, (commands, outlet) => {\n    if
(typeof commands === 'string') {\n      commands = [commands];\n    }\n    if (commands !== null) {\n
      children[outlet] = createNewSegmentGroup(new UrlSegmentGroup([], {}), 0, commands);\n    }\n  });\n  return
children;\n}\n\nfunction stringify(params: {[key: string]: any}): {[key: string]: string} {\n  const res: {[key: string]:
string} = {};\n  forEach(params, (v: any, k: string) => res[k] = `${v}`);\n  return res;\n}\n\nfunction compare(path:
string, params: {[key: string]: any}, segment: UrlSegment): boolean {\n  return path == segment.path &&
shallowEqual(params, segment.parameters);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {Route} from './models';\nimport
{ActivatedRouteSnapshot, RouterStateSnapshot} from './router_state';\n\n/**\n * Identifies the call or event that
triggered a navigation.\n * * 'imperative': Triggered by `router.navigateByUrl()` or `router.navigate()`. * *

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'popstate' : Triggered by a `popstate` event.\n * * `hashchange`-: Triggered by a `hashchange` event.\n *\n *
@publicApi\n *\nexport type NavigationTrigger = 'imperative'|'popstate'|'hashchange';\n\n/**\n * Identifies the type
of a router event.\n *\n * @publicApi\n *\nexport const enum EventType {\n  NavigationStart,\n  NavigationEnd,\n  NavigationCancel,\n  NavigationError,\n  RoutesRecognized,\n  ResolveStart,\n  ResolveEnd,\n  GuardsCheckStart,\n  GuardsCheckEnd,\n  RouteConfigLoadStart,\n  RouteConfigLoadEnd,\n  ChildActivationStart,\n  ChildActivationEnd,\n  ActivationStart,\n  ActivationEnd,\n  Scroll,\n}\n\n/**\n * Base for events the router goes through, as opposed to
events tied to a specific\n * route. Fired one time for any given navigation.\n *\n * The following code shows how a
class subscribes to router events.\n *\n * ```ts\n * import {Event, RouterEvent, Router} from '@angular/router';\n *\n * class MyService {\n *   constructor(public router: Router) {\n *     router.events.pipe(\n *       filter((e: Event): e is
RouterEvent => e instanceof RouterEvent)\n *     ).subscribe((e: RouterEvent) => {\n *       // Do something\n *
});\n *   }\n * }\n * ```\n *\n * @see `Event`\n * @see [Router events summary](guide/router-reference#router-
events)\n * @publicApi\n *\nexport class RouterEvent {\n  constructor(\n    /** A unique ID that the router
assigns to every router navigation. *\n    public id: number,\n    /** The
URL that is the destination for this navigation. *\n    public url: string) {\n  }\n\n/**\n * An event triggered when
a navigation starts.\n *\n * @publicApi\n *\nexport class NavigationStart extends RouterEvent {\n  readonly type =
EventType.NavigationStart;\n\n/**\n * Identifies the call or event that triggered the navigation.\n * An
`imperative` trigger is a call to `router.navigateByUrl()` or `router.navigate()`. \n *\n * @see `NavigationEnd`\n *
@see `NavigationCancel`\n * @see `NavigationError`\n *\n  navigationTrigger?: NavigationTrigger;\n\n/**\n * The navigation state that was previously supplied to the `pushState` call,\n * when the navigation is triggered by
a `popstate` event. Otherwise null.\n *\n * The state object is defined by `NavigationExtras`, and contains any\n *
developer-defined state value, as well as a unique ID that\n * the router assigns to every router
transition/navigation.\n *\n * From the perspective of the router, the
router never `\"goes back\"`. \n *\n * When the user clicks on the back button in the browser,\n * a new navigation ID
is created.\n *\n * Use the ID in this previous-state object to differentiate between a newly created\n * state and
one returned to by a `popstate` event, so that you can restore some\n * remembered state, such as scroll position.\n
*\n * \n *\n  restoredState?: {[k: string]: any, navigationId: number}|null;\n\n  constructor(\n    /**
@docsNotRequired *\n    id: number,\n    /** @docsNotRequired *\n    url: string,\n    /** @docsNotRequired
*\n    navigationTrigger: NavigationTrigger = 'imperative',\n    /** @docsNotRequired *\n    restoredState: {[k:
string]: any, navigationId: number}|null = null) {\n    super(id, url);\n    this.navigationTrigger =
navigationTrigger;\n    this.restoredState = restoredState;\n  }\n\n  /** @docsNotRequired *\n  override toString():
string {\n    return `NavigationStart(id: ${this.id}, url: '${this.url}')`;\n  }\n}\n\n/**\n * An event triggered when a navigation ends successfully.\n *\n * @see `NavigationStart`\n * @see
`NavigationCancel`\n * @see `NavigationError`\n *\n * @publicApi\n *\nexport class NavigationEnd extends
RouterEvent {\n  readonly type = EventType.NavigationEnd;\n\n  constructor(\n    /** @docsNotRequired *\n    id: number,\n    /** @docsNotRequired *\n    url: string,\n    /** @docsNotRequired *\n    public
urlAfterRedirects: string) {\n    super(id, url);\n  }\n\n  /** @docsNotRequired *\n  override toString(): string {\n
return `NavigationEnd(id: ${this.id}, url: '${this.url}', urlAfterRedirects: '${\n    this.urlAfterRedirects}')`;\n  }\n}\n\n/**\n * A code for the `NavigationCancel` event of the `Router` to indicate the\n * reason a navigation
failed.\n *\n * @publicApi\n *\nexport const enum NavigationCancellationCode {\n  /**\n * A navigation failed
because a guard returned a `UrlTree` to redirect.\n * \n *\n  Redirect,\n  /**\n * A navigation
failed because a more recent navigation started.\n * \n *\n  SupersededByNewNavigation,\n  /**\n * A navigation
failed because one of the resolvers completed without emitting a value.\n * \n *\n  NoDataFromResolver,\n  /**\n * A
navigation failed because a guard returned `false`. \n * \n *\n  GuardRejected,\n}\n\n/**\n * An event triggered when a
navigation is canceled, directly or indirectly.\n * This can happen for several reasons including when a route guard\n *
returns `false` or initiates a redirect by returning a `UrlTree`. \n *\n * @see `NavigationStart`\n * @see
`NavigationEnd`\n * @see `NavigationError`\n *\n * @publicApi\n *\nexport class NavigationCancel extends
RouterEvent {\n  readonly type = EventType.NavigationCancel;\n\n  constructor(\n    /** @docsNotRequired *\n

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id: number,\n    /** @docsNotRequired */\n    url: string,\n    /**\n     * A description of why the navigation
was cancelled. For debug purposes only. Use `code`
instead for a stable
cancellation reason that can be used in production.\n    */\n    public reason: string,\n    /**\n     * A code to
indicate why the navigation was canceled. This cancellation code is stable for
the reason and can be relied on
whereas the `reason` string could change and should not be
used in production.\n    */\n    readonly code?:
NavigationCancellationCode) {\n    super(id, url);\n }
\n    /** @docsNotRequired */\n    override toString(): string
{\n    return `NavigationCancel(id: ${this.id}, url: '${this.url}')`;
\n }
\n}\n\n/**\n * An event triggered when a
navigation fails due to an unexpected error.\n */\n * @see `NavigationStart`\n * @see `NavigationEnd`\n * @see
`NavigationCancel`\n */\n * @publicApi\n */\nexport class NavigationError extends RouterEvent {\n    readonly type
= EventType.NavigationError;\n\n    constructor(\n        /** @docsNotRequired */\n        id: number,\n        /**
@docsNotRequired */\n        url: string,\n        /** @docsNotRequired */\n        public error: any,\n        /**\n         * The target of the navigation when the error occurred.\n         */\n        * Note that
this can be `undefined` because an error could have occurred before the
`RouterStateSnapshot` was created
for the navigation.\n        */\n        readonly target?: RouterStateSnapshot) {\n    super(id, url);\n }
\n    /**
@docsNotRequired */\n    override toString(): string {\n    return `NavigationError(id: ${this.id}, url: '${this.url}',
error: ${this.error}`;\n }
\n}\n\n/**\n * An event triggered when routes are recognized.\n */\n * @publicApi\n
*/\nexport class RoutesRecognized extends RouterEvent {\n    readonly type = EventType.RoutesRecognized;\n\n    constructor(\n        /** @docsNotRequired */\n        id: number,\n        /** @docsNotRequired */\n        url: string,\n        /** @docsNotRequired */\n        public urlAfterRedirects: string,\n        /** @docsNotRequired */\n        public state:
RouterStateSnapshot) {\n    super(id, url);\n }
\n    /** @docsNotRequired
*/\n    override toString(): string {\n    return `RoutesRecognized(id: ${this.id}, url: '${this.url}', urlAfterRedirects:
'${\n        this.urlAfterRedirects}', state: ${this.state})`;
\n }
\n}\n\n/**\n * An event triggered at the start of the
Guard phase of routing.\n */\n * @see `GuardsCheckEnd`\n */\n * @publicApi\n */\nexport class GuardsCheckStart
extends RouterEvent {\n    readonly type = EventType.GuardsCheckStart;\n\n    constructor(\n        /**
@docsNotRequired */\n        id: number,\n        /** @docsNotRequired */\n        url: string,\n        /** @docsNotRequired
*/\n        public urlAfterRedirects: string,\n        /** @docsNotRequired */\n        public state: RouterStateSnapshot) {\n    super(id, url);\n }
\n    override toString(): string {\n    return `GuardsCheckStart(id: ${this.id}, url: '${this.url}',
urlAfterRedirects: '${\n        this.urlAfterRedirects}', state: ${this.state})`;
\n }
\n}\n\n/**\n * An event triggered at
the end of the Guard phase of routing.\n */\n * @see
`GuardsCheckStart`\n */\n * @publicApi\n */\nexport class GuardsCheckEnd extends RouterEvent {\n    readonly
type = EventType.GuardsCheckEnd;\n\n    constructor(\n        /** @docsNotRequired */\n        id: number,\n        /**
@docsNotRequired */\n        url: string,\n        /** @docsNotRequired */\n        public urlAfterRedirects: string,\n        /**
@docsNotRequired */\n        public state: RouterStateSnapshot,\n        /** @docsNotRequired */\n        public
shouldActivate: boolean) {\n    super(id, url);\n }
\n    override toString(): string {\n    return `GuardsCheckEnd(id:
${this.id}, url: '${this.url}', urlAfterRedirects: '${\n        this.urlAfterRedirects}', state: ${this.state}, shouldActivate:
${this.shouldActivate})`;
\n }
\n}\n\n/**\n * An event triggered at the start of the Resolve phase of routing.\n */\n *
Runs in the `resolve` phase whether or not there is anything to resolve.\n * In future, may change to only run when
there are things to be resolved.\n */\n * @see `ResolveEnd`\n */\n *
@publicApi\n */\nexport class ResolveStart extends RouterEvent {\n    readonly type = EventType.ResolveStart;\n\n    constructor(\n        /** @docsNotRequired */\n        id: number,\n        /** @docsNotRequired */\n        url: string,\n        /** @docsNotRequired
*/\n        public urlAfterRedirects: string,\n        /** @docsNotRequired */\n        public state:
RouterStateSnapshot) {\n    super(id, url);\n }
\n    override toString(): string {\n    return `ResolveStart(id:
${this.id}, url: '${this.url}', urlAfterRedirects: '${\n        this.urlAfterRedirects}', state: ${this.state})`;
\n }
\n}\n\n/**\n * An event triggered at the end of the Resolve phase of routing.\n */\n * @see `ResolveStart`\n */\n *
@publicApi\n */\nexport class ResolveEnd extends RouterEvent {\n    readonly type = EventType.ResolveEnd;\n\n    constructor(\n        /** @docsNotRequired */\n        id: number,\n        /** @docsNotRequired */\n        url: string,\n        /** @docsNotRequired
*/\n        public urlAfterRedirects: string,\n        /**

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@docsNotRequired */\n    public state: RouterStateSnapshot) {\n    super(id, url);\n    }\n\n    override toString():
string {\n    return `ResolveEnd(id: ${this.id}, url: '${this.url}', urlAfterRedirects: '${this.urlAfterRedirects}',
state: ${this.state})`; \n    }\n\n    }\n\n    /**\n     * An event triggered before lazy loading a route configuration.\n     */\n    * @see
`RouteConfigLoadEnd`\n    * @publicApi\n    */\n    * export class RouteConfigLoadStart {\n    readonly type =
EventType.RouteConfigLoadStart;\n\n    constructor(\n    /** @docsNotRequired */\n    public route: Route) {\n    }\n\n    toString(): string {\n    return `RouteConfigLoadStart(path: ${this.route.path})`; \n    }\n\n    }\n\n    /**\n     * An event
triggered when a route has been lazy loaded.\n     */\n    * @see `RouteConfigLoadStart`\n    * @publicApi\n    */\n    * export class RouteConfigLoadEnd {\n    readonly type = EventType.RouteConfigLoadEnd;\n\n    constructor(\n    /**
@docsNotRequired */\n    public route: Route) {\n    }\n\n    toString(): string {\n    return `RouteConfigLoadEnd(path:
${this.route.path})`; \n    }\n\n    }\n\n    /**\n     * An event triggered at the start of the child-activation\n     * part of the Resolve
phase of routing.\n     */\n    * @see `ChildActivationEnd`\n    * @see `ResolveStart`\n    * @publicApi\n    */\n    * export class
ChildActivationStart {\n    readonly type = EventType.ChildActivationStart;\n\n    constructor(\n    /**
@docsNotRequired */\n    public snapshot: ActivatedRouteSnapshot) {\n    }\n\n    toString(): string {\n    const path =
this.snapshot.routeConfig && this.snapshot.routeConfig.path || ";\n    return `ChildActivationStart(path:
${path})`; \n    }\n\n    }\n\n    /**\n     * An event triggered at the end of the child-activation part\n     * of the Resolve phase of
routing.\n     */\n    * @see `ChildActivationStart`\n    * @see `ResolveStart`\n    * @publicApi\n    */\n    * export class
ChildActivationEnd {\n    readonly type = EventType.ChildActivationEnd;\n\n    constructor(\n    /**
@docsNotRequired */\n    public snapshot: ActivatedRouteSnapshot) {\n    }\n\n    toString(): string {\n    const path
= this.snapshot.routeConfig && this.snapshot.routeConfig.path || ";\n    return `ChildActivationEnd(path:
${path})`; \n    }\n\n    }\n\n    /**\n     * An event triggered at the start of the activation part\n     * of the Resolve phase of
routing.\n     */\n    * @see `ActivationEnd`\n    * @see `ResolveStart`\n    * @publicApi\n    */\n    * export class ActivationStart
{\n    readonly type = EventType.ActivationStart;\n\n    constructor(\n    /** @docsNotRequired */\n    public
snapshot: ActivatedRouteSnapshot) {\n    }\n\n    toString(): string {\n    const path = this.snapshot.routeConfig &&
this.snapshot.routeConfig.path || ";\n    return `ActivationStart(path: ${path})`; \n    }\n\n    }\n\n    /**\n     * An event
triggered at the end of the activation part\n     * of the Resolve phase of routing.\n     */\n    * @see `ActivationStart`\n    * @see
`ResolveStart`\n    * @publicApi\n    */\n    * export class ActivationEnd {\n    readonly type =
EventType.ActivationEnd;\n\n    constructor(\n    /** @docsNotRequired */\n    public snapshot:
ActivatedRouteSnapshot) {\n    }\n\n    toString(): string {\n    const path = this.snapshot.routeConfig && this.snapshot.routeConfig.path || ";\n    return
`ActivationEnd(path: ${path})`; \n    }\n\n    }\n\n    /**\n     * An event triggered by scrolling.\n     */\n    * @publicApi\n    */\n    * export class Scroll {\n    readonly type = EventType.Scroll;\n\n    constructor(\n    /** @docsNotRequired */\n    readonly routerEvent: NavigationEnd,\n\n    /** @docsNotRequired */\n    readonly position: [number,
number]|null,\n\n    /** @docsNotRequired */\n    readonly anchor: string|null) {\n    }\n\n    toString(): string {\n    const pos = this.position ? `${this.position[0]}, ${this.position[1]}` : null;\n    return `Scroll(anchor: ${this.anchor},
position: ${pos})`; \n    }\n\n    }\n\n    }\n\n    /**\n     * Router events that allow you to track the lifecycle of the router.\n     */\n    * The
events occur in the following sequence:\n     */\n    * * [NavigationStart](api/router/NavigationStart): Navigation starts.\n     */\n    * * [RouteConfigLoadStart](api/router/RouteConfigLoadStart): Before\n     */\n    * the router [lazy loads](/guide/router#lazy-loading) a route configuration.\n     */\n    * * [RouteConfigLoadEnd](api/router/RouteConfigLoadEnd): After a route has been lazy loaded.\n     */\n    * * [RoutesRecognized](api/router/RoutesRecognized): When the router parses the URL\n     */\n    * and the routes are
recognized.\n     */\n    * * [GuardsCheckStart](api/router/GuardsCheckStart): When the router begins the *guards*\n     */\n    * phase of routing.\n     */\n    * * [ChildActivationStart](api/router/ChildActivationStart): When the router\n     */\n    * begins activating a
route's children.\n     */\n    * * [ActivationStart](api/router/ActivationStart): When the router begins activating a route.\n     */\n    * * [GuardsCheckEnd](api/router/GuardsCheckEnd): When the router finishes the *guards*\n     */\n    * phase of routing
successfully.\n     */\n    * * [ResolveStart](api/router/ResolveStart): When the router begins the *resolve*\n     */\n    * phase of routing.\n     */\n    * * [ResolveEnd](api/router/ResolveEnd): When the router finishes the *resolve*\n     */\n    * phase of routing
successfully.\n     */\n    * * [ChildActivationEnd](api/router/ChildActivationEnd):

```



```

When the router finishes activating a route's children.
[ActivationEnd](api/router/ActivationEnd): When the router finishes activating a route.
[NavigationEnd](api/router/NavigationEnd): When navigation ends successfully.
[NavigationCancel](api/router/NavigationCancel): When navigation is canceled.
[NavigationError](api/router/NavigationError): When navigation fails due to an unexpected error.
[Scroll](api/router/Scroll): When the user scrolls.
@publicApi
export type Event =
RouterEvent|NavigationStart|NavigationEnd|NavigationCancel|NavigationError|RoutesRecognized|
GuardsCheckStart|GuardsCheckEnd|RouteConfigLoadStart|RouteConfigLoadEnd|ChildActivationStart|
ChildActivationEnd|ActivationStart|ActivationEnd|Scroll|ResolveStart|ResolveEnd;
export function stringifyEvent(routerEvent: Event): string {
  if (!('type' in routerEvent)) {
    return `Unknown Router Event: ${routerEvent.constructor.name}`;
  }
  switch (routerEvent.type) {
    case EventType.ActivationEnd:
      return `ActivationEnd(path: '${routerEvent.snapshot.routeConfig?.path || ''}')`;
    case EventType.ActivationStart:
      return `ActivationStart(path: '${routerEvent.snapshot.routeConfig?.path || ''}')`;
    case EventType.ChildActivationEnd:
      return `ChildActivationEnd(path: '${routerEvent.snapshot.routeConfig?.path || ''}')`;
    case EventType.ChildActivationStart:
      return `ChildActivationStart(path: '${routerEvent.snapshot.routeConfig?.path || ''}')`;
    case EventType.GuardsCheckEnd:
      return `GuardsCheckEnd(id: ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${routerEvent.urlAfterRedirects}', state: ${routerEvent.state}, shouldActivate: ${routerEvent.shouldActivate})`;
    case EventType.GuardsCheckStart:
      return `GuardsCheckStart(id: ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${routerEvent.urlAfterRedirects}', state: ${routerEvent.state})`;
    case EventType.NavigationCancel:
      return `NavigationCancel(id: ${routerEvent.id}, url: '${routerEvent.url}')`;
    case EventType.NavigationEnd:
      return `NavigationEnd(id: ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${routerEvent.urlAfterRedirects}')`;
    case EventType.NavigationError:
      return `NavigationError(id: ${routerEvent.id}, url: '${routerEvent.url}', error: ${routerEvent.error})`;
    case EventType.NavigationStart:
      return `NavigationStart(id: ${routerEvent.id}, url: '${routerEvent.url}')`;
    case EventType.ResolveEnd:
      return `ResolveEnd(id: ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${routerEvent.urlAfterRedirects}', state: ${routerEvent.state})`;
    case EventType.ResolveStart:
      return `ResolveStart(id: ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${routerEvent.urlAfterRedirects}', state: ${routerEvent.state})`;
    case EventType.RouteConfigLoadEnd:
      return `RouteConfigLoadEnd(path: ${routerEvent.route.path})`;
    case EventType.RouteConfigLoadStart:
      return `RouteConfigLoadStart(path: ${routerEvent.route.path})`;
    case EventType.RoutesRecognized:
      return `RoutesRecognized(id: ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${routerEvent.urlAfterRedirects}', state: ${routerEvent.state})`;
    case EventType.Scroll:
      const pos = routerEvent.position ? `${routerEvent.position[0]}, ${routerEvent.position[1]}` : null;
      return `Scroll(anchor: '${routerEvent.anchor}', position: '${pos}')`;
  }
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
export class Tree<T> {
  /** @internal */
  _root: TreeNode<T>;

  constructor(root: TreeNode<T>) {
    this._root = root;
  }

  get root(): T {
    return this._root.value;
  }

  /** @internal */
  parent(t: T): T|null {
    const p = this.pathFromRoot(t);
    return p.length > 1 ? p[p.length - 2] : null;
  }

  /** @internal */
  children(t: T): T[] {
    const n = findNode(t, this._root);
    return n ? n.children.map(t => t.value) : [];
  }

  /** @internal */
  firstChild(t: T): T|null {
    const n = findNode(t, this._root);
    return n && n.children.length > 0 ? n.children[0].value : null;
  }

  /** @internal */
  siblings(t: T): T[] {
    const p = findPath(t, this._root);
    if (p.length < 2) return [];
    const c = p[p.length - 2].children.map(c => c.value);
    return c.filter(cc => cc !== t);
  }

  /** @internal */
  pathFromRoot(t: T): T[] {
    return findPath(t, this._root).map(s => s.value);
  }
}

```

```

DFS for the node matching the value\nfunction findNode<T>(value: T, node: TreeNode<T>): TreeNode<T>|null
{\n if (value === node.value) return node;\n\n for (const child of node.children) {\n  const node =
findNode(value, child);\n  if (node) return node;\n  }\n\n return null;\n}\n\n// Return the path to the node with the
given value using DFS\nfunction findPath<T>(value: T, node: TreeNode<T>): TreeNode<T>[] {\n if (value ===
node.value) return [node];\n\n for (const child of node.children) {\n  const path = findPath(value, child);\n  if
(path.length) {\n  path.unshift(node);\n  return path;\n  }\n }\n\n return [];\n}\n\n\nexport class TreeNode<T>
{\n constructor(public value: T, public children: TreeNode<T>[]) {\n\n toString(): string {\n return
`TreeNode(${this.value});\n  }\n}\n\n// Return the list of T indexed by outlet name\nexport function
nodeChildrenAsMap<T extends {outlet: string}>(node: TreeNode<T>|null) {\n const map: {[outlet: string]:
TreeNode<T>} = {};\n\n if (node) {\n  node.children.forEach(child => map[child.value.outlet] = child);\n  }\n\n
return map;\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {Type} from '@angular/core';\nimport {BehaviorSubject, Observable, of} from 'rxjs';\nimport {map}
from 'rxjs/operators';\nimport {Data, ResolveData, Route} from './models';\nimport {convertToParamMap,
ParamMap, Params, PRIMARY_OUTLET, RouteTitleKey} from './shared';\nimport {equalSegments, UrlSegment,
UrlSegmentGroup, UrlTree} from './url_tree';\nimport {shallowEqual, shallowEqualArrays} from
 './utils/collection';\nimport {Tree, TreeNode} from './utils/tree';\n\n/**\n * Represents the state of the router as a tree
of activated routes.\n * \n * @usageNotes\n * \n * Every node in the route tree is an `ActivatedRoute` instance\n *
that knows
about the `consumed` URL segments, the extracted parameters,\n * and the resolved data.\n * Use the
`ActivatedRoute` properties to traverse the tree from any node.\n * \n * The following fragment shows how a
component gets the root node\n * of the current state to establish its own route tree:\n * \n * ```\n *
@Component({ templateUrl: 'template.html'})\n * class MyComponent {\n *  constructor(router: Router) {\n *
const state: RouterState = router.routerState;\n *  const root: ActivatedRoute = state.root;\n *  const child =
root.firstChild;\n *  const id: Observable<string> = child.params.map(p => p.id);\n *  //...\n *  }\n * }\n *
```\n * \n * @see `ActivatedRoute`\n * @see [Getting route information](guide/router#getting-route-information)\n * \n *
\n * @publicApi\n * \n\nexport class RouterState extends Tree<ActivatedRoute> {\n /** @internal *\n constructor(\n
root: TreeNode<ActivatedRoute>,\n /** The current snapshot of the router state *\n public snapshot:
RouterStateSnapshot) {\n super(root);\n setRouterState(<RouterState>this, root);\n }\n\n override toString():
string {\n return this.snapshot.toString();\n }\n}\n\nexport function createState(urlTree: UrlTree,
rootComponent: Type<any>|null): RouterState {\n const snapshot = createStateSnapshot(urlTree,
rootComponent);\n const emptyUrl = new BehaviorSubject([new UrlSegment("", {})]);\n const emptyParams = new
BehaviorSubject({});\n const emptyData = new BehaviorSubject({});\n const emptyQueryParams = new
BehaviorSubject({});\n const fragment = new BehaviorSubject("");\n const activated = new ActivatedRoute(\n
emptyUrl, emptyParams, emptyQueryParams, fragment, emptyData, PRIMARY_OUTLET, rootComponent,\n
snapshot.root);\n activated.snapshot = snapshot.root;\n return new RouterState(new
TreeNode<ActivatedRoute>(activated, []), snapshot);\n}\n\nexport function createStateSnapshot(\n urlTree:
UrlTree, rootComponent: Type<any>|null): RouterStateSnapshot
{\n const emptyParams = {};\n const emptyData = {};\n const emptyQueryParams = {};\n const fragment = "";\n
const activated = new ActivatedRouteSnapshot(\n [], emptyParams, emptyQueryParams, fragment, emptyData,
PRIMARY_OUTLET, rootComponent, null,\n urlTree.root, -1, {});\n return new RouterStateSnapshot("", new
TreeNode<ActivatedRouteSnapshot>(activated, []));\n}\n\n\n/**\n * Provides access to information about a route
associated with a component\n * that is loaded in an outlet.\n * Use to traverse the `RouterState` tree and extract
information from nodes.\n * \n * The following example shows how to construct a component using information
from a\n * currently activated route.\n * \n * Note: the observables in this class only emit when the current and
previous values differ based\n * on shallow equality. For example, changing deeply nested properties in resolved
`data` will not\n * cause the `ActivatedRoute.data` `Observable` to emit a new value.\n * \n * @example

```

```

router/activated-route/module.ts region="activated-route" * header="activated-route.component.ts"} *
@see [Getting route information](guide/router#getting-route-information) * @publicApi *
export class
ActivatedRoute {
  /** The current snapshot of this route */
  snapshot!: ActivatedRouteSnapshot;
  /** @internal */
  _futureSnapshot: ActivatedRouteSnapshot;
  /** @internal */
  _routerState!: RouterState;
  /** @internal */
  _paramMap!: Observable<ParamMap>;
  /** @internal */
  _queryParamMap!:
  Observable<ParamMap>;
  /** An Observable of the resolved route title */
  readonly title:
  Observable<string|undefined> =
  this.data?.pipe(map((d: Data) => d[RouteTitleKey])) ?? of(undefined);
  /** @internal */
  constructor(
    /** An observable of the URL segments matched by this route. */
    public url: Observable<UrlSegment[]>,
    /** An observable of the matrix parameters scoped to this route. */
    public params:
    Observable<Params>,
    /** An observable of the query parameters shared by all the routes. */
    public queryParams: Observable<Params>,
    /** An observable of the URL fragment shared by all the routes. */
    public fragment: Observable<string|null>,
    /** An observable of the static and resolved data of this route. */
    public data: Observable<Data>,
    /** The outlet name of the route, a constant. */
    public outlet: string,
    /** The component of the route, a constant. */
    public component: Type<any>|null,
    futureSnapshot:
    ActivatedRouteSnapshot) {
    this._futureSnapshot = futureSnapshot;
  }
  /** The configuration used to match
  this route. */
  get routeConfig(): Route|null {
    return this._futureSnapshot.routeConfig;
  }
  /** The root of
  the router state. */
  get root(): ActivatedRoute {
    return this._routerState.root;
  }
  /** The parent of this
  route in the router state tree. */
  get parent(): ActivatedRoute|null
  {
    return this._routerState.parent(this);
  }
  /** The first child of this route in the router state tree. */
  get
  firstChild(): ActivatedRoute|null {
    return this._routerState.firstChild(this);
  }
  /** The children of this route
  in the router state tree. */
  get children(): ActivatedRoute[] {
    return this._routerState.children(this);
  }
  /** The path from the root of the router state tree to this route. */
  get pathFromRoot(): ActivatedRoute[] {
    return this._routerState.pathFromRoot(this);
  }
  /** An Observable that contains a map of the required
  and optional parameters
  * specific to the route.
  * The map supports retrieving single and multiple values from
  the same parameter.
  */
  get paramMap(): Observable<ParamMap> {
    if (!this._paramMap) {
      this._paramMap = this.params.pipe(map((p: Params): ParamMap =>
      convertToParamMap(p)));
    }
    return this._paramMap;
  }
  /** An Observable that
  contains a map of the query parameters available to all routes.
  * The map supports retrieving single and multiple
  values from the query parameter.
  */
  get queryParamMap(): Observable<ParamMap> {
    if
    (!this._queryParamMap) {
      this._queryParamMap =
      this.queryParams.pipe(map((p: Params): ParamMap
      => convertToParamMap(p)));
    }
    return this._queryParamMap;
  }
  toString(): string {
    return
    this.snapshot ? this.snapshot.toString() : `Future(${this._futureSnapshot})`;
  }
}
export type
ParamsInheritanceStrategy = 'emptyOnly'|'always';
/** @internal */
export type Inherited = {
  params:
  Params,
  data: Data,
  resolve: Data,
};
/** Returns the inherited params, data, and resolve for a given
route.
* By default, this only inherits values up to the nearest path-less or component-less route.
*/
/** @internal */
export function inheritedParamsDataResolve(
  route: ActivatedRouteSnapshot,
  paramsInheritanceStrategy: ParamsInheritanceStrategy
  = 'emptyOnly'): Inherited {
  const pathFromRoot = route.pathFromRoot;
  let inheritingStartingFrom = 0;
  if (paramsInheritanceStrategy !== 'always') {
    inheritingStartingFrom = pathFromRoot.length - 1;
  }
  while (inheritingStartingFrom >= 1) {
    const current = pathFromRoot[inheritingStartingFrom];
    const parent =
    pathFromRoot[inheritingStartingFrom - 1];
    // current route is an empty path => inherits its parent's params and
    data
    if (current.routeConfig && current.routeConfig.path === "") {
      inheritingStartingFrom--;
      //
      parent is componentless => current route should inherit its params and data
    } else if (!parent.component) {
      inheritingStartingFrom--;
    } else {
      break;
    }
  }
  return
  flattenInherited(pathFromRoot.slice(inheritingStartingFrom));
}
/** @internal */
function
flattenInherited(pathFromRoot: ActivatedRouteSnapshot[]): Inherited {
  return pathFromRoot.reduce((res,

```

```

curr) => {\n  const params = {...res.params, ...curr.params};\n  const data = {...res.data, ...curr.data};\n  const
resolve =\n    {...curr.data, ...res.resolve, ...curr.routeConfig?.data, ...curr._resolvedData};\n  return {params,
data, resolve};\n }, {params: {}, data: {}, resolve: {}});\n\n\n**\n * @description\n *\n * Contains the
information about a route associated with a component loaded in an\n * outlet at a particular moment in time.
ActivatedRouteSnapshot can also be used to\n * traverse the router state tree.\n *\n * The following example
initializes a component with route information extracted\n * from the snapshot of the root node at the time of
creation.\n *\n * ```\n * @Component({templateUrl: './my-component.html'})\n * class MyComponent {\n *
constructor(route: ActivatedRoute) {\n *   const id: string = route.snapshot.params.id;\n *   const url: string =
route.snapshot.url.join(');\n *   const user = route.snapshot.data.user;\n
* } }\n * }\n * ```\n *\n * @publicApi\n */\n\nexport class ActivatedRouteSnapshot {\n /** The configuration used to
match this route **/\n public readonly routeConfig: Route|null;\n /** @internal **/\n _urlSegment:
UrlSegmentGroup;\n /** @internal */\n _lastPathIndex: number;\n /**\n * @internal\n *\n * Used only in dev
mode to detect if application relies on `relativeLinkResolution: 'legacy'`\n * Should be removed in v16.\n */\n
_correctedLastPathIndex: number;\n /** @internal */\n _resolve: ResolveData;\n /** @internal */\n //
TODO(issue/24571): remove '!\n _resolvedData!: Data;\n /** @internal */\n // TODO(issue/24571): remove '!\n
_routerState!: RouterStateSnapshot;\n /** @internal */\n // TODO(issue/24571): remove '!\n _paramMap!:
ParamMap;\n /** @internal */\n // TODO(issue/24571): remove '!\n _queryParamMap!: ParamMap;\n\n /** The
resolved route title */\n readonly title?: string = this.data?.[RouteTitleKey];\n\n /** @internal */\n
constructor(\n /** The URL segments matched by this route */\n public url: UrlSegment[],\n /**\n *
The matrix parameters scoped to this route.\n *\n * You can compute all params (or data) in the router state
or to get params outside\n * of an activated component by traversing the `RouterState` tree as in the following\n
* example:\n * ```\n * collectRouteParams(router: Router) {\n *   let params = {};\n *   let
stack: ActivatedRouteSnapshot[] = [router.routerState.snapshot.root];\n *   while (stack.length > 0) {\n *
const route = stack.pop()!;\n *   params = {...params, ...route.params};\n *
stack.push(...route.children);\n *   }\n *   return params;\n * }\n * ```\n *\n */\n public params:
Params,\n /** The query parameters shared by all the routes */\n public queryParams: Params,\n /** The
URL fragment shared by all the
routes */\n public fragment: string|null,\n /** The static and resolved data of this route */\n public data:
Data,\n /** The outlet name of the route */\n public outlet: string,\n /** The component of the route */\n
public component: Type<any>|null, routeConfig: Route|null, urlSegment: UrlSegmentGroup,\n lastPathIndex:
number, resolve: ResolveData, correctedLastPathIndex?: number) {\n  this.routeConfig = routeConfig;\n
this._urlSegment = urlSegment;\n  this._lastPathIndex = lastPathIndex;\n  this._correctedLastPathIndex =
correctedLastPathIndex ?? lastPathIndex;\n  this._resolve = resolve;\n }\n\n /** The root of the router state */\n
get root(): ActivatedRouteSnapshot {\n  return this._routerState.root;\n }\n\n /** The parent of this route in the
router state tree */\n get parent(): ActivatedRouteSnapshot|null {\n  return this._routerState.parent(this);\n }\n\n
/** The first child of this route in the router state tree */\n
get firstChild(): ActivatedRouteSnapshot|null {\n  return this._routerState.firstChild(this);\n }\n\n /** The
children of this route in the router state tree */\n get children(): ActivatedRouteSnapshot[] {\n  return
this._routerState.children(this);\n }\n\n /** The path from the root of the router state tree to this route */\n
get pathFromRoot(): ActivatedRouteSnapshot[] {\n  return this._routerState.pathFromRoot(this);\n }\n\n get
paramMap(): ParamMap {\n  if (!this._paramMap) {\n    this._paramMap = convertToParamMap(this.params);\n
  }\n  return this._paramMap;\n }\n\n get queryParamMap(): ParamMap {\n  if (!this._queryParamMap) {\n
this._queryParamMap = convertToParamMap(this.queryParams);\n  }\n  return this._queryParamMap;\n }\n\n toString():
string {\n  const url = this.url.map(segment => segment.toString()).join('/');\n  const matched =
this.routeConfig ? this.routeConfig.path : '';\n  return `Route(url:'${url}', path:'${matched}')`\n
}\n}\n\n**\n * @description\n *\n * Represents the state of the router at a moment in time.\n *\n * This is a tree of
activated route snapshots. Every node in this tree knows about\n * the \"consumed\" URL segments, the extracted
parameters, and the resolved data.\n *\n * The following example shows how a component is initialized with

```

```

information\n * from the snapshot of the root node's state at the time of creation.\n *\n * ```\n *
@Component({templateUrl:'template.html'})\n * class MyComponent {\n *   constructor(router: Router) {\n *     const state: RouterState = router.routerState;\n *     const snapshot: RouterStateSnapshot = state.snapshot;\n *     const root: ActivatedRouteSnapshot = snapshot.root;\n *     const child = root.firstChild;\n *     const id:
Observable<string> = child.params.map(p => p.id);\n *     //...\n *   }\n * }\n * ```\n * @publicApi\n * ^\nexport
class RouterStateSnapshot extends Tree<ActivatedRouteSnapshot> {\n *   /** @internal */\n *   constructor(\n
    /** The url from which this snapshot was created */\n *   public url: string, root:
TreeNode<ActivatedRouteSnapshot>) {\n *     super(root);\n *     setRouterState(<RouterStateSnapshot>this, root);\n
}\n *   \n *   override toString(): string {\n *     return serializeNode(this._root);\n *   }\n *   \n *   function setRouterState<U, T
extends { _routerState: U }>(state: U, node: TreeNode<T>): void {\n *     node.value._routerState = state;\n
node.children.forEach(c => setRouterState(state, c));\n *   }\n *   \n *   function serializeNode(node:
TreeNode<ActivatedRouteSnapshot>): string {\n *     const c = node.children.length > 0 ? `
${node.children.map(serializeNode).join(', ')} ` : '';\n *     return `${node.value}${c}`;\n *   }\n * }\n * ```\n * The expectation
is that the activate route is created with the right set of parameters.\n * So we push new values into the observables
only when they are not the initial values.\n * And we detect that by checking if the snapshot field is set.\n * ^\nexport
function advanceActivatedRoute(route: ActivatedRoute):
void {\n *   if (route.snapshot) {\n *     const currentSnapshot = route.snapshot;\n *     const nextSnapshot =
route._futureSnapshot;\n *     route.snapshot = nextSnapshot;\n *     if (!shallowEqual(currentSnapshot.queryParams,
nextSnapshot.queryParams)) {\n *       (<any>route.queryParams).next(nextSnapshot.queryParams);\n *     }\n *     if
(currentSnapshot.fragment !== nextSnapshot.fragment) {\n *       (<any>route.fragment).next(nextSnapshot.fragment);\n *     }\n *     if
(!shallowEqual(currentSnapshot.params, nextSnapshot.params)) {\n *       (<any>route.params).next(nextSnapshot.params);\n *     }\n *     if
(!shallowEqualArrays(currentSnapshot.url, nextSnapshot.url)) {\n *       (<any>route.url).next(nextSnapshot.url);\n *     }\n *     if
(!shallowEqual(currentSnapshot.data, nextSnapshot.data)) {\n *       (<any>route.data).next(nextSnapshot.data);\n *     }\n *     }\n *     } else {\n *       route.snapshot = route._futureSnapshot;\n *       // this
is for resolved data\n *       (<any>route.data).next(route._futureSnapshot.data);\n *     }\n *   }\n * }\n * ^\nexport
function equalParamsAndUrlSegments(a: ActivatedRouteSnapshot, b: ActivatedRouteSnapshot): boolean {\n *   const
equalUrlParams = shallowEqual(a.params, b.params) && equalSegments(a.url, b.url);\n *   const
parentsMismatch = !a.parent !== !b.parent;\n *   return equalUrlParams && !parentsMismatch && (!a.parent ||
equalParamsAndUrlSegments(a.parent, b.parent!));\n * }\n * ```\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n * ^\n\nimport {BehaviorSubject} from 'rxjs';\n\nimport
{DetachedRouteHandleInternal, RouteReuseStrategy} from './route_reuse_strategy';\n\nimport {ActivatedRoute,
ActivatedRouteSnapshot, RouterState, RouterStateSnapshot} from './router_state';\n\nimport {TreeNode} from
 './utils/tree';\n * ^\nexport function createState(\n *   routeReuseStrategy: RouteReuseStrategy, curr:
RouterStateSnapshot,\n *   prevState: RouterState):
RouterState {\n *   const root = createNode(routeReuseStrategy, curr._root, prevState ? prevState._root : undefined);\n *
return new RouterState(root, curr);\n * }\n * ^\nfunction createNode(\n *   routeReuseStrategy: RouteReuseStrategy, curr:
TreeNode<ActivatedRouteSnapshot>,\n *   prevState?: TreeNode<ActivatedRoute>): TreeNode<ActivatedRoute>
{\n *   // reuse an activated route that is currently displayed on the screen\n *   if (prevState &&
routeReuseStrategy.shouldReuseRoute(curr.value, prevState.value.snapshot)) {\n *     const value = prevState.value;\n *
value._futureSnapshot = curr.value;\n *     const children = createOrReuseChildren(routeReuseStrategy, curr,
prevState);\n *     return new TreeNode<ActivatedRoute>(value, children);\n *   } else {\n *     if
(routeReuseStrategy.shouldAttach(curr.value)) {\n *       // retrieve an activated route that is used to be displayed, but is
not currently displayed\n *       const detachedRouteHandle = routeReuseStrategy.retrieve(curr.value);\n *       if
(detachedRouteHandle
!== null) {\n *         const tree = (detachedRouteHandle as DetachedRouteHandleInternal).route;\n *
tree.value._futureSnapshot = curr.value;\n *         tree.children = curr.children.map(c =>

```

```
createNode(routeReuseStrategy, c));\n    return tree;\n  }\n}\n\nconst value =\ncreateActivatedRoute(curr.value);\nconst children = curr.children.map(c => createNode(routeReuseStrategy,\nc));\nreturn new TreeNode<ActivatedRoute>(value, children);\n}\n}\n\nfunction createOrReuseChildren(\nrouteReuseStrategy: RouteReuseStrategy, curr: TreeNode<ActivatedRouteSnapshot>,\nprevState:\nTreeNode<ActivatedRoute>) {\n  return curr.children.map(child => {\n    for (const p of prevState.children) {\n      if (routeReuseStrategy.shouldReuseRoute(child.value, p.value.snapshot)) {\n        return\n        createNode(routeReuseStrategy, child, p);\n      }\n    }\n    return createNode(routeReuseStrategy, child);\n  });\n}\n\nfunction createActivatedRoute(c: ActivatedRouteSnapshot) {\n  return new ActivatedRoute(\n    new BehaviorSubject(c.url), new BehaviorSubject(c.params), new\n    BehaviorSubject(c.queryParams),\n    new BehaviorSubject(c.fragment), new BehaviorSubject(c.data), c.outlet,\nc.component, c);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this\n * source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\nimport {NavigationCancellationCode} from './events';\nimport\n{NavigationBehaviorOptions} from './models';\nimport {isUrlTree, UrlSerializer, UrlTree} from\n'./url_tree';\n\nexport const NAVIGATION_CANCELING_ERROR = 'ngNavigationCancelingError';\n\nexport\ntype NavigationCancelingError =\n  Error&{[NAVIGATION_CANCELING_ERROR]: true, cancellationCode:\n  NavigationCancellationCode};\n\nexport type RedirectingNavigationCancelingError =\n  NavigationCancelingError&{\n    url: UrlTree;\n    navigationBehaviorOptions?: NavigationBehaviorOptions;\n    cancellationCode: NavigationCancellationCode.Redirect;\n  };\n\nexport\nfunction redirectingNavigationError(\n  urlSerializer: UrlSerializer, redirect: UrlTree):\n  RedirectingNavigationCancelingError {\n  const {redirectTo, navigationBehaviorOptions} =\n  isUrlTree(redirect) ? {redirectTo: redirect, navigationBehaviorOptions: undefined} : redirect;\n  const error =\n  navigationCancelingError(\n    ngDevMode && `Redirecting to \"${urlSerializer.serialize(redirectTo)}\"`,\n    NavigationCancellationCode.Redirect, redirect) as RedirectingNavigationCancelingError;\n  error.url =\n  redirectTo;\n  error.navigationBehaviorOptions = navigationBehaviorOptions;\n  return error;\n}\n\nexport function\nnavigationCancelingError(\n  message: string|null|false, code: NavigationCancellationCode, redirectUrl?: UrlTree)\n{\n  const error =\n  new Error('NavigationCancelingError: ' + (message || '')) as NavigationCancelingError;\n  error[NAVIGATION_CANCELING_ERROR] = true;\n  error.cancellationCode = code;\n\n  if (redirectUrl) {\n    (error as RedirectingNavigationCancelingError).url = redirectUrl;\n  }\n  return\n  error;\n}\n\nexport function isRedirectingNavigationCancelingError(\n  error: unknown|\n  RedirectingNavigationCancelingError): error is RedirectingNavigationCancelingError {\n  return\n  isNavigationCancelingError(error) && isUrlTree((error as any).url);\n}\n\nexport function\nisNavigationCancelingError(error: unknown): error is NavigationCancelingError {\n  return error && (error as\n  any)[NAVIGATION_CANCELING_ERROR];\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights\n * Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n * LICENSE file at https://angular.io/license\n */\n\nimport {ComponentFactoryResolver, ComponentRef,\n  EnvironmentInjector, Injectable} from '@angular/core';\n\nimport {RouterOutletContract} from\n'./directives/router_outlet';\nimport {ActivatedRoute} from './router_state';\n\n/**\n * Store contextual information\n * about a `RouterOutlet`\n * @publicApi\n */\n\nexport class OutletContext {\n  outlet: RouterOutletContract|null\n  = null;\n  route: ActivatedRoute|null = null;\n\n  /**\n * @deprecated Passing a resolver to retrieve a component\n * factory is not required and is\n * deprecated since v14.\n */\n  resolver: ComponentFactoryResolver|null =\n  null;\n  injector: EnvironmentInjector|null = null;\n  children = new ChildrenOutletContexts();\n  attachRef:\n  ComponentRef<any>|null = null;\n}\n\n/**\n * Store contextual information about the children (= nested)\n * `RouterOutlet`\n * @publicApi\n */\n\n@Injectable({providedIn: 'root'})\nexport class ChildrenOutletContexts\n{\n  // contexts for child outlets, by name.\n  private contexts = new Map<string, OutletContext>();\n\n  /**\n * Called\n * when a `RouterOutlet` directive is instantiated\n */\n  onChildOutletCreated(childName: string, outlet:\n  RouterOutletContract): void {\n    const context = this.getOrCreateContext(childName);\n    context.outlet
```

```

= outlet;\n  this.contexts.set(childName, context);\n }\n\n /**\n * Called when a `RouterOutlet` directive is
destroyed.\n * We need to keep the context as the outlet could be destroyed inside a NgIf and might be\n * re-
created later.\n */\n onChildOutletDestroyed(childName: string): void {\n  const context =
this.getContext(childName);\n  if (context) {\n    context.outlet = null;\n    context.attachRef = null;\n  }\n
}\n\n /**\n * Called when the corresponding route is deactivated during navigation.\n * Because the component
get destroyed, all children outlet are destroyed.\n */\n onOutletDeactivated(): Map<string, OutletContext> {\n
const contexts = this.contexts;\n  this.contexts = new Map();\n  return contexts;\n }\n\n
onOutletReAttached(contexts: Map<string, OutletContext>) {\n  this.contexts = contexts;\n }\n\n
getOrCreateContext(childName: string): OutletContext {\n  let context = this.getContext(childName);\n\n  if
(!context)\n\n    {\n      context = new OutletContext();\n      this.contexts.set(childName, context);\n    }\n\n  return context;\n
}\n\n getContext(childName: string): OutletContext|null {\n  return this.contexts.get(childName) || null;\n
}\n}\n\n", "*/\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport { Attribute, ChangeDetectorRef, ComponentFactoryResolver, ComponentRef, Directive,
EnvironmentInjector, EventEmitter, Injector, OnDestroy, OnInit, Output, ViewContainerRef, RuntimeError as
RuntimeError, } from '@angular/core';\n\nimport { RuntimeErrorCode } from './errors';\n\nimport { Data } from
'./models';\n\nimport { ChildrenOutletContexts } from './router_outlet_context';\n\nimport { ActivatedRoute } from
'./router_state';\n\nimport { PRIMARY_OUTLET } from './shared';\n\nconst NG_DEV_MODE = typeof ngDevMode
=== 'undefined' || ngDevMode;\n\n\n * An interface that defines the contract for developing a component outlet for the `Router`.\n * An outlet acts as
a placeholder that Angular dynamically fills based on the current router state.\n * A router outlet should register
itself with the `Router` via\n * `ChildrenOutletContexts#onChildOutletCreated` and unregister with\n *
`ChildrenOutletContexts#onChildOutletDestroyed`. When the `Router` identifies a matched `Route`,\n * it looks for
a registered outlet in the `ChildrenOutletContexts` and activates it.\n * @see `ChildrenOutletContexts`\n *
@publicApi\n */\nexport interface RouterOutletContract {\n  /**\n * Whether the given outlet is activated.\n */\n
* An outlet is considered "activated" if it has an active component.\n */\n  isActive: boolean;\n\n  /**\n * The
instance of the activated component or `null` if the outlet is not activated.\n */\n  component: Object|null;\n\n  /**\n *
The `Data` of the `ActivatedRoute` snapshot.\n */\n  activatedRouteData:
Data;\n\n  /**\n * The `ActivatedRoute` for the outlet or `null` if the outlet is not activated.\n */\n
  activatedRoute: ActivatedRoute|null;\n\n  /**\n * Called by the `Router` when the outlet should activate (create a
component).\n */\n  activateWith(activatedRoute: ActivatedRoute, environmentInjector: EnvironmentInjector|null):
void;\n\n  /**\n * Called by the `Router` when the outlet should activate (create a component).\n */\n
  @deprecated Passing a resolver to retrieve a component factory is not required and is\n * deprecated since
v14.\n */\n  activateWith(activatedRoute: ActivatedRoute, resolver: ComponentFactoryResolver|null): void;\n\n  /**\n * A request to destroy the currently activated component.\n */\n
  * When a `RouteReuseStrategy` indicates that an `ActivatedRoute` should be removed but stored for\n * later re-use rather than destroyed, the `Router` will
call `detach` instead.\n */\n  deactivate(): void;\n\n  /**\n * Called when the `RouteReuseStrategy`
instructs to detach the subtree.\n */\n  * This is similar to `deactivate`, but the activated component should `_not_`
be destroyed.\n * Instead, it is returned so that it can be reattached later via the `attach` method.\n */\n
  detach():
ComponentRef<unknown>;\n\n  /**\n * Called when the `RouteReuseStrategy` instructs to re-attach a previously
detached subtree.\n */\n  attach(ref: ComponentRef<unknown>, activatedRoute: ActivatedRoute): void;\n\n  /**\n
* Emits an activate event when a new component is instantiated\n */\n  activateEvents?:
EventEmitter<unknown>;\n\n  /**\n * Emits a deactivate event when a component is destroyed.\n */\n
  deactivateEvents?: EventEmitter<unknown>;\n\n  /**\n * Emits an attached component instance when the
`RouteReuseStrategy` instructs to re-attach a\n * previously detached subtree.\n */\n  attachEvents?:
EventEmitter<unknown>;\n\n  /**\n * Emits a detached component instance when the `RouteReuseStrategy`
instructs

```

to detach the subtree. The `detachEvents?` property is an `EventEmitter<unknown>`. Acts as a placeholder that Angular dynamically fills based on the current router state. Each outlet can have a unique name, determined by the optional `name` attribute. The name cannot be set or changed dynamically. If not set, default value is `"primary"`.

```
<router-outlet></router-outlet>
```

```
<router-outlet name='left'></router-outlet>
```

```
<router-outlet name='right'></router-outlet>
```

Named outlets can be the targets of secondary routes. The `Route` object for a secondary route has an `outlet` property to identify the target outlet.

```
{ path: <base-path>, component: <component>, outlet: <target_outlet_name> }
```

Using named outlets and secondary routes, you can target multiple outlets in the same `RouterLink` directive. The router keeps track of separate branches in a navigation tree for each named outlet and generates a representation of that tree in the URL. The URL for a secondary route uses the following syntax to specify both the primary and secondary routes at the same time:

```
http://base-path/primary-route-path(outlet-name:route-path)
```

A router outlet emits an `activate` event when a new component is instantiated, a `deactivate` event when a component is destroyed. An attached event emits when the `RouteReuseStrategy` instructs the outlet to reattach the subtree, and the `detach` event emits when the `RouteReuseStrategy` instructs the outlet to detach the subtree.

```
<router-outlet (activate)='onActivate($event)' (deactivate)='onDeactivate($event)' (attach)='onAttach($event)' (detach)='onDetach($event)'></router-outlet>
```

@see [Routing tutorial](guide/router-tutorial-toh#named-outlets "Example of a named outlet and secondary route configuration"). @see `RouterLink` @see `Route`

```
@NgModule RouterModule @publicApi @Directive({ selector: 'router-outlet', exportAs: 'outlet', standalone: true }) export class RouterOutlet implements OnDestroy, OnInit, RouterOutletContract { private activated: ComponentRef<any> | null = null; private _activatedRoute: ActivatedRoute | null = null; private name: string; @Output('activate') activateEvents = new EventEmitter<any>(); @Output('deactivate') deactivateEvents = new EventEmitter<any>(); /** Emits an attached component instance when the RouteReuseStrategy instructs to re-attach a previously detached subtree. */ @Output('attach') attachEvents = new EventEmitter<unknown>(); /** Emits a detached component instance when the RouteReuseStrategy instructs to detach the subtree. */ @Output('detach') detachEvents = new EventEmitter<unknown>(); constructor(private parentContexts: ChildrenOutletContexts, private location: ViewContainerRef, @Attribute('name') name: string, private changeDetector: ChangeDetectorRef, private environmentInjector: EnvironmentInjector) { this.name = name || PRIMARY_OUTLET; parentContexts.onChildOutletCreated(this.name, this); } /** @nodoc */ ngOnDestroy(): void { // Ensure that the registered outlet is this one before removing it on the context. if (this.parentContexts.getContext(this.name)?.outlet === this) { this.parentContexts.onChildOutletDestroyed(this.name); } } /** @nodoc */ ngOnInit(): void { if (!this.activated) { // If the outlet was not instantiated at the time the route got activated we need to populate the outlet when it is initialized (ie inside a NgIf) const context = this.parentContexts.getContext(this.name); if (context && context.route) { if (context.attachRef) { // attachRef is populated when there is an existing component to mount this.attach(context.attachRef, context.route); } else { // otherwise the component defined in the configuration is created this.activateWith(context.route, context.injector); } } } } get isActive(): boolean { return !!this.activated; } /** @returns The currently activated component instance. * @throws An error if the outlet is not activated. */ get component(): Object { if (!this.activated) throw new RuntimeError(RuntimeErrorCode.OUTLET_NOT_ACTIVATED, NG_DEV_MODE && 'Outlet is not activated'); return this.activated.instance; } get activatedRoute(): ActivatedRoute { if (!this.activated) throw new RuntimeError(RuntimeErrorCode.OUTLET_NOT_ACTIVATED, NG_DEV_MODE && 'Outlet is not activated'); return this._activatedRoute as ActivatedRoute; } get activatedRouteData(): Data { if (this._activatedRoute) {
```



```

return this._activatedRoute.snapshot.data;\n
  }\n  return {};\n }\n\n /**\n  * Called when the `RouteReuseStrategy` instructs to detach the subtree\n  */\n  detach(): ComponentRef<any> {\n    if (!this.activated)\n      throw new RuntimeError(\n        RuntimeErrorCode.OUTLET_NOT_ACTIVATED, NG_DEV_MODE && 'Outlet is not activated');\n    this.location.detach();\n    const cmp = this.activated;\n    this.activated = null;\n    this._activatedRoute = null;\n    this.detachEvents.emit(cmp.instance);\n    return cmp;\n  }\n\n /**\n  * Called when the `RouteReuseStrategy` instructs to re-attach a previously detached subtree\n  */\n  attach(ref: ComponentRef<any>, activatedRoute: ActivatedRoute) {\n    this.activated = ref;\n    this._activatedRoute = activatedRoute;\n    this.location.insert(ref.hostView);\n    this.attachEvents.emit(ref.instance);\n  }\n\n  deactivate(): void {\n    if (this.activated) {\n      const c = this.component;\n      this.activated.destroy();\n      this.activated = null;\n      this._activatedRoute = null;\n      this.deactivateEvents.emit(c);\n    }\n  }\n\n  activateWith(activatedRoute: ActivatedRoute,\n    resolverOrInjector?: ComponentFactoryResolver|EnvironmentInjector|null) {\n    if (this.isActivated) {\n      throw new RuntimeError(\n        RuntimeErrorCode.OUTLET_ALREADY_ACTIVATED,\n          NG_DEV_MODE && 'Cannot activate an already activated outlet');\n    }\n    this._activatedRoute = activatedRoute;\n    const location = this.location;\n    const snapshot = activatedRoute._futureSnapshot;\n    const component = snapshot.component!;\n    const childContexts = this.parentContexts.getOrCreateContext(this.name).children;\n    const injector = new OutletInjector(activatedRoute, childContexts, location.injector);\n    if (resolverOrInjector && isComponentFactoryResolver(resolverOrInjector)) {\n      const factory = resolverOrInjector.resolveComponentFactory(component);\n      this.activated = location.createComponent(factory, location.length, injector);\n    } else {\n      const environmentInjector = resolverOrInjector ?? this.environmentInjector;\n      this.activated = location.createComponent(\n        component, {\n          index: location.length, injector, environmentInjector\n        });\n    }\n    // Calling `markForCheck` to make sure we will run the change detection when the\n    // `RouterOutlet` is inside a `ChangeDetectionStrategy.OnPush` component.\n    this.changeDetector.markForCheck();\n    this.activateEvents.emit(this.activated.instance);\n  }\n}\n\nclass OutletInjector implements Injector {\n  constructor(\n    private route: ActivatedRoute, private childContexts: ChildrenOutletContexts,\n    private parent: Injector) {\n  }\n  get(token: any, notFoundValue?: any): any {\n    if (token === ActivatedRoute) {\n      return this.route;\n    }\n    if (token === ChildrenOutletContexts) {\n      return this.childContexts;\n    }\n    return this.parent.get(token, notFoundValue);\n  }\n}\n\nfunction isComponentFactoryResolver(item: any): item is ComponentFactoryResolver {\n  return !!item.resolveComponentFactory;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\nimport {Component} from '@angular/core';\nimport {RouterOutlet} from './directives/router_outlet';\n\n/**\n * This component is used internally within the router to be a placeholder when an empty\n * router-outlet is needed. For example, with a config such as:\n *\n * {path: 'parent', outlet: 'nav', children: [...]}\n *\n * In order to render, there needs to be a component on this config, which will default\n * to this `EmptyOutletComponent`.\n *\n * @Component({\n *   template: `<router-outlet></router-outlet>`,\n *   imports: [RouterOutlet],\n *   standalone: true,\n * })\n * export class EmptyOutletComponent {\n * }\n */\nexport class EmptyOutletComponent {\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {createEnvironmentInjector, EnvironmentInjector, Type, isStandalone as isStandalone, RuntimeError as RuntimeError} from '@angular/core';\nimport {EmptyOutletComponent} from './components/empty_outlet';\nimport {RuntimeErrorCode} from './errors';\nimport {Route, Routes} from './models';\nimport {ActivatedRouteSnapshot} from './router_state';\nimport {PRIMARY_OUTLET} from './shared';\n\n/**\n * Creates an `EnvironmentInjector` if the `Route` has providers and one does not already exist\n * and returns the injector. Otherwise, if the `Route` does not have `providers`, returns the\n * `currentInjector`.\n *\n * @param route The route that might have providers\n * @param currentInjector The parent injector of the

```

```

Route`
n */
nexport function getOrCreateRouteInjectorIfNeeded(
n
n route: Route, currentInjector: EnvironmentInjector) {
n if (route.providers && !route._injector) {
n route._injector =
n createEnvironmentInjector(route.providers, currentInjector, `Route: ${route.path}`);
n }
n return route._injector ?? currentInjector;
n}
n}
nexport function getLoadedRoutes(route: Route): Route[]
n {
n return route._loadedRoutes;
n}
n}
nexport function getLoadedInjector(route: Route):
n EnvironmentInjector
n {
n return route._loadedInjector;
n}
n}
nexport function getLoadedComponent(route:
n Route): Type<unknown>
n {
n return route._loadedComponent;
n}
n}
nexport function
n getProvidersInjector(route: Route): EnvironmentInjector
n {
n return route._injector;
n}
n}
nexport function
n validateConfig(
n config: Routes, parentPath: string = "", requireStandaloneComponents = false): void {
n //
n forEach doesn't iterate undefined values
n for (let i = 0; i < config.length; i++) {
n const route: Route =
n config[i];
n
n const fullPath: string = getFullPath(parentPath, route);
n validateNode(route, fullPath,
n requireStandaloneComponents);
n }
n}
n}
nexport function assertStandalone(fullPath: string, component:
n Type<unknown>)
n {
n if (component && !isStandalone(component)) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration of route '${fullPath}'. The
n component must be standalone.`);
n }
n}
n}
nfunction validateNode(route: Route, fullPath: string,
n requireStandaloneComponents: boolean): void {
n if (typeof ngDevMode === 'undefined' || ngDevMode) {
n if
n (!route) {
n throw new RuntimeError(RuntimeErrorCode.INVALID_ROUTE_CONFIG, `
n Invalid
n configuration of route '${fullPath}': Encountered undefined route.
n The reason might be an extra comma.
n Example:
n const routes: Routes = [
n { path: "", redirectTo: '/dashboard', pathMatch: 'full' },
n { path:
n 'dashboard', component: DashboardComponent
n },
n << two commas
n { path: 'detail/:id', component: HeroDetailComponent }
n ];
n `);
n }
n if
n (Array.isArray(route)) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration of route '${fullPath}': Array
n cannot be specified`);
n }
n if (!route.redirectTo && !route.component && !route.loadComponent &&
n !route.children &&
n !route.loadChildren && (route.outlet && route.outlet !== PRIMARY_OUTLET)) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration
n of route '${
n fullPath}': a componentless route without children or loadChildren cannot have a named outlet
n set`);
n }
n if (route.redirectTo && route.children) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration of route '${
n fullPath}':
n redirectTo and children cannot be used
n together`);
n }
n if (route.redirectTo && route.loadChildren) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration of route '${
n fullPath}':
n redirectTo and loadChildren cannot be used together`);
n }
n if (route.children && route.loadChildren) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration
n of route '${
n fullPath}': children and loadChildren cannot be used together`);
n }
n if (route.redirectTo
n && (route.component || route.loadComponent)) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration of route '${
n fullPath}':
n redirectTo and component/loadComponent cannot be used together`);
n }
n if (route.component &&
n route.loadComponent) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid
n configuration of route '${
n fullPath}': component and loadComponent cannot be used together`);
n }
n }
n if (route.redirectTo && route.canActivate) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration of route '${
n fullPath}':
n redirectTo and canActivate cannot be used together. Redirects happen before activation `
n +
n `so
n canActivate will never be executed.`);
n }
n if (route.path && route.matcher) {
n throw new RuntimeError(
n
n RuntimeErrorCode.INVALID_ROUTE_CONFIG,
n `Invalid configuration of route '${fullPath}': path
n and matcher cannot be used together`);
n }
n if (route.redirectTo === void 0 && !route.component &&

```

```

!route.loadComponent &&!route.children &&!route.loadChildren) {\n  throw new RuntimeError(\n
RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n    `Invalid configuration of route '${\n      fullPath}'.
One of the following must be provided: component, loadComponent, redirectTo, children or loadChildren`);\n  }\n
if (route.path === void 0 && route.matcher === void 0) {\n  throw new RuntimeError(\n
RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n    `Invalid configuration of route '${\n      fullPath}':
routes must have either a path or a matcher specified`);\n  }\n  if (typeof route.path === 'string' &&
route.path.charAt(0) === '/') {\n  throw new RuntimeError(\n
RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n    `Invalid configuration of route '${fullPath}': path cannot
start with a slash`);\n  }\n  if (route.path === '' && route.redirectTo !== void 0 && route.pathMatch === void 0)
{\n  const exp =\n    `The default value of 'pathMatch' is 'prefix', but often the intent is to use 'full'.`;
throw new RuntimeError(\n    RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n    `Invalid configuration
of route '{path: \"${fullPath}\"',
redirectTo: \"${\n      route.redirectTo}\"}: please provide 'pathMatch'. ${exp}`);\n  }\n  if
(requireStandaloneComponents) {\n  assertStandalone(fullPath, route.component);\n  }\n  }\n  if (route.children)
{\n  validateConfig(route.children, fullPath, requireStandaloneComponents);\n  }\n  }\n\nfunction
getFullPath(parentPath: string, currentRoute: Route): string {\n  if (!currentRoute) {\n  return parentPath;\n  }\n  if
(!parentPath && !currentRoute.path) {\n  return \"\";\n  } else if (parentPath && !currentRoute.path) {\n  return
`${parentPath}`;\n  } else if (!parentPath && currentRoute.path) {\n  return currentRoute.path;\n  } else {\n
return `${parentPath}/${currentRoute.path}`;\n  }\n  }\n\n/**\n * Makes a copy of the config and adds any default
required properties.\n */\nexport function standardizeConfig(r: Route): Route {\n  const children = r.children &&
r.children.map(standardizeConfig);\n  const c = children ? {...r, children} : {...r};\n  if ((!c.component &&
!c.loadComponent) && (children || c.loadChildren) &&\n    (c.outlet && c.outlet !==
PRIMARY_OUTLET)) {\n  c.component = EmptyOutletComponent;\n  }\n  return c;\n  }\n\n/** Returns the
`route.outlet` or PRIMARY_OUTLET if none exists. */\nexport function getOutlet(route: Route): string {\n  return
route.outlet || PRIMARY_OUTLET;\n  }\n\n/**\n * Sorts the `routes` such that the ones with an outlet matching
`outletName` come first.\n * The order of the configs is otherwise preserved.\n */\nexport function
sortByMatchingOutlets(routes: Routes, outletName: string): Routes {\n  const sortedConfig = routes.filter(r =>
getOutlet(r) === outletName);\n  sortedConfig.push(...routes.filter(r => getOutlet(r) !== outletName));\n  return
sortedConfig;\n  }\n\n/**\n * Gets the first injector in the snapshot's parent tree.\n */\n * If the `Route` has a static list
of providers, the returned injector will be the one created from\n * those. If it does not exist, the returned injector
may
come from the parents, which may be from a\n * loaded config or their static providers.\n */\n * Returns `null` if
there is neither this nor any parents have a stored injector.\n */\n * Generally used for retrieving the injector to use
for getting tokens for guards/resolvers and\n * also used for getting the correct injector to use for creating
components.\n */\nexport function getClosestRouteInjector(snapshot: ActivatedRouteSnapshot):
EnvironmentInjector|\n  null {\n  if (!snapshot) return null;\n  }\n  // If the current route has its own injector, which is
created from the static providers on the\n  // route itself, we should use that. Otherwise, we start at the parent since
we do not want to\n  // include the lazy loaded injector from this route.\n  if (snapshot.routeConfig?._injector) {\n
return snapshot.routeConfig._injector;\n  }\n  for (let s = snapshot.parent; s; s = s.parent) {\n  const route =
s.routeConfig;\n  // Note that the order here is important. `_loadedInjector`
stored on the route with\n  // `loadChildren: () => NgModule` so it applies to child routes with priority. The
`_injector`\n  // is created from the static providers on that parent route, so it applies to the children as\n  // well,
but only if there is no lazy loaded NgModuleRef injector.\n  if (route?._loadedInjector) return
route._loadedInjector;\n  if (route?._injector) return route._injector;\n  }\n  }\n  return null;\n  }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {ComponentFactoryResolver,
EnvironmentInjector, NgModuleRef} from '@angular/core';\nimport {MonoTypeOperatorFunction} from
'rxjs';\nimport {map} from 'rxjs/operators';\nimport {ActivationEnd, ChildActivationEnd, Event} from

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'./events';\nimport {DetachedRouteHandleInternal, RouteReuseStrategy} from './route_reuse_strategy';\nimport
{NavigationTransition} from './router';\nimport {ChildrenOutletContexts} from './router_outlet_context';\nimport
{ActivatedRoute, advanceActivatedRoute, RouterState} from './router_state';\nimport {forEach} from
'./utils/collection';\nimport {getClosestRouteInjector} from './utils/config';\nimport {nodeChildrenAsMap,
TreeNode} from './utils/tree';\n\nexport const activateRoutes = (\n  rootContexts: ChildrenOutletContexts,
routeReuseStrategy: RouteReuseStrategy,\n  forwardEvent: (evt: Event) => void):
MonoTypeOperatorFunction<NavigationTransition> =>{\n  map(t => {\n    new ActivateRoutes(\n
routeReuseStrategy, t.targetRouterState!, t.currentRouterState, forwardEvent)\n      .activate(rootContexts);\n
return t;\n  });\n}\n\nexport class ActivateRoutes {\n  constructor(\n    private routeReuseStrategy:
RouteReuseStrategy, private futureState: RouterState,\n    private currState: RouterState, private forwardEvent:
(evt: Event) => void)
  {\n\n    activate(parentContexts: ChildrenOutletContexts): void {\n      const futureRoot = this.futureState._root;\n
const currRoot = this.currState ? this.currState._root : null;\n\n      this.deactivateChildRoutes(futureRoot, currRoot,
parentContexts);\n      advanceActivatedRoute(this.futureState.root);\n      this.activateChildRoutes(futureRoot,
currRoot, parentContexts);\n    }\n\n    // De-activate the child route that are not re-used for the future state\n
private deactivateChildRoutes(\n      futureNode: TreeNode<ActivatedRoute>, currNode:
TreeNode<ActivatedRoute>|null,\n      contexts: ChildrenOutletContexts): void {\n      const children: {[outletName:
string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(currNode);\n\n      // Recurse on the routes active in the
future state to de-activate deeper children\n      futureNode.children.forEach(futureChild => {\n        const
childOutletName = futureChild.value.outlet;\n        this.deactivateRoutes(futureChild, children[childOutletName],
contexts);\n\n        delete children[childOutletName];\n      });\n\n      // De-activate the routes that will not be re-used\n
forEach(children, (v: TreeNode<ActivatedRoute>, childName: string) => {\n
this.deactivateRouteAndItsChildren(v, contexts);\n    });\n\n    private deactivateRoutes(\n      futureNode:
TreeNode<ActivatedRoute>, currNode: TreeNode<ActivatedRoute>,\n      parentContext: ChildrenOutletContexts):
void {\n      const future = futureNode.value;\n      const curr = currNode ? currNode.value : null;\n\n      if (future ===
curr) {\n        // Reusing the node, check to see if the children need to be de-activated\n        if (future.component) {\n
// If we have a normal route, we need to go through an outlet.\n          const context =
parentContext.getContext(future.outlet);\n          if (context) {\n            this.deactivateChildRoutes(futureNode,
currNode, context.children);\n          }\n        } else {\n          // if we have a componentless route, we recurse but keep the
same outlet map.\n          this.deactivateChildRoutes(futureNode, currNode, parentContext);\n        }\n      } else {\n
if (curr) {\n        // Deactivate the current route which will not be re-used\n
this.deactivateRouteAndItsChildren(currNode, parentContext);\n      }\n    }\n\n    private
deactivateRouteAndItsChildren(\n      route: TreeNode<ActivatedRoute>, parentContexts: ChildrenOutletContexts):
void {\n      // If there is no component, the Route is never attached to an outlet (because there is no\n      // component
to attach).\n      if (route.value.component && this.routeReuseStrategy.shouldDetach(route.value.snapshot)) {\n
this.detachAndStoreRouteSubtree(route, parentContexts);\n      } else {\n        this.deactivateRouteAndOutlet(route,
parentContexts);\n      }\n    }\n\n    private detachAndStoreRouteSubtree(\n      route: TreeNode<ActivatedRoute>,
parentContexts: ChildrenOutletContexts): void {\n      const context =
parentContexts.getContext(route.value.outlet);\n      const
contexts = context && route.value.component ? context.children : parentContexts;\n      const children:
{[outletName: string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(route);\n      for (const childOutlet of
Object.keys(children)) {\n        this.deactivateRouteAndItsChildren(children[childOutlet], contexts);\n      }\n\n      if
(context && context.outlet) {\n        const componentRef = context.outlet.detach();\n        const contexts =
context.children.onOutletDeactivated();\n        this.routeReuseStrategy.store(route.value.snapshot, {componentRef,
route, contexts});\n      }\n    }\n\n    private deactivateRouteAndOutlet(\n      route: TreeNode<ActivatedRoute>,
parentContexts: ChildrenOutletContexts): void {\n      const context =
parentContexts.getContext(route.value.outlet);\n      // The context could be `null` if we are on a componentless route

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but there may still be\n // children that need deactivating.\n  const contexts = context && route.value.component
? context.children : parentContexts;\n
  const children: {[outletName: string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(route);\n  for
(const childOutlet of Object.keys(children)) {\n    this.deactivateRouteAndItsChildren(children[childOutlet],
contexts);\n  }\n  if (context && context.outlet) {\n    // Destroy the component\n
context.outlet.deactivate();\n    // Destroy the contexts for all the outlets that were in the component\n
context.children.onOutletDeactivated();\n    // Clear the information about the attached component on the context
but keep the reference to\n    // the outlet.\n    context.attachRef = null;\n    context.resolver = null;\n
context.route = null;\n  }\n  private activateChildRoutes(\n    futureNode: TreeNode<ActivatedRoute>,
currNode: TreeNode<ActivatedRoute>|null,\n    contexts: ChildrenOutletContexts): void {\n    const children:
{[outlet: string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(currNode);\n
futureNode.children.forEach(c
=> {\n    this.activateRoutes(c, children[c.value.outlet], contexts);\n    this.forwardEvent(new
ActivationEnd(c.value.snapshot));\n  });\n  if (futureNode.children.length) {\n    this.forwardEvent(new
ChildActivationEnd(futureNode.value.snapshot));\n  }\n  private activateRoutes(\n    futureNode:
TreeNode<ActivatedRoute>, currNode: TreeNode<ActivatedRoute>,\n    parentContexts:
ChildrenOutletContexts): void {\n    const future = futureNode.value;\n    const curr = currNode ? currNode.value :
null;\n    advanceActivatedRoute(future);\n    // reusing the node\n    if (future === curr) {\n    if
(future.component) {\n    // If we have a normal route, we need to go through an outlet.\n    const context =
parentContexts.getOrCreateContext(future.outlet);\n    this.activateChildRoutes(futureNode, currNode,
context.children);\n    } else {\n    // if we have a componentless route, we recurse but keep the same outlet
map.\n    this.activateChildRoutes(futureNode,
currNode, parentContexts);\n    } } else {\n    if (future.component) {\n    // if we have a normal route, we
need to place the component into the outlet and recurse.\n    const context =
parentContexts.getOrCreateContext(future.outlet);\n    if
(this.routeReuseStrategy.shouldAttach(future.snapshot)) {\n    const stored =\n
(<DetachedRouteHandleInternal>this.routeReuseStrategy.retrieve(future.snapshot));\n
this.routeReuseStrategy.store(future.snapshot, null);\n
context.children.onOutletReAttached(stored.contexts);\n    context.attachRef = stored.componentRef;\n
context.route = stored.route.value;\n    if (context.outlet) {\n    // Attach right away when the outlet has
already been instantiated\n    // Otherwise attach from `RouterOutlet.ngOnInit` when it is instantiated\n
context.outlet.attach(stored.componentRef, stored.route.value);\n    }\n
advanceActivatedRoute(stored.route.value);\n    this.activateChildRoutes(futureNode, null,
context.children);\n    } else {\n    const injector = getClosestRouteInjector(future.snapshot);\n    const
cmpFactoryResolver = injector?.get(ComponentFactoryResolver) ?? null;\n    context.attachRef = null;\n
context.route = future;\n    context.resolver = cmpFactoryResolver;\n    context.injector = injector;\n    if
(context.outlet) {\n    // Activate the outlet when it has already been instantiated\n    // Otherwise it will get
activated from its `ngOnInit` when instantiated\n    context.outlet.activateWith(future, context.injector);\n
}\n    this.activateChildRoutes(futureNode, null, context.children);\n    } } else {\n    // if we have a
componentless route, we recurse but keep the same outlet map.\n    this.activateChildRoutes(futureNode, null,
parentContexts);\n
  }\n  }\n  }\n  }\n  "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {Injector, ProviderToken, isInjectable as isInjectable} from '@angular/core';\nimport
{RunGuardsAndResolvers} from '../models';\nimport {ChildrenOutletContexts, OutletContext} from
'../router_outlet_context';\nimport {ActivatedRouteSnapshot, equalParamsAndUrlSegments, RouterStateSnapshot}
from '../router_state';\nimport {equalPath} from '../url_tree';\nimport {forEach, shallowEqual} from
'../utils/collection';\nimport {nodeChildrenAsMap, TreeNode} from '../utils/tree';\n\nexport class CanActivate {\n

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readonly route: ActivatedRouteSnapshot;\n constructor(public path: ActivatedRouteSnapshot[]) {\n this.route = this.path[this.path.length - 1];\n }\n}\n\nexport class CanDeactivate {\n constructor(public component: Object|null, public route:

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  ActivatedRouteSnapshot) {}
}\n\nexport declare type Checks = {\n  canDeactivateChecks: CanDeactivate[],\n  canActivateChecks: CanActivate[],\n};\n\nexport function getAllRouteGuards(\n  future: RouterStateSnapshot,\n  curr: RouterStateSnapshot,\n  parentContexts: ChildrenOutletContexts) {\n  const futureRoot = future._root;\n  const currRoot = curr ? curr._root : null;\n  return getChildRouteGuards(futureRoot, currRoot, parentContexts, [futureRoot.value]);\n}\n\nexport function getCanActivateChild(p: ActivatedRouteSnapshot):\n  {node: ActivatedRouteSnapshot, guards: any[]}|null {\n  const canActivateChild = p.routeConfig ? p.routeConfig.canActivateChild : null;\n  if (!canActivateChild || canActivateChild.length === 0) return null;\n  return {node: p, guards: canActivateChild};\n}\n\nexport function getTokenOrFunctionIdentity<T>(\n  tokenOrFunction: Function|ProviderToken<T>, injector: Injector): Function|T {\n  const NOT_FOUND = Symbol();\n  const result = injector.get<T|Symbol>(tokenOrFunction, NOT_FOUND);\n  if (result === NOT_FOUND) {\n    if (typeof tokenOrFunction === 'function' && !isInjectable(tokenOrFunction)) {\n      // We think the token is just a function so return it as-is\n      return tokenOrFunction;\n    } else {\n      // This will throw the not found error\n      return injector.get<T>(tokenOrFunction);\n    }\n  }\n  return result as T;\n}\n\nfunction getChildRouteGuards(\n  futureNode: TreeNode<ActivatedRouteSnapshot>, currNode: TreeNode<ActivatedRouteSnapshot>|null,\n  contexts: ChildrenOutletContexts|null, futurePath: ActivatedRouteSnapshot[], checks: Checks = {\n    canDeactivateChecks: [],\n    canActivateChecks: []\n }): Checks {\n  const prevChildren = nodeChildrenAsMap(currNode);\n  // Process the children of the future route\n  futureNode.children.forEach(c => {\n    getRouteGuards(c, prevChildren[c.value.outlet], contexts, futurePath.concat([c.value]), checks);\n    delete prevChildren[c.value.outlet];\n  });\n  // Process any children left from the current route (not active for the future route)\n  forEach(\n    prevChildren,\n    (v: TreeNode<ActivatedRouteSnapshot>, k: string) =>\n      deactivateRouteAndItsChildren(v, contexts!.getContext(k), checks);\n  );\n  return checks;\n}\n\nfunction getRouteGuards(\n  futureNode: TreeNode<ActivatedRouteSnapshot>, currNode: TreeNode<ActivatedRouteSnapshot>,\n  parentContexts: ChildrenOutletContexts|null, futurePath: ActivatedRouteSnapshot[],\n  checks: Checks = {\n    canDeactivateChecks: [],\n    canActivateChecks: []\n }): Checks {\n  const future = futureNode.value;\n  const curr = currNode ? currNode.value : null;\n  const context = parentContexts ? parentContexts.getContext(futureNode.value.outlet) : null;\n  // reusing the node\n  if (curr && future.routeConfig === curr.routeConfig) {\n    const shouldRun =\n      shouldRunGuardsAndResolvers(curr, future, future.routeConfig!.runGuardsAndResolvers);\n    if (shouldRun) {\n      checks.canActivateChecks.push(new CanActivate(futurePath));\n    } else {\n      // we need to set the data\n      future.data = curr.data;\n      future._resolvedData = curr._resolvedData;\n    }\n  }\n  // If we have a component, we need to go through an outlet.\n  if (future.component) {\n    getChildRouteGuards(\n      futureNode, currNode, context ? context.children : null, futurePath, checks);\n  }\n  // if we have a componentless route, we recurse but keep the same outlet map.\n  } else {\n    getChildRouteGuards(futureNode, currNode, parentContexts, futurePath, checks);\n  }\n  if (shouldRun && context && context.outlet && context.outlet.isActive) {\n    checks.canDeactivateChecks.push(new CanDeactivate(context.outlet.component, curr));\n  }\n  } else {\n    if (curr) {\n      deactivateRouteAndItsChildren(currNode, context, checks);\n    }\n    checks.canActivateChecks.push(new CanActivate(futurePath));\n  }\n  // If we have a component, we need to go through an outlet.\n  if (future.component) {\n    getChildRouteGuards(futureNode, null, context ? context.children : null, futurePath, checks);\n  }\n  // if we have a componentless route, we recurse but keep the same outlet map.\n  } else {\n    getChildRouteGuards(futureNode, null, parentContexts, futurePath, checks);\n  }\n}\n\nreturn checks;\n}\n\nfunction shouldRunGuardsAndResolvers(\n  curr: ActivatedRouteSnapshot, future: ActivatedRouteSnapshot,\n  mode: RunGuardsAndResolvers|undefined): boolean {\n  if (typeof mode === 'function') {\n    return mode(curr, future);\n  }\n  switch (mode) {\n    case 'pathParamsChange':\n      return
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!equalPath(curr.url, future.url);\n\n case 'pathParamsOrQueryParamsChange':\n return !equalPath(curr.url,
future.url) ||\n !shallowEqual(curr.queryParams, future.queryParams);\n\n case 'always':\n return true;\n\n
case 'paramsOrQueryParamsChange':\n return !equalParamsAndUrlSegments(curr, future)
||\n !shallowEqual(curr.queryParams, future.queryParams);\n\n case 'paramsChange':\n default:\n return
!equalParamsAndUrlSegments(curr, future);\n } }\n\nfunction deactivateRouteAndItsChildren(\n route:
TreeNode<ActivatedRouteSnapshot>, context: OutletContext|null, checks: Checks): void {\n const children =
nodeChildrenAsMap(route);\n const r = route.value;\n\n forEach(children, (node:
TreeNode<ActivatedRouteSnapshot>, childName: string) => {\n if (!r.component) {\n
deactivateRouteAndItsChildren(node, context, checks);\n } else if (context) {\n
deactivateRouteAndItsChildren(node, context.children.getContext(childName), checks);\n } else {\n
deactivateRouteAndItsChildren(node, null, checks);\n } }\n });\n\n if (!r.component) {\n
checks.canDeactivateChecks.push(new CanDeactivate(null, r));\n } else if (context && context.outlet &&
context.outlet.isActivated) {\n checks.canDeactivateChecks.push(new CanDeactivate(context.outlet.component,
r));\n } else {\n checks.canDeactivateChecks.push(new CanDeactivate(null, r));\n } }\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {EmptyError} from
'rxjs';\n\nimport {CanActivate, CanActivateChild, CanDeactivate, CanLoad, CanMatch} from './models';\n\nimport
{NAVIGATION_CANCELING_ERROR, NavigationCancelingError, RedirectingNavigationCancelingError} from
'./navigation_canceling_error';\n\nimport {isUrlTree} from './url_tree';\n\n/**\n * Simple function check, but generic
so type inference will flow. Example:\n *\n * function product(a: number, b: number) {\n * return a * b;\n * }\n *\n * if (isFunction<product>(fn)) {\n * return fn(1, 2);\n * } else {\n * throw `Must provide the `product`
function`;\n * }\n */\n\nexport function isFunction<T>(v: any): v is T {\n return typeof v ===
'function';\n }\n\nexport
function isBoolean(v: any): v is boolean {\n return typeof v === 'boolean';\n }\n\nexport function isCanLoad(guard:
any): guard is CanLoad {\n return guard && isFunction<CanLoad>(guard.canLoad);\n }\n\nexport function
isCanActivate(guard: any): guard is CanActivate {\n return guard &&
isFunction<CanActivate>(guard.canActivate);\n }\n\nexport function isCanActivateChild(guard: any): guard is
CanActivateChild {\n return guard && isFunction<CanActivateChild>(guard.canActivateChild);\n }\n\nexport
function isCanDeactivate<T>(guard: any): guard is CanDeactivate<T> {\n return guard &&
isFunction<CanDeactivate<T>>(guard.canDeactivate);\n }\n\nexport function isCanMatch(guard: any): guard is
CanMatch {\n return guard && isFunction<CanMatch>(guard.canMatch);\n }\n\nexport function
isRedirectingNavigationCancelingError(\n error: unknown|\n RedirectingNavigationCancelingError): error is
RedirectingNavigationCancelingError {\n return isNavigationCancelingError(error) && isUrlTree((error
as any).url);\n }\n\nexport function isNavigationCancelingError(error: unknown): error is NavigationCancelingError
{\n return error && (error as any)[NAVIGATION_CANCELING_ERROR];\n }\n\nexport function
isEmptyError(e: Error): e is EmptyError {\n return e instanceof EmptyError || e?.name ===
'EmptyError';\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {combineLatest, Observable, OperatorFunction} from 'rxjs';\n\nimport {filter, map, scan, startWith,
switchMap, take} from 'rxjs/operators';\n\nimport {isUrlTree, UrlTree} from './url_tree';\n\nconst
INITIAL_VALUE = Symbol('INITIAL_VALUE');\ndeclare type INTERIM_VALUES = typeof INITIAL_VALUE
| boolean | UrlTree;\n\nexport function prioritizedGuardValue():\n
OperatorFunction<Observable<boolean|UrlTree>[], boolean|UrlTree> {\n return switchMap(obs =>
{\n return combineLatest(obs.map(o => o.pipe(take(1), startWith(INITIAL_VALUE as
INTERIM_VALUES))))\n .pipe(\n map((results: INTERIM_VALUES[]) => {\n for (const result
of results) {\n if (result === true) {\n // If result is true, check the next one\n
continue;\n } else if (result === INITIAL_VALUE) {\n // If guard has not finished, we need to
stop processing.\n return INITIAL_VALUE;\n } else if (result === false || result instanceof

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UrlTree) {\n          // Result finished and was not true. Return the result.\n          // Note that we only allow
false/UrlTree. Other values are considered invalid and\n          // ignored.\n          return result;\n
}\n      }\n      // Everything resolved to true. Return true.\n      return true;\n      },\n
filter((item):
item is boolean|UrlTree => item !== INITIAL_VALUE),\n      take(1),\n      );\n  });\n  }"}\n  "/**\n  * @license\n  * Copyright Google LLC All Rights Reserved.\n  * Use of this source code is governed by an MIT-style license
that can be\n  * found in the LICENSE file at https://angular.io/license\n  */\n  import {EnvironmentInjector,
ProviderToken} from '@angular/core';\n  import {concat, defer, from, MonoTypeOperatorFunction, Observable, of,
OperatorFunction, pipe} from 'rxjs';\n  import {concatMap, first, map, mergeMap, tap} from
'rxjs/operators';\n  import {ActivationStart, ChildActivationStart, Event} from './events';\n  import
{CanActivateChild, CanActivateChildFn, CanActivateFn, Route} from './models';\n  import
{redirectingNavigationError} from './navigation_canceling_error';\n  import {NavigationTransition} from
'./router';\n  import {ActivatedRouteSnapshot, RouterStateSnapshot} from './router_state';\n  import {isUrlTree,
UrlSegment, UrlSerializer, UrlTree} from './url_tree';\n  import
{wrapIntoObservable} from './utils/collection';\n  import {getClosestRouteInjector} from './utils/config';\n  import
{CanActivate, CanDeactivate, getCanActivateChild, getTokenOrFunctionIdentity} from
'./utils/preactivation';\n  import {isBoolean, isCanActivate, isCanActivateChild, isCanDeactivate, isCanLoad,
isCanMatch} from './utils/type_guards';\n  import {prioritizedGuardValue} from
'./prioritized_guard_value';\n  \n  export function checkGuards(injector: EnvironmentInjector, forwardEvent?: (evt:
Event) => void):\n    MonoTypeOperatorFunction<NavigationTransition> {\n    return mergeMap(t => {\n    const
{targetSnapshot, currentSnapshot, guards: {canActivateChecks, canDeactivateChecks}} = t;\n    if
(canDeactivateChecks.length === 0 && canActivateChecks.length === 0) {\n    return of({...t, guardsResult:
true});\n    }\n    \n    return runCanDeactivateChecks(canDeactivateChecks, targetSnapshot!, currentSnapshot,
injector)\n    .pipe(\n    mergeMap(canDeactivate => {\n
return canDeactivate && isBoolean(canDeactivate) ?\n    runCanActivateChecks(targetSnapshot!,
canActivateChecks, injector, forwardEvent) :\n    of(canDeactivate);\n    }),\n    map(guardsResult
=> ({...t, guardsResult}));\n    });\n    \n    function runCanDeactivateChecks(\n    checks: CanDeactivate[], futureRSS:
RouterStateSnapshot, currRSS: RouterStateSnapshot,\n    injector: EnvironmentInjector) {\n    return
from(checks).pipe(\n    mergeMap(\n    check => runCanDeactivate(check.component, check.route, currRSS,
futureRSS, injector)),\n    first(result => {\n    return result !== true;\n    }, true as boolean |
UrlTree));\n    \n    function runCanActivateChecks(\n    futureSnapshot: RouterStateSnapshot, checks: CanActivate[],
injector: EnvironmentInjector,\n    forwardEvent?: (evt: Event) => void) {\n    return from(checks).pipe(\n
concatMap((check: CanActivate) => {\n    return concat(\n    fireChildActivationStart(check.route.parent,
forwardEvent),\n    fireActivationStart(check.route, forwardEvent),\n
runCanActivateChild(futureSnapshot, check.path, injector),\n    runCanActivate(futureSnapshot, check.route,
injector));\n    }),\n    first(result => {\n    return result !== true;\n    }, true as boolean | UrlTree));\n    \n    /**\n    * This should fire off `ActivationStart` events for each route being activated at this\n    * level.\n    * In other words, if you're activating `a` and `b` below, `path` will contain the\n    * `ActivatedRouteSnapshot`s for both and we will fire
`ActivationStart` for both. Always\n    * return\n    * `true` so checks continue to run.\n    */\n    function
fireActivationStart(\n    snapshot: ActivatedRouteSnapshot|null,\n    forwardEvent?: (evt: Event) => void):
Observable<boolean> {\n    if (snapshot !== null && forwardEvent) {\n    forwardEvent(new
ActivationStart(snapshot));\n    }\n    return of(true);\n    }\n    \n    /**\n    * This should fire off `ChildActivationStart`
events for each route being activated at this\n    * level.\n    * In other words, if you're activating `a` and `b` below,
`path` will contain the\n    * `ActivatedRouteSnapshot`s for both and we will fire `ChildActivationStart` for both.
Always\n    * return\n    * `true` so checks continue to run.\n    */\n    function fireChildActivationStart(\n    snapshot:
ActivatedRouteSnapshot|null,\n    forwardEvent?: (evt: Event) => void): Observable<boolean> {\n    if (snapshot !==
null && forwardEvent) {\n    forwardEvent(new ChildActivationStart(snapshot));\n    }\n    return
of(true);\n    }\n    \n    function runCanActivate(\n    futureRSS: RouterStateSnapshot, futureARS:

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ActivatedRouteSnapshot,\n injector: EnvironmentInjector): Observable<boolean|UrlTree> {\n const canActivate
= futureARS.routeConfig ? futureARS.routeConfig.canActivate : null;\n if (!canActivate || canActivate.length ===
0) return of(true);\n\n const canActivateObservables =\n canActivate.map((canActivate:
CanActivateFn|ProviderToken<unknown>)
=> {\n return defer(() => {\n const closestInjector = getClosestRouteInjector(futureARS) ?? injector;\n
const guard = getTokenOrFunctionIdentity<CanActivate>(canActivate, closestInjector);\n const guardVal =
isCanActivate(guard) ?\n guard.canActivate(futureARS, futureRSS) :\n closestInjector.runInContext(() => (guard as CanActivateFn)(futureARS, futureRSS));\n return
wrapIntoObservable(guardVal).pipe(first());\n });\n });\n return
of(canActivateObservables).pipe(prioritizedGuardValue());\n}\n\nfunction runCanActivateChild(\n futureRSS:
RouterStateSnapshot, path: ActivatedRouteSnapshot[],\n injector: EnvironmentInjector):
Observable<boolean|UrlTree> {\n const futureARS = path[path.length - 1];\n\n const canActivateChildGuards =
path.slice(0, path.length - 1)\n .reverse()\n .map(p =>
getCanActivateChild(p))\n
.filter(_ => _ !== null);\n\n const canActivateChildGuardsMapped =
canActivateChildGuards.map((d: any) => {\n return defer(() => {\n const guardsMapped =\n d.guards.map((canActivateChild: CanActivateChildFn|ProviderToken<unknown>) => {\n const
closestInjector = getClosestRouteInjector(d.node) ?? injector;\n const guard =\n getTokenOrFunctionIdentity<CanActivateChild>(canActivateChild, closestInjector);\n const guardVal =
isCanActivateChild(guard) ?\n guard.canActivateChild(futureARS, futureRSS) :\n closestInjector.runInContext(() => guard(futureARS, futureRSS));\n return
wrapIntoObservable(guardVal).pipe(first());\n });\n return
of(guardsMapped).pipe(prioritizedGuardValue());\n });\n });\n return
of(canActivateChildGuardsMapped).pipe(prioritizedGuardValue());\n}\n\nfunction runCanDeactivate(\n
component: Object|null, currARS: ActivatedRouteSnapshot,
currRSS: RouterStateSnapshot,\n futureRSS: RouterStateSnapshot, injector: EnvironmentInjector):
Observable<boolean|UrlTree> {\n const canDeactivate = currARS && currARS.routeConfig ?
currARS.routeConfig.canDeactivate : null;\n if (!canDeactivate || canDeactivate.length === 0) return of(true);\n
const canDeactivateObservables = canDeactivate.map((c: any) => {\n const closestInjector =
getClosestRouteInjector(currARS) ?? injector;\n const guard = getTokenOrFunctionIdentity<any>(c,
closestInjector);\n const guardVal = isCanDeactivate(guard) ?\n guard.canDeactivate(component, currARS,
currRSS, futureRSS) :\n closestInjector.runInContext<boolean|UrlTree>(\n () => guard(component,
currARS, currRSS, futureRSS));\n return wrapIntoObservable(guardVal).pipe(first());\n });\n return
of(canDeactivateObservables).pipe(prioritizedGuardValue());\n}\n\nexport function runCanLoadGuards(\n
injector: EnvironmentInjector, route: Route, segments:
UrlSegment[],\n urlSerializer: UrlSerializer): Observable<boolean> {\n const canLoad = route.canLoad;\n if
(canLoad === undefined || canLoad.length === 0) {\n return of(true);\n }\n\n const canLoadObservables =
canLoad.map((injectionToken: any) => {\n const guard = getTokenOrFunctionIdentity<any>(injectionToken,
injector);\n const guardVal = isCanLoad(guard) ?\n guard.canLoad(route, segments) :\n injector.runInContext<boolean|UrlTree>(() => guard(route, segments));\n return wrapIntoObservable(guardVal);\n
});\n\n return of(canLoadObservables)\n .pipe(\n prioritizedGuardValue(),\n
redirectIfUrlTree(urlSerializer),\n );\n}\n\nfunction redirectIfUrlTree(urlSerializer: UrlSerializer):\n
OperatorFunction<UrlTree|boolean, boolean> {\n return pipe(\n tap((result: UrlTree|boolean) => {\n if
(!isUrlTree(result)) return;\n\n throw redirectingNavigationError(urlSerializer, result);\n })),\n map(result
=> result === true),\n );\n}\n\nexport function runCanMatchGuards(\n injector: EnvironmentInjector, route:
Route, segments: UrlSegment[],\n urlSerializer: UrlSerializer): Observable<boolean> {\n const canMatch =
route.canMatch;\n if (!canMatch || canMatch.length === 0) return of(true);\n\n const canMatchObservables =
canMatch.map(injectionToken => {\n const guard = getTokenOrFunctionIdentity(injectionToken, injector);\n

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const guardVal = isCanMatch(guard) ?\n    guard.canMatch(route, segments) :\ninjector.runInContext<boolean|UrlTree>(() => guard(route, segments));\n return wrapIntoObservable(guardVal);\n});\n\n return of(canMatchObservables)\n .pipe(\n    prioritizedGuardValue(),\n    redirectIfUrlTree(urlSerializer),\n    );\n}\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n\n*/\n\nimport {EnvironmentInjector, Injector} from '@angular/core';\nimport {Observable, of} from 'rxjs';\nimport {map} from 'rxjs/operators';\nimport {Route} from './models';\nimport {runCanMatchGuards} from './operators/check_guards';\nimport {defaultUrlMatcher, PRIMARY_OUTLET} from './shared';\nimport {UrlSegment, UrlSegmentGroup, UrlSerializer} from './url_tree';\nimport {forEach} from './collection';\nimport {getOrCreateRouteInjectorIfNeeded, getOutlet} from './config';\n\nexport interface MatchResult {\n  matched: boolean;\n  consumedSegments: UrlSegment[];\n  remainingSegments: UrlSegment[];\n  parameters: {[k: string]: string};\n  positionalParamSegments: {[k: string]: UrlSegment};\n}\n\nconst noMatch: MatchResult = {\n  matched: false,\n  consumedSegments: [],\n  remainingSegments: [],\n  parameters: {},\n  positionalParamSegments: {};\n}\n\nexport function matchWithChecks(\n  segmentGroup: UrlSegmentGroup, route: Route, segments: UrlSegment[],\n  injector: EnvironmentInjector, urlSerializer: UrlSerializer): Observable<MatchResult> {\n  const result = match(segmentGroup, route, segments);\n  if (!result.matched) {\n    return of(result);\n  }\n  // Only create the Route's `EnvironmentInjector` if it matches the attempted\n  // navigation\n  injector = getOrCreateRouteInjectorIfNeeded(route, injector);\n  return runCanMatchGuards(injector, route, segments, urlSerializer)\n    .pipe(\n      map((v) => v === true ? result : {...noMatch}),\n    );\n}\n\nexport function match(\n  segmentGroup: UrlSegmentGroup, route: Route, segments: UrlSegment[]): MatchResult {\n  if (route.path === "") {\n    if (route.pathMatch === 'full' && (segmentGroup.hasChildren() || segments.length > 0)) {\n      return {...noMatch};\n    }\n    return {\n      matched: true,\n      consumedSegments: [],\n      remainingSegments: segments,\n      parameters: {},\n      positionalParamSegments: {};\n    };\n  }\n  const matcher = route.matcher || defaultUrlMatcher;\n  const res = matcher(segments, segmentGroup, route);\n  if (!res) return {...noMatch};\n  const posParams: {[n: string]: string} = {};\n  forEach(res.posParams!, (v: UrlSegment, k: string) => {\n    posParams[k] = v.path;\n  });\n  const parameters = res.consumed.length > 0 ?\n    {...posParams, ...res.consumed[res.consumed.length - 1].parameters} :\n    posParams;\n  return {\n    matched: true,\n    consumedSegments: res.consumed,\n    remainingSegments: segments.slice(res.consumed.length),\n    // TODO(atscott): investigate combining parameters and positionalParamSegments\n    parameters,\n    positionalParamSegments: res.posParams ?? {};\n  }\n}\n\nexport function split(\n  segmentGroup: UrlSegmentGroup, consumedSegments: UrlSegment[], slicedSegments: UrlSegment[],\n  config: Route[], relativeLinkResolution: 'legacy'|'corrected' = 'corrected') {\n  if (slicedSegments.length > 0 &&\n    !containsEmptyPathMatchesWithNamedOutlets(segmentGroup, slicedSegments, config))\n    {\n      const s = new UrlSegmentGroup(\n        consumedSegments,\n        createChildrenForEmptyPaths(\n          segmentGroup, consumedSegments, config,\n            new UrlSegmentGroup(slicedSegments, segmentGroup.children)),\n        s._sourceSegment = segmentGroup;\n        s._segmentIndexShift = consumedSegments.length;\n        return {segmentGroup: s, slicedSegments: []};\n    }\n    if (slicedSegments.length === 0 &&\n    !containsEmptyPathMatches(segmentGroup, slicedSegments, config))\n    {\n      const s = new UrlSegmentGroup(\n        segmentGroup.segments,\n        addEmptyPathsToChildrenIfNeeded(\n          segmentGroup, consumedSegments, slicedSegments, config, segmentGroup.children,\n            relativeLinkResolution)),\n        s._sourceSegment = segmentGroup;\n        s._segmentIndexShift = consumedSegments.length;\n        return {segmentGroup: s, slicedSegments};\n    }\n    const s = new UrlSegmentGroup(segmentGroup.segments, segmentGroup.children);\n    s._sourceSegment = segmentGroup;\n    s._segmentIndexShift = consumedSegments.length;\n    return {segmentGroup: s, slicedSegments};\n  }\n}\n\nfunction addEmptyPathsToChildrenIfNeeded(\n  segmentGroup: UrlSegmentGroup, consumedSegments: UrlSegment[], slicedSegments: UrlSegment[],\n  routes: Route[], children: {[name: string]: UrlSegmentGroup},\n
```

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relativeLinkResolution: 'legacy'|'corrected'): {[name: string]: UrlSegmentGroup} {\n  const res: {[name: string]:
UrlSegmentGroup} = {};\n  for (const r of routes) {\n    if (emptyPathMatch(segmentGroup, slicedSegments, r) &&
!children[getOutlet(r)]) {\n      const s = new UrlSegmentGroup([], {});\n      s._sourceSegment = segmentGroup;\n      if (relativeLinkResolution === 'legacy') {\n        s._segmentIndexShift = segmentGroup.segments.length;\n        if
(typeof ngDevMode === 'undefined' || !ngDevMode) {\n          s._segmentIndexShiftCorrected =
consumedSegments.length;\n        }\n      } else {\n        s._segmentIndexShift = consumedSegments.length;\n      }\n      res[getOutlet(r)]
= s;\n    }\n  }\n  return {...children, ...res};\n}\n\nfunction createChildrenForEmptyPaths(\n  segmentGroup:
UrlSegmentGroup, consumedSegments: UrlSegment[], routes: Route[],\n  primarySegment: UrlSegmentGroup):
{[name: string]: UrlSegmentGroup} {\n  const res: {[name: string]: UrlSegmentGroup} = {};\n  res[PRIMARY_OUTLET] = primarySegment;\n  primarySegment._sourceSegment = segmentGroup;\n  primarySegment._segmentIndexShift = consumedSegments.length;\n  for (const r of routes) {\n    if (r.path === "
&& getOutlet(r) !== PRIMARY_OUTLET) {\n      const s = new UrlSegmentGroup([], {});\n      s._sourceSegment
= segmentGroup;\n      s._segmentIndexShift = consumedSegments.length;\n      res[getOutlet(r)] = s;\n    }\n  }\n  return res;\n}\n\nfunction containsEmptyPathMatchesWithNamedOutlets(\n  segmentGroup: UrlSegmentGroup,
slicedSegments: UrlSegment[], routes: Route[]): boolean {\n  return routes.some(\n    r =>
emptyPathMatch(segmentGroup, slicedSegments, r) &&
getOutlet(r) !== PRIMARY_OUTLET);\n}\n\nfunction containsEmptyPathMatches(\n  segmentGroup:
UrlSegmentGroup, slicedSegments: UrlSegment[], routes: Route[]): boolean {\n  return routes.some(r =>
emptyPathMatch(segmentGroup, slicedSegments, r));\n}\n\nfunction emptyPathMatch(\n  segmentGroup:
UrlSegmentGroup, slicedSegments: UrlSegment[], r: Route): boolean {\n  if ((segmentGroup.hasChildren() ||
slicedSegments.length > 0) && r.pathMatch === 'full') {\n    return false;\n  }\n  return r.path === ";\n}\n\n/*\n * Determines if `route` is a path match for the `rawSegment`, `segments`, and `outlet` without\n * verifying that its
children are a full match for the remainder of the `rawSegment` children as\n * well.\n */\nexport function
isImmediateMatch(\n  route: Route, rawSegment: UrlSegmentGroup, segments: UrlSegment[], outlet: string):
boolean {\n  // We allow matches to empty paths when the outlets differ so we can match a url like `/(b:b)` to\n // a
config like\n // * `{path:
", children: [{path: 'b', outlet: 'b'}]}`\n // or even\n // * `{path: ", outlet: 'a', children: [{path: 'b', outlet: 'b'}]}`\n //\n // The exception here is when the segment outlet is for the primary outlet. This would\n // result in a match inside
the named outlet because all children there are written as primary\n // outlets. So we need to prevent child named
outlet matches in a url like `/b` in a config like\n // * `{path: ", outlet: 'x' children: [{path: 'b'}]}`\n // This should
only match if the url is `/(x:b)`\n if (getOutlet(route) !== outlet &&\n  (outlet === PRIMARY_OUTLET ||
!emptyPathMatch(rawSegment, segments, route))) {\n    return false;\n  }\n  if (route.path === '**') {\n    return
true;\n  }\n  return match(rawSegment, route, segments).matched;\n}\n\nexport function noLeftoversInUrl(\n
segmentGroup: UrlSegmentGroup, segments: UrlSegment[], outlet: string): boolean {\n  return segments.length ===
0 && !segmentGroup.children[outlet];\n}\n\n", /**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport
{EnvironmentInjector, RuntimeError as RuntimeError} from '@angular/core';\nimport {from, Observable, of,
throwError} from 'rxjs';\nimport {catchError, concatMap, first, last, map, mergeMap, scan, switchMap, tap} from
'rxjs/operators';\nimport {RuntimeErrorCode} from './errors';\nimport {NavigationCancellationCode} from
'./events';\nimport {LoadedRouterConfig, Route, Routes} from './models';\nimport {navigationCancelingError} from
'./navigation_canceling_error';\nimport {runCanLoadGuards} from './operators/check_guards';\nimport
{RouterConfigLoader} from './router_config_loader';\nimport {Params, PRIMARY_OUTLET} from
'./shared';\nimport {createRoot, squashSegmentGroup, UrlSegment, UrlSegmentGroup, UrlSerializer, UrlTree} from
'./url_tree';\nimport {forEach} from './utils/collection';\nimport
{getOrCreateRouteInjectorIfNeeded, getOutlet, sortByMatchingOutlets} from './utils/config';\nimport
{isImmediateMatch, match, matchWithChecks, noLeftoversInUrl, split} from './utils/config_matching';\nimport

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{isEmptyError} from './utils/type_guards';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
ngDevMode;\n\nclass NoMatch {\n  public segmentGroup: UrlSegmentGroup|null;\n\n  constructor(segmentGroup?: UrlSegmentGroup) {\n    this.segmentGroup = segmentGroup || null;\n  }\n}\n\nclass
AbsoluteRedirect {\n  constructor(public urlTree: UrlTree) {}\n}\n\nfunction noMatch(segmentGroup:
UrlSegmentGroup): Observable<UrlSegmentGroup> {\n  return throwError(new
NoMatch(segmentGroup));\n}\n\nfunction absoluteRedirect(newTree: UrlTree): Observable<any> {\n  return
throwError(new AbsoluteRedirect(newTree));\n}\n\nfunction namedOutletsRedirect(redirectTo: string):
Observable<any> {\n  return throwError(new RuntimeError(\n
RuntimeErrorCode.NAMED_OUTLET_REDIRECT,\n
  NG_DEV_MODE &&\n    `Only absolute redirects can have named outlets. redirectTo:
'${redirectTo}'));\n}\n\nfunction canLoadFails(route: Route): Observable<LoadedRouterConfig> {\n  return
throwError(navigationCancelingError(\n  NG_DEV_MODE &&\n    `Cannot load children because the guard
of the route \"path: '${\n    route.path}'\" returned false`,\n
  NavigationCancellationCode.GuardRejected));\n}\n\n/**\n * Returns the `UrlTree` with the redirection applied.\n
*\n * Lazy modules are loaded along the way.\n */\nexport function applyRedirects(\n  injector:
EnvironmentInjector, configLoader: RouterConfigLoader, urlSerializer: UrlSerializer,\n  urlTree: UrlTree, config:
Routes): Observable<UrlTree> {\n  return new ApplyRedirects(injector, configLoader, urlSerializer, urlTree,
config).apply();\n}\n\nclass ApplyRedirects {\n  private allowRedirects: boolean = true;\n\n  constructor(\n
private injector: EnvironmentInjector, private configLoader: RouterConfigLoader,\n
  private urlSerializer: UrlSerializer, private urlTree: UrlTree, private config: Routes) {\n\n  apply():
Observable<UrlTree> {\n    const splitGroup = split(this.urlTree.root, [], [], this.config).segmentGroup;\n    //
TODO(atscott): creating a new segment removes the _sourceSegment _segmentIndexShift, which is\n    // only
necessary to prevent failures in tests which assert exact object matches. The `split` is\n    // now shared between
`applyRedirects` and `recognize` but only the `recognize` step needs these\n    // properties. Before the
implementations were merged, the `applyRedirects` would not assign\n    // them. We should be able to remove this
logic as a \"breaking change\" but should do some more\n    // investigation into the failures first.\n    const
rootSegmentGroup = new UrlSegmentGroup(splitGroup.segments, splitGroup.children);\n\n    const expanded$ =\n      this.expandSegmentGroup(this.injector, this.config, rootSegmentGroup, PRIMARY_OUTLET);\n\n    const urlTrees$ = expanded$.pipe(map((rootSegmentGroup: UrlSegmentGroup) => {\n    return
this.createUrlTree(\n      squashSegmentGroup(rootSegmentGroup), this.urlTree.queryParams,\n
this.urlTree.fragment);\n    }));\n    return urlTrees$.pipe(catchError((e: any) => {\n    if (e instanceof
AbsoluteRedirect) {\n      // After an absolute redirect we do not apply any more redirects!\n      // If this
implementation changes, update the documentation note in `redirectTo`.\n      this.allowRedirects = false;\n      //
we need to run matching, so we can fetch all lazy-loaded modules\n      return this.match(e.urlTree);\n    }\n\n    if (e instanceof NoMatch) {\n      throw this.noMatchError(e);\n    }\n\n    throw e;\n    }));\n    }\n\n    private
match(tree: UrlTree): Observable<UrlTree> {\n      const expanded$ =\n        this.expandSegmentGroup(this.injector,
this.config, tree.root, PRIMARY_OUTLET);\n      const mapped$ = expanded$.pipe(map((rootSegmentGroup:
UrlSegmentGroup)
=> {\n        return this.createUrlTree(\n          squashSegmentGroup(rootSegmentGroup), tree.queryParams,\n
tree.fragment);\n        }));\n      return mapped$.pipe(catchError((e: any): Observable<UrlTree> => {\n    if (e
instanceof NoMatch) {\n      throw this.noMatchError(e);\n    }\n\n    throw e;\n    }));\n    }\n\n    private
noMatchError(e: NoMatch): any {\n      return new RuntimeError(\n        RuntimeErrorCode.NO_MATCH,\n
        NG_DEV_MODE && `Cannot match any routes. URL Segment: '${e.segmentGroup}');\n    }\n\n    private
createUrlTree(rootCandidate: UrlSegmentGroup, queryParams: Params, fragment: string|null): UrlTree {\n      const
root = createRoot(rootCandidate);\n      return new UrlTree(root, queryParams, fragment);\n    }\n\n    private
expandSegmentGroup(\n      injector: EnvironmentInjector, routes: Route[], segmentGroup: UrlSegmentGroup,\n
      outlet: string): Observable<UrlSegmentGroup> {\n      if (segmentGroup.segments.length === 0 &&
segmentGroup.hasChildren())

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    {\n    return this.expandChildren(injector, routes, segmentGroup)\n        .pipe(map((children: any) => new
UrlSegmentGroup([], children));\n    }\n\n    return this.expandSegment(injector, segmentGroup, routes,
segmentGroup.segments, outlet, true);\n    }\n\n    // Recursively expand segment groups for all the child outlets\n
private expandChildren(\n    injector: EnvironmentInjector, routes: Route[],\n    segmentGroup:
UrlSegmentGroup): Observable<{[name: string]: UrlSegmentGroup}> {\n    // Expand outlets one at a time, starting
with the primary outlet. We need to do it this way\n    // because an absolute redirect from the primary outlet takes
precedence.\n    const childOutlets: string[] = [];\n    for (const child of Object.keys(segmentGroup.children)) {\n
if (child === 'primary') {\n        childOutlets.unshift(child);\n    } else {\n        childOutlets.push(child);\n    }\n
}\n\n    return from(childOutlets)\n        .pipe(\n            concatMap(childOutlet
=> {\n                const child = segmentGroup.children[childOutlet];\n                // Sort the routes so routes with outlets
that match the segment appear\n                // first, followed by routes for other outlets, which might match if they have
an\n                // empty path.\n                const sortedRoutes = sortByMatchingOutlets(routes, childOutlet);\n
return this.expandSegmentGroup(injector, sortedRoutes, child, childOutlet)\n                    .pipe(map(s => ({segment:
s, outlet: childOutlet}));\n                },\n                scan(\n                    (children, expandedChild) => {\n
children[expandedChild.outlet] = expandedChild.segment;\n                    return children;\n                },\n                {}
as {[outlet: string]: UrlSegmentGroup}),\n                last(),\n                );\n    }\n\n    private expandSegment(\n    injector:
EnvironmentInjector, segmentGroup: UrlSegmentGroup, routes: Route[],\n    segments: UrlSegment[], outlet:
string,\n    allowRedirects: boolean): Observable<UrlSegmentGroup> {\n    return from(routes).pipe(\n        concatMap(r
=> {\n            const expanded$ = this.expandSegmentAgainstRoute(\n                injector, segmentGroup, routes, r,
segments, outlet, allowRedirects);\n            return expanded$.pipe(catchError((e: any) => {\n                if (e instanceof
NoMatch) {\n                    return of(null);\n                }\n                throw e;\n            }));\n            },\n            first((s): s is
UrlSegmentGroup => !!s), catchError((e: any, _: any) => {\n                if (isEmptyError(e)) {\n                    if
(noLeftoversInUrl(segmentGroup, segments, outlet)) {\n                        return of(new UrlSegmentGroup([], {}));\n                    }\n
return noMatch(segmentGroup);\n                }\n                throw e;\n            }));\n    }\n\n    private
expandSegmentAgainstRoute(\n    injector: EnvironmentInjector, segmentGroup: UrlSegmentGroup, routes:
Route[], route: Route,\n    paths: UrlSegment[], outlet: string,
allowRedirects: boolean): Observable<UrlSegmentGroup> {\n    if (!isImmediateMatch(route, segmentGroup,
paths, outlet)) {\n        return noMatch(segmentGroup);\n    }\n\n    if (route.redirectTo === undefined) {\n        return
this.matchSegmentAgainstRoute(injector, segmentGroup, route, paths, outlet);\n    }\n\n    if (allowRedirects &&
this.allowRedirects) {\n        return this.expandSegmentAgainstRouteUsingRedirect(\n            injector, segmentGroup,
routes, route, paths, outlet);\n    }\n\n    return noMatch(segmentGroup);\n    }\n\n    private
expandSegmentAgainstRouteUsingRedirect(\n    injector: EnvironmentInjector, segmentGroup: UrlSegmentGroup,
routes: Route[], route: Route,\n    segments: UrlSegment[], outlet: string): Observable<UrlSegmentGroup> {\n    if
(route.path === '**') {\n        return this.expandWildcardWithParamsAgainstRouteUsingRedirect(\n            injector,
routes, route, outlet);\n    }\n\n    return this.expandRegularSegmentAgainstRouteUsingRedirect(\n        injector,
segmentGroup, routes, route, segments, outlet);\n    }\n\n    private
expandWildcardWithParamsAgainstRouteUsingRedirect(\n    injector: EnvironmentInjector, routes: Route[],
route: Route,\n    outlet: string): Observable<UrlSegmentGroup> {\n    const newTree =
this.applyRedirectCommands([], route.redirectTo!, {});\n    if (route.redirectTo!.startsWith('/')) {\n        return
absoluteRedirect(newTree);\n    }\n\n    return this.linalizeSegments(route,
newTree).pipe(mergeMap((newSegments: UrlSegment[]) => {\n        const group = new
UrlSegmentGroup(newSegments, {});\n        return this.expandSegment(injector, group, routes, newSegments, outlet,
false);\n    }));\n    }\n\n    private expandRegularSegmentAgainstRouteUsingRedirect(\n    injector:
EnvironmentInjector, segmentGroup: UrlSegmentGroup, routes: Route[], route: Route,\n    segments:
UrlSegment[], outlet: string): Observable<UrlSegmentGroup> {\n    const {matched, consumedSegments,
remainingSegments, positionalParamSegments}

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=|n    match(segmentGroup, route, segments);|n    if (!matched) return noMatch(segmentGroup);|n|n    const
newTree =|n    this.applyRedirectCommands(consumedSegments, route.redirectTo!,
positionalParamSegments);|n    if (route.redirectTo!.startsWith('/')) {|n    return absoluteRedirect(newTree);|n
}|n|n    return this.linalizeSegments(route, newTree).pipe(mergeMap((newSegments: UrlSegment[]) => {|n
return this.expandSegment(|n    injector, segmentGroup, routes, newSegments.concat(remainingSegments),
outlet, false);|n    }));|n    }|n|n    private matchSegmentAgainstRoute(|n    injector: EnvironmentInjector,
rawSegmentGroup: UrlSegmentGroup, route: Route,|n    segments: UrlSegment[], outlet: string):
Observable<UrlSegmentGroup> {|n    if (route.path === '**') {|n    // Only create the Route's
`EnvironmentInjector` if it matches the attempted navigation|n    injector =
getOrCreateRouteInjectorIfNeeded(route, injector);|n    if (route.loadChildren) {|n
const loaded$ = route._loadedRoutes ?|n    of({routes: route._loadedRoutes, injector: route._loadedInjector})
:|n    this.configLoader.loadChildren(injector, route);|n    return loaded$.pipe(map((cfg:
LoadedRouterConfig) => {|n    route._loadedRoutes = cfg.routes;|n    route._loadedInjector = cfg.injector;|n
return new UrlSegmentGroup(segments, {});|n    }));|n    }|n|n    return of(new
UrlSegmentGroup(segments, {}));|n    }|n|n    return matchWithChecks(rawSegmentGroup, route, segments,
injector, this.urlSerializer)|n    .pipe(|n    switchMap(({matched, consumedSegments, remainingSegments})
=> {|n    if (!matched) return noMatch(rawSegmentGroup);|n|n    // If the route has an injector created
from providers, we should start using that.|n    injector = route._injector ?? injector;|n    const
childConfig$ = this.getChildConfig(injector, route, segments);|n|n    return
childConfig$.pipe(mergeMap((routerConfig:
LoadedRouterConfig) => {|n    const childInjector = routerConfig.injector ?? injector;|n    const
childConfig = routerConfig.routes;|n|n    const {segmentGroup: splitSegmentGroup, slicedSegments} =|n
split(rawSegmentGroup, consumedSegments, remainingSegments, childConfig);|n    // See comment
on the other call to `split` about why this is necessary.|n    const segmentGroup =|n    new
UrlSegmentGroup(splitSegmentGroup.segments, splitSegmentGroup.children);|n|n    if
(slicedSegments.length === 0 && segmentGroup.hasChildren()) {|n    const expanded$ =
this.expandChildren(childInjector, childConfig, segmentGroup);|n    return expanded$.pipe(|n
map((children: any) => new UrlSegmentGroup(consumedSegments, children));|n    }|n|n    if
(childConfig.length === 0 && slicedSegments.length
=== 0) {|n    return of(new UrlSegmentGroup(consumedSegments, {}));|n    }|n|n    const
matchedOnOutlet = getOutlet(route) === outlet;|n    const expanded$ = this.expandSegment(|n
childInjector, segmentGroup, childConfig, slicedSegments,|n    matchedOnOutlet ? PRIMARY_OUTLET
: outlet, true);|n    return expanded$.pipe(|n    map((cs: UrlSegmentGroup) => new
UrlSegmentGroup(|n    consumedSegments.concat(cs.segments), cs.children));|n    }));|n
}|n    }|n    }|n|n    private getChildConfig(injector: EnvironmentInjector, route: Route, segments:
UrlSegment[]):|n    Observable<LoadedRouterConfig> {|n    if (route.children) {|n    // The children belong to the
same module|n    return of({routes: route.children, injector});|n    }|n|n    if (route.loadChildren) {|n    // lazy
children belong to the loaded module|n    if
(route._loadedRoutes !== undefined) {|n    return of({routes: route._loadedRoutes, injector:
route._loadedInjector});|n    }|n|n    return runCanLoadGuards(injector, route, segments, this.urlSerializer)|n
.pipe(mergeMap((shouldLoadResult: boolean) => {|n    if (shouldLoadResult) {|n    return
this.configLoader.loadChildren(injector, route)|n    .pipe(tap((cfg: LoadedRouterConfig) => {|n
route._loadedRoutes = cfg.routes;|n    route._loadedInjector = cfg.injector;|n    }));|n    }|n|n
return canLoadFails(route);|n    }));|n    }|n|n    return of({routes: [], injector});|n    }|n|n    private
linalizeSegments(route: Route, urlTree: UrlTree): Observable<UrlSegment[]> {|n    let res: UrlSegment[] = [];|n
let c = urlTree.root;|n    while (true) {|n    res = res.concat(c.segments);|n    if (c.numberOfChildren === 0) {|n
return of(res);|n    }|n|n    if (c.numberOfChildren

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> 1 || !c.children[PRIMARY_OUTLET]) {\n    return namedOutletsRedirect(route.redirectTo!);\n  }\n\n  c =
c.children[PRIMARY_OUTLET];\n  }\n }\n\n private applyRedirectCommands(\n  segments: UrlSegment[],
redirectTo: string, posParams: {[k: string]: UrlSegment}): UrlTree {\n  return this.applyRedirectCreateUrlTree(\n
  redirectTo, this.urlSerializer.parse(redirectTo), segments, posParams);\n  }\n\n private
applyRedirectCreateUrlTree(\n  redirectTo: string, urlTree: UrlTree, segments: UrlSegment[],\n  posParams:
{[k: string]: UrlSegment}): UrlTree {\n  const newRoot = this.createSegmentGroup(redirectTo, urlTree.root,
segments, posParams);\n  return new UrlTree(\n    newRoot, this.createQueryParams(urlTree.queryParams,
this.urlTree.queryParams),\n    urlTree.fragment);\n  }\n\n private createQueryParams(redirectToParams: Params,
actualParams: Params): Params {\n  const res: Params = {};\n  forEach(redirectToParams, (v:
any, k: string) => {\n    const copySourceValue = typeof v === 'string' && v.startsWith(':');\n    if
(copySourceValue) {\n      const sourceName = v.substring(1);\n      res[k] = actualParams[sourceName];\n    }
else {\n      res[k] = v;\n    }\n  });\n  return res;\n  }\n\n private createSegmentGroup(\n  redirectTo: string,
group: UrlSegmentGroup, segments: UrlSegment[],\n  posParams: {[k: string]: UrlSegment}): UrlSegmentGroup
{\n  const updatedSegments = this.createSegments(redirectTo, group.segments, segments, posParams);\n  let
children: {[n: string]: UrlSegmentGroup} = {};\n  forEach(group.children, (child: UrlSegmentGroup, name: string)
=> {\n    children[name] = this.createSegmentGroup(redirectTo, child, segments, posParams);\n  });\n  return
new UrlSegmentGroup(updatedSegments, children);\n  }\n\n private createSegments(\n  redirectTo: string,
redirectToSegments: UrlSegment[], actualSegments: UrlSegment[],\n  posParams: {[k:
string]: UrlSegment}): UrlSegment[] {\n  return redirectToSegments.map(\n    s => s.path.startsWith(':') ?
this.findPosParam(redirectTo, s, posParams) :\n    this.findOrReturn(s, actualSegments));\n  }\n\n private findPosParam(\n  redirectTo: string, redirectToUrlSegment: UrlSegment,\n  posParams: {[k:
string]: UrlSegment}): UrlSegment {\n  const pos = posParams[redirectToUrlSegment.path.substring(1)];\n  if
(!pos)\n    throw new RuntimeError(\n      RuntimeErrorCode.MISSING_REDIRECT,\n      NG_DEV_MODE
&&\n      `Cannot redirect to '${redirectTo}'. Cannot find '${redirectToUrlSegment.path}'`);\n  return pos;\n  }\n\n private findOrReturn(redirectToUrlSegment: UrlSegment, actualSegments: UrlSegment[]): UrlSegment {\n
let idx = 0;\n  for (const s of actualSegments) {\n    if (s.path === redirectToUrlSegment.path) {\n
actualSegments.splice(idx);\n    return s;\n    }\n    idx++;\n  }\n  return redirectToUrlSegment;\n  }\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {EnvironmentInjector} from '@angular/core';\nimport
{MonoTypeOperatorFunction} from 'rxjs';\nimport {map, switchMap} from 'rxjs/operators';\nimport
{applyRedirects as applyRedirectsFn} from './apply_redirects';\nimport {Routes} from './models';\nimport
{NavigationTransition} from './router';\nimport {RouterConfigLoader} from './router_config_loader';\nimport
{UrlSerializer} from './url_tree';\n\nexport function applyRedirects(\n  environmentInjector: EnvironmentInjector,
configLoader: RouterConfigLoader,\n  urlSerializer: UrlSerializer, config: Routes):
MonoTypeOperatorFunction<NavigationTransition> {\n  return switchMap(\n    t =>\n    applyRedirectsFn(environmentInjector, configLoader, urlSerializer, t.extractedUrl,
config)\n    .pipe(map(urlAfterRedirects => ({...t, urlAfterRedirects})))));\n  }\n}\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {EnvironmentInjector, Type,
RuntimeError as RuntimeError} from '@angular/core';\nimport {EmptyError, from, Observable, Observer, of} from
'rxjs';\nimport {catchError, concatMap, defaultIfEmpty, first, last as rxjsLast, map, scan, switchMap, takeWhile}
from 'rxjs/operators';\nimport {RuntimeErrorCode} from './errors';\nimport {Data, ResolveData, Route, Routes}
from './models';\nimport {ActivatedRouteSnapshot, inheritedParamsDataResolve, ParamsInheritanceStrategy,
RouterStateSnapshot} from './router_state';\nimport {PRIMARY_OUTLET} from './shared';\nimport {UrlSegment,
UrlSegmentGroup, UrlSerializer, UrlTree} from './url_tree';\nimport {last} from './utils/collection';\nimport
{getOutlet, sortByMatchingOutlets} from './utils/config';\nimport {isImmediateMatch, matchWithChecks,
noLeftoversInUrl, split} from './utils/config_matching';\nimport {TreeNode} from './utils/tree';\nimport

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{isEmptyError} from './utils/type_guards';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
!!ngDevMode;\n\nclass NoMatch {}\n\nfunction newObservableError(e: unknown):
Observable<RouterStateSnapshot> {\n // TODO(atscott): This pattern is used throughout the router code and can be
`throwError` instead.\n return new Observable<RouterStateSnapshot>((obs: Observer<RouterStateSnapshot>) =>
obs.error(e));\n}\n\nexport function recognize(\n injector: EnvironmentInjector, rootComponentType:
Type<any>|null, config: Routes,\n urlTree: UrlTree, url: string, urlSerializer: UrlSerializer,\n paramsInheritanceStrategy: ParamsInheritanceStrategy = 'emptyOnly',\n relativeLinkResolution:
'legacy'|'corrected' = 'legacy'): Observable<RouterStateSnapshot> {\n return new Recognizer(\n
injector, rootComponentType, config, urlTree, url, paramsInheritanceStrategy,\n
relativeLinkResolution, urlSerializer)\n .recognize()\n .pipe(switchMap(result => {\n if (result === null)
{\n return newObservableError(new NoMatch());\n } else {\n return of(result);\n }\n
}));\n}\n\nexport class Recognizer {\n constructor(\n private injector: EnvironmentInjector, private
rootComponentType: Type<any>|null,\n private config: Routes, private urlTree: UrlTree, private url: string,\n private paramsInheritanceStrategy: ParamsInheritanceStrategy,\n private relativeLinkResolution:
'legacy'|'corrected',\n private readonly urlSerializer: UrlSerializer) {} \n\n recognize():
Observable<RouterStateSnapshot|null> {\n const rootSegmentGroup =\n split(\n this.urlTree.root, [],
[], this.config.filter(c => c.redirectTo === undefined),\n this.relativeLinkResolution)\n
.segmentGroup;\n\n return this.processSegmentGroup(this.injector, this.config, rootSegmentGroup,
PRIMARY_OUTLET)\n .pipe(map(children => {\n if (children === null) {\n return null;\n
}\n\n // Use Object.freeze to prevent readers of the Router state from modifying it outside of a\n //
navigation, resulting in the router being out of sync with the browser.\n const root = new
ActivatedRouteSnapshot(\n [], Object.freeze({}), Object.freeze({...this.urlTree.queryParams}),\n
this.urlTree.fragment, {}, PRIMARY_OUTLET, this.rootComponentType, null,\n this.urlTree.root, -1,
{});\n\n const rootNode = new TreeNode<ActivatedRouteSnapshot>(root, children);\n const routeState =
new RouterStateSnapshot(this.url, rootNode);\n this.inheritParamsAndData(routeState._root);\n return
routeState;\n }));\n }\n\n inheritParamsAndData(routeNode:
TreeNode<ActivatedRouteSnapshot>): void {\n const route = routeNode.value;\n\n const i =
inheritedParamsDataResolve(route, this.paramsInheritanceStrategy);\n route.params = Object.freeze(i.params);\n
route.data = Object.freeze(i.data);\n\n routeNode.children.forEach(n => this.inheritParamsAndData(n));\n }\n\n
processSegmentGroup(\n injector: EnvironmentInjector, config: Route[], segmentGroup: UrlSegmentGroup,\n
outlet: string): Observable<TreeNode<ActivatedRouteSnapshot>[]|null> {\n if (segmentGroup.segments.length
=== 0 && segmentGroup.hasChildren()) {\n return this.processChildren(injector, config, segmentGroup);\n
}\n\n return this.processSegment(injector, config, segmentGroup, segmentGroup.segments, outlet);\n }\n\n /**\n
* Matches every child outlet in the `segmentGroup` to a `Route` in the config. Returns `null` if\n
* we cannot find a match for _any_ of the children.\n
* @param config - The `Routes` to match against\n
* @param
segmentGroup - The `UrlSegmentGroup` whose children need to be matched against the\n
* config.\n
*/\n
processChildren(injector: EnvironmentInjector, config: Route[], segmentGroup: UrlSegmentGroup):\n
Observable<TreeNode<ActivatedRouteSnapshot>[]|null> {\n return from(Object.keys(segmentGroup.children))\n
.pipe(\n concatMap(childOutlet => {\n const child = segmentGroup.children[childOutlet];\n
\n // Sort the config so that routes with outlets that match the one being activated\n // appear first, followed by
routes for other outlets, which might match if they have\n // an empty path.\n const sortedConfig =
sortByMatchingOutlets(config, childOutlet);\n return this.processSegmentGroup(injector, sortedConfig,
child, childOutlet);\n }),\n scan((children, outletChildren) => {\n if (!children ||
!outletChildren) return null;\n children.push(...outletChildren);\n
\n return children;\n }),\n takeWhile(children => children !== null),\n
defaultIfEmpty(null as TreeNode<ActivatedRouteSnapshot>[] | null),\n rxjsLast(),\n map(children =>
{\n if (children === null) return null;\n // Because we may have matched two outlets to the same
empty path segment, we can have\n // multiple activated results for the same outlet. We should merge the

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children of\n          // these results so the final return value is only one `TreeNode` per outlet.\n          const
mergedChildren = mergeEmptyPathMatches(children);\n          if (NG_DEV_MODE) {\n          // This should
really never happen - we are only taking the first match for each\n          // outlet and merge the empty path
matches.\n          checkOutletNameUniqueness(mergedChildren);\n          }\n          sortActivatedRouteSnapshots(mergedChildren);\n
          return mergedChildren;\n          },\n          );\n          }\n          }\n          processSegment(\n          injector: EnvironmentInjector,
routes: Route[], segmentGroup: UrlSegmentGroup,\n          segments: UrlSegment[], outlet: string):
Observable<TreeNode<ActivatedRouteSnapshot>[]|null> {\n          return from(routes).pipe(\n          concatMap(r => {\n
          return this.processSegmentAgainstRoute(\n          r._injector ?? injector, r, segmentGroup, segments,
outlet);\n          })),\n          first((x): x is TreeNode<ActivatedRouteSnapshot>[] => !!(x), catchError(e => {\n          if
(isEmptyError(e)) {\n          if (noLeftoversInUrl(segmentGroup, segments, outlet)) {\n          return of([]);\n
          }\n          return of(null);\n          }\n          throw e;\n          }));\n          }\n          }\n          processSegmentAgainstRoute(\n
injector: EnvironmentInjector, route: Route, rawSegment: UrlSegmentGroup,\n          segments: UrlSegment[], outlet:
string): Observable<TreeNode<ActivatedRouteSnapshot>[]|null>
{\n          if (route.redirectTo || !isImmediateMatch(route, rawSegment, segments, outlet)) return of(null);\n          let
matchResult: Observable<{\n          snapshot: ActivatedRouteSnapshot,\n          consumedSegments: UrlSegment[],\n
remainingSegments: UrlSegment[],\n          }|null>;\n          if (route.path === '**') {\n          const params = segments.length
> 0 ? last(segments)!.parameters : {};\n          const pathIndexShift = getPathIndexShift(rawSegment) +
segments.length;\n          const snapshot = new ActivatedRouteSnapshot(\n          segments, params,
Object.freeze({...this.urlTree.queryParams}), this.urlTree.fragment,\n          getData(route), getOutlet(route),
route.component ?? route._loadedComponent ?? null,\n          route, getSourceSegmentGroup(rawSegment),
pathIndexShift, getResolve(route),\n          // NG_DEV_MODE is used to prevent the getCorrectedPathIndexShift
function from affecting\n          // production bundle size. This value is intended only to surface a
warning to users\n          // depending on `relativeLinkResolution: 'legacy` in dev mode.\n          (NG_DEV_MODE
? getCorrectedPathIndexShift(rawSegment) + segments.length :\n          pathIndexShift));\n          matchResult
= of({\n          snapshot,\n          consumedSegments: [],\n          remainingSegments: [],\n          });\n          } else {\n
matchResult =\n          matchWithChecks(rawSegment, route, segments, injector, this.urlSerializer)\n
.pipe(map(({matched, consumedSegments, remainingSegments, parameters}) => {\n          if (!matched) {\n
          return null;\n          }\n          const pathIndexShift = getPathIndexShift(rawSegment) +
consumedSegments.length;\n          const snapshot = new ActivatedRouteSnapshot(\n
consumedSegments, parameters, Object.freeze({...this.urlTree.queryParams}),\n          this.urlTree.fragment,
getData(route), getOutlet(route),\n          route.component
?? route._loadedComponent ?? null, route,\n          getSourceSegmentGroup(rawSegment), pathIndexShift,
getResolve(route),\n          (NG_DEV_MODE ?\n          getCorrectedPathIndexShift(rawSegment) +
consumedSegments.length :\n          pathIndexShift));\n          return {snapshot, consumedSegments,
remainingSegments};\n          }));\n          }\n          }\n          return matchResult.pipe(switchMap((result) => {\n          if (result ===
null) {\n          return of(null);\n          }\n          const {snapshot, consumedSegments, remainingSegments} = result;\n          //
If the route has an injector created from providers, we should start using that.\n          injector = route._injector ??
injector;\n          const childInjector = route._loadedInjector ?? injector;\n          const childConfig: Route[] =
getChildConfig(route);\n          const {segmentGroup, slicedSegments} = split(\n          rawSegment,
consumedSegments, remainingSegments,\n          // Filter
out routes with redirectTo because we are trying to create activated route\n          // snapshots and don't handle
redirects here. That should have been done in\n          // `applyRedirects`.\n          childConfig.filter(c => c.redirectTo
=== undefined), this.relativeLinkResolution);\n          if (slicedSegments.length === 0 &&
segmentGroup.hasChildren()) {\n          return this.processChildren(childInjector, childConfig,
segmentGroup).pipe(map(children => {\n          if (children === null) {\n          return null;\n          }\n          return
[new TreeNode<ActivatedRouteSnapshot>(snapshot, children);\n          ]));\n          }\n          }\n          if (childConfig.length ===
0 && slicedSegments.length === 0) {\n          return of([new TreeNode<ActivatedRouteSnapshot>(snapshot, [])]);\n

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    }\n\n    const matchedOnOutlet = getOutlet(route) === outlet;\n    // If we matched a config due to empty path
match on a different outlet, we need to\n    // continue passing the current outlet for
the segment rather than switch to PRIMARY.\n    // Note that we switch to primary when we have a match
because outlet configs look like\n    // this: {path: 'a', outlet: 'a', children: [\n    // {path: 'b', component: B},\n    // {path: 'c', component: C},\n    // ]}\n    // Notice that the children of the named outlet are configured with the
primary outlet\n    return this\n        .processSegment(\n            childInjector, childConfig, segmentGroup,
slicedSegments,\n            matchedOnOutlet ? PRIMARY_OUTLET : outlet)\n        .pipe(map(children => {\n
    if (children === null) {\n        return null;\n    }\n    return [new
TreeNode<ActivatedRouteSnapshot>(snapshot, children)];\n    }));\n    });\n    });\n    });\n\n\nfunction
sortActivatedRouteSnapshots(nodes: TreeNode<ActivatedRouteSnapshot>[]): void {\n    nodes.sort((a, b) => {\n    if
(a.value.outlet === PRIMARY_OUTLET) return -1;\n    if (b.value.outlet === PRIMARY_OUTLET) return
1;\n    return a.value.outlet.localeCompare(b.value.outlet);\n    });\n    });\n\n\nfunction getChildConfig(route: Route):
Route[] {\n    if (route.children) {\n    return route.children;\n    }\n\n    if (route.loadChildren) {\n    return
route._loadedRoutes!;\n    }\n\n    return [];\n    }\n\n\nfunction hasEmptyPathConfig(node:
TreeNode<ActivatedRouteSnapshot>) {\n    const config = node.value.routeConfig;\n    return config && config.path
=== '' && config.redirectTo === undefined;\n    }\n\n\n/**\n * Finds `TreeNode`s with matching empty path route
configs and merges them into `TreeNode` with\n * the children from each duplicate. This is necessary because
different outlets can match a\n * single empty path route config and the results need to then be merged.\n
*/\n\nfunction mergeEmptyPathMatches(nodes: Array<TreeNode<ActivatedRouteSnapshot>>):\n
Array<TreeNode<ActivatedRouteSnapshot>> {\n    const result: Array<TreeNode<ActivatedRouteSnapshot>> =
[];\n    // The set of nodes which contain children that were merged
from two duplicate empty path nodes.\n    const mergedNodes: Set<TreeNode<ActivatedRouteSnapshot>> = new
Set();\n\n    for (const node of nodes) {\n    if (!hasEmptyPathConfig(node)) {\n    result.push(node);\n
continue;\n    }\n\n    const duplicateEmptyPathNode =\n        result.find(resultNode => node.value.routeConfig ===
resultNode.value.routeConfig);\n    if (duplicateEmptyPathNode !== undefined) {\n
duplicateEmptyPathNode.children.push(...node.children);\n    mergedNodes.add(duplicateEmptyPathNode);\n    }
else {\n    result.push(node);\n    }\n    }\n    // For each node which has children from multiple sources, we need to
recompute a new `TreeNode`\n    // by also merging those children. This is necessary when there are multiple empty
path configs\n    // in a row. Put another way: whenever we combine children of two nodes, we need to also check\n
    // if any of those children can be combined into a single node as well.\n    for (const mergedNode of mergedNodes)
{\n    const
mergedChildren = mergeEmptyPathMatches(mergedNode.children);\n    result.push(new
TreeNode(mergedNode.value, mergedChildren));\n    }\n    return result.filter(n =>
!mergedNodes.has(n));\n    }\n\n\nfunction checkOutletNameUniqueness(nodes:
TreeNode<ActivatedRouteSnapshot>[]): void {\n    const names: {[k: string]: ActivatedRouteSnapshot} = {};\n
nodes.forEach(n => {\n    const routeWithSameOutletName = names[n.value.outlet];\n    if
(routeWithSameOutletName) {\n    const p = routeWithSameOutletName.url.map(s => s.toString()).join('/');\n
const c = n.value.url.map(s => s.toString()).join('/');\n    throw new RuntimeError(\n
RuntimeErrorCode.TWO_SEGMENTS_WITH_SAME_OUTLET,\n        NG_DEV_MODE && `Two segments
cannot have the same outlet name: '${p}' and '${c}'.`);\n    }\n    names[n.value.outlet] = n.value;\n
});\n    }\n\n\nfunction getSourceSegmentGroup(segmentGroup: UrlSegmentGroup): UrlSegmentGroup {\n    let s =
segmentGroup;\n    while (s._sourceSegment) {\n    s = s._sourceSegment;\n
}\n    return s;\n    }\n\n\nfunction getPathIndexShift(segmentGroup: UrlSegmentGroup): number {\n    let s =
segmentGroup;\n    let res = s._segmentIndexShift ?? 0;\n    while (s._sourceSegment) {\n    s = s._sourceSegment;\n
res += s._segmentIndexShift ?? 0;\n    }\n    return res - 1;\n    }\n\n\nfunction getCorrectedPathIndexShift(segmentGroup:
UrlSegmentGroup): number {\n    let s = segmentGroup;\n    let res = s._segmentIndexShiftCorrected ??
s._segmentIndexShift ?? 0;\n    while (s._sourceSegment) {\n    s = s._sourceSegment;\n    res +=
s._segmentIndexShiftCorrected ?? s._segmentIndexShift ?? 0;\n    }\n    return res - 1;\n    }\n\n\nfunction getData(route:

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Route): Data {\n return route.data || {};\n}\n\nfunction getResolve(route: Route): ResolveData {\n return
route.resolve || {};\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport
{EnvironmentInjector, Type} from '@angular/core';\nimport {MonoTypeOperatorFunction} from 'rxjs';\nimport
{map, mergeMap} from 'rxjs/operators';\nimport {Route} from './models';\nimport {recognize as recognizeFn}
from './recognize';\nimport {NavigationTransition} from './router';\nimport {UrlSerializer} from
'./url_tree';\n\nexport function recognize(\n injector: EnvironmentInjector, rootComponentType: Type<any>|null,
config: Route[],\n serializer: UrlSerializer, paramsInheritanceStrategy: 'emptyOnly'|'always',\n
relativeLinkResolution: 'legacy'|'corrected'): MonoTypeOperatorFunction<NavigationTransition> {\n return
mergeMap(\n t => recognizeFn(\n injector, rootComponentType, config, t.urlAfterRedirects!,\n
serializer.serialize(t.urlAfterRedirects!), serializer, paramsInheritanceStrategy,\n
relativeLinkResolution)\n
.pipe(map(targetSnapshot => ({...t, targetSnapshot})));)\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {EnvironmentInjector, ProviderToken}
from '@angular/core';\nimport {EMPTY, from, MonoTypeOperatorFunction, Observable, of, throwError} from
'rxjs';\nimport {catchError, concatMap, first, map, mapTo, mergeMap, takeLast, tap} from
'rxjs/operators';\nimport {ResolveData, Route} from './models';\nimport {NavigationTransition} from
'./router';\nimport {ActivatedRouteSnapshot, inheritedParamsDataResolve, RouterStateSnapshot} from
'./router_state';\nimport {RouteTitleKey} from './shared';\nimport {wrapIntoObservable} from
'./utils/collection';\nimport {getClosestRouteInjector} from './utils/config';\nimport {getTokenOrFunctionIdentity}
from './utils/preactivation';\nimport {isEmptyError} from './utils/type_guards';\n\nexport function resolveData(\n
paramsInheritanceStrategy: 'emptyOnly'|'always',\n
injector: EnvironmentInjector): MonoTypeOperatorFunction<NavigationTransition> {\n return mergeMap(t =>
{\n const {targetSnapshot, guards: {canActivateChecks}} = t;\n\n if (!canActivateChecks.length) {\n return
of(t);\n }\n\n let canActivateChecksResolved = 0;\n return from(canActivateChecks)\n
.pipe(\n concatMap(\n check =>\n runResolve(check.route, targetSnapshot!,
paramsInheritanceStrategy, injector),\n tap(() => canActivateChecksResolved++),\n
takeLast(1),\n
mergeMap(_ => canActivateChecksResolved === canActivateChecks.length ? of(t) : EMPTY),\n
));\n}\n}\n\nfunction runResolve(\n futureARS: ActivatedRouteSnapshot, futureRSS: RouterStateSnapshot,\n
paramsInheritanceStrategy: 'emptyOnly'|'always', injector: EnvironmentInjector) {\n const config =
futureARS.routeConfig;\n const resolve = futureARS._resolve;\n if (config?.title !== undefined &&
!hasStaticTitle(config))
{\n resolve[RouteTitleKey] = config.title;\n }\n\n return resolveNode(resolve, futureARS, futureRSS,
injector).pipe(map((resolvedData: any) => {\n futureARS._resolvedData = resolvedData;\n futureARS.data =
inheritedParamsDataResolve(futureARS, paramsInheritanceStrategy).resolve;\n if (config &&
hasStaticTitle(config)) {\n futureARS.data[RouteTitleKey] = config.title;\n }\n\n return null;\n
}));\n}\n\nfunction resolveNode(\n resolve: ResolveData, futureARS: ActivatedRouteSnapshot, futureRSS:
RouterStateSnapshot,\n injector: EnvironmentInjector): Observable<any> {\n const keys =
getDataKeys(resolve);\n if (keys.length === 0) {\n return of({});\n }\n\n const data: {[k: string|symbol]: any} =
{};\n return from(keys).pipe(\n mergeMap(\n key => getResolver(resolve[key], futureARS, futureRSS,
injector)\n
.pipe(first(), tap((value: any) => {\n
data[key] = value;\n
}))),\n takeLast(1),\n mapTo(data),\n catchError((e: unknown) => isEmptyError(e as Error) ? EMPTY :
throwError(e)),\n );\n}\n\nfunction getDataKeys(obj: Object): Array<string|symbol> {\n return
[...Object.keys(obj), ...Object.getOwnPropertySymbols(obj)];\n}\n\nfunction getResolver(\n injectionToken:
ProviderToken<any>|Function, futureARS: ActivatedRouteSnapshot,\n futureRSS: RouterStateSnapshot, injector:
EnvironmentInjector): Observable<any> {\n const closestInjector = getClosestRouteInjector(futureARS) ??
injector;\n const resolver = getTokenOrFunctionIdentity(injectionToken, closestInjector);\n const resolverValue =

```

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resolver.resolve ?\n    resolver.resolve(futureARS, futureRSS) :\n    closestInjector.runInContext(() =>
resolver(futureARS, futureRSS));\n return wrapIntoObservable(resolverValue);\n}\n\nfunction
hasStaticTitle(config: Route) {\n return typeof config.title === 'string' || config.title === null;\n}\n\n",/**\n *
@license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {from, MonoTypeOperatorFunction,
ObservableInput, of} from 'rxjs';\nimport {map, switchMap} from 'rxjs/operators';\n\n/**\n * Perform a side effect
through a switchMap for every emission on the source Observable,\n * but return an Observable that is identical to
the source. It's essentially the same as\n * the `tap` operator, but if the side effectful `next` function returns an
ObservableInput,\n * it will wait before continuing with the original value.\n */\n\nexport function
switchTap<T>(next: (x: T) => void|ObservableInput<any>):\n MonoTypeOperatorFunction<T> {\n return
switchMap(v => {\n const nextResult = next(v);\n if (nextResult) {\n return from(nextResult).pipe(map(() =>
v));\n } \n return of(v);\n });\n }\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {inject, Injectable} from '@angular/core';\nimport {Title} from
'@angular/platform-browser';\nimport {ActivatedRouteSnapshot, RouterStateSnapshot} from
'./router_state';\nimport {PRIMARY_OUTLET, RouteTitleKey} from './shared';\n\n/**\n * Provides a strategy for
setting the page title after a router navigation.\n *\n * The built-in implementation traverses the router state snapshot
and finds the deepest primary\n * outlet with `title` property. Given the `Routes` below, navigating to\n *
`/base/child(popup:aux)` would result in the document title being set to `child`.\n *\n * ``\n * [\n * {path: 'base', title:
'base', children: [\n * {path: 'child', title: 'child'},\n * ],\n * {path: 'aux', outlet: 'popup', title: 'popupTitle'}\n *
] ]\n * ``\n *\n * This class can be used as a base class for custom title strategies. That is, you
can create your\n * own class that extends the `TitleStrategy`. Note that in the above example, the `title` from
the named outlet is never used. However, a custom strategy might be implemented to\n * incorporate titles in named
outlets.\n *\n * @publicApi\n * @see [Page title guide](guide/router#setting-the-page-title)\n
*/\n\n@Injectable({providedIn: 'root', useFactory: () => inject(DefaultTitleStrategy)})\n\nexport abstract class
TitleStrategy {\n /** Performs the application title update. */\n abstract updateTitle(snapshot:
RouterStateSnapshot): void;\n\n /**\n * @returns The `title` of the deepest primary route.\n */\n
buildTitle(snapshot: RouterStateSnapshot): string|undefined {\n let pageTitle: string|undefined;\n let route:
ActivatedRouteSnapshot|undefined = snapshot.root;\n while (route !== undefined) {\n pageTitle =
this.getResolvedTitleForRoute(route) ?? pageTitle;\n route = route.children.find(child => child.outlet ===
PRIMARY_OUTLET);\n }\n\n return pageTitle;\n }\n\n /**\n * Given an `ActivatedRouteSnapshot`, returns the final value of the\n *
`Route.title` property, which can either be a static string or a resolved value.\n */\n
getResolvedTitleForRoute(snapshot: ActivatedRouteSnapshot) {\n return snapshot.data[RouteTitleKey];\n
}\n}\n\n/**\n * The default `TitleStrategy` used by the router that updates the title using the `Title` service.\n
*/\n\n@Injectable({providedIn: 'root'})\n\nexport class DefaultTitleStrategy extends TitleStrategy {\n
constructor(readonly title: Title) {\n super();\n }\n\n /**\n * Sets the title of the browser to the given value.\n
*/\n * @param title The `pageTitle` from the deepest primary route.\n */\n override updateTitle(snapshot:
RouterStateSnapshot): void {\n const title = this.buildTitle(snapshot);\n if (title !== undefined) {\n
this.title.setTitle(title);\n }\n }\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n/**\n * Exists to aid internal migration off of the deprecated relativeLinkResolution
option.\n */\n\nexport function assignRelativeLinkResolution(\n router: {relativeLinkResolution:
'legacy'|'corrected'}): void {\n }\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {ComponentRef} from '@angular/core';\nimport {OutletContext} from

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'/router_outlet_context';\nimport { ActivatedRoute, ActivatedRouteSnapshot} from './router_state';\nimport
{TreeNode} from './utils/tree';\n\n/**\n * @description\n * Represents the detached route tree.\n * This is an
opaque value the router will give to a custom route reuse strategy\n * to store and retrieve later on.\n *\n *
@publicApi\n */\nexport type
  DetachedRouteHandle = {};\n\n/** @internal */\nexport type DetachedRouteHandleInternal = {\n contexts:
Map<string, OutletContext>,\n componentRef: ComponentRef<any>,\n route:
TreeNode<ActivatedRoute>,\n};\n\n/**\n * @description\n * Provides a way to customize when activated
routes get reused.\n *\n * @publicApi\n */\nexport abstract class RouteReuseStrategy {\n /** Determines if this
route (and its subtree) should be detached to be reused later */\n abstract shouldDetach(route:
ActivatedRouteSnapshot): boolean;\n\n /**\n * Stores the detached route.\n *\n * Storing a `null` value should
erase the previously stored value.\n *\n abstract store(route: ActivatedRouteSnapshot, handle:
DetachedRouteHandle|null): void;\n\n /** Determines if this route (and its subtree) should be reattached */\n
abstract shouldAttach(route: ActivatedRouteSnapshot): boolean;\n\n /** Retrieves the previously stored route */\n
abstract retrieve(route: ActivatedRouteSnapshot): DetachedRouteHandle|null;\n\n
  /** Determines if a route should be reused */\n  abstract shouldReuseRoute(future: ActivatedRouteSnapshot, curr:
ActivatedRouteSnapshot): boolean;\n}\n\n/**\n * @description\n * This base route reuse strategy only reuses
routes when the matched router configs are\n * identical. This prevents components from being destroyed and
recreated\n * when just the route parameters, query parameters or fragment change\n * (that is, the existing
component is _reused_).\n *\n * This strategy does not store any routes for later reuse.\n *\n * Angular uses this
strategy by default.\n *\n * It can be used as a base class for custom route reuse strategies, i.e. you can create
your own\n * class that extends the `BaseRouteReuseStrategy` one.\n *\n * @publicApi\n */\nexport abstract class
BaseRouteReuseStrategy implements RouteReuseStrategy {\n /**\n * Whether the given route should detach for
later reuse.\n * Always returns false for `BaseRouteReuseStrategy`.\n *\n */\n abstract shouldDetach(route:
ActivatedRouteSnapshot): boolean {\n return false;\n }\n\n /**\n * A no-op; the route is never stored since this
strategy never detaches routes for later re-use.\n *\n */\n abstract store(route: ActivatedRouteSnapshot, detachedTree:
DetachedRouteHandle): void {\n }\n\n /** Returns `false`, meaning the route (and its subtree) is never reattached */\n
abstract shouldAttach(route: ActivatedRouteSnapshot): boolean {\n return false;\n }\n\n /** Returns `null` because this
strategy does not store routes for later re-use.\n *\n */\n abstract retrieve(route: ActivatedRouteSnapshot):
DetachedRouteHandle|null {\n return null;\n }\n\n /**\n * Determines if a route should be reused.\n * This
strategy returns `true` when the future route config and current route config are\n * identical.\n *\n */\n
abstract shouldReuseRoute(future: ActivatedRouteSnapshot, curr: ActivatedRouteSnapshot): boolean {\n return
future.routeConfig === curr.routeConfig;\n }\n}\n\nexport class DefaultRouteReuseStrategy extends
BaseRouteReuseStrategy {\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { InjectionToken} from '@angular/core';\nimport { UrlSerializer, UrlTree}
from './url_tree';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' || !!ngDevMode;\n\n/**\n *
Error handler that is invoked when a navigation error occurs.\n *\n * If the handler returns a value, the navigation
Promise is resolved with this value.\n *\n * If the handler throws an exception, the navigation Promise is rejected with\n
* the exception.\n *\n * @publicApi\n */\nexport type ErrorHandler = (error: any) => any;\n\n/**\n * Allowed
values in an `ExtraOptions` object that configure\n * when the router performs the initial navigation operation.\n *\n
* * `enabledNonBlocking` - (default) The initial navigation starts after the\n * root component has been created.
The bootstrap is not blocked on the completion of the initial\n * navigation.\n * * `enabledBlocking` - The initial
navigation starts before the root component is created.\n * The bootstrap is blocked until the initial navigation is
complete. This value is required\n * for [server-side rendering](guide/universal) to work.\n * * `disabled` - The
initial navigation is not performed. The location listener is set up before\n * the root component gets created. Use
if there is a reason to have\n * more control over when the router starts its initial navigation due to some complex\n
* initialization logic.\n *\n * @see `forRoot()`\n *\n * @publicApi\n */\nexport type InitialNavigation =
'disabled'|'enabledBlocking'|'enabledNonBlocking';\n\n/**\n * Extra configuration options that can be used with the

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`withRouterConfig` function.\n *\n * @publicApi\n *\n * @developerPreview\n *\n * \nexport interface RouterConfigOptions {\n /**\n * Configures how the Router attempts to restore state when a navigation is cancelled.\n *\n * 'replace' - Always uses `location.replaceState` to set the browser state to the state of the\n * router before the navigation started. This means that if the URL of the browser is updated\n * before the navigation is canceled, the Router will simply replace the item in history rather\n * than trying to restore to the previous location in the session history. This happens most\n * frequently with `urlUpdateStrategy: 'eager'` and navigations with the browser back/forward\n * buttons.\n *\n * 'computed' - Will attempt to return to the same index in the session history that corresponds\n * to the Angular route when the navigation gets cancelled. For example, if the browser back\n * button is clicked and the navigation is cancelled, the Router will trigger a forward\n * navigation\n * and vice versa.\n *\n * Note: the 'computed' option is incompatible with any `UrlHandlingStrategy`\n * which only\n * handles a portion of the URL because the history restoration navigates to the previous place in\n * the browser history rather than simply resetting a portion of the URL.\n *\n * The default value is `replace` when not set.\n */\n canceledNavigationResolution?: 'replace'|'computed';\n /**\n * Define what the router should do if it receives a navigation request to the current URL.\n * Default is `ignore`, which causes the router ignores the navigation.\n * This can disable features such as a `refresh` button.\n * Use this option to configure the behavior when navigating to the\n * current URL. Default is `ignore`.\n */\n onSameUrlNavigation?: 'reload'|'ignore';\n /**\n * Defines how the router merges parameters, data, and resolved data from parent to child\n * routes. By default ('emptyOnly'), inherits parent parameters only for\n * path-less or component-less routes.\n *\n * Set to 'always' to enable unconditional inheritance of parent parameters.\n *\n * Note that when dealing with matrix parameters, `parent` refers to the parent `Route`\n * config which does not necessarily mean the `URL segment to the left`. When the `Route`\n * `path`\n * contains multiple segments, the matrix parameters must appear on the last segment. For example,\n * matrix parameters for `{path: 'a/b', component: MyComp}` should appear as `a/b;foo=bar`\n * and not `a;foo=bar/b`.\n *\n * \n paramsInheritanceStrategy?: 'emptyOnly'|'always';\n /**\n * Defines when the router updates the browser URL. By default ('deferred'),\n * update after successful navigation.\n * Set to 'eager' if prefer to update the URL at the beginning of navigation.\n * Updating the URL early allows you to handle a failure of navigation by\n * showing an error message with the URL that failed.\n */\n urlUpdateStrategy?: 'deferred'|'eager';\n }\n\n /**\n * Configuration options for the scrolling feature which can be used with `withInMemoryScrolling`\n * function.\n *\n * @publicApi\n *\n * @developerPreview\n *\n * \nexport interface InMemoryScrollingOptions {\n /**\n * When set to 'enabled', scrolls to the anchor element when the URL has a fragment.\n * Anchor scrolling is disabled by default.\n *\n * Anchor scrolling does not happen on 'popstate'. Instead, we restore the position\n * that we stored or scroll to the top.\n */\n anchorScrolling?: 'disabled'|'enabled';\n /**\n * Configures if the scroll position needs to be restored when navigating back.\n *\n * 'disabled' - (Default) Does nothing. Scroll position is maintained on navigation.\n *\n * 'top' - Sets the scroll position to x = 0, y = 0 on all navigation.\n *\n * 'enabled' - Restores the previous scroll position on backward navigation, else sets the\n * position to the anchor if one is provided, or sets the scroll position to [0, 0]\n * (forward\n * navigation). This option will be the default in the future.\n *\n * You can implement custom scroll restoration behavior by adapting the enabled behavior as\n * in the following example.\n */\n *\n * \n typescript\n * class AppComponent {\n *   movieData: any;\n *   constructor(private router: Router, private viewportScroller: ViewportScroller,\n *   changeDetectorRef: ChangeDetectorRef) {\n *     router.events.pipe(filter((event: Event): event is Scroll => event instanceof Scroll)\n *     ).subscribe(e => {\n *       fetch('http://example.com/movies.json').then(response => {\n *         this.movieData = response.json();\n *         // update the template with the data before restoring scroll\n *         changeDetectorRef.detectChanges();\n *         if (e.position) {\n *           viewportScroller.scrollToPosition(e.position);\n *         }\n *       });\n *     });\n *   }\n * }\n * \n *\n * \n scrollPositionRestoration?: 'disabled'|'enabled'|'top';\n }\n\n /**\n * A set of configuration options for a router module, provided in the\n * `forRoot()` method.\n *\n * @see `forRoot()`\n */

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*\n *\n * @publicApi\n */\nexport interface ExtraOptions extends InMemoryScrollingOptions,
RouterConfigOptions {\n /**\n * When true, log all internal navigation events to the console.\n * Use for
debugging.\n */\n enableTracing?: boolean;\n\n /**\n * When true, enable the location strategy that uses the
URL fragment\n * instead of the history API.\n */\n useHash?: boolean;\n\n /**\n * One of `enabled`,
`enabledBlocking`, `enabledNonBlocking` or `disabled`.\n * When set to `enabled` or `enabledBlocking`, the
initial navigation starts before the root\n * component is created. The bootstrap is blocked until the initial
navigation is complete. This\n * value is required for [server-side rendering](guide/universal) to work. When set
to\n * `enabledNonBlocking`, the initial navigation starts after the root component has been created.\n * The
bootstrap is not blocked on the completion of the initial navigation. When set to\n * `disabled`, the initial
navigation
is not performed. The location listener is set up before the\n * root component gets created. Use if there is a reason
to have more control over when the router\n * starts its initial navigation due to some complex initialization
logic.\n */\n initialNavigation?: InitialNavigation;\n\n /**\n * A custom error handler for failed navigations.\n *
If the handler returns a value, the navigation Promise is resolved with this value.\n * If the handler throws an
exception, the navigation Promise is rejected with the exception.\n */\n errorHandler?: ErrorHandler;\n\n /**\n * Configures a preloading strategy.\n * One of `PreloadAllModules` or `NoPreloading` (the default).\n */\n
preloadingStrategy?: any;\n\n /**\n * Configures the scroll offset the router will use when scrolling to an
element.\n */\n * When given a tuple with x and y position value,\n * the router uses that offset each time it
scrolls.\n * When given a function, the router invokes the
function every time\n * it restores scroll position.\n */\n scrollOffset?: [number, number] | (() => [number,
number]);\n\n /**\n * A custom handler for malformed URI errors. The handler is invoked when `encodedURI`
contains\n * invalid character sequences.\n * The default implementation is to redirect to the root URL,
dropping\n * any path or parameter information. The function takes three parameters:\n */\n * - `URIError` -
Error thrown when parsing a bad URL.\n * - `UrlSerializer` - UrlSerializer that's configured with the router.\n * -
`url` - The malformed URL that caused the URIError\n */\n malformedUriErrorHandler?: (error:
URIError, urlSerializer: UrlSerializer, url: string) => UrlTree;\n\n /**\n * Enables a bug fix that corrects relative
link resolution in components with empty paths.\n * Example:\n */\n * ```\n * const routes = [\n * {\n *
path: '',\n * component: ContainerComponent,\n * children: [\n
*   { path: 'a', component: AComponent },\n *   { path: 'b', component: BComponent },\n * ]\n * }]\n * ```\n
*\n * From the `ContainerComponent`, you should be able to navigate to `AComponent` using\n *
the following `routerLink`, but it will not work if `relativeLinkResolution` is set\n * to `legacy`:\n */\n * `<a
[routerLink]='["./a"]">Link to A</a>\n */\n * However, this will work:\n */\n * `<a
[routerLink]='["./a"]">Link to A</a>\n */\n * In other words, you're required to use `../` rather than `./` when the
relative link\n * resolution is set to `legacy`.\n */\n * The default in v11 is `corrected`.\n */\n * @deprecated\n
*/\n relativeLinkResolution?: 'legacy'|'corrected';\n}\n\n/**\n * A [DI token](guide/glossary/#di-token) for the
router service.\n */\n * @publicApi\n */\nexport const ROUTER_CONFIGURATION =\n new
InjectionToken<ExtraOptions>(NG_DEV_MODE ? 'router config' : '', {\n providedIn: 'root',\n
factory: () => ({}),\n });\n\n /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport { Compiler, EnvironmentInjector, Injectable, InjectFlags, InjectionToken,
Injector, NgModuleFactory, Type } from '@angular/core';\nimport { ConnectableObservable, from, Observable, of,
Subject } from 'rxjs';\nimport { catchError, finalize, map, mergeMap, refCount, tap } from 'rxjs/operators';\nimport
{ LoadChildren, LoadedRouterConfig, Route, Routes } from './models';\nimport { flatten, wrapIntoObservable } from
'./utils/collection';\nimport { assertStandalone, standardizeConfig, validateConfig } from './utils/config';\n\nconst
NG_DEV_MODE = typeof ngDevMode === 'undefined' || !ngDevMode;\n\n/**\n * The [DI
token](guide/glossary/#di-token) for a router configuration.\n */\n * `ROUTES` is a low level API for router
configuration via dependency

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the router state to an empty state.\n * As a result, all the active components will be destroyed.\n *\n */\n abstract
shouldProcessUrl(url: UrlTree): boolean;\n\n /**\n * Extracts the part of the URL that should be handled by the
router.\n * The rest of the URL will remain untouched.\n */\n abstract extract(url: UrlTree): UrlTree;\n\n /**\n * Merges the URL fragment with the rest of the URL.\n */\n abstract merge(newUrlPart: UrlTree, rawUrl:
UrlTree): UrlTree;\n}\n\n/**\n * @publicApi\n */\nexport class DefaultUrlHandlingStrategy implements
UrlHandlingStrategy {\n  shouldProcessUrl(url: UrlTree): boolean
{\n  return true;\n }\n  extract(url: UrlTree): UrlTree {\n  return url;\n }\n  merge(newUrlPart: UrlTree,
wholeUrl: UrlTree): UrlTree {\n  return newUrlPart;\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {Location} from '@angular/common';\nimport {Compiler,
inject, Injectable, Injector, NgModuleRef, NgZone, Type, Console as Console, RuntimeError as RuntimeError}
from '@angular/core';\nimport {BehaviorSubject, combineLatest, EMPTY, Observable, of, Subject,
SubscriptionLike} from 'rxjs';\nimport {catchError, defaultIfEmpty, filter, finalize, map, switchMap, take, tap} from
'rxjs/operators';\nimport {createRouterState} from './create_router_state';\nimport {createUrlTree} from
'./create_url_tree';\nimport {RuntimeErrorCode} from './errors';\nimport {Event, GuardsCheckEnd,
GuardsCheckStart, NavigationCancel,
NavigationCancellationCode, NavigationEnd, NavigationError, NavigationStart, NavigationTrigger, ResolveEnd,
ResolveStart, RouteConfigLoadEnd, RouteConfigLoadStart, RoutesRecognized} from './events';\nimport
{NavigationBehaviorOptions, QueryParamsHandling, Route, Routes} from './models';\nimport
{isNavigationCancelingError, isRedirectingNavigationCancelingError, redirectingNavigationError} from
'./navigation_canceling_error';\nimport {activateRoutes} from './operators/activate_routes';\nimport
{applyRedirects} from './operators/apply_redirects';\nimport {checkGuards} from
'./operators/check_guards';\nimport {recognize} from './operators/recognize';\nimport {resolveData} from
'./operators/resolve_data';\nimport {switchTap} from './operators/switch_tap';\nimport {DefaultTitleStrategy,
TitleStrategy} from './page_title_strategy';\nimport {assignRelativeLinkResolution} from
'./patchable_relative_link_resolution';\nimport {DefaultRouteReuseStrategy, RouteReuseStrategy} from
'./route_reuse_strategy';\nimport
{ErrorHandler, ExtraOptions, ROUTER_CONFIGURATION} from './router_config';\nimport
{RouterConfigLoader, ROUTES} from './router_config_loader';\nimport {ChildrenOutletContexts} from
'./router_outlet_context';\nimport {ActivatedRoute, ActivatedRouteSnapshot, createEmptyState, RouterState,
RouterStateSnapshot} from './router_state';\nimport {Params} from './shared';\nimport
{DefaultUrlHandlingStrategy, UrlHandlingStrategy} from './url_handling_strategy';\nimport {containsTree,
createEmptyUrlTree, IsActiveMatchOptions, isUrlTree, UrlSerializer, UrlTree} from './url_tree';\nimport {flatten}
from './utils/collection';\nimport {standardizeConfig, validateConfig} from './utils/config';\nimport {Checks,
getAllRouteGuards} from './utils/preactivation';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined'
|| !!ngDevMode;\n\n/**\n * @description\n */\n * Options that modify the `Router` URL.\n * Supply an object
containing any of these properties to a `Router` navigation
function to\n * control how the target URL should be constructed.\n */\n * @see [Router.navigate()
method](api/router/Router#navigate)\n * @see [Router.createUrlTree() method](api/router/Router#createurltree)\n *
@see [Routing and Navigation guide](guide/router)\n */\n * @publicApi\n */\nexport interface UrlCreationOptions
{\n  /**\n   * Specifies a root URI to use for relative navigation.\n   *\n   * For example, consider the following route
configuration where the parent route\n   * has two children.\n   *\n   * ```\n   * {\n   *   path: 'parent',\n   *
component: ParentComponent,\n   * children: [\n   *   {\n   *     path: 'list',\n   *     component: ListComponent\n   * },\n   *
{\n   *     path: 'child',\n   *     component: ChildComponent\n   * }]\n   * }\n   * ```\n   *\n   * The following `go()`
function navigates to the `list` route by\n   * interpreting the destination URI as relative to the activated `child`
route\n   *\n   * ```\n   * @Component({...})\n   * class ChildComponent
{\n   *   constructor(private router: Router, private route: ActivatedRoute) {\n   *     go() {\n   *
this.router.navigate(['../list'], { relativeTo: this.route });\n   *   }\n   * }\n   * ```\n   *\n   * A value of `null` or

```

`undefined` indicates that the navigation commands should be applied relative to the root.

`relativeTo?: ActivatedRoute | null;`

`queryParams?: string;` Sets query parameters to the URL.

`queryParamsHandling?: QueryParamsHandling | null;`

`fragment?: string;` Sets the hash fragment for the URL.

`preserve?: boolean;` How to handle query parameters in the router link for the next navigation. One of:

- `'preserve'`: Preserve current parameters.
- `'merge'`: Merge new with current parameters.

`merge?: boolean;` The "preserve" option discards any new query params.

`queryParamsHandling?: QueryParamsHandling | null;` The "merge" option appends new query params to the params from the current URL.

`preserveFragment?: boolean;` In case of a key collision between current parameters and those in the `queryParams` object, the new value is used.

`preserveFragment?: boolean;` When true, preserves the URL fragment for the next navigation.

`options?: RouterOptions;` Options that modify the `Router` navigation strategy. Supply an object containing any of these properties to a `Router` navigation function to control how the target URL should be constructed or interpreted.

`@see [Router.navigate() method](api/router/Router#navigate)`

`@see [Router.navigateByUrl() method](api/router/Router#navigatebyurl)`

`@see [Router.createUrlTree() method](api/router/Router#createurltree)`

`@see [Routing and Navigation guide](guide/router)`

`@see [UrlCreationOptions]`

`@see [NavigationBehaviorOptions]`

`@publicApi`

`@next` export interface

`NavigationExtras extends UrlCreationOptions, NavigationBehaviorOptions {}`

`defaultErrorHandler(error: any): any`

`defaultMalformedUriErrorHandler(error: UriError, urlSerializer: UrlSerializer, url: string): UrlTree`

`RestoredState = { [k: string]: any; }`

`Remove `navigationId` and `routerPageId` and move to `ng` or `` namespace.`

`navigationId: number;` The prefix is there to reduce the chance of colliding with any existing user properties on the history state.

`routerPageId?: number;` Information about a navigation operation.

`Router.getCurrentNavigation() method`

`id: number;` The unique identifier of the current navigation.

`initialUrl: string;` The target URL passed into the `Router#navigateByUrl()` call before navigation. This is the value before the router has parsed or applied redirects to it.

`extractedUrl: string;` The initial target URL after being parsed with `UrlSerializer.extract()`.

`finalUrl: string;` The extracted URL after redirects have been applied. This URL may not be available immediately, therefore this property can be `undefined`. It is guaranteed to be set after the `RoutesRecognized` event fires.

`trigger: string;` Identifies how this navigation was triggered.

- `'imperative'`--Triggered by `router.navigateByUrl()` or `router.navigate()`.
- `'popstate'`--Triggered by a popstate event.
- `'hashchange'`--Triggered by a hashchange event.

`extras: NavigationExtras;` A `NavigationExtras` options object that controlled the strategy used for this navigation.

`previousNavigation: Navigation | null;` The previously successful `Navigation` object. Only one previous navigation is available, therefore this previous `Navigation` object has a `null` value for its own `previousNavigation`.

`@publicApi`

`@next` export interface

`Navigation {`

`id: number;` The unique identifier of the current navigation.

`initialUrl: UrlTree;` The target URL passed into the `Router#navigateByUrl()` call before navigation. This is the value before the router has parsed or applied redirects to it.

`extractedUrl: UrlTree;` The initial target URL after being parsed with `UrlSerializer.extract()`.

`finalUrl: UrlTree;` The extracted URL after redirects have been applied. This URL may not be available immediately, therefore this property can be `undefined`. It is guaranteed to be set after the `RoutesRecognized` event fires.

`trigger: string;` Identifies how this navigation was triggered.

- `'imperative'`--Triggered by `router.navigateByUrl()`

or `router.navigate`.  
 \* `popstate`--Triggered by a popstate event.  
 \* `hashchange`--Triggered by a hashchange event.  
 \* trigger: 'imperative'|'popstate'|'hashchange';  
 \* Options that controlled the strategy used for this navigation.  
 \* See `NavigationExtras`.  
 \* extras: NavigationExtras;  
 \* The previously successful `Navigation` object. Only one previous navigation is available, therefore this previous `Navigation` object has a `null` value for its own `previousNavigation`.  
 \* previousNavigation: Navigation|null;  
 \* export interface NavigationTransition {  
 id: number;  
 targetPageId: number;  
 currentUrlTree: UrlTree;  
 currentRawUrl: UrlTree;  
 extractedUrl: UrlTree;  
 urlAfterRedirects?: UrlTree;  
 rawUrl: UrlTree;  
 extras: NavigationExtras;  
 resolve: any;  
 reject: any;  
 promise: Promise<boolean>;  
 source: NavigationTrigger;  
 restoredState: RestoredState|null;  
 currentSnapshot: RouterStateSnapshot;  
 targetSnapshot: RouterStateSnapshot|null;  
 currentRouterState: RouterState;  
 targetRouterState: RouterState|null;  
 guards: Checks;  
 guardsResult: boolean|UrlTree|null; }  
 \* The equivalent `IsActiveMatchOptions` options for `Router.isActive` is called with `true` (exact = true).  
 \* export const exactMatchOptions: IsActiveMatchOptions = {  
 paths: 'exact',  
 fragment: 'ignored',  
 matrixParams: 'ignored',  
 queryParams: 'exact'};  
 \* The equivalent `IsActiveMatchOptions` options for `Router.isActive` is called with `false` (exact = false).  
 \* export const subsetMatchOptions: IsActiveMatchOptions = {  
 paths: 'subset',  
 fragment: 'ignored',  
 matrixParams: 'ignored',  
 queryParams: 'subset'};  
 \* export function assignExtraOptionsToRouter(opts: ExtraOptions, router: Router): void {  
 if (opts.errorHandler) {  
 router.errorHandler = opts.errorHandler;  
 }  
 if (opts.malformedUriErrorHandler) {  
 router.malformedUriErrorHandler = opts.malformedUriErrorHandler;  
 }  
 if (opts.onSameUrlNavigation) {  
 router.onSameUrlNavigation = opts.onSameUrlNavigation;  
 }  
 if (opts.paramsInheritanceStrategy) {  
 router.paramsInheritanceStrategy = opts.paramsInheritanceStrategy;  
 }  
 if (opts.relativeLinkResolution) {  
 router.relativeLinkResolution = opts.relativeLinkResolution;  
 }  
 if (opts.urlUpdateStrategy) {  
 router.urlUpdateStrategy = opts.urlUpdateStrategy;  
 }  
 if (opts.canceledNavigationResolution) {  
 router.canceledNavigationResolution = opts.canceledNavigationResolution;  
 }  
 }  
 \* export function setupRouter() {  
 const urlSerializer = inject(UrlSerializer);  
 const contexts = inject(ChildrenOutletContexts);  
 const location = inject(Location);  
 const injector = inject(Injector);  
 const compiler = inject(Compiler);  
 const config = inject(ROUTES, { optional: true }) ?? [];  
 const opts = inject(ROUTER\_CONFIGURATION, { optional: true }) ?? {};  
 const defaultTitleStrategy = inject(DefaultTitleStrategy);  
 const titleStrategy = inject(TitleStrategy, { optional: true });  
 const urlHandlingStrategy = inject(UrlHandlingStrategy, { optional: true });  
 const routeReuseStrategy = inject(RouteReuseStrategy, { optional: true });  
 const router = new Router(null, urlSerializer, contexts, location, injector, compiler, flatten(config));  
 if (urlHandlingStrategy) {  
 router.urlHandlingStrategy = urlHandlingStrategy;  
 }  
 if (routeReuseStrategy) {  
 router.routeReuseStrategy = routeReuseStrategy;  
 }  
 router.titleStrategy = titleStrategy ?? defaultTitleStrategy;  
 assignExtraOptionsToRouter(opts, router);  
 assignRelativeLinkResolution(router);  
 return router; }  
 \* @description  
 \* A service that provides navigation among views and URL manipulation capabilities.  
 \* @see `Route`.  
 \* @see [Routing and Navigation Guide](guide/router).  
 \* @ngModule RouterModule  
 \* @publicApi  
 \* @Injectable({  
 providedIn: 'root',  
 useFactory: setupRouter,  
 })  
 \* export class Router {  
 \* Represents the activated `UrlTree` that the `Router` is configured to handle (through `UrlHandlingStrategy`). That is, after we find the route config tree that we're going to activate, run guards, and are just about to activate the route, we set the currentUrlTree.  
 \* This should match the `browserUrlTree` when a navigation succeeds. If the `UrlHandlingStrategy.shouldProcessUrl` is `false`, only the `browserUrlTree` is updated.  
 \* private currentUrlTree: UrlTree;  
 \* Meant to represent the entire browser url after a successful navigation. In the life of a navigation transition:  
 \* 1. The rawUrl represents the full URL that's being navigated to.  
 \* 2. We apply redirects, which might only apply to part of the URL (due to `UrlHandlingStrategy`).  
 \* 3. Right before activation (because we assume activation will succeed), we update the rawUrlTree to be a combination of the urlAfterRedirects (again, this might only apply to part of the

initial url) and the rawUrl of the transition (which was the original navigation url in its full form).  
private rawUrlTree: UriTree; // Meant to represent the part of the browser url that the Router is set up to handle (via the UrlHandlingStrategy). This value is updated immediately after the browser url is updated (or the browser url update is skipped via skipLocationChange).

With that, note that browserUrlTree may not reflect the actual browser URL for two reasons:  
1. UrlHandlingStrategy only handles part of the URL  
2. skipLocationChange does not update the browser url.  
So to reiterate, browserUrlTree only represents the Router's internal understanding of the current route, either before guards with urlUpdateStrategy === 'eager' or right before activation with 'deferred'. This should match the currentUrlTree when the navigation succeeds.  
private browserUrlTree: UriTree;  
private readonly transitions: BehaviorSubject<NavigationTransition>;  
private navigations: Observable<NavigationTransition>;  
private lastSuccessfulNavigation: Navigation|null = null;  
private currentNavigation: Navigation|null = null;  
private disposed = false;  
private locationSubscription?: SubscriptionLike;  
private navigationId: number = 0; // The id of the currently active page in the router. Updated to the transition's target id on a successful navigation. This is used to track what page the router last activated. When an attempted navigation fails, the router can then use this to compute how to restore the state back to the previously active page.  
private currentPageId: number = 0; // The routerPageId of whatever page is currently active in the browser history. This is important for computing the target page id for new navigations because we need to ensure each page id in the browser history is 1 more than the previous entry.  
private get browserPageId(): number|undefined { return (this.location.getState() as RestoredState | null)?.routerPageId; }  
private configLoader: RouterConfigLoader;  
private ngModule: NgModuleRef<any>;  
private console: Console;  
private isNgZoneEnabled: boolean = false;  
// An event stream for routing events in this NgModule.

public readonly events: Observable<Event> = new Subject<Event>; // The current state of routing in this NgModule.  
public readonly routerState: RouterState;  
// A handler for navigation errors in this NgModule.  
private errorHandler: ErrorHandler = defaultErrorHandler;  
// A handler for errors thrown by Router.parseUrl(url) when url contains an invalid character. The most common case is a % sign that's not encoded and is not part of a percent encoded sequence.  
private malformedUriErrorHandler: (error: UriError, urlSerializer: UrlSerializer, url: string) => UriTree = defaultMalformedUriErrorHandler;  
// True if at least one navigation event has occurred, false otherwise.  
private navigated: boolean = false;  
private lastSuccessfulId: number = -1;  
// Hook that enables you to pause navigation after the preactivation phase. Used by RouterModule.

@internal  
private afterPreactivation: () => Observable<void> = () => of(void 0); // A strategy for extracting and merging URLs. Used for AngularJS to Angular migrations.  
private urlHandlingStrategy: UrlHandlingStrategy = new DefaultUrlHandlingStrategy();  
// A strategy for re-using routes.  
private routeReuseStrategy: RouteReuseStrategy = new DefaultRouteReuseStrategy();  
// A strategy for setting the title based on the routerState.  
private titleStrategy?: TitleStrategy;  
// How to handle a navigation request to the current URL. One of:  
- 'ignore': The router ignores the request.  
- 'reload': The router reloads the URL. Use to implement a 'refresh' feature.  
Note that this only configures whether the Route reprocesses the URL and triggers related action and events like redirects, guards, and resolvers. By default, the router re-uses a component instance when it re-navigates

to the same component type without visiting a different component first. This behavior is configured by the RouteReuseStrategy. In order to reload routed components on same url navigation, you need to set onSameUrlNavigation to 'reload' and provide a RouteReuseStrategy which returns false for shouldReuseRoute.  
private onSameUrlNavigation: 'reload'|'ignore' = 'ignore';  
// How to merge parameters, data, resolved data, and title from parent to child routes. One of:  
- 'emptyOnly': Inherit parent parameters, data, and resolved data for path-less or component-less routes.  
- 'always': Inherit parent parameters, data, and resolved data for all child routes.  
private paramsInheritanceStrategy: 'emptyOnly'|'always' = 'emptyOnly';  
// Determines when the router updates the browser URL. By

default (``deferred``), updates the browser URL after navigation has finished. \* Set to ``eager`` to update the browser URL at the beginning of navigation. \* You can choose to update early so that, if navigation fails, \* you can show an error message with the URL that failed. \*  
 urlUpdateStrategy: 'deferred'|'eager' = 'deferred';  
 /\*\* \* Enables a bug fix that corrects relative link resolution in components with empty paths. \* @see `RouterModule` \* @deprecated \*  
 relativeLinkResolution: 'legacy'|'corrected' = 'corrected';  
 /\*\* \* Configures how the Router attempts to restore state when a navigation is cancelled. \*  
 \* 'replace' - Always uses `location.replaceState` to set the browser state to the state of the \* router before the navigation started. This means that if the URL of the browser is updated \* \_before\_ the navigation is canceled, the Router will simply replace the item in history rather \* than trying to restore to the previous location in the session history. This happens most \* frequently with `urlUpdateStrategy: 'eager` and navigations with the browser back/forward \* buttons. \*  
 \* 'computed' - Will attempt to return to the same index in the session history that corresponds \* to the Angular route when the navigation gets cancelled. For example, if the browser back \* button is clicked and the navigation is cancelled, the Router will trigger a forward navigation \* and vice versa. \*  
 \* Note: the 'computed' option is incompatible with any `UrlHandlingStrategy` which only \* handles a portion of the URL because the history restoration navigates to the previous place in \* the browser history rather than simply resetting a portion of the URL. \*  
 \* The default value is `replace`. \*  
 canceledNavigationResolution: 'replace'|'computed' = 'replace';  
 /\*\* \* Creates the router service. \*  
 // TODO: vsavkin make internal after the final is out. \*  
 constructor(\n private rootComponentType: Type<any>|null, private urlSerializer: UrlSerializer,\n private rootContexts: ChildrenOutletContexts, private location: Location, injector: Injector,\n compiler: Compiler, public config: Routes) {\n const onLoadStart = (r: Route) => this.triggerEvent(new RouteConfigLoadStart(r));\n const onLoadEnd = (r: Route) => this.triggerEvent(new RouteConfigLoadEnd(r));\n this.configLoader = injector.get(RouterConfigLoader);\n this.configLoader.onLoadEndListener = onLoadEnd;\n this.configLoader.onLoadStartListener = onLoadStart;\n\n this.ngModule = injector.get(NgModuleRef);\n this.console = injector.get(Console);\n const ngZone = injector.get(NgZone);\n this.isNgZoneEnabled = ngZone instanceof NgZone && NgZone.isInAngularZone();\n\n this.resetConfig(config);\n this.currentUrlTree = createEmptyUrlTree();\n this.rawUrlTree = this.currentUrlTree;\n this.browserUrlTree = this.currentUrlTree;\n\n this.routerState = createEmptyState(this.currentUrlTree, this.rootComponentType);\n\n this.transitions = new BehaviorSubject<NavigationTransition>({\n id: 0,\n targetPageId: 0,\n currentUrlTree: this.currentUrlTree,\n currentRawUrl: this.currentUrlTree,\n extractedUrl: this.urlHandlingStrategy.extract(this.currentUrlTree),\n urlAfterRedirects: this.urlHandlingStrategy.extract(this.currentUrlTree),\n rawUrl: this.currentUrlTree,\n extras: {},\n resolve: null,\n reject: null,\n promise: Promise.resolve(true),\n source: 'imperative',\n restoredState: null,\n currentSnapshot: this.routerState.snapshot,\n targetSnapshot: null,\n currentRouterState: this.routerState,\n targetRouterState: null,\n guards: {canActivateChecks: [], canDeactivateChecks: []},\n guardsResult: null,\n });\n this.navigations = this.setupNavigations(this.transitions);\n\n this.processNavigations();\n }\n\n private setupNavigations(transitions: Observable<NavigationTransition>):\n Observable<NavigationTransition>\n {\n const eventsSubject = (this.events as Subject<Event>);\n return transitions.pipe(\n filter(t => t.id !== 0),\n // Extract URL\n map(t =>\n ({...t, extractedUrl: this.urlHandlingStrategy.extract(t.rawUrl)} as\n NavigationTransition)),\n // Using switchMap so we cancel executing navigations when a new one comes in\n switchMap(overallTransitionState => {\n let completed = false;\n let errored = false;\n return of(overallTransitionState)\n .pipe(\n // Store the Navigation object\n tap(t => {\n this.currentNavigation = {\n id: t.id,\n initialUrl: t.rawUrl,\n extractedUrl: t.extractedUrl,\n trigger: t.source,\n extras: t.extras,\n previousNavigation: this.lastSuccessfulNavigation\n ?\n {...this.lastSuccessfulNavigation, previousNavigation: null} :\n null\n

```

    });\n
    },\n
    switchMap(t => {\n
    const browserUrlTree =
this.browserUrlTree.toString());\n
    const urlTransition = !this.navigated ||\n
t.extractedUrl.toString() !== browserUrlTree ||\n
    // Navigations which succeed or ones which fail
and are cleaned up\n
    // correctly should result in `browserUrlTree` and `currentUrlTree`\n
    // matching. If this is not the case, assume something went wrong and\n
    // try
processing the URL again.\n
    browserUrlTree !== this.currentUrlTree.toString());\n
    const processCurrentUrl =\n
    (this.onSameUrlNavigation === 'reload' ? true : urlTransition) &&\n
this.urlHandlingStrategy.shouldProcessUrl(t.rawUrl);\n
    if (processCurrentUrl) {\n
    // If the source of the navigation is from a browser event, the URL is\n
    // already updated. We
already need to sync the internal state.\n
    if (isBrowserTriggeredNavigation(t.source)) {\n
    this.browserUrlTree = t.extractedUrl;\n
    }\n
    return of(t).pipe(\n
    // Fire NavigationStart event\n
    switchMap(t => {\n
    const transition
= this.transitions.getValue());\n
    eventsSubject.next(new NavigationStart(\n
    t.id, this.serializeUrl(t.extractedUrl),
t.source,\n
    t.restoredState));\n
    if (transition !==
this.transitions.getValue()) {\n
    return EMPTY;\n
    }\n
    // This delay is required to match old behavior that forced\n
    // navigation to always be
async\n
    return Promise.resolve(t);\n
    }},\n
    //
ApplyRedirects\n
    applyRedirects(\n
    this.ngModule.injector,
this.configLoader, this.urlSerializer,\n
    this.config),\n
    // Update the
currentNavigation\n
    // `urlAfterRedirects` is guaranteed to be set after this point\n
    tap(t => {\n
    this.currentNavigation = {\n
    ...this.currentNavigation!,\n
    finalUrl:
t.urlAfterRedirects\n
    });\n
    overallTransitionState.urlAfterRedirects =
t.urlAfterRedirects;\n
    }},\n
    // Recognize\n
    recognize(\n
    this.ngModule.injector, this.rootComponentType, this.config,\n
this.urlSerializer, this.paramsInheritanceStrategy,\n
    this.relativeLinkResolution),\n
    // Update URL if in `eager` update mode\n
    tap(t => {\n
    overallTransitionState.targetSnapshot = t.targetSnapshot;\n
    if (this.urlUpdateStrategy ===
'eager') {\n
    if (!t.extras.skipLocationChange) {\n
    const rawUrl =
this.urlHandlingStrategy.merge(\n
    t.urlAfterRedirects!, t.rawUrl);\n
    this.setBrowserUrl(rawUrl, t);\n
    }\n
    this.browserUrlTree =
t.urlAfterRedirects!\n
    });\n
    // Fire RoutesRecognized\n
    const routesRecognized = new RoutesRecognized(\n
    t.id,
this.serializeUrl(t.extractedUrl),\n
    this.serializeUrl(t.urlAfterRedirects!),
t.targetSnapshot!);\n
    eventsSubject.next(routesRecognized);\n
    }));\n
    } else {\n
    const processPreviousUrl = urlTransition &&
this.rawUrlTree &&\n
    this.urlHandlingStrategy.shouldProcessUrl(this.rawUrlTree);\n
    /* When the current URL shouldn't be processed, but the previous one\n
    * was, we handle
this "error condition" by navigating to the\n
    * previously successful URL, but leaving the URL
intact.*\n
    if (processPreviousUrl) {\n
    const {id, extractedUrl, source,
restoredState, extras} = t;\n
    const navStart = new NavigationStart(\n
    id,
this.serializeUrl(extractedUrl), source, restoredState);\n
    eventsSubject.next(navStart);\n
    const targetSnapshot =\n
    createEmptyState(extractedUrl, this.rootComponentType).snapshot;\n
    overallTransitionState = {\n
    ...t,\n
    targetSnapshot,\n
urlAfterRedirects: extractedUrl,\n
    extras: {...extras, skipLocationChange: false, replaceUrl:

```

```

false},\n                };\n                return of(overallTransitionState);\n                } else {\n                /* When neither the current or previous URL can be processed, do\n                * nothing\n                other than update router's internal reference to the\n                * current \"settled\" URL. This way the next\n                navigation will be coming\n                * from the current URL in the browser.\n                */\n                this.rawUrlTree\n                = t.rawUrl;\n                t.resolve(null);\n                return EMPTY;\n                }\n                },\n                },\n                // --- GUARDS ---\n                tap(t => {\n                const guardsStart = new GuardsCheckStart(\n                t.id, this.serializeUrl(t.extractedUrl),\n                this.serializeUrl(t.urlAfterRedirects!), t.targetSnapshot!);\n                this.triggerEvent(guardsStart);\n                },\n                map(t => {\n                overallTransitionState = {\n                ...t,\n                guards: getAllRouteGuards(\n                t.targetSnapshot!, t.currentSnapshot,\n                this.rootContexts)\n                });\n                return overallTransitionState;\n                },\n                checkGuards(\n                this.ngModule.injector, (evt: Event) =>\n                this.triggerEvent(evt)),\n                tap(t => {\n                overallTransitionState.guardsResult =\n                t.guardsResult;\n                if (isUrlTree(t.guardsResult)) {\n                throw\n                redirectingNavigationError(this.urlSerializer, t.guardsResult);\n                }\n                const\n                guardsEnd = new GuardsCheckEnd(\n                t.id, this.serializeUrl(t.extractedUrl),\n                this.serializeUrl(t.urlAfterRedirects!), t.targetSnapshot!,\n                !!t.guardsResult);\n                this.triggerEvent(guardsEnd);\n                },\n                filter(t => {\n                if\n                (!t.guardsResult) {\n                this.restoreHistory(t);\n                this.cancelNavigationTransition(\n                t, \"NavigationCancellationCode.GuardRejected);\n                return false;\n                }\n                return true;\n                })),\n                // --\n                - RESOLVE ---\n                switchTap(t => {\n                if (t.guards.canActivateChecks.length) {\n                return of(t).pipe(\n                tap(t => {\n                const resolveStart = new\n                ResolveStart(\n                t.id, this.serializeUrl(t.extractedUrl),\n                this.serializeUrl(t.urlAfterRedirects!), t.targetSnapshot!);\n                this.triggerEvent(resolveStart);\n                },\n                switchMap(t => {\n                let dataResolved = false;\n                return of(t).pipe(\n                resolveData(\n                this.paramsInheritanceStrategy, this.ngModule.injector),\n                tap({\n                next: () => dataResolved = true,\n                complete: () => {\n                if\n                (!dataResolved) {\n                this.restoreHistory(t);\n                this.cancelNavigationTransition(\n                t,\n                NG_DEV_MODE ?\n                `At least one route resolver didn't emit any value.` :\n                \"NavigationCancellationCode.NoDataFromResolver);\n                }\n                },\n                })),\n                },\n                tap(t => {\n                const resolveEnd = new ResolveEnd(\n                t.id, this.serializeUrl(t.extractedUrl),\n                this.serializeUrl(t.urlAfterRedirects!),\n                this.triggerEvent(resolveEnd);\n                }));\n                },\n                return undefined;\n                })),\n                // --- LOAD COMPONENTS ---\n                switchTap((t: NavigationTransition) => {\n                const loadComponents =\n                (route: ActivatedRouteSnapshot): Array<Observable<void>> => {\n                const loaders: Array<Observable<void>> = [];\n                if (route.routeConfig?.loadComponent\n                &&\n                !route.routeConfig._loadedComponent) {\n                loaders.push(this.configLoader.loadComponent(route.routeConfig)\n                .pipe(\n                tap(loadedComponent => {\n                route.component =\n                loadedComponent;\n                })),\n                map(() => void 0),\n                ));\n                for (const child of route.children)

```

```

{\n
loaders.push(...loadComponents(child));\n
return loaders;\n
};\n
return combineLatest(loadComponents(t.targetSnapshot!.root))\n
.pipe(defaultIfEmpty(), take(1));\n
}),\n\n
switchTap(() =>
this.afterPreactivation()),\n\n
map((t: NavigationTransition) => {\n
const
targetRouterState = createRouterState(\n
this.routeReuseStrategy, t.targetSnapshot!,
t.currentRouterState);\n
overallTransitionState = {...t, targetRouterState};\n
return
(overallTransitionState);\n
}),\n\n
/* Once here, we are about to activate
synchronously. The assumption is\n
this will succeed, and user code may read from the Router
service.\n
Therefore before activation, we need to update router properties storing\n
the current URL and the RouterState, as well as updated the browser URL.\n
All
this should happen *before* activating. *\n
tap((t: NavigationTransition) => {\n
this.currentUrlTree = t.urlAfterRedirects!;\n
this.rawUrlTree =\n
this.urlHandlingStrategy.merge(t.urlAfterRedirects!, t.rawUrl);\n\n
(this as {routerState:
RouterState}).routerState = t.targetRouterState!;\n\n
if (this.urlUpdateStrategy === 'deferred') {\n
if (!t.extras.skipLocationChange) {\n
this.setBrowserUrl(this.rawUrlTree, t);\n
}\n
this.browserUrlTree = t.urlAfterRedirects!;\n
})\n
}),\n\n
activateRoutes(\n
this.rootContexts, this.routeReuseStrategy,\n
(evt: Event) => this.triggerEvent(evt)),\n\n
tap({\n
next() {\n
completed = true;\n
},\n
complete() {\n
completed = true;\n
}),\n
finalize() => {\n
/* When the navigation stream finishes either through error or success,\n
* we set the `completed` or `errored` flag. However, there are some\n
* situations where we
could get here without either of those being set.\n
* For instance, a redirect during NavigationStart.
Therefore, this is a\n
* catch-all to make sure the NavigationCancel event is fired when a\n
* navigation
gets cancelled but not caught by other means. *\n
if (!completed && !errored) {\n
const cancellationReason = NG_DEV_MODE ?\n
`Navigation ID ${\n
overallTransitionState\n
.id} is not equal to the current navigation id ${\n
this.navigationId}` :\n
"";\n
this.cancelNavigationTransition(\n
overallTransitionState, cancellationReason,\n
NavigationCancellationCode.SupersededByNewNavigation);\n
})\n
// Only clear
current navigation if it is still set to the one that\n
// finalized.\n
if
(this.currentNavigation?.id === overallTransitionState.id) {\n
this.currentNavigation = null;\n
})\n
}),\n
catchError((e) => {\n
errored = true;\n
/* This error type is issued during Redirect, and is handled as a\n
* cancellation rather than an error. *\n
if (isNavigationCancelingError(e)) {\n
if (!isRedirectingNavigationCancelingError(e)) {\n
// Set property only if we're not redirecting.
If we landed on a page\n
// and redirect to `^` route, the new navigation is going to see the\n
// `^` isn't a change from the default currentUrlTree and won't\n
// navigate. This is
only applicable with initial navigation, so\n
// setting `navigated` only when not redirecting
resolves this\n
// scenario.\n
this.navigated = true;\n
this.restoreHistory(overallTransitionState, true);\n
})\n
const navCancel = new
NavigationCancel(\n
overallTransitionState.id,\n
this.serializeUrl(overallTransitionState.extractedUrl), e.message,\n
e.cancellationCode);\n
eventsSubject.next(navCancel);\n
// When redirecting, we need to delay resolving the
navigation\n
// promise and push it to the redirect navigation\n
if

```



```

(!isRedirectingNavigationCancelingError(e)) {\n                                overallTransitionState.resolve(false);\n    } else {\n                                const mergedTree =\nthis.urlHandlingStrategy.merge(e.url,\n    this.rawUrlTree);\n                                const extras = {\n                                skipLocationChange:\n    overallTransitionState.extras.skipLocationChange,\n                                // The URL is already updated at this\npoint if we have 'eager' URL\n                                // updates or if the navigation was triggered by the browser\n(back\n                                // button, URL bar, etc). We want to replace that item in history\n                                //\nif the navigation is rejected.\n                                replaceUrl: this.urlUpdateStrategy === 'eager' ||\n    isBrowserTriggeredNavigation(overallTransitionState.source)\n                                });\nthis.scheduleNavigation(mergedTree, 'imperative', null, extras, {\n                                resolve:\noverallTransitionState.resolve,\n                                reject: overallTransitionState.reject,\n                                promise:\noverallTransitionState.promise\n                                });\n                                }\n                                };\n                                /* All other errors\nshould reset to the router's internal URL reference\n                                * to the pre-error state. */\nelse {\n                                this.restoreHistory(overallTransitionState, true);\n                                const navError = new\nNavigationError(\n                                overallTransitionState.id,\nthis.serializeUrl(overallTransitionState.extractedUrl), e,\n                                overallTransitionState.targetSnapshot\n?? undefined);\n                                eventsSubject.next(navError);\n                                try {\noverallTransitionState.resolve(this.errorHandler(e));\n                                }\n                                } catch (ee) {\n                                overallTransitionState.reject(ee);\n                                }\n                                }\n                                return EMPTY;\n                                });\n                                // TODO(jasonaden): remove cast once g3\nis on updated TypeScript\n                                ))) as any as Observable<NavigationTransition>;\n                                }\n                                /**\n * @internal\n * TODO: this should be removed once the constructor of the router made internal\n * ^\nresetRootComponentType(rootComponentType: Type<any>): void {\n    this.rootComponentType =\nrootComponentType;\n    // TODO: vsavkin router 4.0 should make the root component set to null\n    // this will\nsimplify the lifecycle of the router.\n    this.routerState.root.component = this.rootComponentType;\n}\nprivate\nsetTransition(t: Partial<NavigationTransition>): void {\n    this.transitions.next({...this.transitions.value, ...t});\n}\n/**\n * Sets up the location change\nlistener and performs the initial navigation.\n * ^\ninitialNavigation(): void {\nthis.setUpLocationChangeListener();\n    if (this.navigationId === 0) {\nthis.navigateByUrl(this.location.path(true), {replaceUrl: true});\n    }\n}\n/**\n * Sets up the location change\nlistener. This listener detects navigations triggered from outside\n * the Router (the browser back/forward buttons,\nfor example) and schedules a corresponding Router\n * navigation so that the correct events, guards, etc. are\ntriggered.\n * ^\nsetUpLocationChangeListener(): void {\n    // Don't need to use Zone.wrap any more, because\nzone.js\n    // already patch onPopState, so location change callback will\n    // run into ngZone\n    if\n(!this.locationSubscription) {\n    this.locationSubscription = this.location.subscribe(event => {\n    const source\n= event['type'] === 'popstate' ? 'popstate' : 'hashchange';\n    if (source === 'popstate') {\n    // The\n`setTimeout` was added\nin #12160 and is likely to support Angular/AngularJS\n    // hybrid apps.\n    setTimeout(() => {\nconst extras: NavigationExtras = {replaceUrl: true};\n    // Navigations coming from Angular router have a\nnavigationId state\n    // property. When this exists, restore the state.\n    const state =\nevent.state?.navigationId ? event.state : null;\n    if (state) {\n    const stateCopy = {...state} as\nPartial<RestoredState>;\n    delete stateCopy.navigationId;\n    delete stateCopy.routerPageId;\nif (Object.keys(stateCopy).length !== 0) {\n    extras.state = stateCopy;\n    }\n    }\nconst\nurlTree = this.parseUrl(event['url']!);\n    this.scheduleNavigation(urlTree, source, state, extras);\n    }, 0);\n    }\n    });\n    }\n}\n/** The current URL. *\nget url(): string {\n    return\nthis.serializeUrl(this.currentUrlTree);\n}

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    }
  }

  /** Returns the current `Navigation` object when the router is navigating, and `null` when idle.
   * @return Navigation|null
   */
  getCurrentNavigation(): Navigation | null {
    return this.currentNavigation;
  }

  /** @internal
   * @param event Event
   */
  triggerEvent(event: Event): void {
    (this.events as Subject<Event>).next(event);
  }

  /** Resets the route configuration used for navigation and generating links.
   * @param config The route array for the new configuration.
   * @param usageNotes
   */
  router.resetConfig([
    { path: 'team/:id', component: TeamCmp, children: [
      { path: 'simple', component: SimpleCmp },
      { path: 'user/:name', component: UserCmp }
    ]
  });

  /** resetConfig(config: Routes): void
   * @param NG_DEV_MODE && validateConfig(config);
   * this.config = config.map(standardizeConfig);
   * this.navigated = false;
   * this.lastSuccessfulId = -1;
   */
  @nodoc
  ngOnDestroy(): void {
    this.dispose();
  }

  /** Disposes of the router.
   * @return void
   */
  dispose(): void {
    this.transitions.complete();
    if (this.locationSubscription) {
      this.locationSubscription.unsubscribe();
      this.locationSubscription = undefined;
    }
    this.disposed = true;
  }

  /** Appends URL segments to the current URL tree to create a new URL tree.
   * @param commands An array of URL fragments with which to construct the new URL tree.
   * If the path is static, can be the literal URL string. For a dynamic path, pass an array of path segments, followed by the parameters for each segment.
   * The fragments are applied to the current URL tree or the one provided in the `relativeTo` property of the options object, if supplied.
   * @param navigationExtras Options that control the navigation strategy.
   * @returns The new URL tree.
   * @param usageNotes
   */
  // create /team/33/user/11
  router.createUrlTree(['/team', 33, 'user', 11]);
  // create /team/33;expand=true/user/11
  router.createUrlTree(['/team', 33, {expand: true}, 'user', 11]);
  // you can collapse static segments like this (this works only with the first passed-in value)
  router.createUrlTree(['/team/33/user', userId]);
  // If the first segment can contain slashes, and you do not want the router to split it, you can do the following:
  router.createUrlTree([segmentPath: '/one/two']);
  // create /team/33/(user/11/right:chat)
  router.createUrlTree(['/team', 33, {outlets: {primary: 'user/11', right: 'chat'}}]);
  // remove the right secondary node
  router.createUrlTree(['/team', 33, {outlets: {primary: 'user/11', right: null}}]);
  // assuming the current url is `/team/33/user/11` and the route points to `user/11`
  // navigate to /team/33/user/11/details
  router.createUrlTree(['details', {relativeTo: route}]);
  // navigate to /team/33/user/22
  router.createUrlTree(['../22'], {relativeTo: route});
  // navigate to /team/44/user/22
  router.createUrlTree(['../../team/44/user/22'], {relativeTo: route});
  // Note that a value of `null` or `undefined` for `relativeTo` indicates that the tree should be created relative to the root.
  // createUrlTree(commands: any[], navigationExtras: UrlCreationOptions = {}): UrlTree
  const {relativeTo, queryParams, fragment, queryParamsHandling, preserveFragment} = navigationExtras;
  const a = relativeTo || this.routerState.root;
  const f = preserveFragment ? this.currentUrlTree.fragment : fragment;
  let q: Params | null = null;
  switch (queryParamsHandling) {
    case 'merge':
      q = {...this.currentUrlTree.queryParams, ...queryParams};
      break;
    case 'preserve':
      q = this.currentUrlTree.queryParams;
      break;
    default:
      q = queryParams || null;
  }
  if (q !== null) {
    q = this.removeEmptyProps(q);
  }
  return createUrlTree(a, this.currentUrlTree, commands, q, f ?? null);
}

/** Navigates to a view using an absolute route path.
 * @param url An absolute path for a defined route. The function does not apply any delta to the current URL.
 * @param extras An object containing properties that modify the navigation strategy.
 * @returns A Promise that resolves to 'true' when navigation succeeds, to 'false' when navigation fails, or is rejected on error.
 * @param usageNotes
 * The following calls request navigation to an absolute path.
 * router.navigateByUrl("/team/33/user/11");
 * // Navigate without updating the URL
  router.navigateByUrl("/team/33/user/11", { skipLocationChange: true });
 * @see [Routing and Navigation guide](guide/router)
 * @param url: string | UrlTree, extras: NavigationBehaviorOptions = { skipLocationChange: false }
 * @return Promise<boolean>
   * if (typeof ngDevMode === 'undefined' || ngDevMode && this.isNgZoneEnabled && !NgZone.isInAngularZone()) {
     this.console.warn(`Navigation triggered outside Angular zone, did you forget to call 'ngZone.run()'`);
   }

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}\n\n  const urlTree = isUrlTree(url) ? url : this.parseUrl(url);\n  const mergedTree =
this.urlHandlingStrategy.merge(urlTree, this.rawUrlTree);\n\n  return this.scheduleNavigation(mergedTree,
'imperative', null, extras);\n }\n\n /**\n  * Navigate based on the provided array of commands and a starting
point.\n  * If no starting route is provided, the navigation is absolute.\n  * @param commands An array of
URL fragments with which to construct the target URL.\n  * If the path is static, can be the literal URL string. For a
dynamic path, pass an array of path\n  * segments, followed by the parameters for each segment.\n  * The
fragments are applied to the current URL or the one provided in the `relativeTo` property\n  * of the options
object, if supplied.\n  * @param extras An options object that determines how the URL should be constructed or\n
* interpreted.\n  * @returns A Promise that resolves to `true` when navigation succeeds, to `false` when
navigation\n  * fails,\n  * or is rejected on error.\n  * @usageNotes\n  * The following calls request
navigation to a dynamic route path relative to the current URL.\n  * ``\n  * router.navigate(['team', 33, 'user',
11], {relativeTo: route});\n  * // Navigate without updating the URL, overriding the default behavior\n  *
router.navigate(['team', 33, 'user', 11], {relativeTo: route, skipLocationChange: true});\n  * ``\n  * @see
[Routing and Navigation guide](guide/router)\n  * */\n  navigate(commands: any[], extras: NavigationExtras =
{skipLocationChange: false}): Promise<boolean> {\n    validateCommands(commands);\n
return this.navigateByUrl(this.createUrlTree(commands, extras), extras);\n }\n\n /** Serializes a `UrlTree` into a
string */\n  serializeUrl(url: UrlTree): string {\n    return this.urlSerializer.serialize(url);\n }\n\n /** Parses a string
into a `UrlTree` */\n  parseUrl(url: string): UrlTree {\n    let urlTree: UrlTree;\n    try {\n      urlTree =
this.urlSerializer.parse(url);\n    } catch (e) {\n      urlTree = this.malformedUriErrorHandler(e as URIError,
this.urlSerializer, url);\n    }\n    return urlTree;\n }\n\n /**\n  * Returns whether the url is activated.\n  * @deprecated\n  * Use `IsActiveMatchOptions` instead.\n  * - The equivalent `IsActiveMatchOptions` for
`true` is\n  * `{paths: 'exact', queryParams: 'exact', fragment: 'ignored', matrixParams: 'ignored'}`.\n  * - The
equivalent for `false` is\n  * `{paths: 'subset', queryParams: 'subset', fragment: 'ignored', matrixParams:
'ignored'}`.\n  * */\n  isActive(url: string|UrlTree,
exact: boolean): boolean;\n\n /**\n  * Returns whether the url is activated.\n  * */\n  isActive(url: string|UrlTree,
matchOptions: IsActiveMatchOptions): boolean;\n\n /** @internal */\n  isActive(url: string|UrlTree, matchOptions:
boolean|IsActiveMatchOptions): boolean;\n  isActive(url: string|UrlTree, matchOptions:
boolean|IsActiveMatchOptions): boolean {\n    let options: IsActiveMatchOptions;\n    if (matchOptions === true)\n    {\n      options = {...exactMatchOptions};\n    } else if (matchOptions === false) {\n      options =
{...subsetMatchOptions};\n    } else {\n      options = matchOptions;\n    }\n    if (isUrlTree(url)) {\n      return
containsTree(this.currentUrlTree, url, options);\n    }\n\n    const urlTree = this.parseUrl(url);\n    return
containsTree(this.currentUrlTree, urlTree, options);\n }\n\n private removeEmptyProps(params: Params): Params
{\n    return Object.keys(params).reduce((result: Params, key: string) => {\n      const value: any = params[key];\n
      if (value !== null && value !== undefined) {\n        result[key] = value;\n      }\n      return result;\n    }, {});\n
}\n\n private processNavigations(): void {\n    this.navigations.subscribe(\n      t => {\n        this.navigated =
true;\n        this.lastSuccessfulId = t.id;\n        this.currentPageId = t.targetPageId;\n        (this.events as
Subject<Event>)\n          .next(new NavigationEnd(\n            t.id, this.serializeUrl(t.extractedUrl),
this.serializeUrl(this.currentUrlTree));\n        this.lastSuccessfulNavigation = this.currentNavigation;\n
this.titleStrategy?.updateTitle(this.routerState.snapshot);\n        t.resolve(true);\n      },\n      e => {\n
this.console.warn('Unhandled Navigation Error: ${e}');\n      });\n    }\n\n    private scheduleNavigation(\n
rawUrl: UrlTree, source: NavigationTrigger, restoredState: RestoredState|null,\n      extras: NavigationExtras,\n
priorPromise?: {resolve: any, reject:
any, promise: Promise<boolean>}): Promise<boolean> {\n      if (this.disposed) {\n        return
Promise.resolve(false);\n      }\n\n      let resolve: any;\n      let reject: any;\n      let promise: Promise<boolean>;\n      if
(priorPromise) {\n        resolve = priorPromise.resolve;\n        reject = priorPromise.reject;\n        promise =
priorPromise.promise;\n      } else {\n        promise = new Promise<boolean>((res, rej) => {\n          resolve = res;\n
          reject = rej;\n        });\n      }\n\n      const id = ++this.navigationId;\n      let targetPageId: number;\n      if
(this.canceledNavigationResolution === 'computed') {\n        const isInitialPage = this.currentPageId === 0;\n        if

```

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(isInitialPage) {\n    restoredState = this.location.getState() as RestoredState | null;\n    }\n    // If the
`routerPageId` exist in the state then `targetpageId` should have the value of\n    // `routerPageId`. This is the case
for something like a page refresh where we assign the\n    // target id to
the previously set value for that page.\n    if (restoredState && restoredState.routerPageId) {\n    targetPageId =
restoredState.routerPageId;\n    } else {\n    // If we're replacing the URL or doing a silent navigation, we do not
want to increment the\n    // page id because we aren't pushing a new entry to history.\n    if (extras.replaceUrl ||
extras.skipLocationChange) {\n    targetPageId = this.browserPageId ?? 0;\n    } else {\n    targetPageId =
(this.browserPageId ?? 0) + 1;\n    }\n    }\n    } else {\n    // This is unused when
`canceledNavigationResolution` is not computed.\n    targetPageId = 0;\n    }\n\n    this.setTransition({\n    id,\n    targetPageId,\n    source,\n    restoredState,\n    currentUrlTree: this.currentUrlTree,\n    currentRawUrl:
this.rawUrlTree,\n    rawUrl,\n    extras,\n    resolve,\n    reject,\n    promise,\n    currentSnapshot:
this.routerState.snapshot,\n    currentRouterState:
this.routerState\n    });\n\n    // Make sure that the error is propagated even though `processNavigations` catch\n    //
handler does not rethrow\n    return promise.catch((e: any) => {\n    return Promise.reject(e);\n    });\n    }\n\n    private setBrowserUrl(url: UrlTree, t: NavigationTransition) {\n    const path = this.urlSerializer.serialize(url);\n    const state = {...t.extras.state, ...this.generateNgRouterState(t.id, t.targetPageId)};\n    if
(this.location.isCurrentPathEqualTo(path) || !t.extras.replaceUrl) {\n    this.location.replaceState(path, "", state);\n    }
else {\n    this.location.go(path, "", state);\n    }\n    }\n\n    /**\n    * Performs the necessary rollback action to restore
the browser URL to the\n    * state before the transition.\n    */\n    private restoreHistory(t: NavigationTransition,
restoringFromCaughtError = false) {\n    if (this.canceledNavigationResolution === 'computed') {\n    const
targetPagePosition = this.currentPageId - t.targetPageId;\n
// The navigator change the location before triggered the browser event,\n    // so we need to go back to the
current url if the navigation is canceled.\n    // Also, when navigation gets cancelled while using url update strategy
eager, then we need to\n    // go back. Because, when `urlUpdateStrategy` is `eager`; `setBrowserUrl` method is
called\n    // before any verification.\n    const browserUrlUpdateOccurred =\n    (t.source === 'popstate' ||
this.urlUpdateStrategy === 'eager' ||\n    this.currentUrlTree === this.currentNavigation?.finalUrl);\n    if
(browserUrlUpdateOccurred && targetPagePosition !== 0) {\n    this.location.historyGo(targetPagePosition);\n    }
else if (\n    this.currentUrlTree === this.currentNavigation?.finalUrl && targetPagePosition === 0) {\n    //
We got to the activation stage (where currentUrlTree is set to the navigation's\n    // finalUrl), but we weren't
moving anywhere in history (skipLocationChange
or replaceUrl).\n    // We still need to reset the router state back to what it was when the navigation started.\n
this.resetState(t);\n    // TODO(atscott): resetting the `browserUrlTree` should really be done in `resetState`.\n
// Investigate if this can be done by running TGP.\n    this.browserUrlTree = t.currentUrlTree;\n
this.resetUrlToCurrentUrlTree();\n    } else {\n    // The browser URL and router state was not updated before the
navigation cancelled so\n    // there's no restoration needed.\n    }\n    } else if
(this.canceledNavigationResolution === 'replace') {\n    // TODO(atscott): It seems like we should _always_ reset
the state here. It would be a no-op\n    // for `deferred` navigations that haven't change the internal state yet because
guards\n    // reject. For 'eager' navigations, it seems like we also really should reset the state\n    // because the
navigation was cancelled. Investigate if this can be done
by running TGP.\n    if (restoringFromCaughtError) {\n    this.resetState(t);\n    }\n
this.resetUrlToCurrentUrlTree();\n    }\n    }\n\n    private resetState(t: NavigationTransition): void {\n    (this as
{routerState: RouterState}).routerState = t.currentRouterState;\n    this.currentUrlTree = t.currentUrlTree;\n    //
Note here that we use the urlHandlingStrategy to get the reset `rawUrlTree` because it may be\n    // configured to
handle only part of the navigation URL. This means we would only want to reset\n    // the part of the navigation
handled by the Angular router rather than the whole URL. In\n    // addition, the URLHandlingStrategy may be
configured to specifically preserve parts of the URL\n    // when merging, such as the query params so they are not
lost on a refresh.\n    this.rawUrlTree = this.urlHandlingStrategy.merge(this.currentUrlTree, t.rawUrl);\n    }\n\n    private resetUrlToCurrentUrlTree(): void {\n    this.location.replaceState(\n

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this.urlSerializer.serialize(this.rawUrlTree),
",\n    this.generateNgRouterState(this.lastSuccessfulId, this.currentPageId));\n }\n\n private
cancelNavigationTransition(\n    t: NavigationTransition, reason: string, code: NavigationCancellationCode) {\n
const navCancel = new NavigationCancel(t.id, this.serializeUrl(t.extractedUrl), reason, code);\n
this.triggerEvent(navCancel);\n    t.resolve(false);\n }\n\n private generateNgRouterState(navigationId: number,
routerPageId?: number) {\n    if (this.canceledNavigationResolution === 'computed') {\n        return {navigationId,
routerPageId: routerPageId};\n    }\n    return {navigationId};\n }\n}\n\nfunction validateCommands(commands:
string[]): void {\n    for (let i = 0; i < commands.length; i++) {\n        const cmd = commands[i];\n        if (cmd == null) {\n
throw new RuntimeError(\n            RuntimeErrorCode.NULLISH_COMMAND,\n            NG_DEV_MODE &&
`The requested path contains ${cmd} segment at index ${i}`);\n        }\n    }\n}\n\nfunction
isBrowserTriggeredNavigation(source: 'imperative'|'popstate'|'hashchange') {\n    return source !==
'imperative';\n }\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {LocationStrategy} from '@angular/common';\nimport {Attribute, Directive, ElementRef,
HostBinding, HostListener, Input, OnChanges, OnDestroy, Renderer2, SimpleChanges, coerceToBoolean as
coerceToBoolean} from '@angular/core';\nimport {Subject, Subscription} from 'rxjs';\n\nimport {Event,
NavigationEnd} from './events';\nimport {QueryParamsHandling} from './models';\nimport {Router} from
'./router';\nimport {ActivatedRoute} from './router_state';\nimport {Params} from './shared';\nimport {UrlTree}
from './url_tree';\n\n/**\n * @description\n * When applied to an element in a template, makes that element a
link\n * that initiates navigation
to a route. Navigation opens one or more routed components\n * in one or more `` locations on the
page.\n *\n * Given a route configuration `{ path: 'user/:name', component: UserCmp }`,\n * the following creates
a static link to the route:\n *\n * `

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example:\n * \n * ``\n * <a [routerLink]='[/user/bob']" [state]='{tracingId: 123}'">\n * link to user
component\n * </a>\n * ``\n * \n * Use { @link Router.getCurrentNavigation() Router#getCurrentNavigation } to
retrieve a saved\n * navigation-state value. For example, to capture the `tracingId` during the `NavigationStart`\n *
event:\n * \n * ``\n * // Get NavigationStart events\n * router.events.pipe(filter(e => e instanceof
NavigationStart)).subscribe(e => {\n * const navigation = router.getCurrentNavigation();\n *
tracingService.trace({id: navigation.extras.state.tracingId});\n * });\n * ``\n * \n * @ngModule RouterModule\n * \n * @publicApi\n * \n * @Directive({\n selector: ':not(a):not(area)[routerLink]',\n standalone: true,\n })\n * \n * export class
RouterLink implements OnChanges {\n private _preserveFragment = false;\n private _skipLocationChange =
false;\n private _replaceUrl = false;\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree } as
part of the\n
* `UrlCreationOptions`.\n * @see { @link UrlCreationOptions#queryParams
UrlCreationOptions#queryParams }\n * @see { @link Router#createUrlTree Router#createUrlTree }\n * \n * @Input() queryParams?: Params|null;\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree } as
part of the\n
* `UrlCreationOptions`.\n * @see { @link UrlCreationOptions#fragment
UrlCreationOptions#fragment }\n * @see { @link Router#createUrlTree Router#createUrlTree }\n * \n * @Input()
fragment?: string;\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree } as part of the\n
* `UrlCreationOptions`.\n * @see { @link UrlCreationOptions#queryParamsHandling
UrlCreationOptions#queryParamsHandling }\n * @see { @link Router#createUrlTree Router#createUrlTree }\n
* \n * @Input() queryParamsHandling?: QueryParamsHandling|null;\n /**\n * Passed to { @link
Router#navigateByUrl Router#navigateByUrl } as part of the\n
* `NavigationBehaviorOptions`.\n * @see { @link
NavigationBehaviorOptions#state
NavigationBehaviorOptions#state }\n * @see { @link Router#navigateByUrl Router#navigateByUrl }\n * \n * @Input() state?: {[k: string]: any};\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree } as
part of the\n
* `UrlCreationOptions`.\n * Specify a value here when you do not want to use the default value\n *
for `routerLink`, which is the current activated route.\n * Note that a value of `undefined` here will use the
`routerLink` default.\n * @see { @link UrlCreationOptions#relativeTo UrlCreationOptions#relativeTo }\n * @see
{ @link Router#createUrlTree Router#createUrlTree }\n * \n * @Input() relativeTo?: ActivatedRoute|null;\n\n
private commands: any[]|null = null;\n /** @internal * \n * onChanges = new Subject<RouterLink>();\n\n
constructor(\n private router: Router, private route: ActivatedRoute,\n @Attribute('tabindex') private readonly
tabIndexAttribute: string|null|undefined,\n private readonly renderer: Renderer2,\n
private readonly el: ElementRef) {\n this.setTabIndexIfNotOnNativeEl('0');\n }\n /**\n * Passed to { @link
Router#createUrlTree Router#createUrlTree } as part of the\n
* `UrlCreationOptions`.\n * @see { @link
UrlCreationOptions#preserveFragment UrlCreationOptions#preserveFragment }\n * @see { @link
Router#createUrlTree Router#createUrlTree }\n * \n * @Input()\n set preserveFragment(preserveFragment:
boolean|string|null|undefined) {\n this._preserveFragment = coerceToBoolean(preserveFragment);\n }\n\n
get preserveFragment(): boolean {\n return this._preserveFragment;\n }\n\n /**\n * Passed to { @link
Router#navigateByUrl Router#navigateByUrl } as part of the\n
* `NavigationBehaviorOptions`.\n * @see { @link
NavigationBehaviorOptions#skipLocationChange NavigationBehaviorOptions#skipLocationChange }\n * @see
{ @link Router#navigateByUrl Router#navigateByUrl }\n * \n * @Input()\n set
skipLocationChange(skipLocationChange: boolean|string|null|undefined) {\n
this._skipLocationChange = coerceToBoolean(skipLocationChange);\n }\n\n
get skipLocationChange(): boolean
{\n return this._skipLocationChange;\n }\n\n /**\n * Passed to { @link Router#navigateByUrl
Router#navigateByUrl } as part of the\n
* `NavigationBehaviorOptions`.\n * @see { @link
NavigationBehaviorOptions#replaceUrl NavigationBehaviorOptions#replaceUrl }\n * @see { @link
Router#navigateByUrl Router#navigateByUrl }\n * \n * @Input()\n set replaceUrl(replaceUrl:
boolean|string|null|undefined) {\n this._replaceUrl = coerceToBoolean(replaceUrl);\n }\n\n
get replaceUrl():
boolean {\n return this._replaceUrl;\n }\n\n /**\n * Modifies the tab index if there was not a tabindex attribute
on the element during\n
* instantiation.\n * \n * private setTabIndexIfNotOnNativeEl(newTabIndex: string|null)

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{\n  if (this.tabIndexAttribute != null /* both `null` and `undefined` */) {\n    return;\n  }\n  const renderer =
this.renderer;\n  const nativeElement = this.el.nativeElement;\n
  if (newTabIndex !== null) {\n    renderer.setAttribute(nativeElement, 'tabindex', newTabIndex);\n  } else {\n
renderer.removeAttribute(nativeElement, 'tabindex');\n  }\n}\n\n /** @nodoc */\n ngOnChanges(changes:
SimpleChanges) {\n  // This is subscribed to by `RouterLinkActive` so that it knows to update when there are
changes\n  // to the RouterLinks it's tracking.\n  this.onChanges.next(this);\n}\n\n /**\n * Commands to pass to
{@link Router#createUrlTree Router#createUrlTree}.\n * - **array***: commands to pass to {@link
Router#createUrlTree Router#createUrlTree}.\n * - **string***: shorthand for array of commands with just the
string, i.e. `[route]`\n * - **null|undefined***: effectively disables the `routerLink`\n * @see {@link
Router#createUrlTree Router#createUrlTree}\n */\n @Input()\n set routerLink(commands:
any[]|string|null|undefined) {\n  if (commands != null) {\n    this.commands = Array.isArray(commands)
? commands : [commands];\n    this.setTabIndexIfNotOnNativeEl('0');\n  } else {\n    this.commands = null;\n
this.setTabIndexIfNotOnNativeEl(null);\n  }\n}\n\n /** @nodoc */\n @HostListener('click')\n onClick():
boolean {\n  if (this.urlTree === null) {\n    return true;\n  }\n\n  const extras = {\n    skipLocationChange:
this.skipLocationChange,\n    replaceUrl: this.replaceUrl,\n    state: this.state,\n  };\n
this.router.navigateByUrl(this.urlTree, extras);\n  return true;\n}\n\n get urlTree(): UrlTree|null {\n  if
(this.commands === null) {\n    return null;\n  }\n  return this.router.createUrlTree(this.commands, {\n  // If
the `relativeTo` input is not defined, we want to use `this.route` by default.\n  // Otherwise, we should use the
value provided by the user in the input.\n    relativeTo: this.relativeTo !== undefined ? this.relativeTo : this.route,\n
    queryParams: this.queryParams,\n    fragment: this.fragment,\n
    queryParamsHandling: this.queryParamsHandling,\n    preserveFragment: this.preserveFragment,\n  });\n}\n}\n\n/**\n * @description\n */\n * Lets you link to specific routes in your app.\n */\n * See `RouterLink` for more
information.\n */\n * @ngModule RouterModule\n */\n * @publicApi\n */\n @Directive({selector:
'a[routerLink],area[routerLink]', standalone: true})\nexport class RouterLinkWithHref implements OnChanges,
OnDestroy {\n  private _preserveFragment = false;\n  private _skipLocationChange = false;\n  private _replaceUrl =
false;\n\n  // TODO(issue/24571): remove '!'.\n  @HostBinding('attr.target') @Input() target!: string;\n\n /**\n *
Passed to {@link Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see
{@link Router#createUrlTree Router#createUrlTree}\n * @see {@link Router#createUrlTree Router#createUrlTree}\n
*/\n @Input() queryParams?: Params|null;\n\n /**\n * Passed to
{@link Router#createUrlTree
Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see {@link Router#createUrlTree Router#createUrlTree}\n
*/\n @Input() queryParamsHandling?: QueryParamsHandling|null;\n\n /**\n * Passed to {@link
Router#navigateByUrl Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see {@link
Router#navigateByUrl Router#navigateByUrl}\n */\n @Input() state?: {[k: string]: any};\n\n /**\n * Passed to
{@link Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n
* Specify a value here when you do not want to use the default value\n * for `routerLink`, which is the current
activated route.\n * Note that a value of `undefined` here will use the `routerLink` default.\n * @see {@link
Router#createUrlTree Router#createUrlTree}\n */\n @Input() relativeTo?: ActivatedRoute|null;\n\n private commands: any[]|null =
null;\n  private subscription: Subscription;\n\n  // the url displayed on the anchor element.\n  //
@HostBinding('attr.href') is used rather than @HostBinding() because it removes the\n  // href attribute when it
becomes `null`.\n  @HostBinding('attr.href') href: string|null = null;\n\n /** @internal */\n  ngOnChanges = new
Subject<RouterLinkWithHref>();\n\n  constructor(\n    private router: Router, private route: ActivatedRoute,\n

```

```

private locationStrategy: LocationStrategy) {\n  this.subscription = router.events.subscribe((s:
Event) => {\n    if (s instanceof NavigationEnd) {\n      this.updateTargetUrlAndHref();\n    }\n  });\n}\n\n/**\n * Passed to {@link Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see {@link UrlCreationOptions#preserveFragment UrlCreationOptions#preserveFragment}\n * @see {@link Router#createUrlTree Router#createUrlTree}\n */\n @Input()\n set preserveFragment(preserveFragment:
boolean|string|null|undefined) {\n  this._preserveFragment = coerceToBoolean(preserveFragment);\n }\n\n get
preserveFragment(): boolean {\n  return this._preserveFragment;\n }\n\n /**\n * Passed to {@link
Router#navigateByUrl Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see {@link
NavigationBehaviorOptions#skipLocationChange NavigationBehaviorOptions#skipLocationChange}\n * @see
{@link Router#navigateByUrl Router#navigateByUrl}\n */\n @Input()\n set
skipLocationChange(skipLocationChange: boolean|string|null|undefined)
{\n  this._skipLocationChange = coerceToBoolean(skipLocationChange);\n }\n\n get skipLocationChange():
boolean {\n  return this._skipLocationChange;\n }\n\n /**\n * Passed to {@link Router#navigateByUrl
Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see {@link
NavigationBehaviorOptions#replaceUrl NavigationBehaviorOptions#replaceUrl}\n * @see {@link
Router#navigateByUrl Router#navigateByUrl}\n */\n @Input()\n set replaceUrl(replaceUrl:
boolean|string|null|undefined) {\n  this._replaceUrl = coerceToBoolean(replaceUrl);\n }\n\n get replaceUrl():
boolean {\n  return this._replaceUrl;\n }\n\n /**\n * Commands to pass to {@link Router#createUrlTree
Router#createUrlTree}.\n * - **array**: commands to pass to {@link Router#createUrlTree
Router#createUrlTree}.\n * - **string**: shorthand for array of commands with just the string, i.e. `['/route']`\n *
- **null|undefined**: Disables the link by removing
the `href`\n * @see {@link Router#createUrlTree Router#createUrlTree}\n */\n @Input()\n set
routerLink(commands: any[]|string|null|undefined) {\n  if (commands !== null) {\n    this.commands =
Array.isArray(commands) ? commands : [commands];\n  } else {\n    this.commands = null;\n  }\n}\n\n /**
@nodoc */\n ngOnChanges(changes: SimpleChanges): any {\n  this.updateTargetUrlAndHref();\n
this.onChanges.next(this);\n }\n\n /** @nodoc */\n ngOnDestroy(): any {\n  this.subscription.unsubscribe();\n
}\n\n /** @nodoc */\n @HostListener(\n  'click',\n  ['$event.button', '$event.ctrlKey', '$event.shiftKey',
'$event.altKey', '$event.metaKey'])\n onlick(button: number, ctrlKey: boolean, shiftKey: boolean, altKey:
boolean, metaKey: boolean):\n  boolean {\n    if (button !== 0 || ctrlKey || shiftKey || altKey || metaKey) {\n
return true;\n    }\n\n    if (typeof this.target === 'string' && this.target !== '_self' || this.urlTree === null) {\n
return
true;\n    }\n\n    const extras = {\n      skipLocationChange: this.skipLocationChange,\n      replaceUrl:
this.replaceUrl,\n      state: this.state\n    };\n    this.router.navigateByUrl(this.urlTree, extras);\n    return false;\n
}\n\n private updateTargetUrlAndHref(): void {\n  this.href = this.urlTree !== null ?\n
this.locationStrategy.prepareExternalUrl(this.router.serializeUrl(this.urlTree)) :\n  null;\n }\n\n get urlTree():
UrlTree|null {\n  if (this.commands === null) {\n    return null;\n  }\n  return
this.router.createUrlTree(this.commands, {\n    // If the `relativeTo` input is not defined, we want to use `this.route`
by default.\n    // Otherwise, we should use the value provided by the user in the input.\n    relativeTo:
this.relativeTo !== undefined ? this.relativeTo : this.route,\n    queryParams: this.queryParams,\n    fragment:
this.fragment,\n    queryParamsHandling: this.queryParamsHandling,\n    preserveFragment:
this.preserveFragment,\n  });\n }\n}\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {AfterContentInit, ChangeDetectorRef, ContentChildren, Directive, ElementRef, EventEmitter, Input,
OnChanges, OnDestroy, Optional, Output, QueryList, Renderer2, SimpleChanges} from '@angular/core';\nimport
{from, of, Subscription} from 'rxjs';\nimport {mergeAll} from 'rxjs/operators';\nimport {Event, NavigationEnd}
from '../events';\nimport {Router} from '../router';\nimport {IsActiveMatchOptions} from '../url_tree';\nimport
{RouterLink, RouterLinkWithHref} from '../router_link';\n\n/**\n * @description\n */\n * Tracks whether the

```



linked route of an element is currently active, and allows you to specify one or more CSS classes to add to the element when the linked route is active. Use this directive to create a visual distinction for elements associated with an active route. For example, the following code highlights the word "Bob" when the router activates the associated route:

```
<a routerLink="/user/bob" routerLinkActive="active-link">Bob</a>
```

Whenever the URL is either '/user' or '/user/bob', the "active-link" class is added to the anchor tag. If the URL changes, the class is removed. You can set more than one class using a space-separated string or an array. For example:

```
<a routerLink="/user/bob" routerLinkActive="class1 class2">Bob</a>
```

```
[routerLinkActive]="['class1', 'class2']">Bob</a>
```

To add the classes only when the URL matches the link exactly, add the option `exact: true`:

```
<a routerLink="/user/bob" routerLinkActive="active-link" [routerLinkActiveOptions]="{exact: true}">Bob</a>
```

To directly check the `isActive` status of the link, assign the `RouterLinkActive` instance to a template variable. For example, the following checks the status without assigning any CSS classes:

```
<a routerLink="/user/bob" routerLinkActive #rla="routerLinkActive"> Bob {{ rla.isActive ? '(already open)' : '' }}</a>
```

You can apply the `RouterLinkActive` directive to an ancestor of linked elements. For example, the following sets the active-link class on the `<div>` parent tag when the URL is either '/user/jim' or '/user/bob'.

```
<div routerLinkActive="active-link" [routerLinkActiveOptions]="{exact: true}"> <a routerLink="/user/jim">Jim</a> <a routerLink="/user/bob">Bob</a></div>
```

The `RouterLinkActive` directive can also be used to set the `aria-current` attribute to provide an alternative distinction for active elements to visually impaired users. For example, the following code adds the 'active' class to the Home Page link when it is indeed active and in such case also sets its `aria-current` attribute to 'page':

```
<a routerLink="/" routerLinkActive="active" ariaCurrentWhenActive="page">Home Page</a>
```

```
@NgModule RouterModule @publicApi @Directive({ selector: '[routerLinkActive]', exports: 'routerLinkActive', standalone: true,})
export class RouterLinkActive implements OnChanges, OnDestroy, AfterContentInit {
  @ContentChildren(RouterLink, { descendants: true }) links!: QueryList<RouterLink>;
  @ContentChildren(RouterLinkWithHref, { descendants: true }) linksWithHrefs!: QueryList<RouterLinkWithHref>;
  private classes: string[] = [];
  private routerEventsSubscription: Subscription;
  private linkInputChangesSubscription?: Subscription;
  public readonly isActive: boolean = false;

  /** Options to configure how to determine if the router link is active. These options are passed to the Router.isActive() function. @see Router.isActive @Input() routerLinkActiveOptions: {exact: boolean}|IsActiveMatchOptions = {exact: false};

  /** Aria-current attribute to apply when the router link is active. Possible values: 'page' | 'step' | 'location' | 'date' | 'time' | 'true' | 'false'. @see {@link https://developer.mozilla.org/en-US/docs/Web/Accessibility/ARIA/Attributes/aria-current}

  @Input() ariaCurrentWhenActive?: 'page'|'step'|'location'|'date'|'time'|true|false;

  /** You can use the output 'isActiveChange' to get notified each time the link becomes active or inactive. Emits: true -> Route is active false -> Route is inactive

  (isActiveChange)="this.onRouterLinkActive($event)">Bob</a>
```

```
@Output() readonly isActiveChange: EventEmitter<boolean> = new EventEmitter();
constructor(private router: Router, private element: ElementRef, private renderer: Renderer2, private readonly cdr: ChangeDetectorRef, @Optional() private link?: RouterLink, @Optional() private linkWithHref?: RouterLinkWithHref) {
  this.routerEventsSubscription = router.events.subscribe((s: Event) => {
    if (s instanceof NavigationEnd) {
      this.update();
    }
  });
}
/** @nodoc
ngAfterContentInit(): void {
  // `of(null)` is used to force subscribe body to execute once immediately (like `startWith`).
  of(this.links.changes, this.linksWithHrefs.changes, of(null)).pipe(mergeAll()).subscribe(_ => {
    this.update();
    this.subscribeToEachLinkOnChanges();
  });
}
```

```

});\n }\n\n private subscribeToEachLinkOnChanges() {\n  this.linkInputChangeSubscription?.unsubscribe();\n  const allLinkChanges =\n    [...this.links.toArray(), ...this.linksWithHrefs.toArray(), this.link, this.linkWithHref]\n    .filter((link): link is RouterLink|RouterLinkWithHref => !!link)\n    .map(link => link.onChanges);\n  this.linkInputChangeSubscription = from(allLinkChanges).pipe(mergeAll()).subscribe(link => {\n    if\n      (this.isActive !== this.isLinkActive(this.router)(link)) {\n        this.update();\n      }\n    });\n  }\n\n  @Input()\n  set\n  routerLinkActive(data: string[]|string) {\n    const classes = Array.isArray(data) ? data : data.split('');\n    this.classes\n      = classes.filter(c => !!c);\n  }\n\n  /** @nodoc */\n  ngOnChanges(changes: SimpleChanges): void {\n    this.update();\n  }\n\n  /** @nodoc */\n  ngOnDestroy(): void {\n    this.routerEventsSubscription.unsubscribe();\n    this.linkInputChangeSubscription?.unsubscribe();\n  }\n\n  private update(): void {\n    if (!this.links ||\n      !this.linksWithHrefs || !this.router.navigated) return;\n    Promise.resolve().then(() => {\n      const hasActiveLinks =\n        this.hasActiveLinks();\n      if (this.isActive !== hasActiveLinks)\n        {\n          (this as any).isActive = hasActiveLinks;\n          this.cdr.markForCheck();\n          this.classes.forEach((c) => {\n            if (hasActiveLinks) {\n              this.renderer.addClass(this.element.nativeElement, c);\n            } else {\n              this.renderer.removeClass(this.element.nativeElement, c);\n            }\n          });\n          if (hasActiveLinks &&\n            this.ariaCurrentWhenActive !== undefined) {\n            this.renderer.setAttribute(\n              this.element.nativeElement, 'aria-current', this.ariaCurrentWhenActive.toString());\n          } else {\n            this.renderer.removeAttribute(this.element.nativeElement, 'aria-current');\n          }\n          // Emit on isActiveChange\n          after classes are updated\n          this.isActiveChange.emit(hasActiveLinks);\n        }\n    });\n  }\n\n  private\n  isLinkActive(router: Router): (link: (RouterLink|RouterLinkWithHref)) => boolean {\n    const options:\n      boolean|IsActiveMatchOptions =\n        isActiveMatchOptions(this.routerLinkActiveOptions)\n        ?\n          this.routerLinkActiveOptions :\n          // While the types should disallow `undefined` here, it's possible\n          without strict inputs\n          (this.routerLinkActiveOptions.exact || false);\n    return (link:\n      RouterLink|RouterLinkWithHref) =>\n      link.urlTree ? router.isActive(link.urlTree, options) : false;\n  }\n\n  private\n  hasActiveLinks(): boolean {\n    const isActiveCheckFn = this.isLinkActive(this.router);\n    return this.link\n      && isActiveCheckFn(this.link) ||\n      this.linkWithHref && isActiveCheckFn(this.linkWithHref) ||\n      this.links.some(isActiveCheckFn) || this.linksWithHrefs.some(isActiveCheckFn);\n  }\n\n  /**\n   * Use instead of\n   * `paths` in options` to be compatible with property renaming\n   */\n  function\n  isActiveMatchOptions(options: {exact:\n    boolean})\n    IsActiveMatchOptions): options is\n    IsActiveMatchOptions {\n    return\n      !!(\n        options as\n        IsActiveMatchOptions).paths;\n  }\n\n  "","*\n  * @license\n  *\n  * Copyright Google LLC All Rights Reserved.\n  * Use of this source code is governed by an MIT-style license\n  * that can be\n  * found in the LICENSE file at https://angular.io/license\n  */\n  import {Compiler,\n    createEnvironmentInjector, EnvironmentInjector, Injectable, OnDestroy} from '@angular/core';\n  import {from,\n    Observable, of, Subscription} from 'rxjs';\n  import {catchError, concatMap, filter, mergeAll, mergeMap} from\n    'rxjs/operators';\n  import {Event, NavigationEnd} from './events';\n  import {LoadedRouterConfig, Route, Routes}\n    from './models';\n  import {Router} from './router';\n  import {RouterConfigLoader} from\n    './router_config_loader';\n\n  /**\n   * @description\n   * Provides a preloading strategy.\n   */\n  * @publicApi\n  *\n  */\n  export\n  abstract class\n  PreloadingStrategy {\n    abstract\n    preload(route: Route, fn: () => Observable<any>):\n      Observable<any>;\n  }\n\n  /**\n   * @description\n   * Provides a preloading strategy that preloads all modules as\n   * quickly as possible.\n   */\n  * ```\n  * RouterModule.forRoot(ROUTES,\n    {\n      preloadingStrategy: PreloadAllModules\n    })\n  */\n  * @publicApi\n  */\n  @Injectable({providedIn:\n    'root'})\n  export\n  class\n  PreloadAllModules\n  implements\n  PreloadingStrategy {\n    preload(route: Route, fn: () =>\n      Observable<any>):\n      Observable<any> {\n      return\n        fn().pipe(\n          catchError(() => of(null));\n        );\n    }\n  }\n\n  /**\n   * @description\n   * Provides a preloading strategy that does not preload any modules.\n   * This strategy is\n   * enabled by default.\n   */\n  * @publicApi\n  */\n  @Injectable({providedIn:\n    'root'})\n  export\n  class\n  NoPreloading\n  implements\n  PreloadingStrategy {\n    preload(route: Route, fn: () =>\n      Observable<any>):\n      Observable<any> {\n      return\n        of(null);\n    }\n  }\n\n  /**\n   * The preloader optimistically loads all router configurations to\n   * make\n   * navigations into lazily-loaded sections of the application faster.\n   */\n  * The preloader runs in the background. When\n   * the router bootstraps, the preloader\n   * starts listening to all navigation events. After every such event, the

```

```

preloader\n
 * will check if any configurations can be loaded lazily.\n *\n * If a route is protected by `canLoad` guards, the
preloaded will not load it.\n *\n * @publicApi\n *\n@Injectables({providedIn: 'root'})\nexport class
RouterPreloader implements OnDestroy {\n private subscription?: Subscription;\n\n constructor(\n private
router: Router, compiler: Compiler, private injector: EnvironmentInjector,\n private preloadingStrategy:
PreloadingStrategy, private loader: RouterConfigLoader) {\n\n setUpPreloading(): void {\n this.subscription =\n
this.router.events\n .pipe(filter((e: Event) => e instanceof NavigationEnd), concatMap(() =>
this.preload()))\n .subscribe(() => {});\n }\n\n preload(): Observable<any> {\n return
this.processRoutes(this.injector, this.router.config);\n }\n\n /** @nodoc *\n ngOnDestroy(): void {\n if
(this.subscription) {\n this.subscription.unsubscribe();\n }\n }\n\n private processRoutes(injector:
EnvironmentInjector, routes: Routes): Observable<void> {\n const res: Observable<any>[] = [];\n for (const
route of routes) {\n if (route.providers && !route._injector) {\n route._injector =\n
createEnvironmentInjector(route.providers, injector, `Route: ${route.path}`);\n }\n\n const
injectorForCurrentRoute = route._injector ?? injector;\n const injectorForChildren = route._loadedInjector ??
injectorForCurrentRoute;\n\n // Note that `canLoad` is only checked as a condition that prevents `loadChildren`
and not\n // `loadComponent`. `canLoad` guards only block loading of child routes by design. This\n //
happens as a consequence of needing to descend into children for route matching immediately\n // while
component loading is deferred until route activation. Because `canLoad` guards can\n // have side effects, we
cannot execute them here so we instead skip preloading altogether\n // when present. Lastly, it remains
to be decided whether `canLoad` should behave this way\n // at all. Code splitting and lazy loading is separate
from client-side authorization checks\n // and should not be used as a security measure to prevent loading of
code.\n if ((route.loadChildren && !route._loadedRoutes && route.canLoad === undefined) ||\n
(route.loadComponent && !route._loadedComponent)) {\n
res.push(this.preloadConfig(injectorForCurrentRoute, route));\n } else if (route.children || route._loadedRoutes)
{\n res.push(this.processRoutes(injectorForChildren, (route.children ?? route._loadedRoutes)!));\n }\n }\n
return from(res).pipe(mergeAll());\n }\n\n private preloadConfig(injector: EnvironmentInjector, route: Route):
Observable<void> {\n return this.preloadingStrategy.preload(route, () => {\n let loadedChildren$:
Observable<LoadedRouterConfig|null>;\n if (route.loadChildren && route.canLoad === undefined) {\n
loadedChildren$ = this.loader.loadChildren(injector,\n
route);\n } else {\n loadedChildren$ = of(null);\n }\n\n const recursiveLoadChildren$ =\n
loadedChildren$.pipe(mergeMap((config: LoadedRouterConfig|null) => {\n if (config === null) {\n
return of(void 0);\n }\n\n route._loadedRoutes = config.routes;\n route._loadedInjector =
config.injector;\n\n // If the loaded config was a module, use that as the module/module injector going\n
// forward. Otherwise, continue using the current module/module injector.\n return
this.processRoutes(config.injector ?? injector, config.routes);\n }));\n if (route.loadComponent &&
!route._loadedComponent) {\n const loadComponent$ = this.loader.loadComponent(route);\n return
from([recursiveLoadChildren$, loadComponent$]).pipe(mergeAll());\n } else {\n return
recursiveLoadChildren$;\n }\n });\n }\n\n /**\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {ViewportScroller} from
'@angular/common';\nimport {Injectable, InjectionToken, OnDestroy} from '@angular/core';\nimport
{Unsubscribable} from 'rxjs';\nimport {NavigationEnd, NavigationStart, Scroll} from './events';\nimport {Router}
from './router';\n\nexport const ROUTER_SCROLLER = new
InjectionToken<RouterScroller>(");\n\n@Injectables()\nexport class RouterScroller implements OnDestroy {\n //
TODO(issue/24571): remove '!.\n private routerEventsSubscription!: Unsubscribable;\n // TODO(issue/24571):
remove '!.\n private scrollEventsSubscription!: Unsubscribable;\n\n private lastId = 0;\n private lastSource:
'imperative'|'popstate'|'hashchange'|undefined = 'imperative';\n private restoredId = 0;\n private store: {[key: string]:
[number, number]} = {};\n\n constructor(\n

```

```

private router: Router,\n    /** @docsNotRequired */ public readonly viewportScroller: ViewportScroller, private
options: {\n    scrollPositionRestoration?: 'disabled'|'enabled'|'top',\n    anchorScrolling?: 'disabled'|'enabled'\n} = {})\n    // Default both options to 'disabled'\n    options.scrollPositionRestoration =
options.scrollPositionRestoration || 'disabled';\n    options.anchorScrolling = options.anchorScrolling || 'disabled';\n}\n\n    init(): void {\n    // we want to disable the automatic scrolling because having two places\n    // responsible for
scrolling results race conditions, especially given\n    // that browser don't implement this behavior consistently\n    if (this.options.scrollPositionRestoration !== 'disabled') {\n
this.viewportScroller.setHistoryScrollRestoration('manual');\n    }\n    this.routerEventsSubscription =
this.createScrollEvents();\n    this.scrollEventsSubscription = this.consumeScrollEvents();\n    }\n\n    private
createScrollEvents()\n    {\n    return this.router.events.subscribe(e => {\n    if (e instanceof NavigationStart) {\n    // store the scroll
position of the current stable navigations.\n    this.store[this.lastId] = this.viewportScroller.getScrollPosition();\n
this.lastSource = e.navigationTrigger;\n    this.restoredId = e.restoredState ? e.restoredState.navigationId : 0;\n
    } else if (e instanceof NavigationEnd) {\n    this.lastId = e.id;\n    this.scheduleScrollEvent(e,
this.router.parseUrl(e.urlAfterRedirects).fragment);\n    }\n    });\n    }\n\n    private consumeScrollEvents() {\n
return this.router.events.subscribe(e => {\n    if (!(e instanceof Scroll)) return;\n    // a popstate event. The pop
state event will always ignore anchor scrolling.\n    if (e.position) {\n    if (this.options.scrollPositionRestoration
=== 'top') {\n    this.viewportScroller.scrollToPosition([0, 0]);\n    } else if
(this.options.scrollPositionRestoration === 'enabled')\n    {\n    this.viewportScroller.scrollToPosition(e.position);\n    }\n    // imperative navigation\n    } else {\n    if (e.anchor && this.options.anchorScrolling === 'enabled') {\n
this.viewportScroller.scrollToAnchor(e.anchor);\n    } else if (this.options.scrollPositionRestoration !==
'disabled') {\n    this.viewportScroller.scrollToPosition([0, 0]);\n    }\n    }\n    });\n    }\n\n    private
scheduleScrollEvent(routerEvent: NavigationEnd, anchor: string|null): void {\n    this.router.triggerEvent(new
Scroll(\n    routerEvent, this.lastSource === 'popstate' ? this.store[this.restoredId] : null, anchor));\n    }\n\n    /**
@nodoc */\n    ngOnDestroy() {\n    if (this.routerEventsSubscription) {\n
this.routerEventsSubscription.unsubscribe();\n    }\n    if (this.scrollEventsSubscription) {\n
this.scrollEventsSubscription.unsubscribe();\n    }\n    }\n    }\n\n    "/*\n    * @license\n    * Copyright Google LLC All
Rights Reserved.\n
    *\n    * Use of this source code is governed by an MIT-style license that can be\n    * found in the LICENSE file at
https://angular.io/license\n    */\n\n    import {LOCATION_INITIALIZED, ViewportScroller} from
'@angular/common';\n    import {APP_BOOTSTRAP_LISTENER, APP_INITIALIZER, ApplicationRef,
ComponentRef, ENVIRONMENT_INITIALIZER, inject, InjectFlags, InjectionToken, Injector, Provider, Type}
from '@angular/core';\n    import {of, Subject} from 'rxjs';\n    import {filter, map, take} from 'rxjs/operators';\n    import
{Event, NavigationCancel, NavigationCancellationCode, NavigationEnd, NavigationError, stringifyEvent} from
'./events';\n    import {Routes} from './models';\n    import {Router} from './router';\n    import {InMemoryScrollingOptions,
ROUTER_CONFIGURATION, RouterConfigOptions} from './router_config';\n    import {ROUTES} from
'./router_config_loader';\n    import {PreloadingStrategy, RouterPreloader} from './router_preloader';\n    import
{ROUTER_SCROLLER, RouterScroller} from './router_scroller';\n    import {ActivatedRoute}
from './router_state';\n\n    const NG_DEV_MODE = typeof ngDevMode === 'undefined' || ngDevMode;\n\n    /**\n
    * Sets up providers necessary to enable `Router` functionality for the application.\n
    * Allows to configure a set of routes as well as extra features that should be enabled.\n
    *\n
    * @usageNotes\n
    * Basic example of how you can add a Router to your application:\n
    * ```\n
    * const appRoutes: Routes = [];\n
    *\n
    * bootstrapApplication(AppComponent, {\n
    *   providers: [provideRouter(appRoutes)]\n
    * });\n
    * ```\n
    *\n
    * You can also enable optional features in the Router by adding functions from the `RouterFeatures`\n
    * type:\n
    * ```\n
    * const appRoutes: Routes = [];\n
    * bootstrapApplication(AppComponent, {\n
    *   providers: [\n
    *     provideRouter(appRoutes,\n
    *       withDebugTracing(),\n
    *       withRouterConfig({paramsInheritanceStrategy: 'always'})\n
    *     ]\n
    * });\n
    * ```\n
    *\n
    * @see `RouterFeatures`\n
    * @publicApi\n
    * @developerPreview\n
    */

```

\* @param routes

A set of `Route`s to use for the application routing table.\n \* @param features Optional features to configure additional router behaviors.\n \* @returns A set of providers to setup a Router.\n \*/\nexport function provideRouter(routes: Routes, ...features: RouterFeatures[]): Provider[] {\n return [\n provideRoutes(routes),\n {\n provide: ActivatedRoute, useFactory: rootRoute, deps: [Router],\n multi: true, useFactory: getBootstrapListener,\n features.map(feature => feature.providers),\n // TODO: All options used by the `assignExtraOptionsToRouter` factory need to be reviewed for\n // how we want them to be configured. This API doesn't currently have a way to configure them\n // and we should decide what the \_best\_ way to do that is rather than just sticking with the\n // status quo of how it's done today.\n }];\n}\n\nexport function rootRoute(router: Router): ActivatedRoute {\n return router.routerState.root;\n}\n\n/\*\*\n \* Helper type to represent a Router feature.\n \*/\n \* @publicApi\n \* @developerPreview\n \*/\nexport interface RouterFeature<FeatureKind extends RouterFeatureKind> {\n kind: FeatureKind;\n providers: Provider[];\n}\n\n/\*\*\n \* Helper function to create an object that represents a Router feature.\n \*/\nexport function routerFeature<FeatureKind extends RouterFeatureKind>(\n kind: FeatureKind, providers: Provider[]\n): RouterFeature<FeatureKind> {\n return {kind: kind, providers: providers};\n}\n\n/\*\*\n \* Registers a [DI provider](guide/glossary#provider) for a set of routes.\n \*/\n \* @param routes The route configuration to provide.\n \*/\n \* @usageNotes\n \* ```\n \* @NgModule({\n \* providers: [provideRoutes(ROUTES)]\n \* })\n \* class LazyLoadedChildModule {\n \* ```\n \* @publicApi\n \*/\nexport function provideRoutes(routes: Routes): Provider[] {\n return [\n {\n provide: ROUTES, multi: true, useValue: routes,\n }];\n}\n\n/\*\*\n \* A type alias for providers returned by `withInMemoryScrolling` for use with `provideRouter`.\n \*/\n \* @see `withInMemoryScrolling`\n \* @see `provideRouter`\n \*/\n \* @publicApi\n \* @developerPreview\n \*/\nexport type InMemoryScrollingFeature = RouterFeature<RouterFeatureKind.InMemoryScrollingFeature>;\n\n/\*\*\n \* Enables customizable scrolling behavior for router navigations.\n \*/\n \* @usageNotes\n \* Basic example of how you can enable scrolling feature:\n \* ```\n \* const appRoutes: Routes = [];\n \* bootstrapApplication(AppComponent, {\n \* providers: [\n \* provideRouter(appRoutes, withInMemoryScrolling())\n \* ]\n \* });\n \* ```\n \* @see `provideRouter`\n \* @see `ViewportScroller`\n \*/\n \* @publicApi\n \* @developerPreview\n \* @param options Set of configuration parameters to customize scrolling behavior, see `InMemoryScrollingOptions` for additional information.\n \* @returns A set of providers for use with `provideRouter`.\n \*/\nexport function withInMemoryScrolling(options: InMemoryScrollingOptions = {}): InMemoryScrollingFeature {\n const providers = [{\n provide: ROUTER\_SCROLLER,\n useFactory: () => {\n const router = inject(Router);\n const viewportScroller = inject(ViewportScroller);\n return new RouterScroller(router, viewportScroller, options);\n },\n }];\n return routerFeature(RouterFeatureKind.InMemoryScrollingFeature, providers);\n}\n\nexport function getBootstrapListener() {\n const injector = inject(Injector);\n return (bootstrappedComponentRef: ComponentRef<unknown>) => {\n const ref = injector.get(ApplicationRef);\n\n if (bootstrappedComponentRef !== ref.components[0]) {\n return;\n }\n\n const router = injector.get(Router);\n const bootstrapDone = injector.get(BOOTSTRAP\_DONE);\n\n if (injector.get(INITIAL\_NAVIGATION) === InitialNavigation.EnabledNonBlocking) {\n router.initialNavigation();\n }\n\n injector.get(ROUTER\_PRELOADER, null, InjectFlags.Optional)?.setUpPreloading();\n injector.get(ROUTER\_SCROLLER, null, InjectFlags.Optional)?.init();\n router.resetRootComponentType(ref.componentTypes[0]);\n if (!bootstrapDone.closed) {\n bootstrapDone.next();\n bootstrapDone.unsubscribe();\n }\n };\n}\n\n/\*\*\n \* A subject used to indicate that the bootstrapping phase is done. When initial navigation is `enabledBlocking`, the first navigation waits until bootstrapping is finished before continuing to the activation phase.\n \*/\nexport const BOOTSTRAP\_DONE =\n new InjectionToken<Subject<void>>(NG\_DEV\_MODE ? 'bootstrap done indicator':\n '', {\n factory: () => {\n return new Subject<void>();\n }\n });\n\n/\*\*\n \* This and the INITIAL\_NAVIGATION token are used internally only. The public API side of this is configured through the `ExtraOptions`.\n \*/\n \* When set to `EnabledBlocking`, the initial navigation starts before the root component is

created. The bootstrap is blocked until the initial navigation is complete. This value is required for [server-side rendering](guide/universal) to work. When set to `EnabledNonBlocking`, the initial navigation starts after the root component has been created. The bootstrap is not blocked on the completion of the initial navigation. When set to `Disabled`, the initial navigation is not performed. The location listener is set up before the root component gets created. Use if there is a reason to have more control over when the router starts its initial navigation due to some complex initialization logic. @see `ExtraOptions`

```
const enum
InitialNavigation {
  EnabledBlocking,
  EnabledNonBlocking,
  Disabled,
}
INITIAL_NAVIGATION = new InjectionToken<InitialNavigation>(
  NG_DEV_MODE ? 'initial navigation':
  'providedIn: 'root', factory: () => InitialNavigation.EnabledNonBlocking);
// A type alias for providers returned by `withEnabledBlockingInitialNavigation` for use with `provideRouter`.
// @see `withEnabledBlockingInitialNavigation`
```

```
* @see `provideRouter`
* @publicApi
* @developerPreview
export type
EnabledBlockingInitialNavigationFeature =
```

```
RouterFeature<RouterFeatureKind.EnabledBlockingInitialNavigationFeature>;
// A type alias for providers returned by `withEnabledBlockingInitialNavigation` or `withDisabledInitialNavigation` functions for use with `provideRouter`.
// @see `withEnabledBlockingInitialNavigation`
// @see `withDisabledInitialNavigation`
// @see `provideRouter`
// @publicApi
// @developerPreview
export type InitialNavigationFeature =
  EnabledBlockingInitialNavigationFeature|DisabledInitialNavigationFeature;
// Configures initial navigation to start before the root component is created.
// The bootstrap is blocked until the initial navigation is complete. This value is required for [server-side rendering](guide/universal) to work.
// @usageNotes
// Basic example of how you can enable this navigation
```

```
behavior:
const appRoutes: Routes = [];
bootstrapApplication(AppComponent, {
  providers: [
    provideRouter(appRoutes, withEnabledBlockingInitialNavigation()),
  ],
});
// @see `provideRouter`
// @publicApi
// @developerPreview
// @returns A set of providers for use with `provideRouter`.
export function withEnabledBlockingInitialNavigation():
```

```
EnabledBlockingInitialNavigationFeature {
  const providers = [
    { provide: INITIAL_NAVIGATION,
      useValue: InitialNavigation.EnabledBlocking },
    { provide: APP_INITIALIZER,
      multi: true,
      deps: [Injector],
      useFactory: (injector: Injector) => {
        const locationInitialized: Promise<any> =
          injector.get(LOCATION_INITIALIZED, Promise.resolve());
        let initNavigation = false;
        // Performs the given action once the router finishes its next/current navigation.
        // If the navigation is canceled or errors without a redirect, the navigation is considered complete.
        // If the `NavigationEnd` event emits, the navigation is also considered complete.
        // function afterNextNavigation(action: () => void) {
          const router = injector.get(Router);
          router.events
            .pipe(
              filter(
                (e): e is NavigationEnd|NavigationCancel|NavigationError =>
                  e instanceof NavigationEnd ||
                  e instanceof NavigationCancel ||
                  e instanceof NavigationError),
                map(e => {
                  if (e instanceof NavigationEnd) {
                    // Navigation assumed to succeed if we get `ActivationStart`
                    return true;
                  }
                  const redirecting = e instanceof NavigationCancel ?
                    (e.code === NavigationCancellationCode.Redirect ||
                     e.code === NavigationCancellationCode.SupersededByNewNavigation) :
                    false;
                  return redirecting ? null : false;
                }),
                filter((result): result is boolean => result !== null),
                take(1),
              )
            .subscribe(() => {
              action();
            });
        }
        return () => {
          return locationInitialized.then(() => {
            const router = injector.get(Router);
            const bootstrapDone = injector.get(BOOTSTRAP_DONE);
            afterNextNavigation(() => {
              // Unblock APP_INITIALIZER in case the initial navigation was canceled or errored
              // without a redirect.
              resolve(true);
              initNavigation = true;
            });
            router.afterPreactivation = () => {
              // Unblock APP_INITIALIZER once we get to `afterPreactivation`. At this point, we
              // assume activation will complete successfully (even though this is not guaranteed).
              resolve(true);
              // only the initial navigation
```

```

should be delayed until bootstrapping is done.\n      if (!initNavigation) {\n          return
bootstrapDone.closed ? of(void 0) : bootstrapDone;\n          // subsequent navigations should not be delayed\n      } else {\n          return of(void 0);\n      }\n      router.initialNavigation();\n  });\n  });\n  });\n  });\n  ];\n  ];\n  return
routerFeature(RouterFeatureKind.EnabledBlockingInitialNavigationFeature, providers);\n}\n\n**\n * A type alias
for providers returned by `withDisabledInitialNavigation` for use with\n * `provideRouter`.\n * \n * @see
`withDisabledInitialNavigation`\n * @see `provideRouter`\n * \n
* @publicApi\n * @developerPreview\n * \n\nexport type DisabledInitialNavigationFeature =\n
RouterFeature<RouterFeatureKind.DisabledInitialNavigationFeature>;\n\n**\n * Disables initial navigation.\n * \n
* Use if there is a reason to have more control over when the router starts its initial navigation\n * due to some
complex initialization logic.\n * \n * @usageNotes\n * \n * Basic example of how you can disable initial
navigation:\n * ```\n * const appRoutes: Routes = [];\n * bootstrapApplication(AppComponent,\n * {\n *
providers: [\n *   provideRouter(appRoutes, withDisabledInitialNavigation())\n * ]\n * });\n * ```\n * \n
* @see `provideRouter`\n * \n * @returns A set of providers for use with `provideRouter`.\n * \n * @publicApi\n *
* @developerPreview\n * \n\nexport function withDisabledInitialNavigation(): DisabledInitialNavigationFeature {\n
const providers = [\n  {\n    provide: APP_INITIALIZER,\n    multi: true,\n    useFactory: () => {\n      const
router = inject(Router);\n      return () => {\n        router.setUpLocationChangeListener();\n      };\n    },\n
  ]\n  {\n    provide: INITIAL_NAVIGATION, useValue: InitialNavigation.Disabled\n  };\n  ];\n  return
routerFeature(RouterFeatureKind.DisabledInitialNavigationFeature, providers);\n}\n\n**\n * A type alias for
providers returned by `withDebugTracing` for use with `provideRouter`.\n * \n * @see `withDebugTracing`\n *
* @see `provideRouter`\n * \n * @publicApi\n * @developerPreview\n * \n\nexport type DebugTracingFeature =
RouterFeature<RouterFeatureKind.DebugTracingFeature>;\n\n**\n * Enables logging of all internal navigation
events to the console.\n * Extra logging might be useful for debugging purposes to inspect Router event sequence.\n
* \n * @usageNotes\n * \n * Basic example of how you can enable debug tracing:\n * ```\n * const appRoutes: Routes
= [];\n * bootstrapApplication(AppComponent,\n * {\n *   providers: [\n *     provideRouter(appRoutes,
withDebugTracing())\n *   ]\n * });\n * ```\n * \n * @see `provideRouter`\n * \n * @returns A set of providers for use with
`provideRouter`.\n * \n * @publicApi\n * @developerPreview\n * \n\nexport function withDebugTracing():
DebugTracingFeature {\n  let providers: Provider[] = [];\n  if (NG_DEV_MODE) {\n    providers = [{\n      provide:
ENVIRONMENT_INITIALIZER,\n      multi: true,\n      useFactory: () => {\n        const router = inject(Router);\n
return () => router.events.subscribe((e: Event) => {\n          // tslint:disable:no-console\n
console.group?(`Router Event: ${e.constructor.name}`);\n          console.log(stringifyEvent(e));\n
console.log(e);\n          console.groupEnd?.();\n          // tslint:enable:no-console\n        };\n      }];\n    }
else {\n      providers = [];\n    }\n    return routerFeature(RouterFeatureKind.DebugTracingFeature, providers);\n  }\n
}\n\nconst
ROUTER_PRELOADER = new InjectionToken<RouterPreloader>(NG_DEV_MODE ? 'router preloader'
: '');\n\n**\n * A type alias that represents a feature which enables preloading in Router.\n * The type is used to
describe the return value of the `withPreloading` function.\n * \n * @see `withPreloading`\n * @see
`provideRouter`\n * \n * @publicApi\n * @developerPreview\n * \n\nexport type PreloadingFeature =
RouterFeature<RouterFeatureKind.PreloadingFeature>;\n\n**\n * Allows to configure a preloading strategy to use.
The strategy is configured by providing a\n * reference to a class that implements a `PreloadingStrategy`.\n * \n
* @usageNotes\n * \n * Basic example of how you can configure preloading:\n * ```\n * const appRoutes: Routes =
[];\n * bootstrapApplication(AppComponent,\n * {\n *   providers: [\n *     provideRouter(appRoutes,
withPreloading(PreloadAllModules))\n *   ]\n * });\n * ```\n * \n * @see `provideRouter`\n * \n * @param
preloadingStrategy A reference to a class that implements a `PreloadingStrategy` that\n * should be used.\n *
* @returns A set of providers
for use with `provideRouter`.\n * \n * @publicApi\n * @developerPreview\n * \n\nexport function
withPreloading(preloadingStrategy: Type<PreloadingStrategy>): PreloadingFeature {\n  const providers = [\n
  {\n    provide: ROUTER_PRELOADER, useExisting: RouterPreloader\n  },\n  {\n    provide: PreloadingStrategy, useExisting:

```

```

preloadingStrategy},\n ];\n return routerFeature(RouterFeatureKind.PreloadingFeature, providers);\n}\n\n/**\n * A
type alias for providers returned by `withRouterConfig` for use with `provideRouter`.\n *\n * @see
`withRouterConfig`\n * @see `provideRouter`\n *\n * @publicApi\n * @developerPreview\n */\nexport type
RouterConfigurationFeature =\n RouterFeature<RouterFeatureKind.RouterConfigurationFeature>;\n\n/**\n *
Allows to provide extra parameters to configure Router.\n *\n * @usageNotes\n *\n * Basic example of how you
can provide extra configuration options:\n * ```\n * const appRoutes: Routes = [];\n *
bootstrapApplication(AppComponent,\n * {\n *   providers:
[\n *     provideRouter(appRoutes, withRouterConfig({\n *       onSameUrlNavigation: 'reload'\n *     }
))\n *   ]\n * });\n * ```\n *\n * @see `provideRouter`\n *\n * @param options A set of parameters to
configure Router,
see `RouterConfigOptions` for\n * additional information.\n *\n * @returns A set of providers for use with
`provideRouter`.\n *\n * @publicApi\n * @developerPreview\n */\nexport function withRouterConfig(options:
RouterConfigOptions): RouterConfigurationFeature {\n  const providers = [\n    {provide:
ROUTER_CONFIGURATION, useValue: options},\n  ];\n  return
routerFeature(RouterFeatureKind.RouterConfigurationFeature, providers);\n}\n\n/**\n * A type alias that
represents
all Router features available for use with `provideRouter`.\n *\n * Features can be enabled by adding special
functions
to the `provideRouter` call.\n *\n * See documentation for each symbol to find corresponding function name.
See also
`provideRouter`\n *\n * documentation on how to use those functions.\n *\n * @see `provideRouter`\n *\n *
@publicApi\n * @developerPreview\n */\nexport type RouterFeatures =
PreloadingFeature|DebugTracingFeature|InitialNavigationFeature|\n
InMemoryScrollingFeature|RouterConfigurationFeature;\n\n/**\n * The list of features as an enum to uniquely
type
each feature.\n */\nexport const enum RouterFeatureKind {\n  PreloadingFeature,\n  DebugTracingFeature,\n
EnabledBlockingInitialNavigationFeature,\n  DisabledInitialNavigationFeature,\n  InMemoryScrollingFeature,\n
RouterConfigurationFeature\n}\n\n","/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {HashLocationStrategy, Location, LocationStrategy, PathLocationStrategy,
ViewportScroller} from '@angular/common';\nimport {APP_BOOTSTRAP_LISTENER, ComponentRef, inject,
Inject, InjectionToken, ModuleWithProviders, NgModule, NgProbeToken,
Optional, Provider, SkipSelf, RuntimeError as RuntimeError} from '@angular/core';\nimport
{EmptyOutletComponent} from './components/empty_outlet';\nimport {RouterLink, RouterLinkWithHref} from
'./directives/router_link';\nimport {RouterLinkActive} from './directives/router_link_active';\nimport
{RouterOutlet} from './directives/router_outlet';\nimport {RuntimeErrorCode} from './errors';\nimport {Routes} from
'./models';\nimport {getBootstrapListener, provideRoutes, rootRoute, withDebugTracing,
withDisabledInitialNavigation, withEnabledBlockingInitialNavigation, withPreloading} from
'./provide_router';\nimport {Router, setupRouter} from './router';\nimport {ExtraOptions,
ROUTER_CONFIGURATION} from './router_config';\nimport {RouterConfigLoader} from
'./router_config_loader';\nimport {ChildrenOutletContexts} from './router_outlet_context';\nimport
{ROUTER_SCROLLER, RouterScroller} from './router_scroller';\nimport {ActivatedRoute} from
'./router_state';\nimport {DefaultUrlSerializer,
UrlSerializer} from './url_tree';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
ngDevMode;\n\n/**\n * The directives defined in the `RouterModule`.\n */\nconst ROUTER_DIRECTIVES =\n[\n  RouterOutlet, RouterLink, RouterLinkWithHref, RouterLinkActive, EmptyOutletComponent\n];\n\n/**\n *
@docsNotRequired\n */\nexport const ROUTER_FORROOT_GUARD = new InjectionToken<void>(\n
NG_DEV_MODE ? 'router duplicate forRoot guard' : 'ROUTER_FORROOT_GUARD');\n\n// TODO(atscott): All
of these except `ActivatedRoute` are `providedIn: 'root'`. They are only kept\n// here to avoid a breaking
change
whereby the provider order matters based on where the\n// `RouterModule`/`RouterTestingModule` is imported.
These can/should be removed as a "breaking" change in a major version.\n\nexport const
ROUTER_PROVIDERS: Provider[] = [\n  Location,\n  {provide: UrlSerializer, useClass: DefaultUrlSerializer},\n
{provide: Router, useFactory: setupRouter},\n  ChildrenOutletContexts,\n  {provide: ActivatedRoute,

```



```

useFactory: rootRoute, deps: [Router]],\n RouterConfigLoader,\n);\n\nexport function routerNgProbeToken() {\n
return new NgProbeToken('Router', Router);\n}\n\n/**\n * @description\n * Adds directives and providers for
in-app navigation among views defined in an application.\n * Use the Angular `Router` service to declaratively
specify application states and manage state\n * transitions.\n * You can import this NgModule multiple times,
once for each lazy-loaded bundle.\n * However, only one `Router` service can be active.\n * To ensure this, there are
two ways to register routes when importing this module:\n * The `forRoot()` method creates an `NgModule`
that contains all the directives, the given\n * routes, and the `Router` service itself.\n * The `forChild()` method
creates an `NgModule` that contains all the directives and the given\n * routes, but does not include the `Router`
service.\n * @see [Routing and Navigation guide](guide/router) for an\n
* overview of how the `Router` service should be used.\n * @publicApi\n */\n@NgModule({\n imports:
ROUTER_DIRECTIVES,\n exports: ROUTER_DIRECTIVES,\n})\nexport class RouterModule {\n
constructor(@Optional() @Inject(ROUTER_FORROOT_GUARD) guard: any) {\n\n /**\n * Creates and
configures a module with all the router providers and directives.\n * Optionally sets up an application listener to
perform an initial navigation.\n * When registering the NgModule at the root, import as follows:\n *
```\n * @NgModule({\n * imports: [RouterModule.forRoot(ROUTES)]\n * })\n * class MyNgModule {\n\n
* @param routes An array of `Route` objects that define the navigation paths for the application.\n *
@param config An `ExtraOptions` configuration object that controls how navigation is performed.\n * @return
The new `NgModule`.\n * }\n * }\n * static forRoot(routes: Routes, config?: ExtraOptions):
ModuleWithProviders<RouterModule> {\n return
{\n ngModule: RouterModule,\n providers: [\n ROUTER_PROVIDERS,\n NG_DEV_MODE ?
(config?.enableTracing ? withDebugTracing().providers : []): [],\n provideRoutes(routes),\n {\n
provide: ROUTER_FORROOT_GUARD,\n useFactory: provideForRootGuard,\n deps: [[Router, new
Optional(), new SkipSelf()]]\n },\n {provide: ROUTER_CONFIGURATION, useValue: config ? config :
{}},\n config?.useHash ? provideHashLocationStrategy() : providePathLocationStrategy(),\n
provideRouterScroller(),\n config?.preloadingStrategy ? withPreloading(config.preloadingStrategy).providers :
[],\n {provide: NgProbeToken, multi: true, useFactory: routerNgProbeToken},\n config?.initialNavigation ?
provideInitialNavigation(config): [],\n provideRouterInitializer(),\n ],\n });\n }\n\n /**\n * Creates a
module with all the router directives and a provider registering routes,\n * without creating
a new Router service.\n * When registering for submodules and lazy-loaded submodules, create the NgModule as
follows:\n *
```\n * @NgModule({\n * imports: [RouterModule.forChild(ROUTES)]\n * })\n * class
MyNgModule {\n\n * @param routes An array of `Route` objects that define the navigation paths for
the submodule.\n * @return The new NgModule.\n * }\n * }\n * static forChild(routes: Routes):
ModuleWithProviders<RouterModule> {\n return {ngModule: RouterModule, providers:
[provideRoutes(routes)]};\n }\n}\n\n /**\n * For internal use by `RouterModule` only. Note that this differs from
`withInMemoryRouterScroller`\n * because it reads from the `ExtraOptions` which should not be used in the
standalone world.\n * ^\nexport function provideRouterScroller(): Provider {\n return {\n provide:
ROUTER_SCROLLER,\n useFactory: () => {\n const router = inject(Router);\n const viewportScroller =
inject(ViewportScroller);\n const config:
ExtraOptions = inject(ROUTER_CONFIGURATION);\n if (config.scrollOffset) {\n
viewportScroller.setOffset(config.scrollOffset);\n }\n return new RouterScroller(router, viewportScroller,
config);\n },\n });\n\n // Note: For internal use only with `RouterModule`. Standalone setup via `provideRouter`
should\n // provide hash location directly via `{provide: LocationStrategy, useClass:
HashLocationStrategy}`.\nfunction provideHashLocationStrategy(): Provider {\n return {provide:
LocationStrategy, useClass: HashLocationStrategy};\n}\n\n // Note: For internal use only with `RouterModule`.
Standalone setup via `provideRouter` does not\n // need this at all because `PathLocationStrategy` is the default
factory for `LocationStrategy`.\nfunction providePathLocationStrategy(): Provider {\n return {provide:
LocationStrategy, useClass: PathLocationStrategy};\n}\n\nexport function provideForRootGuard(router: Router):
any {\n if (NG_DEV_MODE && router) {\n throw new RuntimeError(\n

```

```

    RuntimeErrorCode.FOR_ROOT_CALLED_TWICE,\n    `The Router was provided more than once. This
    can happen if 'forRoot' is used outside of the root injector.` +\n    ` Lazy loaded modules should use
    RouterModule.forChild() instead.`);\n  }\n  return 'guarded';\n}\n\n// Note: For internal use only with
`RouterModule`. Standalone router setup with `provideRouter`\n// users call `withXInitialNavigation`
directly.\nfunction provideInitialNavigation(config: Pick<ExtraOptions, 'initialNavigation'>): Provider[] {\n  return
[\n    config.initialNavigation === 'disabled' ? withDisabledInitialNavigation().providers : [],\n    config.initialNavigation === 'enabledBlocking' ?\n      withEnabledBlockingInitialNavigation().providers :\n    [],\n  ];\n}\n\n// TODO(atscott): This should not be in the public API\n/**\n * A [DI token](guide/glossary/#di-token) for the router initializer that\n * is called after the app is bootstrapped.\n *\n * @publicApi\n */\nexport const
ROUTER_INITIALIZER = new InjectionToken<(compRef: ComponentRef<any>) => void>(\n  NG_DEV_MODE ? 'Router Initializer' : '');\n\nfunction provideRouterInitializer(): Provider[] {\n  return [\n    //
ROUTER_INITIALIZER token should be removed. It's public API but shouldn't be. We can just\n    // have
`getBootstrapListener` directly attached to APP_BOOTSTRAP_LISTENER.\n    { provide:
ROUTER_INITIALIZER, useFactory: getBootstrapListener, \n    { provide: APP_BOOTSTRAP_LISTENER,
multi: true, useExisting: ROUTER_INITIALIZER }, \n  ];\n}\n", "/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n/**\n * @module\n * @description\n * Entry point for all public
APIs of the router package.\n *\n\nimport { Version } from '@angular/core';\n/**\n * @publicApi\n */\nexport
const VERSION = new Version('14.3.0');\n", "/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n\nexport { EmptyOutletComponent } from
'./components/empty_outlet';\nexport { withPreloading as withPreloading } from './provide_router';\nexport
{ assignExtraOptionsToRouter as assignExtraOptionsToRouter, RestoredState as RestoredState } from
'./router';\nexport { ROUTER_PROVIDERS as ROUTER_PROVIDERS } from './router_module';\nexport { flatten as
flatten } from './utils/collection';\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nexport { createUrlTreeFromSnapshot } from './create_url_tree';\nexport
{ RouterLink, RouterLinkWithHref } from './directives/router_link';\nexport { RouterLinkActive } from
'./directives/router_link_active';\nexport { RouterOutlet,
RouterOutletContract } from './directives/router_outlet';\nexport { ActivationEnd, ActivationStart,
ChildActivationEnd, ChildActivationStart, Event, EventType, GuardsCheckEnd, GuardsCheckStart,
NavigationCancel, NavigationCancellationCode as NavigationCancellationCode, NavigationEnd, NavigationError,
NavigationStart, ResolveEnd, ResolveStart, RouteConfigLoadEnd, RouteConfigLoadStart, RouterEvent,
RoutesRecognized, Scroll } from './events';\nexport { CanActivate, CanActivateChild, CanActivateChildFn,
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ResolveFn, Route, Routes, RunGuardsAndResolvers, UrlMatcher, UrlMatchResult } from './models';\nexport
{ DefaultTitleStrategy, TitleStrategy } from './page_title_strategy';\nexport { DebugTracingFeature,
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withEnabledBlockingInitialNavigation, withInMemoryScrolling, withPreloading, withRouterConfig } from
'./provide_router';\nexport { BaseRouteReuseStrategy, DetachedRouteHandle, RouteReuseStrategy } from
'./route_reuse_strategy';\nexport { Navigation, NavigationExtras, Router, UrlCreationOptions } from
'./router';\nexport { ExtraOptions, InitialNavigation, InMemoryScrollingOptions, ROUTER_CONFIGURATION,
RouterConfigOptions } from './router_config';\nexport { ROUTES } from './router_config_loader';\nexport
{ ROUTER_INITIALIZER, RouterModule } from './router_module';\nexport { ChildrenOutletContexts,
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RouterPreloader} from './router_preloader';\nexport { ActivatedRoute, ActivatedRouteSnapshot, RouterState,
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from './router_state';\nexport { convertToParamMap, defaultUrlMatcher, ParamMap, Params,
PRIMARY_OUTLET} from './shared';\nexport { UrlHandlingStrategy} from './url_handling_strategy';\nexport
{DefaultUrlSerializer, IsActiveMatchOptions, UrlSegment, UrlSegmentGroup, UrlSerializer, UrlTree} from
 './url_tree';\nexport {VERSION} from './version';\n\nexport * from './private_export';\n\n"/**\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n * @module\n * @description\n
* Entry point for all public APIs of this package.\n */\nexport * from './src/index';\n\n// This file only reexports
content of the `src` folder. Keep it that way.\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n
*\n\n// This file is not used to build this module. It is only used during editing\n// by the TypeScript language
service and during build for verification. `ngc`\n// replaces this file with production index.ts when it rewrites private
symbol\n// names.\n\nexport * from './public_api';\n\n"/**\n * Generated bundle index. Do not edit.\n */\n\nexport *
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AACF, aAAA; AAAM, iBAAA; AACL, gBAAA, CAAC, CAAC, kBAaKB, GAAG, gBAAgB, CAAC, MAAM, CAAC; A  
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ACF, KAAA; IACD, OAAW, MAAA, CAAA, MAAA, CAAA, MAAA, CAAA, MAAA, CAAA, EAAA, EAAA, QAAQ,  
CAAK, EAAA, GAAG, CAAE, CAAA; AAC/B, CAAC; AAED, SAAS, 2BAA2B, CACChC, YAA6B, EAAE, gBAAsB, E  
AAE, MA Ae, EAC9E, cAA+B, EAAA; IACjC, MAAM, GAAG, GAAsC, EAAE, CAAC; AACID, IAAA, GAAG, CAAC,  
cAAc, CAAC, GAAG, cAAc, CAAC; AACrC, IAAA, cAAc, CAAC, cAAc, GAAG, YAAE, CAAC; AAC7C, IAAA, cAAc  
, CAAC, kBAaKB, GAAG, gBAAgB, CAAC, MAAM, CAAC; AAEE5D, IAAA, KAAK, MAAM, CAAC, IAAI, MAAM, E  
AAE; AACtB, QAAA, IAAI, CAAC, CAAC, IAAI, KAAK, EAAE, IAAI, SAAS, CAAC, CAAC, CAAC, KAAK, cAAc, E  
AAE; YACpD, MAAM, CAAC, GAAG, IAAI, eAAe, CAAC, EAAE, EAAE, EAAE, CAAC, CAAC; AACtC, YAAA, CA  
AC, CAAC, cAAc, GAAG, YAAE, CAAC; AACChC, YAAA, CAAC, CAAC, kBAaKB, GAAG, gBAAgB, CAAC, MAAM  
, CAAC; YAC/C, GAAG, CAAC, SAAS, CAAC, CAAC, CAAC, CAAC, GAAG, CAAC, CAAC; AACvB, SAAA; AACF,

KAAA;AACD,IAAA,OAAO,GAAG,CAAC;AACb,CAAC;AAED,SAAS,wCAAwC,CAC7C,YAA6B,EAAE,cAA4B,EAAE,MAAe,EAAA;IAC9E,OAAO,MAAM,CAAC,IAAI,CACd,CAAC,IAAI,cAAc,CAAC,YAAY,EAAE,cAAc,EAAE,CAAC,CAAC,IAAI,SAAS,CAAC,CAAC,CAAC,KAAC,cAAc,CAAC,CAAC;AAC/F,CAAC;AAED,SAAS,wBAAwB,CAC7B,YAA6B,EAAE,cAA4B,EAAE,MAAe,EAAA;AAC9E,IAAA,OAAO,MAAM,CAAC,IAAI,CAAC,CAAC,IAAI,cAAc,CAAC,YAAY,EAAE,cAAc,EAAE,CAAC,CAAC,CAAC,CAAC;AAC3E,CAAC;AAED,SAAS,cAAc,CACnB,YAA6B,EAAE,cAA4B,EAAE,CAAQ,EAAA;AACvE,IAAA,IAAI,CAAC,YAAY,CAAC,WAAW,EAAE,IAAI,cAAc,CAAC,MAAM,GAAG,CAAC,KAAC,CAAC,SAAS,KAAC,MAAM,EAAE;AACvF,QAAA,OAAO,KAAC,CAAC;AACd,KAAA;AAED,IAAA,OAAO,CAAC,CAAC,IAAI,KAAC,EAAE,CAAC;AACvB,CAAC;AAED;;;;AAIG;AACG,SAAU,gBAAgB,CAC5B,KAAY,EAAE,UAA2B,EAAE,QAA5B,EAAE,MAAc,EAAA;;;;AAYnF,IAAA,IAAI,SAAS,CAAC,KAAC,CAAC,KAAC,MAAM;AAC3B,SAAC,MAAM,KAAC,cAAc,IAAI,CAAC,cAAc,CAAC,UAAU,EAAE,QAAQ,EAAE,KAAC,CAAC,CAAC,EAAE;AAC/E,QAAA,OAAO,KAAC,CAAC;AACd,KAAA;AACD,IAAA,IAAI,KAAC,CAAC,IAAI,KAAC,IAAI,EAAE;AACvB,QAAA,OAAO,IAAI,CAAC;AACb,KAAA;IACD,OAAO,KAAC,CAAC,UAAU,EAAE,KAAC,EAAE,QAAQ,CAAC,CAAC,OAAO,CAAC;AACpD,CAAC;SAEe,gBAAgB,CAC5B,YAA6B,EAAE,QAA5B,EAAE,MAAc,EAAA;AACvE,IAAA,OAAO,QAAQ,CAAC,MAAM,KAAC,CAAC,IAAI,CAAC,YAAY,CAAC,QAAQ,CAAC,MAAM,CAAC,CAAC;AACjE;;ACzNA;;;;AAMG;AAMhB,MAAMP,aAAW,GAAG,OAAO,SAAS,KAAC,WAAW,IAAI,SAAS,CAAC;AAEIE,MAAMQ,SAAO,CAAA;AAGX,IAAA,WAAA,CAAY,YAA8B,EAAA;AACxC,QAAA,IAAI,CAAC,YAAY,GAAG,YAAY,IAAI,IAAI,CAAC;KAC1C;AACF,CAAA;AAED,MAAM,gBAAgB,CAAA;AACpB,IAAA,WAAA,CAAmB,OAAgB,EAAA;AAAhB,QAAA,IAAO,CAAA,OAAA,GAAP,OAAO,CAAS;KAAI;AACxC,CAAA;AAED,SAAS,OAAO,CAAC,YAA6B,EAAA;IAC5C,OAAO,UAAU,CAAC,IAAI,SAAO,CAAC,YAAY,CAAC,CAAC,CAAC;AAC/C,CAAC;AAED,SAAS,gBAAgB,CAAC,OAAgB,EAAA;IACxC,OAAO,UAAU,CAAC,IAAI,gBAAgB,CAAC,OAAO,CAAC,CAAC,CAAC;AACnD,CAAC;AAED,SAAS,oBAAoB,CAAC,UAAkB,EAAA;IAC9C,OAAO,UAAU,CAAC,IAAI,aAAy,oDAE9BD,aAAW;AACp,QAAA,CAAA,6DAAA,EAAgE,UAAU,CAAA,CAAA,CAAG,CAAC,CAAC,CAAC;AAC1F,CAAC;AAED,SAAS,YAAY,CAAC,KAAY,EAAA;AACChC,IAAA,OAAO,UAAU,CAAC,wBAAwB,CACtCA,aAAW;QACP,CACI,4DAAA,EAAA,KAAC,CAAC,IAAI,CAAmB,iBAAA,CAAA,EAAA,CAAA,gDACI,CAAC,CAAC;AACjD,CAAC;AAED;;;;AAIG;AACG,SAAUS,gBAAc,CAC1B,QAA6B,EAAE,YAAgC,EAAE,aAA4B,EAC7F,OAAgB,EAAE,MAAc,EAAA;AACIC,IAAA,OAAO,IAAI,cAAc,CAAC,QAAQ,EAAE,YAAY,EAAE,aAAa,EAAE,OAAO,EAAE,MAAM,CAAC,CAAC,KAAC,EAAE,CAAC;AAC5F,CAAC;AAED,MAAM,cAAc,CAAA;IAGIB,WACY,CAAA,QAA6B,EAAU,YAAgC,EACvE,aAA4B,EAAU,OAAgB,EAAU,MAAc,EAAA;AAD9E,QAAA,IAAQ,CAAA,QAAA,GAAR,QAAQ,CAAqB;AAAU,QAAA,IAAY,CAAA,YAAA,GAZ,YAAY,CAAoB;AACvE,QAAA,IAAa,CAAA,aAAA,GAAb,aAAa,CAAe;AAAU,QAAA,IAAO,CAAA,OAAA,GAAP,OAAO,CAAS;AAAU,QAAA,IAAM,CAAA,MAAA,GAAN,MAAM,CAAQ;AAJIF,QAAA,IAAc,CAAA,cAAA,GAAY,IAAI,CAAC;KAIuD;IAE9F,KAAC,GAAA;QACH,MAAM,UAAU,GAAG,KAAC,CAAC,IAAI,CAAC,OAAO,CAAC,IAAI,EAAE,EAAE,EAAE,EAAE,EAAE,IAAI,CAAC,MAAM,CAAC,CAAC,YAAY,CAAC;;;;AAO9E,QAAA,MAAM,gBAAgB,GAAG,IAAI,eAAe,CAAC,UAAU,CAAC,QAAQ,EAAE,UAAU,CAAC,QAAQ,CAAC,CAAC;AAEvF,QAAA,MAAM,SAAS,GACX,IAAI,CAAC,kBAaKB,CAAC,IAAI,CAAC,QAAQ,EAAE,IAAI,CAAC,MAAM,EAAE,gBAAgB,EAAE,cAAc,CAAC,CAAC;QAC1F,MAAM,SAAS,GAAG,SAAS,CAAC,IAAI,CAAC,GAAG,CAAC,CAAC,gBAAiC,KAAI;YACzE,OAAO,IAAI,CAAC,aAAa,CACrB,kBAaKB,CAAC,gBAAgB,CAAC,EAAE,IAAI,CAAC,OAAO,CAAC,WAAW,EAAE,IAAI,CAAC,OAAO,CAAC,QAAQ,CAAC,CAAC;SAC5F,CAAC,CAAC,CAAC;QACJ,OAAO,SAAS,CAAC,IAAI,CAAC,UAAU,CAAC,CAAC,CAAM,KAAI;YAC1C,IAAI,CAAC,YAAY,gBAAgB,EAAE;;;AAGjC,gBAAA,IAAI,CAAC,cAAc,GAAG,KAAC,CAAC;;gBAE5B,OAAO,IAAI,CAAC,KAAC,CAAC,CAAC,CAAC,OAAO,CAAC,CAAC;AAC9B,aAAA;YAED,IAAI,CAAC,YAAYD,SAAO,EAAE;AACxB,gBAAA,MAAM,IAAI,CAAC,YAAY,CAAC,CAAC,CAAC;AAC5B,aAAA;AAED,YAAA,MAAM,CAAC,CAAC;SACT,CAAC,CAAC,CAAC;KACL;AAEO,IAAA,KAAC,CAAC,IAAa,EAAA;QACzB,MAAM,SAAS,GACX,IAAI,CAAC,kBAaKB,CAAC,IAAI,CAAC,QAAQ,EAAE,IAAI,CAAC,MAAM,EAAE,IAAI,CAAC,IAAI,EAAE,cAAc,CAAC,CAAC;QACnF,MAAM,OAAO,GAAG,SAAS,CAAC,IAAI,CAAC,GAAG,CAAC,CAAC,gBAAiC,KAAI;AACvE,YAAA,OAAO,IAAI,CAAC,aAAa,CACrB,kBAaKB,CAAC,gBAAgB,CAAC,EAAE,IAAI,CAAC,WAAW,EAAE,IAAI,CAAC,QAAQ,CAA

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Found

in path(s):

\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2015/router.mjs.map

No license file was found, but licenses were detected in source scan.

```
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public_api.ts", "../../../../packages/router/testing/index.ts", "../../../../packages/router/testing/testing.ts"],"source  
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governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n//  
This file exists to easily patch the SpyNgModuleFactoryLoader into g3\n\nexport const  
EXTRA_ROUTER_TESTING_PROVIDERS = [];\n", "/*\n * @license\n * Copyright Google LLC All Rights  
Reserved.\n *\n\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at  
https://angular.io/license\n *\n\nimport {Location, LocationStrategy} from '@angular/common';\nimport  
{MockLocationStrategy, SpyLocation} from '@angular/common/testing';\nimport {Compiler, Injector,  
ModuleWithProviders, NgModule, Optional} from '@angular/core';\nimport {ChildrenOutletContexts,  
ExtraOptions, NoPreloading, provideRoutes, Route, Router, ROUTER_CONFIGURATION, RouteReuseStrategy,  
RouterModule, ROUTES, Routes, TitleStrategy, UrlHandlingStrategy, UrlSerializer, assignExtraOptionsToRouter  
as assignExtraOptionsToRouter, flatten as flatten, ROUTER_PROVIDERS as ROUTER_PROVIDERS,  
withPreloading as withPreloading} from '@angular/router';\n\nimport  
{EXTRA_ROUTER_TESTING_PROVIDERS} from './extra_router_testing_providers';\n\nfunction  
isUrlHandlingStrategy(opts: ExtraOptions\n\nUrlHandlingStrategy): opts is UrlHandlingStrategy  
{\n // This property
```

```

check is needed because UrlHandlingStrategy is an interface and doesn't exist at\n // runtime.\n return
'shouldProcessUrl' in opts;\n}\n\n/**\n * Router setup factory function used for testing. Only used internally to keep
the factory that's\n * marked as publicApi cleaner (i.e. not having _both_ `TitleStrategy` and
`DefaultTitleStrategy`).\n */\nexport function setupTestingRouterInternal(\n  urlSerializer: UrlSerializer,\n
contexts: ChildrenOutletContexts,\n  location: Location,\n  compiler: Compiler,\n  injector: Injector,\n  routes:
Route[][],\n  titleStrategy: TitleStrategy,\n  opts?: ExtraOptions|UrlHandlingStrategy,\n  urlHandlingStrategy?:
UrlHandlingStrategy,\n  routeReuseStrategy?: RouteReuseStrategy,\n) {\n  return setupTestingRouter(\n
urlSerializer, contexts, location, compiler, injector, routes, opts, urlHandlingStrategy,\n  routeReuseStrategy,
titleStrategy);\n}\n\n/**\n * Router setup factory function used for testing.\n */\n * @publicApi\n
*/\nexport function setupTestingRouter(\n  urlSerializer: UrlSerializer, contexts: ChildrenOutletContexts, location:
Location,\n  compiler: Compiler, injector: Injector, routes: Route[][],\n  opts?:
ExtraOptions|UrlHandlingStrategy|null, urlHandlingStrategy?: UrlHandlingStrategy,\n  routeReuseStrategy?:
RouteReuseStrategy, titleStrategy?: TitleStrategy) {\n  const router =\n    new Router(null!, urlSerializer, contexts,
location, injector, compiler, flatten(routes));\n  if (opts) {\n    // Handle deprecated argument ordering.\n    if
(isUrlHandlingStrategy(opts)) {\n      router.urlHandlingStrategy = opts;\n    } else {\n      // Handle ExtraOptions\n
assignExtraOptionsToRouter(opts, router);\n    }\n  }\n  if (urlHandlingStrategy) {\n    router.urlHandlingStrategy
= urlHandlingStrategy;\n  }\n  if (routeReuseStrategy) {\n    router.routeReuseStrategy = routeReuseStrategy;\n
}\n  router.titleStrategy = titleStrategy;\n  return router;\n}\n\n/**\n * @description\n
*/\n * Sets up the router to be used for testing.\n */\n * The modules sets up the router to be used for testing.\n * It
provides spy implementations of `Location` and `LocationStrategy`.\n */\n * @usageNotes\n * ### Example\n */\n *
```\n * beforeEach(() => {\n *   TestBed.configureTestingModule({\n *     imports: [\n *
RouterTestingModule.withRoutes(\n *       [{path: '', component: BlankCmp}, {path: 'simple', component:
SimpleCmp}]\n *     ),\n *     ]\n *   });\n * });\n * ```\n */\n * @publicApi\n */\n * @NgModule({\n exports:
[RouterModule],\n providers: [\n   ROUTER_PROVIDERS,\n   EXTRA_ROUTER_TESTING_PROVIDERS,\n
{provide: Location, useClass: SpyLocation},\n   {provide: LocationStrategy, useClass: MockLocationStrategy},\n
{provide: Router,\n   useFactory: setupTestingRouterInternal,\n   deps: [\n     UrlSerializer,\n
ChildrenOutletContexts,\n     Location,\n     Compiler,\n     Injector,\n     ROUTES,\n     TitleStrategy,\n
ROUTER_CONFIGURATION,\n     [UrlHandlingStrategy, new Optional()],\n     [RouteReuseStrategy,
new Optional()],\n   ]\n },\n   withPreloading(NoPreloading).providers,\n   provideRoutes([],\n ])\n })\n
})\nexport class RouterTestingModule {\n  static withRoutes(routes: Routes, config?: ExtraOptions):\n
ModuleWithProviders<RouterTestingModule> {\n    return {\n      ngModule: RouterTestingModule,\n
providers: [\n        provideRoutes(routes),\n        {provide: ROUTER_CONFIGURATION, useValue: config ?
config : {}},\n      ]\n    };\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n// This file exists for easily patching SpyNgModuleFactoryLoader in g3\n
export default {};\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is
governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n * @module\n
*/\n * @description\n * Entry point for all public APIs of the router/testing package.\n */\nexport * from
'./router_testing_module';\nexport * from './spy_ng_module_factory_loader';\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n * @module\n
*/\n * @description\n * Entry point for all public APIs of this package.\n */\nexport * from './src/testing';\n\n// This file only reexports content of the
`src` folder. Keep it that way.\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n// This file is not used to build this module. It is only used during editing\n//
by the TypeScript language service and during build for verification. `ngc` replaces this file with production
index.ts when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n"/**\n * Generated bundle

```



index. Do not edit.\n \*/\n\nexport \* from

```
./index';\n"],"names":["flatten","assignExtraOptionsToRouter","ROUTER_PROVIDERS","withPreloading"],"mappings":",,,,,,,,,,AAAA,,,,,AAMG;AAEH;AACO,MAAM,8BAA8B,GAAG,EAAE;;ACThD,,,,,AAMG;AASH,SAAS,qBAAqB,CAAC,IACmB,EAAA;;;IAGhD,OAAO,kBAakB,IAAI,IAAI,CAAC;AACpC,CAAC;AAED;;;AAGG;AACG,SAAU,0BAA0B,CACtC,aAA4B,EAC5B,QAAgC,EACcC,QAAkB,EACIB,QAAkB,EACIB,QAAkB,EACIB,MAAiB,EACjB,aAA4B,EAC5B,IAAuC,EACvC,mBAAyC,EACzC,kBAAuC,EAAA;IAEzC,OAAO,kBAakB,CACrB,aAAa,EAAE,QAAQ,EAAE,QAAQ,EAAE,QAAQ,EAAE,QAAQ,EAAE,MAAM,EAAE,IAAI,EAAE,mBAAmB,EACxP,kBAakB,EAAE,aAAa,CAAC,CAAC;AACzC,CAAC;AAED;;;AAIG;AACG,SAAU,kBAakB,CAAC9B,aAA4B,EAAE,QAAgC,EAAE,QAAkB,EACIF,QAAkB,EAAE,QAAkB,EAAE,MAAiB,EACzD,IAA4C,EAAE,mBAAyC,EACvF,kBAAuC,EAAE,aAA6B,EAAA;IACxE,MAAM,MAAM,GACR,IAAI,MAAM,CAAC,IAAK,EAAE,aAAa,EAAE,QAAQ,EAAE,QAAQ,EAAE,QAAQ,EAAE,QAAQ,EAAEA,QAAO,CAAC,MAAM,CAAC,CAAC,CAAC;AAC9F,IAAA,IAAI,IAAI,EAAE;;AAER,QAAA,IAAI,qBAAqB,CAAC,IAAI,CAAC,EAAE;AAC/B,YAAA,MAAM,CAAC,mBAAmB,GAAG,IAAI,CAAC;AACnC,SAAA;AAAM,aAAA;;AAEL,YAAAC,2BAA0B,CAAC,IAAI,EAAE,MAAM,CAAC,CAAC;AAC1C,SAAA;AACF,KAAA;AAED,IAAA,IAAI,mBAAmB,EAAE;AACvB,QAAA,MAAM,CAAC,mBAAmB,GAAG,mBAAmB,CAAC;AACID,KAAA;AAED,IAAA,IAAI,kBAakB,EAAE;AACtB,QAAA,MAAM,CAAC,kBAakB,GAAG,kBAakB,CAAC;AACChD,KAAA;AAED,IAAA,MAAM,CAAC,aAAa,GAAG,aAAa,CAAC;AAErC,IAAA,OAAO,MAAM,CAAC;AACChB,CAAC;AAED,,,,,,,,,,,,,,,,,,,,,;AAwBG;MA4BU,mBAAmB,CAAA;AAC9B,IAAA,OAAO,UAAU,CAAC,MAAc,EAAE,MAAqB,EAAA;QAErD,OAAO;AACL,YAAA,QAAQ,EAAE,mBAAmB;AAC7B,YAAA,SAAS,EAAE;gBACT,aAAa,CAAC,MAAM,CAAC;AACrB,gBAAA,EAAC,OAAO,EAAE,oBAAoB,EAAE,QAAQ,EAAE,MAAM,GAAG,MAAM,GAAG,EAAE,EAAC;AACHe,aAAA;SACF,CAAC;KACH;;2HAVU,mBAAmB,EAAA,IAAA,EAAA,EAAA,EAAA,MAAA,EAAA,EAAA,CAAA,eAAA,CAAA,QAAA,EAAA,CAAA,CAAA;AAAnB,mBAAA,CAAA,IAAA,GAAA,EAAA,CAAA,mBAAA,CAAA,EAAA,UAAA,EAAA,QAAA,EAAA,OAAA,EAAA,mBAAA,EAAA,QAAA,EAAA,EAAA,IAAA,EAAA,mBAAmB,YA1BpB,YAAY,CAAA,EAAA,CAAA,CAAA;AA0BX,mBAAA,CAAA,IAAA,GAAA,EAAA,CAAA,mBAAA,CAAA,EAAA,UAAA,EAAA,QAAA,EAAA,OAAA,EAAA,mBAAA,EAAA,QAAA,EAAA,EAAA,EAAA,IAAA,EAAA,mBAAmB,EAZbnB,SAAA,EAAA;QACTC,iBAAgB;QACChB,8BAA8B;AAC9B,QAAA,EAAC,OAAO,EAAE,QAAQ,EAAE,QAAQ,EAAE,WAAW,EAAC;AAC1C,QAAA,EAAC,OAAO,EAAE,gBAAgB,EAAE,QAAQ,EAAE,oBAAoB,EAAC;AAC3D,QAAA;AACE,YAAA,OAAO,EAAE,MAAM;AACf,YAAA,UAAU,EAAE,0BAA0B;AACtC,YAAA,IAAI,EAAE;gBACJ,aAAa;gBACb,sBAAsB;gBACtB,QAAQ;gBACR,QAAQ;gBACR,QAAQ;gBACR,MAAM;gBACN,aAAa;gBACb,oBAAoB;AACpB,gBAAA,CAAC,mBAAmB,EAAE,IAAI,QAAQ,EAAE,CAAC;AACrC,gBAAA,CAAC,kBAakB,EAAE,IAAI,QAAQ,EAAE,CAAC;AACrC,aAAA;AACF,SAAA;AACD,QAAAC,eAAc,CAAC,YAAY,CAAC,CAAC,UAAU;QACvC,aAAa,CAAC,EAAC,CAAC;AACIB,KAAA,EAAA,OAAA,EAAA,CAXBS,YAAY,CAAA,EAAA,CAAA,CAAA;sGA0BX,mBAAmB,EAAA,UAAA,EAAA,CAAA;kBA3B/B,QAAQ;AAAC,YAAA,IAAA,EAAA,CAAA;oBACR,OAAO,EAAE,CAAC,YAAY,CAAC;AACvB,oBAAA,SAAS,EAAE;wBACTD,iBAAgB;wBACHb,8BAA8B;AAC9B,wBAAA,EAAE,C,OAAO,EAAE,QAAQ,EAAE,QAAQ,EAAE,WAAW,EAAC;AAC1C,wBAAA,EAAC,OAAO,EAAE,gBAAgB,EAAE,QAAQ,EAAE,oBAAoB,EAAC;AAC3D,wBAAA;AACE,4BAAA,OAAO,EAAE,MAAM;AACf,4BAAA,UAAU,EAAE,0BAA0B;AACtC,4BAAA,IAAI,EAAE;gCACJ,aAAa;gCACb,sBAAsB;gCACtB,QAAQ;gCACR,QAAQ;gCACR,QAAQ;gCACR,MAAM;gCACN,aAAa;gCACb,oBAAoB;AACpB,gCAAA,CAAC,mBAAmB,EAAE,IAAI,QAAQ,EAAE,CAAC;AACrC,gCAAA,CAAC,kBAakB,EAAE,IAAI,QAAQ,EAAE,CAAC;AACrC,6BAAA;AACF,yBAAA;AACD,wBAAAC,eAAc,CAAC,YAAY,CAAC,CAAC,UAAU;wBACvC,aAAa,CAAC,EAAE,CAAC;AACIB,qBAAA;AACF,iBAAA,CAAA;;ACjID,,,,,AAMG;AAEH;AACa,mCAAE,EAAE;;ACTjB,,,,,AAMG;;ACNH,,,,,AAMG;AASH;;ACfA,,,,,AAMG;;ACNH;;AAEG;;;"}

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Found

in path(s):

\* /opt/cola/permits/1784583536\_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2020/testing.mjs.map

No license file was found, but licenses were detected in source scan.

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{ "version":3,"file":"upgrade.mjs","sources":["../../../../../packages/router/upgrade/src/upgrade.ts","../../../../../packages/router/upgrade/public_api.ts","../../../../../packages/router/upgrade/index.ts","../../../../../packages/router/upgrade/upgrade.ts"],"sourcesContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\nimport {Location} from '@angular/common';\nimport {APP_BOOTSTRAP_LISTENER, ComponentRef, InjectionToken} from '@angular/core';\nimport {Router, RestoredState as RestoredState} from '@angular/router';\nimport {UpgradeModule} from '@angular/upgrade/static';\n\n/**\n * Creates an initializer that sets up `ngRoute` integration\n * along with setting up the Angular router.\n *\n * @usageNotes\n *\n * <code-example language=\\\"typescript\\\">\n * @NgModule({\n *   imports: [\n *     RouterModule.forRoot(SOME_ROUTES),\n *     UpgradeModule\n *   ],\n *   providers: [\n *     RouterUpgradeInitializer\n *   ]\n * })\n * export class AppModule {\n *   ngDoBootstrap() {\n *     RouterUpgradeInitializer\n *   }\n * }\n * </code-example>\n *\n * @publicApi\n */\nexport const RouterUpgradeInitializer = {\n  provide: APP_BOOTSTRAP_LISTENER,\n  multi: true,\n  useFactory: locationSyncBootstrapListener as (ngUpgrade: UpgradeModule) => () => void,\n  deps: [UpgradeModule]\n};\n\n/**\n * @internal\n */\nexport function locationSyncBootstrapListener(ngUpgrade: UpgradeModule) {\n  return () => {\n    setUpLocationSync(ngUpgrade);\n  }\n};\n\n/**\n * Sets up a location change listener to trigger `history.pushState`. Works around the problem that `onPopState` does not trigger `history.pushState`. Must be called *after* calling `UpgradeModule.bootstrap`.\n *\n * @param ngUpgrade The upgrade NgModule.\n *\n * @param urlType The location strategy.\n *\n * @see `HashLocationStrategy`\n *\n * @see `PathLocationStrategy`\n */\nexport function setUpLocationSync(ngUpgrade: UpgradeModule, urlType: 'path'|'hash' = 'path') {\n  if (!ngUpgrade.$injector) {\n    throw new Error(`RouterUpgradeInitializer can be used only after UpgradeModule.bootstrap has been called. Remove RouterUpgradeInitializer and call setUpLocationSync after UpgradeModule.bootstrap.`);\n  }\n  const router = ngUpgrade.injector.get(Router);\n  const location: Location = ngUpgrade.injector.get(Location);\n  ngUpgrade.$injector.get('$rootScope').$on('$locationChangeStart', (event: any, newUrl: string, oldUrl: string, newState?: {[k: string]: unknown}|RestoredState, oldState?: {[k: string]: unknown}|RestoredState) => {\n    // Navigations coming from Angular router have a navigationId state\n    // property. Don't trigger Angular router navigation again if it is\n    // caused by a URL change from the current Angular router\n    // navigation.\n    const currentNavigationId = router.getCurrentNavigation()?.id;\n    const newStateNavigationId = newState?.navigationId;\n    if (newStateNavigationId !== undefined && newStateNavigationId === currentNavigationId) {\n      return;\n    }\n    let url;\n    if (urlType === 'path') {\n      url = resolveUrl(newUrl);\n    } else if (urlType === 'hash') {\n      // Remove the first hash from the URL\n      const hashIdx = newUrl.indexOf('#');\n      url = resolveUrl(newUrl.substring(0, hashIdx) + newUrl.substring(hashIdx + 1));\n    } else {\n      throw `Invalid URLType passed to setUpLocationSync: ` + urlType;\n    }\n    const path = location.normalize(url.pathname);\n    router.navigateByUrl(path + url.search + url.hash);\n  });\n}\n\n/**\n * Normalizes and parses a URL.\n *\n * - Normalizing means that a relative URL will be resolved into an absolute URL in the context of the application document.\n *\n * - Parsing means that the anchor's `protocol`, `hostname`, `port`, `pathname` and related properties are all populated to reflect the normalized URL.\n *\n * While this approach has wide compatibility, it doesn't work as expected on IE. On IE, normalizing happens similar to other browsers, but the parsed components will not be set. (E.g. if you assign `a.href = 'foo'`, then `a.protocol`, `a.host`, etc. will not be correctly updated.)\n *\n * We work around that by performing the parsing in a 2nd step by taking a previously normalized URL and assigning it again. This correctly populates all properties.\n *\n * See\n *\n * https://github.com/angular/angular.js/blob/2c7400e7d07b0f6cec1817dab40b9250ce8ebce6/src/ng/urlUtils.js#L26-L33\n * for more info.\n */\nlet anchor: HTMLAnchorElement;\nfunction resolveUrl(url)
```

```
string): {pathname: string, search: string, hash: string} {\n if (!anchor) {\n  anchor =\ndocument.createElement('a');\n }\n\n anchor.setAttribute('href', url);\n anchor.setAttribute('href', anchor.href);\n\nreturn {\n  // IE does not start `pathname` with `^` like other browsers.\n  pathname:\n`/${anchor.pathname.replace(/^\//, '')}`,\n  search: anchor.search,\n  hash: anchor.hash\n };\n}\n\n","**\n *\n @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-\nstyle license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n**\n *\n @module\n *\n @description\n * Entry point for all public APIs of this package.\n */\n\nexport * from './src/upgrade';\n\n// This file\nonly reexports content of the `src` folder. Keep it that way.\n\n","**\n *\n @license\n * Copyright Google LLC All\nRights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\nLICENSE\n\nfile at https://angular.io/license\n */\n\n// This file is not used to build this module. It is only used during editing\n//\nby the TypeScript language service and during build for verification. `ngc` replaces this file with production\nindex.ts when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n\n","**\n *\n Generated bundle\nindex. Do not edit.\n\n*/\n\nexport * from\n\n './index';\n\n"],"names": [], "mappings": ";;;;;;;;;AAAA;;;;;;;;;AAMG;AAOH;;;;;;;;;AAsBG;AACU,MAAA,wB\nAAwB,GAAG;AACtC,IAAA,OOAO,EAAE,sBAAsB;AAC/B,IAAA,KAAK,EAAE,IAAI;AACX,IAAA,UAAU,E\nAAE,6BAAyE;IACrF,IAAI,EAAE,CAAC,aAAa,CAAC;EACrB;AAEF;;AAEG;AACG,SAAU,6BAA6B,CAAC,S\nAAwB,EAAA;AACpE,IAAA,OOAO,MAAK;QACV,iBAAiB,CAAC,SAAS,CAAC,CAAC;AAC/B,KAAK,CAAC\n;AACJ,CAAC;AAED;;;;;;;;;AAWG;SACa,iBAAiB,CAAC,SAAwB,EAAE,UAAyB,MAAM,EAAA;AACzF,IAA\nA,IAAI,CAAC,SAAS,CAAC,SAAS,EAAE;QACxB,MAAM,IAAI,KAAK,CAAC,CAAA;;AAGb,MAAA,CAAA,\nCAAC,CAAC;AACN,KAAA;IAED,MAAM,MAAM,GAAW,SAAS,CAAC,QAAQ,CAAC,GAAG,CAAC,MAAM\n,CAAC,CAAC;IACtD,MAAM,QAAQ,GAAa,SAAS,CAAC,QAAQ,CAAC,GAAG,CAAC,QAAQ,CAAC,CAAC;\nAAE5D,IAAA,SAAS,CAAC,SAAS,CAAC,GAAG,CAAC,YAAY,CAAC;AACbC,SAAA,GAAG,CACA,sBAAsB,\nEACtB,CAAC,KAAU,EAAE,MAAc,EAAE,MAAc,EAC1C,QAA+C,EAC/C,QAA+C,KAAI;;;QAKID,MAAM,m\nBAAmB,GAAG,MAAM,CAAC,oBAAoB,EAAE,EAAE,EAAE,CAAC;AAC9D,QAAA,MAAM,oBAAoB,GAAG,\nQAAQ,EAAE,YAAY,CAAC;QACpD,IAAI,oBAAoB,KAAK,SAAS;YAC1C,oBAAoB,KAAK,mBAAmB,EAAE;\nYACbD,OOAO;AACR,SAAA;AAED,QAAA,IAAI,GAAG,CAAC;QACR,IAAI,OOAO,KAAK,MAAM,EAAE;A\nACtB,YAAA,GAAG,GAAG,UAAU,CAAC,MAAM,CAAC,CAAC;AAC1B,SAAA;aAAM,IAAI,OOAO,KAAK,\nMAAM,EAAE;;YAE7B,MAAM,OOAO,GAAG,MAAM,CAAC,OOAO,CAAC,GAAG,CAAC,CAAC;YACpC,GA\nAG,GAAG,UAAU,CAAC,MAAM,CAAC,SAAS,CAAC,CAAC,EAAE,OOAO,CAAC,GAAG,MAAM,CAAC,SA\nAS,CAAC,OOAO,GAAG,CAAC,CAAC,CAAC,CAAC;AACbF,SAAA;AAAM,aAAA;YAcl,MAAM,+CAA+C,\nGAAG,OOAO,CAAC;AACjE,SAAA;QACD,MAAM,IAAI,GAAG,QAAQ,CAAC,SAAS,CAAC,GAAG,CAAC,Q\nAAQ,CAAC,CAAC;AAC9C,QAAA,MAAM,CAAC,aAAa,CAAC,IAAI,GAAG,GAAG,CAAC,MAAM,GAAG,G\nAAG,CAAC,IAAI,CAAC,CAAC;AACrD,KAAK,CAAC,CAAC;AACb,CAAC;AAED;;;;;;;;;AAiBG;AACb,I\nAAI,MAAmC,CAAC;AACxC,SAAS,UAAU,CAAC,GAAW,EAAA;IAC7B,IAAI,CAAC,MAAM,EAAE;AACX,Q\nAAA,MAAM,GAAG,QAAQ,CAAC,aAAa,CAAC,GAAG,CAAC,CAAC;AACtC,KAAA;AAED,IAAA,MAAM,C\nAAC,YAAY,CAAC,MAAM,EAAE,GAAG,CAAC,CAAC;IACjC,MAAM,CAAC,YAAY,CAAC,MAAM,EAAE,\nMAAM,CAAC,IAAI,CAAC,CAAC;IAEzC,OOAO;;AAEL,QAAA,QAAQ,EAAE,CAAA,CAAA,EAAl,MAAM,C\nAAC,QAAQ,CAAC,OOAO,CAAC,KAAK,EAAE,EAAE,CAAC,CAAE,CAAA;QACID,MAAM,EAAE,MAAM,C\nAAC,MAAM;QACrB,IAAI,EAAE,MAAM,CAAC,IAAI;KACIB,CAAC;AACJ;;AC5IA;;;;;;;;;AAMG;AASH;;ACfA;\n;;;;;;;;;AAMG;;ACNH;;AAEG;;;;;;;;}

Found
in path(s):
* /opt/cola/permits/1784583536_1693546609.939965/0/router-14-3-0-1-tgz/package/fesm2020/upgrade.mjs.map
No license file was found, but licenses were detected in source scan.
```

```
{ "version": 3, "file": "router.mjs", "sources": [ "../../../../../../packages/router/src/shared.ts", "../../../../../../packages/router/s
```

```

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directives/router_outlet.ts", "../..../..../packages/router/src/components/empty_outlet.ts", "../..../..../packages/rout
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rs/prioritized_guard_value.ts", "../..../..../packages/router/src/operators/check_guards.ts", "../..../..../packages/rout
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../..../packages/router/index.ts", "../..../..../packages/router/router.ts"], "sourcesContent": ["/**\n
 * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
 {Route, UrlMatchResult} from './models';\nimport {UrlSegment, UrlSegmentGroup} from './url_tree';\n\n/**\n *
The primary routing outlet.\n *\n * @publicApi\n */\nexport const PRIMARY_OUTLET = 'primary';\n\n/**\n * A
private symbol used to store the value of `Route.title` inside the `Route.data` if it is a\n * static string or
`Route.resolve` if anything else. This allows us to reuse the existing route\n * data/resolvers to support the title
feature without new instrumentation in the `Router` pipeline.\n */\nexport const RouteTitleKey =
Symbol('RouteTitle');\n\n/**\n * A collection of matrix and query URL parameters.\n * @see
`convertToParamMap`\n *\n * @see `ParamMap`\n *\n * @publicApi\n */\nexport type Params = {\n [key: string]:
any;\n};\n\n/**\n * A map that provides access to the required and optional parameters\n * specific to a route.\n *
The map supports retrieving a single value with `get`\n * or multiple values with `getAll`\n *\n * @see
[URLSearchParams](https://developer.mozilla.org/en-US/docs/Web/API/URLSearchParams)\n
*\n * @publicApi\n */\nexport interface ParamMap {\n /**\n * Reports whether the map contains a given
parameter.\n * @param name The parameter name.\n * @returns True if the map contains the given parameter,
false otherwise.\n */\n has(name: string): boolean;\n /**\n * Retrieves a single value for a parameter.\n *
@param name The parameter name.\n * @return The parameter's single value,\n * or the first value if the
parameter has multiple values,\n * or `null` when there is no such parameter.\n */\n get(name: string):
string|null;\n /**\n * Retrieves multiple values for a parameter.\n * @param name The parameter name.\n *
@return An array containing one or more values,\n * or an empty array if there is no such parameter.\n */\n
getAll(name: string): string[];\n\n /** Names of the parameters in the map. */\n readonly keys: string[];\n}\n\nclass
ParamsAsMap implements ParamMap {\n
private params: Params;\n\n constructor(params: Params) {\n this.params = params || {};\n }\n\n has(name:
string): boolean {\n return Object.prototype.hasOwnProperty.call(this.params, name);\n }\n\n get(name: string):
string|null {\n if (this.has(name)) {\n const v = this.params[name];\n return Array.isArray(v) ? v[0] : v;\n
}\n\n return null;\n }\n\n getAll(name: string): string[] {\n if (this.has(name)) {\n const v =
this.params[name];\n return Array.isArray(v) ? v : [v];\n }\n\n return [];\n }\n\n get keys(): string[] {\n
return Object.keys(this.params);\n }}\n\n/**\n * Converts a `Params` instance to a `ParamMap`\n *\n * @param
params The instance to convert.\n * @returns The new map instance.\n *\n * @publicApi\n */\nexport function

```

```

convertToParamMap(params: Params): ParamMap {
  return new ParamsAsMap(params);
}

Matches the route configuration (`route`) against the actual URL (`segments`).

When no matcher is defined on a `Route`, this is the matcher used by the Router by default.

@param segments The remaining unmatched segments in the current navigation
@param segmentGroup The current segment group being matched
@param route The `Route` to match against.
@see UrlMatchResult
@see Route
@returns The resulting match information or `null` if the `route` should not match.
@publicApi

function defaultUrlMatcher(
  segments: UrlSegment[],
  segmentGroup: UrlSegmentGroup,
  route: Route):
  UrlMatchResult|null {
  const parts = route.path!.split("/");

  if (parts.length > segments.length) {
    // The actual URL is shorter than the config, no match
    return null;
  }

  if (route.pathMatch === 'full' && (
    segmentGroup.hasChildren() || parts.length < segments.length)) {
    // The config is longer than the actual URL but we are looking for a full match, return null
    return null;
  }

  const posParams: {[key: string]:
  UrlSegment}
  = {};

  // Check each config part against the actual URL
  for (let index = 0; index < parts.length; index++) {
    const part = parts[index];
    const segment = segments[index];
    const isParameter = part.startsWith(':');

    if (isParameter) {
      posParams[part.substring(1)] = segment;
    } else if (part !== segment.path) {
      // The actual URL part does not match the config, no match
      return null;
    }
  }

  return {consumed:
  segments.slice(0, parts.length), posParams};
}

/**
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 * found in the LICENSE file at https://angular.io/license

import {isObservable as isObservable, isPromise as isPromise}
from '@angular/core';
import {from, Observable, of} from 'rxjs';
import {Params} from '../shared';

export function shallowEqualArrays(a: any[], b: any[]): boolean {
  if (a.length !== b.length)
    return false;
  for (let i = 0; i < a.length; ++i) {
    if (!shallowEqual(a[i], b[i]))
      return false;
  }
  return true;
}

export function shallowEqual(a: Params, b: Params): boolean {
  // While `undefined` should never be possible, it would sometimes be the case in IE 11
  // and pre-chromium Edge. The check below accounts for this edge case.
  const k1 = a ? Object.keys(a) : undefined;
  const k2 = b ? Object.keys(b) : undefined;
  if (!k1 || !k2 || k1.length !== k2.length)
    return false;
  let key: string;
  for (let i = 0; i < k1.length; i++) {
    key = k1[i];
    if (!equalArraysOrString(a[key], b[key]))
      return false;
  }
  return true;
}

/**
 * Test equality for arrays of strings or a string.
 */
export function equalArraysOrString(a: string|string[], b:
string|string[]) {
  if (Array.isArray(a) && Array.isArray(b)) {
    if (a.length !== b.length)
      return false;
    const aSorted = [...a].sort();
    const bSorted = [...b].sort();
    return aSorted.every((val, index) => bSorted[index] === val);
  } else {
    return a === b;
  }
}

/**
 * Flattens single-level nested arrays.
 */
export function flatten<T>(arr: T[][]): T[] {
  return Array.prototype.concat.apply([], arr);
}

/**
 * Return the last element of an array.
 */
export function last<T>(a: T[]): T|null {
  return a.length > 0 ? a[a.length - 1] : null;
}

/**
 * Verifys all booleans in an array are `true`.
 */
export function and(bools: boolean[]): boolean {
  return !bools.some(v => !v);
}

export function forEach<K, V>(map: {[key: string]: V}, callback: (v: V, k: string) => void): void {
  for (const prop in map) {
    if (map.hasOwnProperty(prop)) {
      callback(map[prop], prop);
    }
  }
}

export function wrapIntoObservable<T>(value: T|Promise<T>|Observable<T>): Observable<T> {
  if (isObservable(value))
    return value;
  if (isPromise(value))
    // Use `Promise.resolve()` to wrap promise-like instances.
    // Required ie when a Resolver returns a AngularJS `$q` promise to correctly trigger the
    // change detection.
    return from(Promise.resolve(value));
  return of(value);
}

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 * found in the LICENSE file at https://angular.io/license

import {Injectable,
  RuntimeError as RuntimeError} from '@angular/core';
import {RuntimeErrorCode} from './errors';
import {convertToParamMap, ParamMap, Params, PRIMARY_OUTLET} from './shared';
import {equalArraysOrString,
  forEach, shallowEqual} from './utils/collection';

const NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
ngDevMode;

export function createEmptyUrlTree() {
  return new UrlTree(new UrlSegmentGroup([], {}), {},
  null);
}

/**
 * A set of options which specify how to determine if a `UrlTree` is active, given the `UrlTree`

```

for

```
the current router state.\n * \n * @publicApi\n * @see Router.isActive\n * ^\nexport interface IsActiveMatchOptions  
{\n /**\n * Defines the strategy for comparing the matrix parameters of two `UrlTree`s.\n * \n * The matrix  
parameter matching is dependent on the strategy for matching the\n * segments. That is, if the `paths` option is set  
to `subset`, only\n * the matrix parameters of the matching segments will be compared.\n * \n * - `exact`:  
Requires that matching segments also have exact matrix parameter\n * matches.\n * - `subset`: The matching  
segments in the router's active `UrlTree` may contain\n * extra matrix parameters, but those that exist in the  
`UrlTree` in question must match.\n * - `ignored`: When comparing `UrlTree`s, matrix params will be ignored.\n */\n matrixParams: 'exact'|'subset'|'ignored';\n /**\n * Defines the strategy for comparing the query parameters of  
two `UrlTree`s.\n * \n * - `exact`: the query parameters must match  
exactly.\n * - `subset`: the active `UrlTree` may contain extra parameters,\n * but must match the key and value  
of any that exist in the `UrlTree` in question.\n * - `ignored`: When comparing `UrlTree`s, query params will be  
ignored.\n */\n queryParams: 'exact'|'subset'|'ignored';\n /**\n * Defines the strategy for comparing the  
`UrlSegment`s of the `UrlTree`s.\n * \n * - `exact`: all segments in each `UrlTree` must match.\n * - `subset`: a  
`UrlTree` will be determined to be active if it\n * is a subtree of the active route. That is, the active route may  
contain extra\n * segments, but must at least have all the segments of the `UrlTree` in question.\n */\n paths:  
'exact'|'subset';\n /**\n * - `exact`: indicates that the `UrlTree` fragments must be equal.\n * - `ignored`: the  
fragments will not be compared when determining if a\n * `UrlTree` is active.\n */\n fragment:  
'exact'|'ignored';\n}\n\nntype ParamMatchOptions = 'exact'|'subset'|'ignored';\nntype  
PathCompareFn = (\n container: UrlSegmentGroup, containee: UrlSegmentGroup, matrixParams:  
ParamMatchOptions) =>\n boolean;\nntype ParamCompareFn = (\n container: Params, containee: Params) =>  
boolean;\n\nconst pathCompareMap: Record<IsActiveMatchOptions['paths'], PathCompareFn> = {\n 'exact':  
equalSegmentGroups,\n 'subset': containsSegmentGroup,\n};\n\nconst paramCompareMap:  
Record<ParamMatchOptions, ParamCompareFn> = {\n 'exact': equalParams,\n 'subset': containsParams,\n 'ignored': () => true,\n};\n\nexport function containsTree(\n container: UrlTree, containee: UrlTree, options:  
IsActiveMatchOptions): boolean {\n return pathCompareMap[options.paths](container.root, containee.root,  
options.matrixParams) &&\n paramCompareMap[options.queryParams](container.queryParams,  
containee.queryParams) &&\n !(options.fragment === 'exact' && container.fragment !==  
containee.fragment);\n}\n\nfunction equalParams(container: Params, containee: Params): boolean {\n  
// TODO: This does not handle array params correctly.\n return shallowEqual(container,  
containee);\n}\n\nfunction equalSegmentGroups(\n container: UrlSegmentGroup, containee: UrlSegmentGroup,\n matrixParams: ParamMatchOptions): boolean {\n if (!equalPath(container.segments, containee.segments)) return  
false;\n if (!matrixParamsMatch(container.segments, containee.segments, matrixParams)) {\n return false;\n }\n if (container.numberOfChildren !== containee.numberOfChildren) return false;\n for (const c in containee.children)  
{\n if (!container.children[c]) return false;\n if (!equalSegmentGroups(container.children[c],  
containee.children[c], matrixParams))\n return false;\n }\n return true;\n}\n\nfunction containsParams(container:  
Params, containee: Params): boolean {\n return Object.keys(containee).length <= Object.keys(container).length  
&&\n Object.keys(containee).every(key => equalArraysOrString(container[key],  
containee[key]));\n}\n\nfunction containsSegmentGroup(\n container: UrlSegmentGroup, containee: UrlSegmentGroup,\n matrixParams: ParamMatchOptions): boolean  
{\n return containsSegmentGroupHelper(container, containee, containee.segments, matrixParams);\n}\n\nfunction  
containsSegmentGroupHelper(\n container: UrlSegmentGroup, containee: UrlSegmentGroup, containeePaths:  
UrlSegment[],\n matrixParams: ParamMatchOptions): boolean {\n if (container.segments.length >  
containeePaths.length) {\n const current = container.segments.slice(0, containeePaths.length);\n if  
(!equalPath(current, containeePaths)) return false;\n if (containee.hasChildren()) return false;\n if  
(!matrixParamsMatch(current, containeePaths, matrixParams)) return false;\n return true;\n } else if  
(container.segments.length === containeePaths.length) {\n if (!equalPath(container.segments, containeePaths))  
return false;\n if (!matrixParamsMatch(container.segments, containeePaths, matrixParams)) return false;\n for
```

```

(const c in
  containee.children) {\n  if (!container.children[c]) return false;\n  if
  (!containsSegmentGroup(container.children[c], containee.children[c], matrixParams)) {\n    return false;\n  }\n
  }\n  return true;\n\n } else {\n  const current = containeePaths.slice(0, container.segments.length);\n  const next
  = containeePaths.slice(container.segments.length);\n  if (!equalPath(container.segments, current)) return false;\n
  if (!matrixParamsMatch(container.segments, current, matrixParams)) return false;\n  if
  (!container.children[PRIMARY_OUTLET]) return false;\n  return containsSegmentGroupHelper(\n
  container.children[PRIMARY_OUTLET], containee, next, matrixParams);\n } }\n\nfunction
matrixParamsMatch(\n  containerPaths: UrlSegment[], containeePaths: UrlSegment[], options:
  ParamMatchOptions) {\n  return containeePaths.every((containeeSegment, i) => {\n    return
  paramCompareMap[options](containerPaths[i].parameters, containeeSegment.parameters);\n  });\n }\n\n}
\n\n**\n
  * @description\n  * \n  * Represents the parsed URL.\n  * \n  * Since a router state is a tree, and the URL is nothing but
  a serialized state, the URL is a\n  * serialized tree.\n  * \n  * UrlTree is a data structure that provides a lot of affordances in
  dealing with URLs\n  * \n  * @usageNotes\n  * ### Example\n  * \n  * ```\n  *
  * @Component({ templateUrl: 'template.html' })\n  * class MyComponent {\n  *   constructor(router: Router) {\n  *
  const tree: UrlTree =\n  *     router.parseUrl('/team/33/(user/victor//support:help)?debug=true#fragment');\n  *
  const f = tree.fragment; // return 'fragment'\n  *   const q = tree.queryParams; // returns {debug: 'true'}\n  *   const
  g: UrlSegmentGroup = tree.root.children[PRIMARY_OUTLET];\n  *   const s: UrlSegment[] = g.segments; //
  returns 2 segments 'team' and '33'\n  *   g.children[PRIMARY_OUTLET].segments; // returns 2 segments 'user' and
  'victor'\n  *   g.children['support'].segments; // return 1 segment 'help'\n  *   }\n  *   }\n  *   ```\n  * \n  * @publicApi\n
  *\n  * ^\n  * export class UrlTree {\n  *   /** @internal *\n  *   // TODO(issue/24571): remove '!'.\n  *   _queryParamMap!:
  ParamMap;\n  *   /** @internal *\n  *   constructor(\n  *     /** The root segment group of the URL tree *\n  *     public
  root: UrlSegmentGroup,\n  *     /** The query params of the URL *\n  *     public queryParams: Params,\n  *     /** The
  fragment of the URL *\n  *     public fragment: string|null) {} \n  *   get queryParamMap(): ParamMap {\n  *     if
  (!this._queryParamMap) {\n  *       this._queryParamMap = convertToParamMap(this.queryParams);\n  *     }\n  *     return
  this._queryParamMap;\n  *   }\n  *   /** @docsNotRequired *\n  *   toString(): string {\n  *     return
  DEFAULT_SERIALIZER.serialize(this);\n  *   }\n  *   }\n  *   }\n  *   **\n  *   * @description\n  *   * \n  *   Represents the parsed URL
  segment group.\n  *   * \n  *   See `UrlTree` for more information.\n  *   * \n  *   @publicApi\n  *   *\n  *   ^\n  *   export class
  UrlSegmentGroup {\n  *     /** @internal *\n  *     _sourceSegment?: UrlSegmentGroup;\n  *     /** @internal *\n  *
  _segmentIndexShift?: number;\n  *     /**\n  *     *\n  *     * Used only in dev mode to detect if application relies on `relativeLinkResolution: 'legacy'`\n  *     * Should be
  removed in when `relativeLinkResolution` is removed.\n  *     *\n  *     _segmentIndexShiftCorrected?: number;\n  *     /** The
  parent node in the url tree *\n  *     parent: UrlSegmentGroup|null = null;\n  *     constructor(\n  *       /** The URL segments
  of this group. See `UrlSegment` for more information *\n  *       public segments: UrlSegment[],\n  *       /** The list of
  children of this group *\n  *       public children: {[key: string]: UrlSegmentGroup}) {\n  *         forEach(children, (v: any, k:
  any) => v.parent = this);\n  *       }\n  *       /** Whether the segment has child segments *\n  *       hasChildren(): boolean {\n
  *         return this.numberOfChildren > 0;\n  *       }\n  *       /** Number of child segments *\n  *       get numberOfChildren(): number
  {\n  *         return Object.keys(this.children).length;\n  *       }\n  *       /** @docsNotRequired *\n  *       toString(): string {\n
  *         return
  serializePaths(this);\n  *       }\n  *     }\n  *     }\n  *     **\n  *     * @description\n  *     * \n  *     Represents
  a single URL segment.\n  *     * \n  *     A UrlSegment is a part of a URL between the two slashes. It contains a path and the
  matrix\n  *     parameters associated with the segment.\n  *     * \n  *     @usageNotes\n  *     * ### Example\n  *     * \n  *     ```\n  *
  * @Component({ templateUrl: 'template.html' })\n  * class MyComponent {\n  *   constructor(router: Router) {\n  *
  const tree: UrlTree = router.parseUrl('/team?id=33');\n  *   const g: UrlSegmentGroup =
  tree.root.children[PRIMARY_OUTLET];\n  *   const s: UrlSegment[] = g.segments;\n  *   s[0].path; // returns
  'team'\n  *   s[0].parameters; // returns {id: 33}\n  *   }\n  *   }\n  *   ```\n  * \n  * @publicApi\n  * ^\n  * export class
  UrlSegment {\n  *   /** @internal *\n  *   // TODO(issue/24571): remove '!'.\n  *   _parameterMap!: ParamMap;\n  *   constructor(\n
  *     /** The path part of a URL segment *\n  *     public path: string,\n  *     /** The matrix parameters
  associated with a segment *\n  *     public parameters: {[name: string]: string}) {} \n  *   get parameterMap():

```

```

ParamMap {\n  if
  (!this._parameterMap) {\n    this._parameterMap = convertToParamMap(this.parameters);\n  }\n  return
  this._parameterMap;\n }\n\n /** @docsNotRequired */\n toString(): string {\n  return serializePath(this);\n }\n}\n\n\nexport function equalSegments(as: UrlSegment[], bs: UrlSegment[]): boolean {\n  return equalPath(as, bs)
  && as.every((a, i) => shallowEqual(a.parameters, bs[i].parameters));\n }\n\n\nexport function equalPath(as:
  UrlSegment[], bs: UrlSegment[]): boolean {\n  if (as.length !== bs.length) return false;\n  return as.every((a, i) =>
  a.path === bs[i].path);\n }\n\n\nexport function mapChildrenIntoArray<T>(\n  segment: UrlSegmentGroup, fn: (v:
  UrlSegmentGroup, childOutlet: string) => {\n    if (childOutlet === PRIMARY_OUTLET) {\n      res =
  res.concat(fn(child, childOutlet));\n    }\n  });\n  forEach(segment.children, (child: UrlSegmentGroup, childOutlet:
  string) => {\n
    if (childOutlet !== PRIMARY_OUTLET) {\n      res = res.concat(fn(child, childOutlet));\n    }\n  });\n  return
  res;\n }\n}\n\n\n/**\n * @description\n * Serializes and deserializes a URL string into a URL tree.\n * The url
  serialization strategy is customizable. You can\n * make all URLs case insensitive by providing a custom
  UrlSerializer.\n * See `DefaultUrlSerializer` for an example of a URL serializer.\n * @publicApi\n *\n * @Injectable({providedIn: 'root', useFactory: () => new DefaultUrlSerializer()})\nexport abstract class
  UrlSerializer {\n  /** Parse a url into a `UrlTree` */\n  abstract parse(url: string): UrlTree;\n  /** Converts a
  `UrlTree` into a url */\n  abstract serialize(tree: UrlTree): string;\n }\n\n\n/**\n * @description\n * A default
  implementation of the `UrlSerializer`.\n * Example URLs:\n * ``\n * /inbox/33(popup:compose)\n *
  /inbox/33;open=true/messages/44\n * ``\n * DefaultUrlSerializer uses parentheses to serialize secondary
  segments
  (e.g., popup:compose), the\n * colon syntax to specify the outlet, and the `;parameter=value` syntax (e.g., open=true)
  to\n * specify route specific parameters.\n * @publicApi\n *\nexport class DefaultUrlSerializer implements
  UrlSerializer {\n  /** Parses a url into a `UrlTree` */\n  parse(url: string): UrlTree {\n    const p = new
  UrlParser(url);\n    return new UrlTree(p.parseRootSegment(), p.parseQueryParams(), p.parseFragment());\n  }\n\n  /**
  Converts a `UrlTree` into a url */\n  serialize(tree: UrlTree): string {\n    const segment =
  `/${serializeSegment(tree.root, true)}`; \n    const query = serializeQueryParams(tree.queryParams);\n    const
  fragment = \n    typeof tree.fragment === `string` ? `#${encodeUriFragment(tree.fragment)} ` : ""; \n    return
  `${segment}${query}${fragment}`;\n  }\n}\n\n\nconst DEFAULT_SERIALIZER = new
  DefaultUrlSerializer();\n\n\nexport function serializePaths(segment: UrlSegmentGroup): string {\n  return
  segment.segments.map(p => serializePath(p)).join('/');\n }\n\n\nfunction
  serializeSegment(segment: UrlSegmentGroup, root: boolean): string {\n  if (!segment.hasChildren()) {\n    return
  serializePaths(segment);\n  }\n\n  if (root) {\n    const primary = segment.children[PRIMARY_OUTLET] ?\n    serializeSegment(segment.children[PRIMARY_OUTLET], false) : \n    ""; \n    const children: string[] = [];\n    forEach(segment.children, (v: UrlSegmentGroup, k: string) => {\n      if (k !== PRIMARY_OUTLET) {\n
  children.push(`${k}:${serializeSegment(v, false)}`);\n      }\n    });\n    return children.length > 0 ?
  `${primary}(${children.join('/')}` : primary;\n  }\n  } else {\n    const children = mapChildrenIntoArray(segment, (v:
  UrlSegmentGroup, k: string) => {\n      if (k === PRIMARY_OUTLET) {\n        return
  [serializeSegment(segment.children[PRIMARY_OUTLET], false)];\n      }\n      return
  [`${k}:${serializeSegment(v, false)}`];\n    });\n    // use no parenthesis if the only child is a primary outlet route\n
  if (Object.keys(segment.children).length === 1 && segment.children[PRIMARY_OUTLET] != null) {\n      return
  `${serializePaths(segment)}/${children[0]}`;\n    }\n    return
  `${serializePaths(segment)}/${children.join('/')}`;\n  }\n }\n}\n\n\n/**\n * Encodes a URI string with the default
  encoding. This function will only ever be called from\n * `encodeUriQuery` or `encodeUriSegment` as it's the base
  set of encodings to be used. We need\n * a custom encoding because encodeURIComponent is too aggressive and
  encodes stuff that doesn't\n * have to be encoded per https://url.spec.whatwg.org.\n *\nfunction encodeUriString(s:
  string): string {\n  return encodeURIComponent(s)\n    .replace(/%40/g, '@')\n    .replace(/%3A/gi, ':')\n    .replace(/%24/g, '$')\n    .replace(/%2C/gi, ',');\n }\n}\n\n\n/**\n * This function should be used to encode both keys and

```



```

values in a query string key/value. In the following URL, you need to call encodeURIComponent on "k" and "v":
* http://www.site.org/html;mk=mv?k=v#f
*/export function encodeURIComponent(s: string): string {
  return encodeURIComponent(s).replace(/%3B/gi,
  ');');
}
*/ This function should be used to encode a URL fragment. In the following URL, you need to call
* encodeURIComponent on "f":
* http://www.site.org/html;mk=mv?k=v#f
*/export function
encodeURIComponent(s: string): string {
  return encodeURIComponent(s);
}
*/ This function should be run on any
URI segment as well as the key and value in a key/value
* pair for matrix params. In the following URL, you need
to call encodeURIComponent on "html", "mk", and "mv":
* http://www.site.org/html;mk=mv?k=v#f
*/export function encodeURIComponent(s: string): string {
  return encodeURIComponent(s).replace(/(\/g,
  '%28').replace(/(\/g, '%29').replace(/%26/gi, '&');
}
*/export function decode(s: string): string {
  return
  decodeURIComponent(s);
}
*/ Query keys/values should have the "+" replaced first, as "+" in a query string
is ". decodeURIComponent function will not decode "+" as a space.
*/export function decodeQuery(s:
string): string {
  return decode(s.replace(/\/+g, '%20'));
}
*/export function serializePath(path: UriSegment):
string {
  return `${encodeURIComponent(path.path)}${serializeMatrixParams(path.parameters)}`;
}
*/export function
serializeMatrixParams(params: {[key: string]: string}): string {
  return Object.keys(params).map(key =>
  `;${encodeURIComponent(key)}=${encodeURIComponent(params[key])}`)
  .join("");
}
*/export function
serializeQueryParams(params: {[key: string]: any}): string {
  const strParams: string[] =
  Object.keys(params).map((name) => {
    const value = params[name];
    return
    Array.isArray(value) ?
    value.map(v => `${encodeURIComponent(name)}=${encodeURIComponent(v)}`).join('&')
    :
    `${encodeURIComponent(name)}=${encodeURIComponent(value)}`;
  })
  .filter(s => !!s);
  return
  strParams.length
  ? `?${strParams.join('&')}` : "";
}
*/
const SEGMENT_RE = /^[^\/()?:=#]+/;
function matchSegments(str:
string): string {
  const match = str.match(SEGMENT_RE);
  return match ? match[0] : "";
}
const
QUERY_PARAM_RE = /^[^=?&#]+/;
/* Return the name of the query param at the start of the string or an empty
string
*/function matchQueryParams(str: string): string {
  const match = str.match(QUERY_PARAM_RE);
  return match ? match[0] : "";
}
const QUERY_PARAM_VALUE_RE = /^[^&#]+/;
/* Return the value of the
query param at the start of the string or an empty string
*/function matchUrlQueryParamValue(str: string): string {
  const match = str.match(QUERY_PARAM_VALUE_RE);
  return match ? match[0] : "";
}
class UriParser {
  private remaining: string;
  constructor(private url: string) {
    this.remaining = url;
  }
  parseRootSegment(): UriSegmentGroup {
    this.consumeOptional('/');
    if (this.remaining === "" ||
    this.peekStartsWith('?') ||
    this.peekStartsWith('#')) {
      return new UriSegmentGroup([], {});
    }
    /* The root segment group never
has segments
*/return new UriSegmentGroup([], this.parseChildren());
  }
  parseQueryParams(): Params {
    const params: Params = {};
    if (this.consumeOptional('?')) {
      do {
        this.parseQueryParam(params);
      } while (this.consumeOptional('&'));
    }
    return params;
  }
  parseFragment(): string | null {
    return
    this.consumeOptional('#') ? decodeURIComponent(this.remaining) : null;
  }
  private parseChildren(): {[outlet:
string]: UriSegmentGroup} {
    if (this.remaining === "") {
      return {};
    }
    this.consumeOptional('/');
    const segments: UriSegment[] = [];
    if (!this.peekStartsWith('(') {
      segments.push(this.parseSegment());
    }
    while (this.peekStartsWith('/') && !this.peekStartsWith('/*') &&
    !this.peekStartsWith('(')) {
      this.capture('/');
      segments.push(this.parseSegment());
    }
    let children: {[outlet: string]: UriSegmentGroup} = {};
    if (this.peekStartsWith('(')) {
      this.capture('(');
      children = this.parseParens(true);
    }
    let res: {[outlet: string]: UriSegmentGroup} =
    {};
    if (this.peekStartsWith('(') {
      res = this.parseParens(false);
    }
    if (segments.length > 0 ||
    Object.keys(children).length > 0) {
      res[PRIMARY_OUTLET] = new UriSegmentGroup(segments, children);
    }
    return res;
  }
  /* parse a segment with its matrix parameters
  // ie `name;k1=v1;k2`
  private
parseSegment(): UriSegment {
    const path = matchSegments(this.remaining);
    if (path === "" &&
    this.peekStartsWith(';')) {
      throw new RuntimeError(
      RuntimeErrorCode.EMPTY_PATH_WITH_PARAMS,
      NG_DEV_MODE && `Empty path url segment

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cannot have parameters: '${this.remaining}');\n }\n\n this.capture(path);\n return new
UrlSegment(decode(path), this.parseMatrixParams());\n
}\n\n private parseMatrixParams(): {[key: string]: string} {\n  const params: {[key: string]: string} = {};\n
while (this.consumeOptional(';')) {\n  this.parseParam(params);\n }\n return params;\n }\n\n private
parseParam(params: {[key: string]: string}): void {\n  const key = matchSegments(this.remaining);\n  if (!key) {\n
return;\n }\n this.capture(key);\n let value: any = ";\n if (this.consumeOptional('=')) {\n  const
valueMatch = matchSegments(this.remaining);\n  if (valueMatch) {\n   value = valueMatch;\n
this.capture(value);\n  }\n }\n\n params[decode(key)] = decode(value);\n }\n\n // Parse a single query
parameter `name[=value]`\n private parseQueryParam(params: Params): void {\n  const key =
matchQueryParams(this.remaining);\n  if (!key) {\n   return;\n }\n this.capture(key);\n let value: any = ";\n
if (this.consumeOptional('=')) {\n  const valueMatch = matchUrlQueryParamValue(this.remaining);\n
  if (valueMatch) {\n   value = valueMatch;\n   this.capture(value);\n  }\n }\n\n const decodedKey =
decodeQuery(key);\n  const decodedVal = decodeQuery(value);\n\n  if (params.hasOwnProperty(decodedKey))
{\n   // Append to existing values\n   let currentVal = params[decodedKey];\n   if (!Array.isArray(currentVal))
{\n    currentVal = [currentVal];\n    params[decodedKey] = currentVal;\n   }\n
currentVal.push(decodedVal);\n  } else {\n   // Create a new value\n   params[decodedKey] = decodedVal;\n
}\n }\n\n // parse `(a/b/outlet_name:c/d)`\n private parseParens(allowPrimary: boolean): {[outlet: string]:
UrlSegmentGroup} {\n  const segments: {[key: string]: UrlSegmentGroup} = {};\n  this.capture('(');\n\n while
(!this.consumeOptional(')') && this.remaining.length > 0) {\n   const path = matchSegments(this.remaining);\n
const next = this.remaining[path.length];\n\n   // if is is
not one of these characters, then the segment was unescaped\n   // or the group was not closed\n   if (next !== '/'
&& next !== ')' && next !== ';') {\n    throw new RuntimeError(\n
RuntimeErrorCode.UNPARSABLE_URL, NG_DEV_MODE && `Cannot parse url '${this.url}'`);\n   }\n\n   let
outletName: string = undefined;\n   if (path.indexOf(':') > -1) {\n    outletName = path.slice(0,
path.indexOf(':'));\n    this.capture(outletName);\n    this.capture(':');\n   } else if (allowPrimary) {\n
outletName = PRIMARY_OUTLET;\n   }\n\n   const children = this.parseChildren();\n
segments[outletName] = Object.keys(children).length === 1 ? children[PRIMARY_OUTLET] :\n
new UrlSegmentGroup([], children);\n   this.consumeOptional('/');\n }\n\n return
segments;\n }\n\n private peekStartsWith(str: string): boolean {\n  return this.remaining.startsWith(str);\n }\n\n //
Consumes the prefix when it is present and returns whether it has been consumed\n private consumeOptional(str:
string): boolean {\n  if (this.peekStartsWith(str)) {\n   this.remaining = this.remaining.substring(str.length);\n
return true;\n }\n return false;\n }\n\n private capture(str: string): void {\n  if (!this.consumeOptional(str)) {\n
throw new RuntimeError(\n   RuntimeErrorCode.UNEXPECTED_VALUE_IN_URL, NG_DEV_MODE &&
`Expected \"${str}\"`);\n }\n }\n\n\nexport function createRoot(rootCandidate: UrlSegmentGroup) {\n return
rootCandidate.segments.length > 0 ?\n  new UrlSegmentGroup([], {[PRIMARY_OUTLET]: rootCandidate}) :\n
rootCandidate;\n }\n\n/**\n * Recursively merges primary segment children into their parents and also drops empty
children\n * (those which have no segments and no children themselves). The latter prevents serializing a\n * group
into something like `a(aux)`, where `aux` is an empty child segment.\n */\nexport
function squashSegmentGroup(segmentGroup: UrlSegmentGroup): UrlSegmentGroup {\n  const newChildren = {}
as any;\n  for (const childOutlet of Object.keys(segmentGroup.children)) {\n   const child =
segmentGroup.children[childOutlet];\n   const childCandidate = squashSegmentGroup(child);\n   // don't add
empty children\n   if (childCandidate.segments.length > 0 || childCandidate.hasChildren()) {\n
newChildren[childOutlet] = childCandidate;\n   }\n }\n\n const s = new UrlSegmentGroup(segmentGroup.segments,
newChildren);\n  return mergeTrivialChildren(s);\n }\n\n/**\n * When possible, merges the primary outlet child into
the parent `UrlSegmentGroup`.\n * When a segment group has only one child which is a primary outlet, merges
that child into the\n * parent. That is, the child segment group's segments are merged into the `s` and the child's\n *
children become the children of `s`. Think of this like a 'squash', merging the child segment\n * group into the
parent.\n */\nfunction

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mergeTrivialChildren(s: UrlSegmentGroup): UrlSegmentGroup {
  if (s.numberOfChildren === 1 &&
      s.children[PRIMARY_OUTLET]) {
    const c = s.children[PRIMARY_OUTLET];
    return new
    UrlSegmentGroup(s.segments.concat(c.segments), c.children);
  }
  return s;
}

export function isUrlTree(v: any): v is UrlTree {
  return v instanceof UrlTree;
}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import { RuntimeError as RuntimeError } from
 '@angular/core';
import { RuntimeErrorCode } from './errors';
import { ActivatedRoute,
    ActivatedRouteSnapshot } from './router_state';
import { Params, PRIMARY_OUTLET } from './shared';
import { createRoot, squashSegmentGroup, UrlSegment, UrlSegmentGroup, UrlTree } from './url_tree';
import { forEach, last, shallowEqual } from './utils/collection';
const NG_DEV_MODE = typeof ngDevMode
 === 'undefined' || ngDevMode;

/**
 * Creates a `UrlTree` relative to an `ActivatedRouteSnapshot`.
 *
 * @publicApi
 *
 * @param relativeTo The `ActivatedRouteSnapshot` to apply the commands to.
 * @param commands An array of URL fragments with which to construct the new URL tree.
 * If the path is static, can be the literal URL string. For a dynamic path, pass an array of path
 * segments, followed by the parameters for each segment.
 * The fragments are applied to the one provided in the `relativeTo` parameter.
 * @param queryParams The query parameters for the `UrlTree`. `null` if the `UrlTree` does not have
 * any query parameters.
 * @param fragment The fragment for the `UrlTree`. `null` if the `UrlTree` does not have a fragment.
 *
 * @usageNotes
 * ```
 * // create /team/33/user/11
 * createUrlTreeFromSnapshot(snapshot, ['/team', 33, 'user',
    11]);
 * // create /team/33;expand=true/user/11
 * createUrlTreeFromSnapshot(snapshot, ['/team', 33,
    { expand: true }, 'user', 11]);
 * // you can collapse static segments like this (this works only with the first
    passed-in value)
 * createUrlTreeFromSnapshot(snapshot, ['/team/33/user', userId]);
 * // If the first segment
    can contain slashes, and you do not want the router to split it,
 * // you can do the following:
 * createUrlTreeFromSnapshot(snapshot, [{ segmentPath: '/one/two' }]);
 * // create /team/33/(user/11/right:chat)
 * createUrlTreeFromSnapshot(snapshot, ['/team', 33, { outlets: { primary: 'user/11', right:
    'chat' } }], null, null);
 * // remove the right secondary node
 * createUrlTreeFromSnapshot(snapshot, ['/team', 33, { outlets: { primary:
    'user/11', right: null } }]);
 * // For the examples below, assume the current URL is for the `team/33/user/11` and
    the `ActivatedRouteSnapshot` points to `user/11`:
 * // navigate to /team/33/user/11/details
 * createUrlTreeFromSnapshot(snapshot, ['details']);
 * // navigate to /team/33/user/22
 * createUrlTreeFromSnapshot(snapshot, ['../22']);
 * // navigate to /team/44/user/22
 * createUrlTreeFromSnapshot(snapshot, ['../team/44/user/22']);
 * ```
 */
export function
createUrlTreeFromSnapshot(relativeTo: ActivatedRouteSnapshot, commands: any[], queryParams: Params|null
= null, fragment: string|null = null): UrlTree {
  const relativeToUrlSegmentGroup =
  createSegmentGroupFromRoute(relativeTo);
  return
  createUrlTreeFromSegmentGroup(relativeToUrlSegmentGroup, commands, queryParams,
  fragment);
}

function createSegmentGroupFromRoute(route: ActivatedRouteSnapshot): UrlSegmentGroup {
  let targetGroup: UrlSegmentGroup|undefined;

  function
  createSegmentGroupFromRouteRecursive(currentRoute: ActivatedRouteSnapshot) {
    const childOutlets:
    {[outlet: string]: UrlSegmentGroup} = {};
    for (const childSnapshot of currentRoute.children) {
      const root =
      createSegmentGroupFromRouteRecursive(childSnapshot);
      childOutlets[childSnapshot.outlet]
      = root;
    }
    const segmentGroup = new UrlSegmentGroup(currentRoute.url, childOutlets);
    if (currentRoute
    === route) {
      targetGroup = segmentGroup;
    }
    return segmentGroup;
  }
  const rootCandidate =
  createSegmentGroupFromRouteRecursive(route.root);
  const rootSegmentGroup = createRoot(rootCandidate);
  return targetGroup ?? rootSegmentGroup;
}

export function createUrlTreeFromSegmentGroup(relativeTo:
UrlSegmentGroup, commands: any[], queryParams: Params|null, fragment: string|null): UrlTree {
  let root =
  relativeTo;
  while (root.parent) {
    root = root.parent;
  }
  // There are no commands so the `UrlTree` goes to
  the same path as the one created from the `UrlSegmentGroup`. All we need to do is update the `queryParams`
  and `fragment` without applying any other logic.
  if (commands.length === 0) {
    return tree(root, root,
    root, queryParams, fragment);
  }
  const nav = computeNavigation(commands);
}

```

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    if (nav.toRoot()) {\n    return tree(root, root, new UrlSegmentGroup([], {}), queryParams, fragment);\n } \n\n const
position = findStartingPositionForTargetGroup(nav, root, relativeTo);\n const newSegmentGroup =
position.processChildren ?\n    updateSegmentGroupChildren(position.segmentGroup, position.index,
nav.commands) :\n    updateSegmentGroup(position.segmentGroup, position.index, nav.commands);\n return
tree(root, position.segmentGroup, newSegmentGroup, queryParams, fragment);\n}\n\nexport function
createUrlTree(\n    route: ActivatedRoute, urlTree: UrlTree, commands: any[], queryParams: Params|null,\n    fragment: string|null): UrlTree {\n    if (commands.length === 0) {\n    return tree(urlTree.root, urlTree.root,
urlTree.root, queryParams, fragment);\n } \n\n const nav = computeNavigation(commands);\n if (nav.toRoot())
{\n    return tree(urlTree.root, urlTree.root, new UrlSegmentGroup([], {}), queryParams, fragment);\n } \n\n
function createTreeUsingPathIndex(lastPathIndex:
number) {\n    const startingPosition =\n        findStartingPosition(nav, urlTree, route.snapshot?._urlSegment,
lastPathIndex);\n    const segmentGroup = startingPosition.processChildren ?\n
updateSegmentGroupChildren(\n        startingPosition.segmentGroup, startingPosition.index, nav.commands) :\n
updateSegmentGroup(startingPosition.segmentGroup, startingPosition.index, nav.commands);\n    return
tree(urlTree.root, startingPosition.segmentGroup, segmentGroup, queryParams, fragment);\n } \n // Note: The types
should disallow `snapshot` from being `undefined` but due to test mocks, this\n // may be the case. Since we try to
access it at an earlier point before the refactor to add the\n // warning for `relativeLinkResolution: 'legacy'`, this may
cause failures in tests where it\n // didn't before.\n    const result =
createUrlTreeUsingPathIndex(route.snapshot?._lastPathIndex);\n    // Check if application is relying on
`relativeLinkResolution: 'legacy'`\n
    if (typeof ngDevMode === 'undefined' || !ngDevMode) {\n    const correctedResult =
createUrlTreeUsingPathIndex(route.snapshot?._correctedLastPathIndex);\n    if (correctedResult.toString() !==
result.toString()) {\n    console.warn(\n        `relativeLinkResolution: 'legacy' is deprecated and will be removed in
a future version of Angular. The link to ${\n            result.toString()} will change to ${\n
correctedResult.toString()} if the code is not updated before then.`);\n    } \n } \n\n return result;\n}\n\nfunction
isMatrixParams(command: any): boolean {\n    return typeof command === 'object' && command !== null &&
!command.outlets && !command.segmentPath;\n}\n\n/**\n * Determines if a given command has an `outlets` map.
When we encounter a command\n * with an outlets k/v map, we need to apply each outlet individually to the
existing segment.\n */\nfunction isCommandWithOutlets(command: any): command is {outlets: {[key: string]:
any}} {\n    return typeof command
=== 'object' && command !== null && command.outlets;\n}\n\nfunction tree(\n    oldRoot: UrlSegmentGroup,
oldSegmentGroup: UrlSegmentGroup, newSegmentGroup: UrlSegmentGroup,\n    queryParams: Params|null,
fragment: string|null): UrlTree {\n    let qp: any = {};\n    if (queryParams) {\n    forEach(queryParams, (value: any,
name: any) => {\n    qp[name] = Array.isArray(value) ? value.map((v: any) => `${v}`) : `${value}`;\n });\n
}\n\n let rootCandidate: UrlSegmentGroup;\n if (oldRoot === oldSegmentGroup) {\n    rootCandidate =
newSegmentGroup;\n } else {\n    rootCandidate = replaceSegment(oldRoot, oldSegmentGroup,
newSegmentGroup);\n }\n\n const newRoot = createRoot(squashSegmentGroup(rootCandidate));\n return new
UrlTree(newRoot, qp, fragment);\n}\n\n/**\n * Replaces the `oldSegment` which is located in some child of the
`current` with the `newSegment`.\n * This also has the effect of creating new `UrlSegmentGroup` copies to update
references. This\n * shouldn't be necessary but
the fallback logic for an invalid ActivatedRoute in the creation uses\n * the Router's current url tree. If we don't
create new segment groups, we end up modifying that\n * value.\n */\nfunction replaceSegment(\n    current:
UrlSegmentGroup, oldSegment: UrlSegmentGroup,\n    newSegment: UrlSegmentGroup): UrlSegmentGroup {\n
const children: {[key: string]: UrlSegmentGroup} = {};\n    forEach(current.children, (c: UrlSegmentGroup,
outletName: string) => {\n    if (c === oldSegment) {\n    children[outletName] = newSegment;\n } else {\n
children[outletName] = replaceSegment(c, oldSegment, newSegment);\n } \n });\n    return new
UrlSegmentGroup(current.segments, children);\n}\n\nclass Navigation {\n    constructor(\n    public isAbsolute:
boolean, public numberOfDoubleDots: number, public commands: any[]) {\n    if (isAbsolute && commands.length

```

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> 0 && isMatrixParams(commands[0])) {\n    throw new RuntimeError(\n
RuntimeErrorCode.ROOT_SEGMENT_MATRIX_PARAMS,\n
    NG_DEV_MODE && 'Root segment cannot have matrix parameters');\n    }\n\n    const cmdWithOutlet =
commands.find(isCommandWithOutlets);\n    if (cmdWithOutlet && cmdWithOutlet !== last(commands)) {\n
throw new RuntimeError(\n        RuntimeErrorCode.MISPLACED_OUTLETS_COMMAND,\n
    NG_DEV_MODE && '{outlets: {}} has to be the last command');\n    }\n\n    public toRoot(): boolean {\n
return this.isAbsolute && this.commands.length === 1 && this.commands[0] === '/';\n    }\n\n    /** Transforms
commands to a normalized `Navigation` */\n    function computeNavigation(commands: any[]): Navigation {\n    if
((typeof commands[0] === 'string') && commands.length === 1 && commands[0] === '/') {\n    return new
Navigation(true, 0, commands);\n    }\n\n    let numberOfDoubleDots = 0;\n    let isAbsolute = false;\n\n    const res:
any[] = commands.reduce((res, cmd, cmdIdx) => {\n    if (typeof cmd === 'object' && cmd != null) {\n    if
(cmd.outlets) {\n        const outlets: {[k: string]: any}
= {};\n        forEach(cmd.outlets, (commands: any, name: string) => {\n            outlets[name] = typeof commands
=== 'string' ? commands.split('/') : commands;\n        });\n        return [...res, {outlets}];\n    }\n\n    if
(cmd.segmentPath) {\n        return [...res, cmd.segmentPath];\n    }\n\n    if (!(typeof cmd === 'string')) {\n
return [...res, cmd];\n    }\n\n    if (cmdIdx === 0) {\n        cmd.split('/').forEach((urlPart, partIndex) => {\n    if
(partIndex === 0 && urlPart === '.') {\n            // skip './a'\n        } else if (partIndex === 0 && urlPart === '') { // '/a'\n
isAbsolute = true;\n        } else if (urlPart === '..') { // '../a'\n            numberOfDoubleDots++;\n        } else if
(urlPart !== '') {\n            res.push(urlPart);\n        }\n    });\n\n    return res;\n    }\n\n    return [...res, cmd];\n    },
[]);\n\n    return new Navigation(isAbsolute, numberOfDoubleDots, res);\n\n    class Position {\n    constructor(\n
public
segmentGroup: UrlSegmentGroup, public processChildren: boolean, public index: number) {\n    }\n\n    function
findStartingPositionForTargetGroup(\n    nav: Navigation, root: UrlSegmentGroup, target: UrlSegmentGroup):
Position {\n    if (nav.isAbsolute) {\n    return new Position(root, true, 0);\n    }\n\n    if (!target) {\n    // `NaN` is used
only to maintain backwards compatibility with incorrectly mocked\n    // `ActivatedRouteSnapshot` in tests. In prior
versions of this code, the position here was\n    // determined based on an internal property that was rarely mocked,
resulting in `NaN`. In\n    // reality, this code path should _never_ be touched since `target` is not allowed to be
false.\n    return new Position(root, false, NaN);\n    }\n\n    if (target.parent === null) {\n    return new Position(target,
true, 0);\n    }\n\n    const modifier = isMatrixParams(nav.commands[0]) ? 0 : 1;\n    const index =
target.segments.length - 1 + modifier;\n    return createPositionApplyingDoubleDots(target,
index, nav.numberOfDoubleDots);\n\n    function findStartingPosition(\n    nav: Navigation, tree: UrlTree,
segmentGroup: UrlSegmentGroup, lastPathIndex: number): Position {\n    if (nav.isAbsolute) {\n    return new
Position(tree.root, true, 0);\n    }\n\n    if (lastPathIndex === -1) {\n    // Pathless ActivatedRoute has _lastPathIndex
=== -1 but should not process children\n    // see issue #26224, #13011, #35687\n    // However, if the
ActivatedRoute is the root we should process children like above.\n    const processChildren = segmentGroup ===
tree.root;\n    return new Position(segmentGroup, processChildren, 0);\n    }\n\n    const modifier =
isMatrixParams(nav.commands[0]) ? 0 : 1;\n    const index = lastPathIndex + modifier;\n    return
createPositionApplyingDoubleDots(segmentGroup, index, nav.numberOfDoubleDots);\n\n    function
createPositionApplyingDoubleDots(\n    group: UrlSegmentGroup, index: number, numberOfDoubleDots: number):
Position {\n    let g = group;\n    let ci = index;\n    let
dd = numberOfDoubleDots;\n    while (dd > ci) {\n    dd -= ci;\n    g = g.parent!;\n    if (!g) {\n    throw new
RuntimeError(\n        RuntimeErrorCode.INVALID_DOUBLE_DOTS, NG_DEV_MODE && 'Invalid number of
\\'.^\\');\n    }\n    ci = g.segments.length;\n    }\n    return new Position(g, false, ci - dd);\n\n    function
getOutlets(commands: unknown[]): {[k: string]: unknown[]|string} {\n    if (isCommandWithOutlets(commands[0]))
{\n    return commands[0].outlets;\n    }\n\n    return {[PRIMARY_OUTLET]: commands};\n\n    function
updateSegmentGroup(\n    segmentGroup: UrlSegmentGroup, startIndex: number, commands: any[]):
UrlSegmentGroup {\n    if (!segmentGroup) {\n    segmentGroup = new UrlSegmentGroup([], {});\n    }\n\n    if
(segmentGroup.segments.length === 0 && segmentGroup.hasChildren()) {\n    return

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updateSegmentGroupChildren(segmentGroup, startIndex, commands);\n }\n\n const m =
prefixedWith(segmentGroup, startIndex, commands);\n const slicedCommands =
commands.slice(m.commandIndex);\n
  if (m.match && m.pathIndex < segmentGroup.segments.length) {\n  const g = new
UrlSegmentGroup(segmentGroup.segments.slice(0, m.pathIndex), {});\n  g.children[PRIMARY_OUTLET] =\n  new UrlSegmentGroup(segmentGroup.segments.slice(m.pathIndex), segmentGroup.children);\n  return
updateSegmentGroupChildren(g, 0, slicedCommands);\n } else if (m.match && slicedCommands.length === 0) {\n
  return new UrlSegmentGroup(segmentGroup.segments, {});\n } else if (m.match &&
!segmentGroup.hasChildren()) {\n  return createNewSegmentGroup(segmentGroup, startIndex, commands);\n }
else if (m.match) {\n  return updateSegmentGroupChildren(segmentGroup, 0, slicedCommands);\n } else {\n
return createNewSegmentGroup(segmentGroup, startIndex, commands);\n }\n}\n\nfunction
updateSegmentGroupChildren(\n  segmentGroup: UrlSegmentGroup, startIndex: number, commands: any[]):
UrlSegmentGroup {\n  if (commands.length === 0) {\n  return new UrlSegmentGroup(segmentGroup.segments,
{});\n  }
  else {\n  const outlets = getOutlets(commands);\n  const children: {[key: string]: UrlSegmentGroup} = {};\n\n
forEach(outlets, (commands, outlet) => {\n  if (typeof commands === 'string') {\n  commands =
[commands];\n  }\n  if (commands !== null) {\n  children[outlet] =
updateSegmentGroup(segmentGroup.children[outlet], startIndex, commands);\n  }\n  });\n\n
forEach(segmentGroup.children, (child: UrlSegmentGroup, childOutlet: string) => {\n  if (outlets[childOutlet]
=== undefined) {\n  children[childOutlet] = child;\n  }\n  });\n  return new
UrlSegmentGroup(segmentGroup.segments, children);\n  }\n}\n\nfunction prefixedWith(segmentGroup:
UrlSegmentGroup, startIndex: number, commands: any[]) {\n  let currentCommandIndex = 0;\n  let
currentPathIndex = startIndex;\n\n  const noMatch = {match: false, pathIndex: 0, commandIndex: 0};\n  while
(currentPathIndex < segmentGroup.segments.length) {\n  if (currentCommandIndex >= commands.length)
return noMatch;\n  const path = segmentGroup.segments[currentPathIndex];\n  const command =
commands[currentCommandIndex];\n  // Do not try to consume command as part of the prefixing if it has outlets
because it can\n  // contain outlets other than the one being processed. Consuming the outlets command would\n
// result in other outlets being ignored.\n  if (isCommandWithOutlets(command)) {\n  break;\n  }\n  const curr
= `${command}`;\n  const next =\n  currentCommandIndex < commands.length - 1 ?
commands[currentCommandIndex + 1] : null;\n\n  if (currentPathIndex > 0 && curr === undefined) break;\n\n  if
(curr && next && (typeof next === 'object') && next.outlets === undefined) {\n  if (!compare(curr, next, path))
return noMatch;\n  currentCommandIndex += 2;\n  } else {\n  if (!compare(curr, {}, path)) return noMatch;\n
currentCommandIndex++;\n  }\n  currentPathIndex++;\n  }\n\n  return {match: true, pathIndex:
currentPathIndex,
commandIndex: currentCommandIndex};\n}\n\nfunction createNewSegmentGroup(\n  segmentGroup:
UrlSegmentGroup, startIndex: number, commands: any[]): UrlSegmentGroup {\n  const paths =
segmentGroup.segments.slice(0, startIndex);\n\n  let i = 0;\n  while (i < commands.length) {\n  const command =
commands[i];\n  if (isCommandWithOutlets(command)) {\n  const children =
createNewSegmentChildren(command.outlets);\n  return new UrlSegmentGroup(paths, children);\n  }\n\n  // if
we start with an object literal, we need to reuse the path part from the segment\n  if (i === 0 &&
isMatrixParams(commands[0])) {\n  const p = segmentGroup.segments[startIndex];\n  paths.push(new
UrlSegment(p.path, stringify(commands[0]));\n  i++;\n  continue;\n  }\n\n  const curr =
isCommandWithOutlets(command) ? command.outlets[PRIMARY_OUTLET] : `${command}`;\n  const next = (i
< commands.length - 1) ? commands[i + 1] : null;\n  if (curr && next && isMatrixParams(next))
{\n  paths.push(new UrlSegment(curr, stringify(next));\n  i += 2;\n  } else {\n  paths.push(new
UrlSegment(curr, {}));\n  i++;\n  }\n  }\n  return new UrlSegmentGroup(paths, {});\n}\n\nfunction
createNewSegmentChildren(outlets: {[name: string]: unknown[]|string}): {[outlet: string]: UrlSegmentGroup}
{\n  const children: {[outlet: string]: UrlSegmentGroup} = {};\n  forEach(outlets, (commands, outlet) => {\n  if

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(typeof commands === 'string') {\n  commands = [commands];\n } \n if (commands !== null) {\n
children[outlet] = createNewSegmentGroup(new UrlSegmentGroup([], {}), 0, commands);\n } \n });\n return
children;\n}\n\nfunction stringify(params: {[key: string]: any}): {[key: string]: string} {\n const res: {[key: string]:
string} = {};\n forEach(params, (v: any, k: string) => res[k] = `${v}`);\n return res;\n}\n\nfunction compare(path:
string, params: {[key: string]: any}, segment: UrlSegment): boolean {\n return path == segment.path &&
shallowEqual(params, segment.parameters);\n}\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {Route} from './models';\nimport
{ActivatedRouteSnapshot, RouterStateSnapshot} from './router_state';\n\n/**\n * Identifies the call or event that
triggered a navigation.\n *\n * `imperative`: Triggered by `router.navigateByUrl()` or `router.navigate()`.\n *\n
`popstate`: Triggered by a `popstate` event.\n *\n `hashchange`: Triggered by a `hashchange` event.\n *\n
*/\n\n @publicApi\n */\n\nexport type NavigationTrigger = 'imperative'|'popstate'|'hashchange';\n\n/**\n * Identifies the type
of a router event.\n *\n */\n\n @publicApi\n */\n\nexport const enum EventType {\n NavigationStart,\n NavigationEnd,\n
NavigationCancel,\n NavigationError,\n RoutesRecognized,\n ResolveStart,\n ResolveEnd,\n
GuardsCheckStart,\n GuardsCheckEnd,\n
RouteConfigLoadStart,\n RouteConfigLoadEnd,\n ChildActivationStart,\n ChildActivationEnd,\n
ActivationStart,\n ActivationEnd,\n Scroll,\n}\n\n/**\n * Base for events the router goes through, as opposed to
events tied to a specific\n * route. Fired one time for any given navigation.\n *\n * The following code shows how a
class subscribes to router events.\n *\n * ``ts\n * import {Event, RouterEvent, Router} from '@angular/router';\n *\n
* class MyService {\n *   constructor(public router: Router) {\n *     router.events.pipe(\n *       filter((e: Event): e is
RouterEvent => e instanceof RouterEvent)\n *     ).subscribe((e: RouterEvent) => {\n *       // Do something\n *
});\n *   }\n * }\n * ``\n *\n * @see `Event`\n * @see [Router events summary](guide/router-reference#router-
events)\n * @publicApi\n */\n\nexport class RouterEvent {\n constructor(\n /** A unique ID that the router
assigns to every router navigation. *\n public id: number,\n /** The
URL that is the destination for this navigation. *\n public url: string) {\n }\n\n/**\n * An event triggered when
a navigation starts.\n *\n */\n\n @publicApi\n */\n\nexport class NavigationStart extends RouterEvent {\n readonly type =
EventType.NavigationStart;\n\n /**\n * Identifies the call or event that triggered the navigation.\n * An
`imperative` trigger is a call to `router.navigateByUrl()` or `router.navigate()`.\n *\n * @see `NavigationEnd`\n *
@see `NavigationCancel`\n * @see `NavigationError`\n *\n */\n\n navigationTrigger?: NavigationTrigger;\n\n /**\n
* The navigation state that was previously supplied to the `pushState` call,\n * when the navigation is triggered by
a `popstate` event. Otherwise null.\n *\n * The state object is defined by `NavigationExtras`, and contains any\n
* developer-defined state value, as well as a unique ID that\n * the router assigns to every router
transition/navigation.\n *\n * From the perspective of the router, the
router never `\"goes back\"`.\n *\n * When the user clicks on the back button in the browser,\n * a new navigation ID
is created.\n *\n * Use the ID in this previous-state object to differentiate between a newly created\n * state and
one returned to by a `popstate` event, so that you can restore some\n * remembered state, such as scroll position.\n
*\n * An restoredState?: {[k: string]: any, navigationId: number}|null;\n\n constructor(\n /**
*/\n\n @docsNotRequired *\n id: number,\n /** @docsNotRequired *\n url: string,\n /** @docsNotRequired
*/\n navigationTrigger: NavigationTrigger = 'imperative',\n /** @docsNotRequired *\n restoredState: {[k:
string]: any, navigationId: number}|null = null) {\n super(id, url);\n this.navigationTrigger =
navigationTrigger;\n this.restoredState = restoredState;\n }\n\n/** @docsNotRequired *\n override toString():
string {\n return `NavigationStart(id: ${this.id}, url: '${this.url}')`;\n
}\n}\n\n/**\n * An event triggered when a navigation ends successfully.\n *\n * @see `NavigationStart`\n * @see
`NavigationCancel`\n * @see `NavigationError`\n *\n */\n\n @publicApi\n */\n\nexport class NavigationEnd extends
RouterEvent {\n readonly type = EventType.NavigationEnd;\n\n constructor(\n /** @docsNotRequired *\n id: number,\n
/** @docsNotRequired *\n url: string,\n /** @docsNotRequired *\n public
urlAfterRedirects: string) {\n super(id, url);\n }\n\n/** @docsNotRequired *\n override toString(): string {\n
return `NavigationEnd(id: ${this.id}, url: '${this.url}', urlAfterRedirects: '${this.urlAfterRedirects}')`;\n
}\n}

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}
}

/**
 * A code for the `NavigationCancel` event of the `Router` to indicate the reason a navigation
 * failed.
 */
@publicApi
export const enum NavigationCancellationCode {
  /**
   * A navigation failed because a guard returned a `UrlTree` to redirect.
   */
  Redirect,
  /**
   * A navigation failed because a more recent navigation started.
   */
  SupersededByNewNavigation,
  /**
   * A navigation failed because one of the resolvers completed without emitting a value.
   */
  NoDataFromResolver,
  /**
   * A navigation failed because a guard returned `false`.
   */
  GuardRejected,
}

/**
 * An event triggered when a navigation is canceled, directly or indirectly.
 * This can happen for several reasons including when a route guard
 * returns `false` or initiates a redirect by returning a `UrlTree`.
 * @see `NavigationStart`
 * @see `NavigationEnd`
 * @see `NavigationError`
 */
@publicApi
export class NavigationCancel extends RouterEvent {
  readonly type = EventType.NavigationCancel;

  constructor(
    /** @docsNotRequired */
    id: number,
    /** @docsNotRequired */
    url: string,
    /**
     * A description of why the navigation was cancelled. For debug purposes only. Use `code`
     * instead for a stable cancellation reason that can be used in production.
     */
    public reason: string,
    /**
     * A code to indicate why the navigation was canceled. This cancellation code is stable for
     * the reason and can be relied on whereas the `reason` string could change and should not be
     * used in production.
     */
    readonly code?: NavigationCancellationCode) {
    super(id, url);
  }

  /** @docsNotRequired */
  override toString(): string {
    return `NavigationCancel(id: ${this.id}, url: '${this.url}')`;
  }
}

/**
 * An event triggered when a navigation fails due to an unexpected error.
 * @see `NavigationStart`
 * @see `NavigationEnd`
 * @see `NavigationCancel`
 */
@publicApi
export class NavigationError extends RouterEvent {
  readonly type = EventType.NavigationError;

  constructor(
    /** @docsNotRequired */
    id: number,
    /** @docsNotRequired */
    url: string,
    /** @docsNotRequired */
    public error: any,
    /**
     * The target of the navigation when the error occurred.
     * Note that this can be `undefined` because an error could have occurred before the
     * `RouterStateSnapshot` was created for the navigation.
     */
    readonly target?: RouterStateSnapshot) {
    super(id, url);
  }

  /** @docsNotRequired */
  override toString(): string {
    return `NavigationError(id: ${this.id}, url: '${this.url}', error: ${this.error})`;
  }
}

/**
 * An event triggered when routes are recognized.
 */
@publicApi
export class RoutesRecognized extends RouterEvent {
  readonly type = EventType.RoutesRecognized;

  constructor(
    /** @docsNotRequired */
    id: number,
    /** @docsNotRequired */
    url: string,
    /** @docsNotRequired */
    public urlAfterRedirects: string,
    /** @docsNotRequired */
    public state: RouterStateSnapshot) {
    super(id, url);
  }

  /** @docsNotRequired */
  override toString(): string {
    return `RoutesRecognized(id: ${this.id}, url: '${this.url}', urlAfterRedirects:
    '${this.urlAfterRedirects}', state: ${this.state})`;
  }
}

/**
 * An event triggered at the start of the Guard phase of routing.
 * @see `GuardsCheckEnd`
 */
@publicApi
export class GuardsCheckStart extends RouterEvent {
  readonly type = EventType.GuardsCheckStart;

  constructor(
    /** @docsNotRequired */
    id: number,
    /** @docsNotRequired */
    url: string,
    /** @docsNotRequired */
    public urlAfterRedirects: string,
    /** @docsNotRequired */
    public state: RouterStateSnapshot) {
    super(id, url);
  }

  /** @docsNotRequired */
  override toString(): string {
    return `GuardsCheckStart(id: ${this.id}, url: '${this.url}', urlAfterRedirects:
    '${this.urlAfterRedirects}', state: ${this.state})`;
  }
}

/**
 * An event triggered at the end of the Guard phase of routing.
 * @see `GuardsCheckStart`
 */
@publicApi
export class GuardsCheckEnd extends RouterEvent {
  readonly type = EventType.GuardsCheckEnd;

  constructor(
    /** @docsNotRequired */
    id: number,
    /** @docsNotRequired */
    url: string,
    /** @docsNotRequired */
    public urlAfterRedirects: string,
    /** @docsNotRequired */
    public state: RouterStateSnapshot,
    /** @docsNotRequired */
    public shouldActivate: boolean) {
    super(id, url);
  }

  /** @docsNotRequired */
  override toString(): string {
    return `GuardsCheckEnd(id: ${this.id}, url: '${this.url}', urlAfterRedirects:
    '${this.urlAfterRedirects}', state: ${this.state}, shouldActivate:
    ${this.shouldActivate})`;
  }
}

/**
 * An event triggered at the start of the Resolve phase of routing.
 * Runs in the `resolve` phase whether or not there is anything to resolve.
 * In future, may change to only run when there are things to be resolved.
 * @see `ResolveEnd`
 */

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```

@publicApi\n *^nexport class ResolveStart extends RouterEvent {\n  readonly type = EventType.ResolveStart;\n\n  constructor(\n    /** @docsNotRequired */\n    id: number,\n    /** @docsNotRequired */\n    url: string,\n    /** @docsNotRequired */\n    public urlAfterRedirects: string,\n    /** @docsNotRequired */\n    public state: RouterStateSnapshot) {\n    super(id, url);\n  }\n\n  override toString(): string {\n    return `ResolveStart(id: ${this.id}, url: '${this.url}', urlAfterRedirects: '${this.urlAfterRedirects}', state: ${this.state})`;\n  }\n}\n\n/**\n * An event triggered at the end of the Resolve phase of routing.\n * @see `ResolveStart`\n */\n\n@publicApi\n *^nexport class ResolveEnd extends RouterEvent {\n  readonly type = EventType.ResolveEnd;\n\n  constructor(\n    /** @docsNotRequired */\n    id: number,\n    /** @docsNotRequired */\n    url: string,\n    /** @docsNotRequired */\n    public urlAfterRedirects: string,\n    /**\n     * @docsNotRequired */\n    public state: RouterStateSnapshot) {\n    super(id, url);\n  }\n\n  override toString(): string {\n    return `ResolveEnd(id: ${this.id}, url: '${this.url}', urlAfterRedirects: '${this.urlAfterRedirects}', state: ${this.state})`;\n  }\n}\n\n/**\n * An event triggered before lazy loading a route configuration.\n * @see `RouteConfigLoadEnd`\n */\n\n@publicApi\n *^nexport class RouteConfigLoadStart {\n  readonly type = EventType.RouteConfigLoadStart;\n\n  constructor(\n    /** @docsNotRequired */\n    public route: Route) {\n  }\n\n  toString(): string {\n    return `RouteConfigLoadStart(path: ${this.route.path})`;\n  }\n}\n\n/**\n * An event triggered when a route has been lazy loaded.\n * @see `RouteConfigLoadStart`\n */\n\n@publicApi\n *^nexport class RouteConfigLoadEnd {\n  readonly type = EventType.RouteConfigLoadEnd;\n\n  constructor(\n    /**\n     * @docsNotRequired */\n    public route: Route) {\n  }\n\n  toString(): string {\n    return `RouteConfigLoadEnd(path: ${this.route.path})`;\n  }\n}\n\n/**\n * An event triggered at the start of the child-activation\n * part of the Resolve phase of routing.\n * @see `ChildActivationEnd`\n * @see `ResolveStart`\n */\n\n@publicApi\n *^nexport class ChildActivationStart {\n  readonly type = EventType.ChildActivationStart;\n\n  constructor(\n    /**\n     * @docsNotRequired */\n    public snapshot: ActivatedRouteSnapshot) {\n  }\n\n  toString(): string {\n    const path = this.snapshot.routeConfig && this.snapshot.routeConfig.path || '';\n    return `ChildActivationStart(path: '${path}')`;\n  }\n}\n\n/**\n * An event triggered at the end of the child-activation part\n * of the Resolve phase of routing.\n * @see `ChildActivationStart`\n * @see `ResolveStart`\n */\n\n@publicApi\n *^nexport class ChildActivationEnd {\n  readonly type = EventType.ChildActivationEnd;\n\n  constructor(\n    /**\n     * @docsNotRequired */\n    public snapshot: ActivatedRouteSnapshot) {\n  }\n\n  toString(): string {\n    const path = this.snapshot.routeConfig && this.snapshot.routeConfig.path || '';\n    return `ChildActivationEnd(path: '${path}')`;\n  }\n}\n\n/**\n * An event triggered at the start of the activation part\n * of the Resolve phase of routing.\n * @see `ActivationEnd`\n * @see `ResolveStart`\n */\n\n@publicApi\n *^nexport class ActivationStart {\n  readonly type = EventType.ActivationStart;\n\n  constructor(\n    /** @docsNotRequired */\n    public snapshot: ActivatedRouteSnapshot) {\n  }\n\n  toString(): string {\n    const path = this.snapshot.routeConfig && this.snapshot.routeConfig.path || '';\n    return `ActivationStart(path: '${path}')`;\n  }\n}\n\n/**\n * An event triggered at the end of the activation part\n * of the Resolve phase of routing.\n * @see `ActivationStart`\n * @see `ResolveStart`\n */\n\n@publicApi\n *^nexport class ActivationEnd {\n  readonly type = EventType.ActivationEnd;\n\n  constructor(\n    /** @docsNotRequired */\n    public snapshot: ActivatedRouteSnapshot) {\n  }\n\n  toString(): string {\n    const path = this.snapshot.routeConfig && this.snapshot.routeConfig.path || '';\n    return `ActivationEnd(path: '${path}')`;\n  }\n}\n\n/**\n * An event triggered by scrolling.\n * @publicApi\n */\n\n@publicApi\n *^nexport class Scroll {\n  readonly type = EventType.Scroll;\n\n  constructor(\n    /** @docsNotRequired */\n    readonly routerEvent: NavigationEnd,\n    /** @docsNotRequired */\n    readonly position: [number, number] | null,\n    /** @docsNotRequired */\n    readonly anchor: string | null) {\n  }\n\n  toString(): string {\n    const pos = this.position ? `${this.position[0]}, ${this.position[1]}` : null;\n    return `Scroll(anchor: '${this.anchor}', position: '${pos}')`;\n  }\n}\n\n/**\n * Router events that allow you to track the lifecycle of the router.\n * The events occur in the following sequence:\n * * [NavigationStart](api/router/NavigationStart): Navigation starts.\n * * [RouteConfigLoadStart](api/router/RouteConfigLoadStart): Before\n * the router [lazy loads](/guide/router#lazy-loading) a route configuration.\n * * [RouteConfigLoadEnd](api/router/RouteConfigLoadEnd): After a route has been lazy loaded.\n */

```

[RoutesRecognized](api/router/RoutesRecognized): When the router parses the URL and the routes are recognized.  
 [GuardsCheckStart](api/router/GuardsCheckStart): When the router begins the \*guards\* phase of routing.  
 [ChildActivationStart](api/router/ChildActivationStart): When the router begins activating a route's children.  
 [ActivationStart](api/router/ActivationStart): When the router begins activating a route.  
 [GuardsCheckEnd](api/router/GuardsCheckEnd): When the router finishes the \*guards\* phase of routing successfully.  
 [ResolveStart](api/router/ResolveStart): When the router begins the \*resolve\* phase of routing.  
 [ResolveEnd](api/router/ResolveEnd): When the router finishes the \*resolve\* phase of routing successfully.  
 [ChildActivationEnd](api/router/ChildActivationEnd):

When the router finishes activating a route's children.  
 [ActivationEnd](api/router/ActivationEnd): When the router finishes activating a route.  
 [NavigationEnd](api/router/NavigationEnd): When navigation ends successfully.  
 [NavigationCancel](api/router/NavigationCancel): When navigation is canceled.  
 [NavigationError](api/router/NavigationError): When navigation fails due to an unexpected error.

[Scroll](api/router/Scroll): When the user scrolls.

```
@publicApi\n * export type Event =\n RouterEvent | NavigationStart | NavigationEnd | NavigationCancel | NavigationError | RoutesRecognized | \n GuardsCheckStart | GuardsCheckEnd | RouteConfigLoadStart | RouteConfigLoadEnd | ChildActivationStart | \n ChildActivationEnd | ActivationStart | ActivationEnd | Scroll | ResolveStart | ResolveEnd;
```

```
\n\n export function\n stringifyEvent(routerEvent: Event): string {\n if (!(type in routerEvent)) {\n return `Unknown Router Event:\n ${routerEvent.constructor.name}`;\n
```

```
  }\n switch (routerEvent.type) {\n case EventType.ActivationEnd:\n return `ActivationEnd(path:\n '${routerEvent.snapshot.routeConfig?.path || ''}')`;\n case EventType.ActivationStart:\n return\n `ActivationStart(path: '${routerEvent.snapshot.routeConfig?.path || ''}')`;\n case EventType.ChildActivationEnd:\n return `ChildActivationEnd(path: '${routerEvent.snapshot.routeConfig?.path || ''}')`;\n case\n EventType.ChildActivationStart:\n return `ChildActivationStart(path: '${routerEvent.snapshot.routeConfig?.path\n || ''}')`;\n case EventType.GuardsCheckEnd:\n return `GuardsCheckEnd(id: ${routerEvent.id}, url: '${\n routerEvent.url}', urlAfterRedirects: '${routerEvent.urlAfterRedirects}', state: ${\n routerEvent.state},\n shouldActivate: ${routerEvent.shouldActivate})`;\n case EventType.GuardsCheckStart:\n return\n `GuardsCheckStart(id: ${routerEvent.id}, url: '${\n routerEvent.url}', urlAfterRedirects:\n '${routerEvent.urlAfterRedirects}',\n state: ${\n routerEvent.state})`;\n case EventType.NavigationCancel:\n return `NavigationCancel(id:\n ${routerEvent.id}, url: '${routerEvent.url}')`;\n case EventType.NavigationEnd:\n return `NavigationEnd(id:\n ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${\n routerEvent.urlAfterRedirects}')`;\n case\n EventType.NavigationError:\n return `NavigationError(id: ${routerEvent.id}, url: '${routerEvent.url}', error:\n ${\n routerEvent.error})`;\n case EventType.NavigationStart:\n return `NavigationStart(id:\n ${routerEvent.id}, url: '${routerEvent.url}')`;\n case EventType.ResolveEnd:\n return `ResolveEnd(id:\n ${routerEvent.id}, url: '${routerEvent.url}', urlAfterRedirects: '${\n routerEvent.urlAfterRedirects}', state:\n ${routerEvent.state})`;\n case EventType.ResolveStart:\n return `ResolveStart(id: ${routerEvent.id}, url:\n '${routerEvent.url}', urlAfterRedirects: '${\n routerEvent.urlAfterRedirects}', state: ${\n routerEvent.state})`;\n case EventType.RouteConfigLoadEnd:\n return `RouteConfigLoadEnd(path: ${routerEvent.route.path})`;\n case EventType.RouteConfigLoadStart:\n return `RouteConfigLoadStart(path: ${routerEvent.route.path})`;\n case EventType.RoutesRecognized:\n return `RoutesRecognized(id: ${routerEvent.id}, url: '${\n routerEvent.url}', urlAfterRedirects:\n '${routerEvent.urlAfterRedirects}', state: ${\n routerEvent.state})`;\n case EventType.Scroll:\n const pos\n =\n routerEvent.position ? `${routerEvent.position[0]}, ${routerEvent.position[1]}` : null;\n return\n `Scroll(anchor: '${routerEvent.anchor}', position: '${pos}')`;\n }\n }\n\n /**\n * @license\n * Copyright Google\n LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found\n in the LICENSE file at https://angular.io/license\n */\n export class Tree<T> {\n
```

```
  /** @internal\n * @internal _root: TreeNode<T>;\n\n constructor(root: TreeNode<T>) {\n this._root = root;\n }\n\n get\n root(): T {\n return this._root.value;\n }\n\n /**\n * @internal\n * @internal parent(t: T): T | null {\n const p =
```

```

this.pathFromRoot(t);\n  return p.length > 1 ? p[p.length - 2] : null;\n  }\n\n  /**\n   * @internal\n   */\n  children(t: T): T[] {\n    const n = findNode(t, this._root);\n    return n ? n.children.map(t => t.value) : [];\n  }\n\n  /**\n   * @internal\n   */\n  firstChild(t: T): T|null {\n    const n = findNode(t, this._root);\n    return n && n.children.length > 0 ? n.children[0].value : null;\n  }\n\n  /**\n   * @internal\n   */\n  siblings(t: T): T[] {\n    const p = findPath(t, this._root);\n    if (p.length < 2) return [];\n    const c = p[p.length - 2].children.map(c => c.value);\n    return c.filter(cc => cc !== t);\n  }\n\n  /**\n   * @internal\n   */\n  pathFromRoot(t: T): T[] {\n    return findPath(t, this._root).map(s => s.value);\n  }\n}\n\n//

```

```

DFS for the node matching the value\nfunction findNode<T>(value: T, node: TreeNode<T>): TreeNode<T>|null {\n  if (value === node.value) return node;\n  for (const child of node.children) {\n    const node = findNode(value, child);\n    if (node) return node;\n  }\n  return null;\n}\n\n// Return the path to the node with the given value using DFS\nfunction findPath<T>(value: T, node: TreeNode<T>): TreeNode<T>[] {\n  if (value === node.value) return [node];\n  for (const child of node.children) {\n    const path = findPath(value, child);\n    if (path.length) {\n      path.unshift(node);\n      return path;\n    }\n  }\n  return [];\n}\n\nexport class TreeNode<T> {\n  constructor(public value: T, public children: TreeNode<T>[]) {\n  }\n  toString(): string {\n    return `TreeNode(${this.value})`;\n  }\n}\n\n// Return the list of T indexed by outlet name\nexport function nodeChildrenAsMap<T extends {outlet: string}>(node: TreeNode<T>|null) {\n  const map: {[outlet: string]: TreeNode<T>} = {};\n  if (node) {\n    node.children.forEach(child => map[child.value.outlet] = child);\n  }\n  return map;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Type} from '@angular/core';\nimport {BehaviorSubject, Observable, of} from 'rxjs';\nimport {map} from 'rxjs/operators';\nimport {Data, ResolveData, Route} from './models';\nimport {convertToParamMap, ParamMap, Params, PRIMARY_OUTLET, RouteTitleKey} from './shared';\nimport {equalSegments, UrlSegment, UrlSegmentGroup, UrlTree} from './url_tree';\nimport {shallowEqual, shallowEqualArrays} from './utils/collection';\nimport {Tree, TreeNode} from './utils/tree';\n\n/**\n * Represents the state of the router as a tree of activated routes.\n *\n * @usageNotes\n *\n * Every node in the route tree is an `ActivatedRoute` instance\n * that knows

```

```

about the `consumed` URL segments, the extracted parameters,\n * and the resolved data.\n * Use the `ActivatedRoute` properties to traverse the tree from any node.\n *\n * The following fragment shows how a component gets the root node\n * of the current state to establish its own route tree:\n *\n * ``\n *\n * @Component({templateUrl:'template.html'})\n * class MyComponent {\n *   constructor(router: Router) {\n *     const state: RouterState = router.routerState;\n *     const root: ActivatedRoute = state.root;\n *     const child = root.firstChild;\n *     const id: Observable<string> = child.params.map(p => p.id);\n *     //...\n *   }\n * }\n *\n * @see `ActivatedRoute`\n * @see [Getting route information](guide/router#getting-route-information)\n *\n * @publicApi\n */\nexport class RouterState extends Tree<ActivatedRoute> {\n  /** @internal\n   */\n  constructor(\n    root: TreeNode<ActivatedRoute>,\n    /** The current snapshot of the router state\n     */\n    public snapshot: RouterStateSnapshot) {\n    super(root);\n    setRouterState(<RouterState>this, root);\n  }\n\n  override toString(): string {\n    return this.snapshot.toString();\n  }\n}\n\nexport function createEmptyState(urlTree: UrlTree, rootComponent: Type<any>|null): RouterState {\n  const snapshot = createEmptyStateSnapshot(urlTree, rootComponent);\n  const emptyUrl = new BehaviorSubject([new UrlSegment("", {})]);\n  const emptyParams = new BehaviorSubject({});\n  const emptyData = new BehaviorSubject({});\n  const emptyQueryParams = new BehaviorSubject({});\n  const fragment = new BehaviorSubject("");\n  const activated = new ActivatedRoute(\n    emptyUrl, emptyParams, emptyQueryParams, fragment, emptyData, PRIMARY_OUTLET, rootComponent,\n    snapshot.root);\n  activated.snapshot = snapshot.root;\n  return new RouterState(new\n    TreeNode<ActivatedRoute>(activated, []), snapshot);\n}\n\nexport function createEmptyStateSnapshot(\n  urlTree: UrlTree, rootComponent: Type<any>|null): RouterStateSnapshot {\n  const emptyParams = {};\n  const emptyData = {};\n  const emptyQueryParams = {};\n  const fragment = "";\n  const activated = new ActivatedRouteSnapshot(\n    [], emptyParams, emptyQueryParams, fragment, emptyData, PRIMARY_OUTLET, rootComponent, null,\n    urlTree.root, -1, {});\n  return new RouterStateSnapshot("", new

```

```

TreeNode<ActivatedRouteSnapshot>(activated, []);
}

/**
 * Provides access to information about a route
 * associated with a component
 * that is loaded in an outlet.
 * Use to traverse the `RouterState` tree and extract
 * information from nodes.
 * The following example shows how to construct a component using information
 * from a
 * currently activated route.
 * Note: the observables in this class only emit when the current and
 * previous values differ based
 * on shallow equality. For example, changing deeply nested properties in resolved
 * `data` will not
 * cause the `ActivatedRoute.data` `Observable` to emit a new value.
 * {@example
  router/activated-route/module.ts region="activated-route" header="activated-route.component.ts"}
 * @see [Getting route information](guide/router#getting-route-information)
 */
export class
ActivatedRoute {
  /** The current snapshot of this route */
  snapshot!: ActivatedRouteSnapshot;

  /** @internal */
  _futureSnapshot: ActivatedRouteSnapshot;

  /** @internal */
  _routerState!: RouterState;

  /** @internal */
  _paramMap!: Observable<ParamMap>;

  /** @internal */
  _queryParams!:
Observable<ParamMap>;

  /** An Observable of the resolved route title */
  readonly title:
Observable<string|undefined> =
  this.data?.pipe(map((d: Data) => d[RouteTitleKey])) ?? of(undefined);

  /** @internal */
  constructor(
    /** An observable of the URL segments matched by this route. */
    public url: Observable<UrlSegment[]>,
    /** An observable of the matrix parameters scoped to this route. */
    public params:
Observable<Params>,
    /** An observable of the query parameters shared by all the routes. */
    public queryParams: Observable<Params>,
    /** An observable of the URL fragment shared by all the routes. */
    public fragment: Observable<string|null>,
    /** An observable of the static and resolved data of this route. */
    public data: Observable<Data>,
    /** The outlet name of the route, a constant. */
    public outlet: string,
    /** The component of the route, a constant. */
    public component: Type<any>|null,
    futureSnapshot:
ActivatedRouteSnapshot) {
    this._futureSnapshot = futureSnapshot;
  }

  /** The configuration used to match
  this route. */
  get routeConfig(): Route|null {
    return this._futureSnapshot.routeConfig;
  }

  /** The root of
  the router state. */
  get root(): ActivatedRoute {
    return this._routerState.root;
  }

  /** The parent of this
  route in the router state tree. */
  get parent(): ActivatedRoute|null
  {
    return this._routerState.parent(this);
  }

  /** The first child of this route in the router state tree. */
  get firstChild(): ActivatedRoute|null {
    return this._routerState.firstChild(this);
  }

  /** The children of this route
  in the router state tree. */
  get children(): ActivatedRoute[] {
    return this._routerState.children(this);
  }

  /** The path from the root of the router state tree to this route. */
  get pathFromRoot(): ActivatedRoute[] {
    return this._routerState.pathFromRoot(this);
  }

  /** An Observable that contains a map of the required
  and optional parameters
  specific to the route.
  The map supports retrieving single and multiple values from
  the same parameter. */
  get paramMap(): Observable<ParamMap> {
    if (!this._paramMap) {
      this._paramMap = this.params.pipe(map((p: Params): ParamMap =>
      convertToParamMap(p)));
    }
    return
this._paramMap;
  }

  /** An Observable that
  contains a map of the query parameters available to all routes.
  The map supports retrieving single and multiple
  values from the query parameter. */
  get queryParams(): Observable<ParamMap> {
    if
(!this._queryParams) {
      this._queryParams =
      this.queryParams.pipe(map((p: Params): ParamMap
=> convertToParamMap(p)));
    }
    return
this._queryParams;
  }

  toString(): string {
    return
this.snapshot ? this.snapshot.toString() : `Future(${this._futureSnapshot}`;
  }
}

export type
ParamsInheritanceStrategy = 'emptyOnly'|'always';

/** @internal */
export type Inherited = {
  params:
Params,
  data: Data,
  resolve: Data,
};

/** Returns the inherited params, data, and resolve for a given
route.
By default, this only inherits values up to the nearest path-less or component-less route.
 */
/** @internal */
export function inheritedParamsDataResolve(
  route: ActivatedRouteSnapshot,
  paramsInheritanceStrategy: ParamsInheritanceStrategy
= 'emptyOnly'): Inherited {
  const pathFromRoot = route.pathFromRoot;
  let inheritingStartingFrom = 0;
  (paramsInheritanceStrategy !== 'always') {
    inheritingStartingFrom = pathFromRoot.length - 1;
  }
  while
(inheritingStartingFrom >= 1) {
    const current = pathFromRoot[inheritingStartingFrom];
    const parent =
pathFromRoot[inheritingStartingFrom - 1];
    // current route is an empty path => inherits its parent's params and

```

```

data\n    if (current.routeConfig && current.routeConfig.path === '') {\n        inheritingStartingFrom--;\n        //
parent is componentless => current route should inherit its params and data\n    } else if (!parent.component) {\n
inheritingStartingFrom--;\n    } else {\n        break;\n    }\n    }\n    }\n    return
flattenInherited(pathFromRoot.slice(inheritingStartingFrom));\n}\n\n/** @internal */\nfunction
flattenInherited(pathFromRoot: ActivatedRouteSnapshot[]): Inherited {\n    return pathFromRoot.reduce((res,
curr) => {\n        const params = {...res.params, ...curr.params};\n        const data = {...res.data, ...curr.data};\n        const
resolve =\n            {...curr.data, ...res.resolve, ...curr.routeConfig?.data, ...curr._resolvedData};\n        return {params,
data, resolve};\n    }, {params: {}, data: {}, resolve: {}});\n}\n\n/**\n * @description\n * Contains the
information about a route associated with a component loaded in an\n * outlet at a particular moment in time.
ActivatedRouteSnapshot can also be used to\n * traverse the router state tree.\n * \n * The following example
initializes a component with route information extracted\n * from the snapshot of the root node at the time of
creation.\n * \n * ```\n * @Component({templateUrl: './my-component.html'})\n * class MyComponent {\n *
constructor(route: ActivatedRoute) {\n *     const id: string = route.snapshot.params.id;\n *     const url: string =
route.snapshot.url.join('');\n *     const user = route.snapshot.data.user;\n *
} \n * }\n * ```\n * \n * @publicApi\n */\nexport class ActivatedRouteSnapshot {\n    /** The configuration used to
match this route */\n    public readonly routeConfig: Route|null;\n    /** @internal */\n    _urlSegment:
UrlSegmentGroup;\n    /** @internal */\n    _lastPathIndex: number;\n    /**\n * @internal\n * Used only in dev
mode to detect if application relies on `relativeLinkResolution: 'legacy'`\n * Should be removed in v16.\n */\n    _correctedLastPathIndex: number;\n    /** @internal */\n    _resolve: ResolveData;\n    /** @internal */\n    //
TODO(issue/24571): remove '!\n    _resolvedData!: Data;\n    /** @internal */\n    // TODO(issue/24571): remove '!\n    _routerState!: RouterStateSnapshot;\n    /** @internal */\n    // TODO(issue/24571): remove '!\n    _paramMap!:
ParamMap;\n    /** @internal */\n    // TODO(issue/24571): remove '!\n    _queryParamMap!: ParamMap;\n\n    /** The
resolved route title */\n    readonly title?: string = this.data?.[RouteTitleKey];\n\n    /** @internal */\n
constructor(\n        /** The URL segments matched by this route */\n        public url: UrlSegment[],\n        /**\n * The matrix parameters scoped to this route.\n * \n * You can compute all params (or data) in the router state
or to get params outside\n * of an activated component by traversing the `RouterState` tree as in the following\n *
example:\n * \n * ```\n * collectRouteParams(router: Router) {\n *     let params = {};\n *     let
stack: ActivatedRouteSnapshot[] = [router.routerState.snapshot.root];\n *     while (stack.length > 0) {\n *
const route = stack.pop()!;\n *     params = {...params, ...route.params};\n *
stack.push(...route.children);\n *     }\n *     return params;\n * }\n * ```\n * \n */\n    public params:
Params,\n        /** The query parameters shared by all the routes */\n        public queryParams: Params,\n        /** The
URL fragment shared by all the
routes */\n        public fragment: string|null,\n        /** The static and resolved data of this route */\n        public data:
Data,\n        /** The outlet name of the route */\n        public outlet: string,\n        /** The component of the route */\n
public component: Type<any>|null, routeConfig: Route|null, urlSegment: UrlSegmentGroup,\n        lastPathIndex:
number, resolve: ResolveData, correctedLastPathIndex?: number) {\n        this.routeConfig = routeConfig;\n        this._urlSegment = urlSegment;\n        this._lastPathIndex = lastPathIndex;\n        this._correctedLastPathIndex =
correctedLastPathIndex ?? lastPathIndex;\n        this._resolve = resolve;\n    }\n\n    /** The root of the router state */\n
get root(): ActivatedRouteSnapshot {\n        return this._routerState.root;\n    }\n\n    /** The parent of this route in the
router state tree */\n    get parent(): ActivatedRouteSnapshot|null {\n        return this._routerState.parent(this);\n    }\n\n    /** The first child of this route in the router state tree */\n
get firstChild(): ActivatedRouteSnapshot|null {\n        return this._routerState.firstChild(this);\n    }\n\n    /** The
children of this route in the router state tree */\n    get children(): ActivatedRouteSnapshot[] {\n        return
this._routerState.children(this);\n    }\n\n    /** The path from the root of the router state tree to this route */\n
get pathFromRoot(): ActivatedRouteSnapshot[] {\n        return this._routerState.pathFromRoot(this);\n    }\n\n    get
paramMap(): ParamMap {\n        if (!this._paramMap) {\n            this._paramMap = convertToParamMap(this.params);\n        }\n        return this._paramMap;\n    }\n\n    get queryParamMap(): ParamMap {\n        if (!this._queryParamMap) {\n
            this._queryParamMap = convertToParamMap(this.queryParams);\n        }\n        return this._queryParamMap;\n    }\n}\n
}

```

```

toString(): string {\n  const url = this.url.map(segment => segment.toString()).join('/');\n  const matched =
this.routeConfig ? this.routeConfig.path : '';\n  return `Route(url:'${url}', path:'${matched}')`;\n
}\n}\n\n/**\n * @description\n * Represents the state of the router at a moment in time.\n * This is a tree of
activated route snapshots. Every node in this tree knows about\n * the \"consumed\" URL segments, the extracted
parameters, and the resolved data.\n * The following example shows how a component is initialized with
information\n * from the snapshot of the root node's state at the time of creation.\n * ```\n *
@Component({ templateUrl:'template.html'})\n * class MyComponent {\n *   constructor(router: Router) {\n *
const state: RouterState = router.routerState;\n *   const snapshot: RouterStateSnapshot = state.snapshot;\n *
const root: ActivatedRouteSnapshot = snapshot.root;\n *   const child = root.firstChild;\n *   const id:
Observable<string> = child.params.map(p => p.id);\n *   //...\n *   }\n *   ```\n *   @publicApi\n *   ^\nexport
class RouterStateSnapshot extends Tree<ActivatedRouteSnapshot> {\n *   /** @internal *\n *   constructor(\n
  /** The url from which this snapshot was created *\n   public url: string, root:
TreeNode<ActivatedRouteSnapshot>) {\n   super(root);\n   setRouterState(<RouterStateSnapshot>this, root);\n
}\n\n  override toString(): string {\n   return serializeNode(this._root);\n  }\n}\n\nfunction setRouterState<U, T
extends { _routerState: U}>(state: U, node: TreeNode<T>): void {\n  node.value._routerState = state;\n
node.children.forEach(c => setRouterState(state, c));\n}\n\nfunction serializeNode(node:
TreeNode<ActivatedRouteSnapshot>): string {\n  const c = node.children.length > 0 ? ` {
${node.children.map(serializeNode).join(', ')} ` : '';\n  return `${node.value}${c}`;\n}\n\n/**\n * The expectation
is that the activate route is created with the right set of parameters.\n * So we push new values into the observables
only when they are not the initial values.\n * And we detect that by checking if the snapshot field is set.\n */\nexport
function advanceActivatedRoute(route: ActivatedRoute):
void {\n  if (route.snapshot) {\n    const currentSnapshot = route.snapshot;\n    const nextSnapshot =
route._futureSnapshot;\n    route.snapshot = nextSnapshot;\n    if (!shallowEqual(currentSnapshot.queryParams,
nextSnapshot.queryParams)) {\n      (<any>route.queryParams).next(nextSnapshot.queryParams);\n    }\n    if
(currentSnapshot.fragment !== nextSnapshot.fragment) {\n      (<any>route.fragment).next(nextSnapshot.fragment);\n    }\n    if (!shallowEqual(currentSnapshot.params,
nextSnapshot.params)) {\n      (<any>route.params).next(nextSnapshot.params);\n    }\n    if
(!shallowEqualArrays(currentSnapshot.url, nextSnapshot.url)) {\n      (<any>route.url).next(nextSnapshot.url);\n
}\n    if (!shallowEqual(currentSnapshot.data, nextSnapshot.data)) {\n      (<any>route.data).next(nextSnapshot.data);\n    }\n  } else {\n    route.snapshot = route._futureSnapshot;\n    // this
is for resolved data\n    (<any>route.data).next(route._futureSnapshot.data);\n  }\n}\n\nexport
function equalParamsAndUrlSegments(a: ActivatedRouteSnapshot, b: ActivatedRouteSnapshot): boolean {\n
const equalUrlParams = shallowEqual(a.params, b.params) && equalSegments(a.url, b.url);\n  const
parentsMismatch = !a.parent !== !b.parent;\n  return equalUrlParams && !parentsMismatch && (!a.parent ||
equalParamsAndUrlSegments(a.parent, b.parent!));\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {BehaviorSubject} from 'rxjs';\n\nimport
{DetachedRouteHandleInternal, RouteReuseStrategy} from './route_reuse_strategy';\nimport {ActivatedRoute,
ActivatedRouteSnapshot, RouterState, RouterStateSnapshot} from './router_state';\nimport {TreeNode} from
'./utils/tree';\n\nexport function createRouterState(\n  routeReuseStrategy: RouteReuseStrategy, curr:
RouterStateSnapshot,\n  prevState: RouterState):
RouterState {\n  const root = createNode(routeReuseStrategy, curr._root, prevState ? prevState._root : undefined);\n
return new RouterState(root, curr);\n}\n\nfunction createNode(\n  routeReuseStrategy: RouteReuseStrategy, curr:
TreeNode<ActivatedRouteSnapshot>,\n  prevState?: TreeNode<ActivatedRoute>): TreeNode<ActivatedRoute>
{\n  // reuse an activated route that is currently displayed on the screen\n  if (prevState &&
routeReuseStrategy.shouldReuseRoute(curr.value, prevState.value.snapshot)) {\n    const value = prevState.value;\n
value._futureSnapshot = curr.value;\n    const children = createOrReuseChildren(routeReuseStrategy, curr,
prevState);\n    return new TreeNode<ActivatedRoute>(value, children);\n  } else {\n    if

```

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(routeReuseStrategy.shouldAttach(curr.value)) {\n    // retrieve an activated route that is used to be displayed, but is
not currently displayed\n    const detachedRouteHandle = routeReuseStrategy.retrieve(curr.value);\n    if
(detachedRouteHandle
!== null) {\n    const tree = (detachedRouteHandle as DetachedRouteHandleInternal).route;\n
tree.value._futureSnapshot = curr.value;\n    tree.children = curr.children.map(c =>
createNode(routeReuseStrategy, c));\n    return tree;\n    }\n    }\n    const value =
createActivatedRoute(curr.value);\n    const children = curr.children.map(c => createNode(routeReuseStrategy,
c));\n    return new TreeNode<ActivatedRoute>(value, children);\n    }\n    }\n\nfunction createOrReuseChildren(\n
routeReuseStrategy: RouteReuseStrategy, curr: TreeNode<ActivatedRouteSnapshot>,\n    prevState:
TreeNode<ActivatedRoute>) {\n    return curr.children.map(child => {\n    for (const p of prevState.children) {\n
if (routeReuseStrategy.shouldReuseRoute(child.value, p.value.snapshot)) {\n    return
createNode(routeReuseStrategy, child, p);\n    }\n    }\n    return createNode(routeReuseStrategy, child);\n
});\n    }\n\nfunction createActivatedRoute(c: ActivatedRouteSnapshot) {\n
return new ActivatedRoute(\n    new BehaviorSubject(c.url), new BehaviorSubject(c.params), new
BehaviorSubject(c.queryParams),\n    new BehaviorSubject(c.fragment), new BehaviorSubject(c.data), c.outlet,
c.component, c);\n    }\n    }\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {NavigationCancellationCode} from './events';\nimport
{NavigationBehaviorOptions} from './models';\nimport {isUrlTree, UrlSerializer, UrlTree} from
'./url_tree';\n\nexport const NAVIGATION_CANCELING_ERROR = 'ngNavigationCancelingError';\n\nexport
type NavigationCancelingError =\n    Error&{[NAVIGATION_CANCELING_ERROR]: true, cancellationCode:
NavigationCancellationCode};\n\nexport type RedirectingNavigationCancelingError =
NavigationCancelingError&{\n    url: UrlTree;\n    navigationBehaviorOptions?: NavigationBehaviorOptions;\n
cancellationCode: NavigationCancellationCode.Redirect;\n};\n\nexport
function redirectingNavigationError(\n    urlSerializer: UrlSerializer, redirect: UrlTree):
RedirectingNavigationCancelingError {\n    const {redirectTo, navigationBehaviorOptions} =\n
isUrlTree(redirect) ? {redirectTo: redirect, navigationBehaviorOptions: undefined} : redirect;\n    const error =\n
navigationCancelingError(\n        ngDevMode && `Redirecting to \"${urlSerializer.serialize(redirectTo)}\"`,\n
NavigationCancellationCode.Redirect, redirect) as RedirectingNavigationCancelingError;\n    error.url =
redirectTo;\n    error.navigationBehaviorOptions = navigationBehaviorOptions;\n    return error;\n    }\n\nexport function
navigationCancelingError(\n    message: string|null|false, code: NavigationCancellationCode, redirectUrl?: UrlTree)
{\n    const error =\n    new Error('NavigationCancelingError: ' + (message || '')) as NavigationCancelingError;\n
error[NAVIGATION_CANCELING_ERROR] = true;\n    error.cancellationCode = code;\n
if (redirectUrl) {\n    (error as RedirectingNavigationCancelingError).url = redirectUrl;\n    }\n    return
error;\n    }\n\nexport function isRedirectingNavigationCancelingError(\n    error: unknown|\n
RedirectingNavigationCancelingError): error is RedirectingNavigationCancelingError {\n    return
isNavigationCancelingError(error) && isUrlTree((error as any).url);\n    }\n\nexport function
isNavigationCancelingError(error: unknown): error is NavigationCancelingError {\n    return error && (error as
any)[NAVIGATION_CANCELING_ERROR];\n    }\n    }\n\n/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {ComponentFactoryResolver, ComponentRef,
EnvironmentInjector, Injectable} from '@angular/core';\nimport {RouterOutletContract} from
'./directives/router_outlet';\nimport {ActivatedRoute} from './router_state';\n\n/**\n * Store contextual information
about a `RouterOutlet`\n * \n * @publicApi\n */\n\nexport class OutletContext {\n    outlet: RouterOutletContract|null
= null;\n    route: ActivatedRoute|null = null;\n    /**\n     * @deprecated Passing a resolver to retrieve a component
factory is not required and is\n     * deprecated since v14.\n     */\n    resolver: ComponentFactoryResolver|null =
null;\n    injector: EnvironmentInjector|null = null;\n    children = new ChildrenOutletContexts();\n    attachRef:
ComponentRef<any>|null = null;\n    }\n\n/**\n * Store contextual information about the children (= nested)

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`RouterOutlet`\n *\n * @publicApi\n *\n@Injectables({providedIn: 'root'})\nexport class ChildrenOutletContexts
{\n // contexts for child outlets, by name.\n private contexts = new Map<string, OutletContext>();\n\n /** Called
when a `RouterOutlet` directive is instantiated *\n onChildOutletCreated(childName: string, outlet:
RouterOutletContract): void {\n const context = this.getOrCreateContext(childName);\n context.outlet
= outlet;\n this.contexts.set(childName, context);\n }\n\n /**\n * Called when a `RouterOutlet` directive is
destroyed.\n * We need to keep the context as the outlet could be destroyed inside a NgIf and might be\n * re-
created later.\n *\n onChildOutletDestroyed(childName: string): void {\n const context =
this.getContext(childName);\n if (context) {\n context.outlet = null;\n context.attachRef = null;\n }\n
}\n\n /**\n * Called when the corresponding route is deactivated during navigation.\n * Because the component
get destroyed, all children outlet are destroyed.\n *\n onOutletDeactivated(): Map<string, OutletContext> {\n
const contexts = this.contexts;\n this.contexts = new Map();\n return contexts;\n }\n\n
onOutletReAttached(contexts: Map<string, OutletContext>) {\n this.contexts = contexts;\n }\n\n
getOrCreateContext(childName: string): OutletContext {\n let context = this.getContext(childName);\n\n if
(!context)
{\n context = new OutletContext();\n this.contexts.set(childName, context);\n }\n\n return context;\n
}\n\n getContext(childName: string): OutletContext|null {\n return this.contexts.get(childName) || null;\n
}\n}\n", "*/\n *\n @license\n *\n Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport { Attribute, ChangeDetectorRef, ComponentFactoryResolver, ComponentRef, Directive,
EnvironmentInjector, EventEmitter, Injector, OnDestroy, OnInit, Output, ViewContainerRef, RuntimeError as
RuntimeError, } from '@angular/core';\n\nimport { RuntimeErrorCode } from '../errors';\n\nimport { Data } from
'../models';\n\nimport { ChildrenOutletContexts } from '../router_outlet_context';\n\nimport { ActivatedRoute } from
'../router_state';\n\nimport { PRIMARY_OUTLET } from '../shared';\n\nconst NG_DEV_MODE = typeof ngDevMode
=== 'undefined' || ngDevMode;\n\n\n *\n * An interface that defines the contract for developing a component outlet for the `Router`.\n *\n * An outlet acts as
a placeholder that Angular dynamically fills based on the current router state.\n *\n * A router outlet should register
itself with the `Router` via\n * `ChildrenOutletContexts#onChildOutletCreated` and unregister with\n *
`ChildrenOutletContexts#onChildOutletDestroyed`. When the `Router` identifies a matched `Route`,\n * it looks for
a registered outlet in the `ChildrenOutletContexts` and activates it.\n *\n * @see `ChildrenOutletContexts`\n *\n
*\n * @publicApi\n *\n\nexport interface RouterOutletContract {\n /**\n * Whether the given outlet is activated.\n *\n
*\n * An outlet is considered "activated" if it has an active component.\n * isActivated: boolean;\n\n /** The
instance of the activated component or `null` if the outlet is not activated.\n * component: Object|null;\n\n /**\n *
The `Data` of the `ActivatedRoute` snapshot.\n *\n activatedRouteData:
Data;\n\n /**\n * The `ActivatedRoute` for the outlet or `null` if the outlet is not activated.\n *\n
activatedRoute: ActivatedRoute|null;\n\n /**\n * Called by the `Router` when the outlet should activate (create a
component).\n *\n activateWith(activatedRoute: ActivatedRoute, environmentInjector: EnvironmentInjector|null):
void;\n\n /**\n * Called by the `Router` when the outlet should activate (create a component).\n *\n *\n
*\n * @deprecated Passing a resolver to retrieve a component factory is not required and is\n * deprecated since
v14.\n *\n activateWith(activatedRoute: ActivatedRoute, resolver: ComponentFactoryResolver|null): void;\n\n
/**\n * A request to destroy the currently activated component.\n *\n *\n * When a `RouteReuseStrategy` indicates
that an `ActivatedRoute` should be removed but stored for\n * later re-use rather than destroyed, the `Router` will
call `detach` instead.\n *\n deactivate(): void;\n\n /**\n * Called when the `RouteReuseStrategy`
instructs to detach the subtree.\n *\n *\n * This is similar to `deactivate`, but the activated component should not
be destroyed.\n * Instead, it is returned so that it can be reattached later via the `attach` method.\n *\n detach():
ComponentRef<unknown>;\n\n /**\n * Called when the `RouteReuseStrategy` instructs to re-attach a previously
detached subtree.\n *\n attach(ref: ComponentRef<unknown>, activatedRoute: ActivatedRoute): void;\n\n /**\n
*\n * Emits an activate event when a new component is instantiated\n **/\n activateEvents?:
EventEmitter<unknown>;\n\n /**\n *\n * Emits a deactivate event when a component is destroyed.\n *\n

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deactivateEvents?: EventEmitter<unknown>;\n\n /**\n * Emits an attached component instance when the
`RouteReuseStrategy` instructs to re-attach a\n * previously detached subtree.\n **/\n attachEvents?:
EventEmitter<unknown>;\n\n /**\n * Emits a detached component instance when the `RouteReuseStrategy`
instructs
to detach the\n * subtree.\n */\n detachEvents?: EventEmitter<unknown>;\n}\n\n/**\n * @description\n *\n * Acts as a placeholder that Angular dynamically fills based on the current router state.\n *\n * Each outlet can have a unique name, determined by the optional `name` attribute.\n * The name cannot be set or changed dynamically. If not set, default value is `primary`.\n *\n * <router-outlet></router-outlet>\n * <router-outlet name='left'></router-outlet>\n * <router-outlet name='right'></router-outlet>\n * ``\n *\n * Named outlets can be the targets of secondary routes.\n * The `Route` object for a secondary route has an `outlet` property to identify the target outlet.\n *\n * `{path: <base-path>, component: <component>, outlet: <target_outlet_name>}`\n *\n * Using named outlets and secondary routes, you can target multiple outlets in\n * the same `RouterLink` directive.\n *\n * The router keeps track of separate branches in a navigation tree for each named outlet
and\n * generates a representation of that tree in the URL.\n * The URL for a secondary route uses the following syntax to specify both the primary and secondary\n * routes at the same time:\n *\n * `http://base-path/primary-route-path(outlet-name:route-path)`\n *\n * A router outlet emits an activate event when a new component is instantiated,\n * deactivate event when a component is destroyed.\n * An attached event emits when the `RouteReuseStrategy` instructs the outlet to reattach the\n * subtree, and the detached event emits when the `RouteReuseStrategy` instructs the outlet to\n * detach the subtree.\n *\n * ``\n * <router-outlet\n * (activate)='onActivate($event)\n * (deactivate)='onDeactivate($event)\n * (attach)='onAttach($event)\n * (detach)='onDetach($event)'></router-outlet>\n * ``\n *\n * @see [Routing tutorial](guide/router-tutorial-toh#named-outlets `Example of a named\n * outlet and secondary route configuration`).\n * @see `RouterLink`\n * @see `Route`\n
* @ngModule RouterModule\n *\n * @publicApi\n */\n @Directive({\n selector: 'router-outlet',\n exportAs: 'outlet',\n standalone: true,\n })\n export class RouterOutlet implements OnDestroy, OnInit, RouterOutletContract {\n private activated: ComponentRef<any>|null = null;\n private _activatedRoute: ActivatedRoute|null = null;\n private name: string;\n @Output('activate') activateEvents = new EventEmitter<any>();\n @Output('deactivate')
deactivateEvents = new EventEmitter<any>();\n /**\n * Emits an attached component instance when the
`RouteReuseStrategy` instructs to re-attach a\n * previously detached subtree.\n **/\n @Output('attach')
attachEvents = new EventEmitter<unknown>();\n /**\n * Emits a detached component instance when the
`RouteReuseStrategy` instructs to detach the\n * subtree.\n */\n @Output('detach') detachEvents = new
EventEmitter<unknown>();\n\n constructor(\n private parentContexts: ChildrenOutletContexts, private location:
ViewContainerRef,\n @Attribute('name') name: string, private changeDetector: ChangeDetectorRef,\n private environmentInjector:
EnvironmentInjector) {\n this.name = name || PRIMARY_OUTLET;\n parentContexts.onChildOutletCreated(this.name, this);\n }\n\n /** @nodoc */\n ngOnDestroy(): void {\n // Ensure that the registered outlet is this one before removing it on the context.\n if (this.parentContexts.getContext(this.name)?.outlet === this) {\n this.parentContexts.onChildOutletDestroyed(this.name);\n }\n }\n\n /** @nodoc */\n ngOnInit(): void {\n if (!this.activated) {\n // If the outlet was not instantiated at the time the route got activated we need to populate\n // the outlet when it is initialized (ie inside a NgIf)\n const context = this.parentContexts.getContext(this.name);\n if (context && context.route) {\n if (context.attachRef) {\n // `attachRef` is populated when there is an existing component to mount\n this.attach(context.attachRef, context.route);\n } else {\n // otherwise the component defined in the configuration is created\n this.activateWith(context.route, context.injector);\n }\n }\n }\n\n get
isActive(): boolean {\n return !!this.activated;\n }\n\n /**\n * @returns The currently activated component instance.\n * @throws An error if the outlet is not activated.\n */\n get component(): Object {\n if (!this.activated)\n throw new RuntimeError(\n RuntimeErrorCode.OUTLET_NOT_ACTIVATED,

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NG_DEV_MODE && 'Outlet is not activated');\n  return this.activated.instance;\n }\n\n get activatedRoute():
ActivatedRoute {\n  if (!this.activated)\n    throw new RuntimeError(\n
RuntimeErrorCode.OUTLET_NOT_ACTIVATED, NG_DEV_MODE && 'Outlet is not activated');\n  return
this._activatedRoute as ActivatedRoute;\n }\n\n get activatedRouteData(): Data {\n  if (this._activatedRoute) {\n
  return this._activatedRoute.snapshot.data;\n
  }\n  return {};\n }\n\n /**\n  * Called when the `RouteReuseStrategy` instructs to detach the subtree\n  */\n
detach(): ComponentRef<any> {\n  if (!this.activated)\n    throw new RuntimeError(\n
RuntimeErrorCode.OUTLET_NOT_ACTIVATED, NG_DEV_MODE && 'Outlet is not activated');\n  this.location.detach();\n  const cmp = this.activated;\n  this.activated = null;\n  this._activatedRoute = null;\n  this.detachEvents.emit(cmp.instance);\n  return cmp;\n }\n\n /**\n  * Called when the `RouteReuseStrategy`
instructs to re-attach a previously detached subtree\n  */\n  attach(ref: ComponentRef<any>, activatedRoute:
ActivatedRoute) {\n  this.activated = ref;\n  this._activatedRoute = activatedRoute;\n
  this.location.insert(ref.hostView);\n  this.attachEvents.emit(ref.instance);\n }\n\n deactivate(): void {\n  if
(this.activated) {\n  const c = this.component;\n  this.activated.destroy();\n  this.activated
= null;\n  this._activatedRoute = null;\n  this.deactivateEvents.emit(c);\n }\n }\n\n activateWith(\n
activatedRoute: ActivatedRoute,\n  resolverOrInjector?: ComponentFactoryResolver|EnvironmentInjector|null)
{\n  if (this.isActivated) {\n  throw new RuntimeError(\n
RuntimeErrorCode.OUTLET_ALREADY_ACTIVATED,\n    NG_DEV_MODE && 'Cannot activate an
already activated outlet');\n  }\n  this._activatedRoute = activatedRoute;\n  const location = this.location;\n
  const snapshot = activatedRoute._futureSnapshot;\n  const component = snapshot.component!;\n  const
childContexts = this.parentContexts.getOrCreateContext(this.name).children;\n  const injector = new
OutletInjector(activatedRoute, childContexts, location.injector);\n  if (resolverOrInjector &&
isComponentFactoryResolver(resolverOrInjector)) {\n  const factory =
resolverOrInjector.resolveComponentFactory(component);\n  this.activated = location.createComponent(factory,
  location.length, injector);\n  } else {\n  const environmentInjector = resolverOrInjector ??
this.environmentInjector;\n  this.activated = location.createComponent(\n    component, {index:
location.length, injector, environmentInjector});\n  }\n  // Calling `markForCheck` to make sure we will run the
change detection when the\n  // `RouterOutlet` is inside a `ChangeDetectionStrategy.OnPush` component.\n
  this.changeDetector.markForCheck();\n  this.activateEvents.emit(this.activated.instance);\n }\n}\n\nclass
OutletInjector implements Injector {\n  constructor(\n  private route: ActivatedRoute, private childContexts:
ChildrenOutletContexts,\n  private parent: Injector) {\n}\n  get(token: any, notFoundValue?: any): any {\n  if
(token === ActivatedRoute) {\n  return this.route;\n  }\n  if (token === ChildrenOutletContexts) {\n  return
this.childContexts;\n  }\n  return this.parent.get(token, notFoundValue);\n }\n}\n\nfunction
isComponentFactoryResolver(item: any): item is ComponentFactoryResolver {\n  return
!!item.resolveComponentFactory;\n}\n\n"/**\n  * @license\n  * Copyright Google LLC All Rights Reserved.\n  */\n  *
Use of this source code is governed by an MIT-style license that can be\n  * found in the LICENSE file at
https://angular.io/license\n  */\n  * import {Component} from '@angular/core';\n  * import {RouterOutlet} from
'./directives/router_outlet';\n  */\n  * This component is used internally within the router to be a placeholder when
an empty\n  * router-outlet is needed. For example, with a config such as:\n  *\n  * {path: 'parent', outlet: 'nav',
children: [...]}\n  * In order to render, there needs to be a component on this config, which will default\n  * to this
`EmptyOutletComponent`.\n  */\n  * @Component({\n  *   template: `<router-outlet></router-outlet>`,\n  *   imports:
[RouterOutlet],\n  *   standalone: true,\n  * })\n  * export class EmptyOutletComponent {\n  * }\n  */\n  * export
{EmptyOutletComponent as EmptyOutletComponent};\n  */\n  */\n  * @license\n  * Copyright Google LLC All Rights Reserved.\n  */\n  * Use of this source code is governed by an
MIT-style license that can be\n  * found in the LICENSE file at https://angular.io/license\n  */\n  * import
{createEnvironmentInjector, EnvironmentInjector, Type, isStandalone as isStandalone, RuntimeError as
RuntimeError} from '@angular/core';\n  * import {EmptyOutletComponent} from
'./components/empty_outlet';\n  * import {RuntimeErrorCode} from './errors';\n  * import {Route, Routes} from

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'./models';\nimport { ActivatedRouteSnapshot } from './router_state';\nimport { PRIMARY_OUTLET } from
'./shared';\n\n/*\n * Creates an `EnvironmentInjector` if the `Route` has providers and one does not already exist\n
* and returns the injector. Otherwise, if the `Route` does not have `providers`, returns the\n * `currentInjector`.\n * \n
* @param route The route that might have providers\n * @param currentInjector The parent injector of the
`Route`\n */\nexport function getOrCreateRouteInjectorIfNeeded(\n
  route: Route, currentInjector: EnvironmentInjector) {\n  if (route.providers && !route._injector) {\n
route._injector =\n    createEnvironmentInjector(route.providers, currentInjector, `Route: ${route.path}`);\n  }\n
return route._injector ?? currentInjector;\n}\n\nexport function getLoadedRoutes(route: Route): Route[]\n\n{\n  return route._loadedRoutes;\n}\n\nexport function getLoadedInjector(route: Route):
EnvironmentInjector\n\n{\n  return route._loadedInjector;\n}\n\nexport function getLoadedComponent(route:
Route): Type<unknown>\n\n{\n  return route._loadedComponent;\n}\n\nexport function
getProvidersInjector(route: Route): EnvironmentInjector\n\n{\n  return route._injector;\n}\n\nexport function
validateConfig(\n  config: Routes, parentPath: string = "", requireStandaloneComponents = false): void {\n  //
forEach doesn't iterate undefined values\n  for (let i = 0; i < config.length; i++) {\n    const route: Route =
config[i];\n
    const fullPath: string = getFullPath(parentPath, route);\n    validateNode(route, fullPath,
requireStandaloneComponents);\n  }\n}\n\nexport function assertStandalone(fullPath: string, component:
Type<unknown>\n\n)\n\n{\n  if (component && !isStandalone(component)) {\n    throw new
RuntimeError(\n      RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n      `Invalid configuration of route
'${fullPath}'. The component must be standalone.`);\n  }\n}\n\nfunction validateNode(route: Route,
fullPath: string,
requireStandaloneComponents: boolean): void {\n  if (typeof ngDevMode === 'undefined' || ngDevMode) {\n
if (!route) {\n    throw new RuntimeError(RuntimeErrorCode.INVALID_ROUTE_CONFIG, `Invalid
configuration of route '${fullPath}': Encountered undefined route.\n    The reason might be an extra
comma.\n\n    Example:\n    const routes: Routes = [\n      { path: "", redirectTo: '/dashboard',
pathMatch: 'full' },\n      { path: 'dashboard', component: DashboardComponent
},\n      << two commas\n      { path: 'detail/:id', component: HeroDetailComponent }\n    ];\n  `);\n
}\n  if
(Array.isArray(route)) {\n    throw new RuntimeError(\n      RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n
      `Invalid configuration of route '${fullPath}': Array cannot be specified`);\n  }\n  if
(!route.redirectTo && !route.component && !route.loadComponent &&
!route.children &&\n    !route.loadChildren && (route.outlet && route.outlet !== PRIMARY_OUTLET)) {\n
throw new RuntimeError(\n      RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n      `Invalid configuration
of route '${\n        fullPath}': a componentless route without children or loadChildren cannot have a
named outlet set`);\n  }\n  if (route.redirectTo && route.children) {\n    throw new
RuntimeError(\n      RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n      `Invalid configuration of route
'${\n        fullPath}': redirectTo and children cannot be used together`);\n  }\n  if (route.redirectTo
&& route.loadChildren) {\n    throw new RuntimeError(\n      RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n
      `Invalid configuration of route '${\n        fullPath}': redirectTo and loadChildren cannot be
used together`);\n  }\n  if (route.children && route.loadChildren) {\n    throw new
RuntimeError(\n      RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n      `Invalid configuration of route
'${\n        fullPath}': children and loadChildren cannot be used together`);\n  }\n  if (route.redirectTo
&& (route.component || route.loadComponent)) {\n    throw new RuntimeError(\n     
RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n      `Invalid configuration of route '${\n        fullPath}':
redirectTo and component/loadComponent cannot be used together`);\n  }\n  if (route.component &&
route.loadComponent) {\n    throw new RuntimeError(\n     
RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n      `Invalid
configuration of route '${\n        fullPath}': component and loadComponent cannot be used together`);\n
  }\n  if (route.redirectTo && route.canActivate) {\n    throw new RuntimeError(\n     
RuntimeErrorCode.INVALID_ROUTE_CONFIG,\n      `Invalid configuration of route '${\n        fullPath}':

```

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redirectTo and canActivate cannot be used together. Redirects happen before activation `+` so
canActivate will never be executed.`);
}
if (route.path && route.matcher) {
  throw new RuntimeError(
    RuntimeErrorCode.INVALID_ROUTE_CONFIG,
    `Invalid configuration of route '${fullPath}': path
    and matcher cannot be used together`);
}
if (route.redirectTo === void 0 && !route.component &&
!route.loadComponent && !route.children && !route.loadChildren) {
  throw new RuntimeError(
    RuntimeErrorCode.INVALID_ROUTE_CONFIG,
    `Invalid configuration of route '${fullPath}'.
    One of the following must be provided: component, loadComponent, redirectTo, children or loadChildren`);
}
if (route.path === void 0 && route.matcher === void 0) {
  throw new RuntimeError(
    RuntimeErrorCode.INVALID_ROUTE_CONFIG,
    `Invalid configuration of route '${fullPath}':
    routes must have either a path or a matcher specified`);
}
if (typeof route.path === 'string' &&
route.path.charAt(0) === '/') {
  throw new RuntimeError(
    RuntimeErrorCode.INVALID_ROUTE_CONFIG,
    `Invalid configuration of route '${fullPath}': path cannot
    start with a slash`);
}
if (route.path === '' && route.redirectTo !== void 0 && route.pathMatch === void 0) {
  const exp = `The default value of 'pathMatch' is 'prefix', but often the intent is to use 'full'`;
  throw new RuntimeError(
    RuntimeErrorCode.INVALID_ROUTE_CONFIG,
    `Invalid configuration
    of route '{path: "${fullPath}"',
    redirectTo: "${route.redirectTo}"': please provide 'pathMatch'. ${exp}`);
}
if (requireStandaloneComponents) {
  assertStandalone(fullPath, route.component);
}
}
if (route.children) {
  validateConfig(route.children, fullPath, requireStandaloneComponents);
}
}
function
getFullPath(parentPath: string, currentRoute: Route): string {
  if (!currentRoute) {
    return parentPath;
  }
  if (!parentPath && !currentRoute.path) {
    return "";
  }
  else if (parentPath && !currentRoute.path) {
    return `${parentPath}/`;
  }
  else if (!parentPath && currentRoute.path) {
    return currentRoute.path;
  }
  else {
    return `${parentPath}/${currentRoute.path}`;
  }
}
/**
 * Makes a copy of the config and adds any default
 * required properties.
 */
export function standardizeConfig(r: Route): Route {
  const children = r.children &&
r.children.map(standardizeConfig);
  const c = children ? {...r, children} : {...r};
  if ((!c.component && !c.loadComponent) && (children || c.loadChildren) &&
(c.outlet && c.outlet !==
PRIMARY_OUTLET)) {
    c.component = EmptyOutletComponent;
  }
  return c;
}
/** Returns the
`route.outlet` or PRIMARY_OUTLET if none exists.
 */
export function getOutlet(route: Route): string {
  return
route.outlet || PRIMARY_OUTLET;
}
/**
 * Sorts the `routes` such that the ones with an outlet matching
 * `outletName` come first.
 * The order of the configs is otherwise preserved.
 */
export function
sortByMatchingOutlets(routes: Routes, outletName: string): Routes {
  const sortedConfig = routes.filter(r =>
getOutlet(r) === outletName);
  sortedConfig.push(...routes.filter(r => getOutlet(r) !== outletName));
  return
sortedConfig;
}
/**
 * Gets the first injector in the snapshot's parent tree.
 * If the `Route` has a static list
 * of providers, the returned injector will be the one created from
 * those. If it does not exist, the returned injector
 * may
 * come from the parents, which may be from a
 * loaded config or their static providers.
 * Returns `null` if
 * there is neither this nor any parents have a stored injector.
 * Generally used for retrieving the injector to use
 * for getting tokens for guards/resolvers and
 * also used for getting the correct injector to use for creating
 * components.
 */
export function getClosestRouteInjector(snapshot: ActivatedRouteSnapshot):
EnvironmentInjector {
  null {
    if (!snapshot) return null;
  }
  // If the current route has its own injector, which is
  created from the static providers on the
  // route itself, we should use that. Otherwise, we start at the parent since
  we do not want to
  // include the lazy loaded injector from this route.
  if (snapshot.routeConfig?._injector) {
    return snapshot.routeConfig._injector;
  }
  for (let s = snapshot.parent; s; s = s.parent) {
    const route =
s.routeConfig;
    // Note that the order here is important.
    `loadedInjector`
    stored on the route with
    // `loadChildren: () => NgModule` so it applies to child routes with priority. The
    `_injector`
    // is created from the static providers on that parent route, so it applies to the children as
    // well,
    but only if there is no lazy loaded NgModuleRef injector.
    if (route?._loadedInjector) return
route._loadedInjector;
    if (route?._injector) return route._injector;
  }
  return null;
}
"/**
 * @license

```

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* Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport { ComponentFactoryResolver,
EnvironmentInjector, NgModuleRef } from '@angular/core';\nimport { MonoTypeOperatorFunction } from
'rxjs';\nimport { map } from 'rxjs/operators';\nimport { ActivationEnd, ChildActivationEnd, Event } from
'./events';\nimport { DetachedRouteHandleInternal, RouteReuseStrategy } from './route_reuse_strategy';\nimport
{ NavigationTransition } from './router';\nimport { ChildrenOutletContexts } from './router_outlet_context';\nimport
{ ActivatedRoute, advanceActivatedRoute, RouterState } from './router_state';\nimport { forEach } from
'./utils/collection';\nimport { getClosestRouteInjector } from './utils/config';\nimport { nodeChildrenAsMap,
TreeNode } from './utils/tree';\n\nexport const activateRoutes = (\n  rootContexts: ChildrenOutletContexts,
routeReuseStrategy: RouteReuseStrategy,\n  forwardEvent: (evt: Event) => void):
MonoTypeOperatorFunction<NavigationTransition> =>{\n  map(t => {\n    new ActivateRoutes(\n
routeReuseStrategy, t.targetRouterState!, t.currentRouterState, forwardEvent)\n      .activate(rootContexts);\n
return t;\n  });\n\nexport class ActivateRoutes {\n  constructor(\n    private routeReuseStrategy:
RouteReuseStrategy, private futureState: RouterState,\n    private currState: RouterState, private forwardEvent:
(evt: Event) => void)
  {\n\n    activate(parentContexts: ChildrenOutletContexts): void {\n      const futureRoot = this.futureState._root;\n
const currRoot = this.currState ? this.currState._root : null;\n\n      this.deactivateChildRoutes(futureRoot, currRoot,
parentContexts);\n      advanceActivatedRoute(this.futureState.root);\n      this.activateChildRoutes(futureRoot,
currRoot, parentContexts);\n    }\n\n    // De-activate the child route that are not re-used for the future state\n
private deactivateChildRoutes(\n      futureNode: TreeNode<ActivatedRoute>, currNode:
TreeNode<ActivatedRoute>|null,\n      contexts: ChildrenOutletContexts): void {\n      const children: {[outletName:
string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(currNode);\n\n      // Recurse on the routes active in the
future state to de-activate deeper children\n      futureNode.children.forEach(futureChild => {\n        const
childOutletName = futureChild.value.outlet;\n        this.deactivateRoutes(futureChild, children[childOutletName],
contexts);\n\n        delete children[childOutletName];\n      });\n\n      // De-activate the routes that will not be re-used\n
forEach(children, (v: TreeNode<ActivatedRoute>, childName: string) => {\n
this.deactivateRouteAndItsChildren(v, contexts);\n    });\n\n    private deactivateRoutes(\n      futureNode:
TreeNode<ActivatedRoute>, currNode: TreeNode<ActivatedRoute>,\n      parentContext: ChildrenOutletContexts):
void {\n      const future = futureNode.value;\n      const curr = currNode ? currNode.value : null;\n\n      if (future ===
curr) {\n        // Reusing the node, check to see if the children need to be de-activated\n        if (future.component) {\n
// If we have a normal route, we need to go through an outlet.\n          const context =
parentContext.getContext(future.outlet);\n          if (context) {\n            this.deactivateChildRoutes(futureNode,
currNode, context.children);\n          }\n        } else {\n          // if we have a componentless route, we recurse but keep the
same outlet map.\n          this.deactivateChildRoutes(futureNode, currNode, parentContext);\n        }\n      } else {\n
if (curr) {\n        // Deactivate the current route which will not be re-used\n        this.deactivateRouteAndItsChildren(currNode, parentContext);\n      }\n    }\n\n    private
deactivateRouteAndItsChildren(\n      route: TreeNode<ActivatedRoute>, parentContexts: ChildrenOutletContexts):
void {\n      // If there is no component, the Route is never attached to an outlet (because there is no\n      // component
to attach).\n      if (route.value.component && this.routeReuseStrategy.shouldDetach(route.value.snapshot)) {\n
this.detachAndStoreRouteSubtree(route, parentContexts);\n      } else {\n        this.deactivateRouteAndOutlet(route,
parentContexts);\n      }\n    }\n\n    private detachAndStoreRouteSubtree(\n      route: TreeNode<ActivatedRoute>,
parentContexts: ChildrenOutletContexts): void {\n      const context =
parentContexts.getContext(route.value.outlet);\n      const
contexts = context && route.value.component ? context.children : parentContexts;\n      const children:
{[outletName: string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(route);\n      for (const childOutlet of
Object.keys(children)) {\n        this.deactivateRouteAndItsChildren(children[childOutlet], contexts);\n      }\n      if
(context && context.outlet) {\n        const componentRef = context.outlet.detach();\n        const contexts =

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context.children.onOutletDeactivated();\n    this.routeReuseStrategy.store(route.value.snapshot, { componentRef,
route, contexts});\n    }\n }\n\n private deactivateRouteAndOutlet(\n    route: TreeNode<ActivatedRoute>,
parentContexts: ChildrenOutletContexts): void {\n    const context =
parentContexts.getContext(route.value.outlet);\n    // The context could be `null` if we are on a componentless route
but there may still be\n    // children that need deactivating.\n    const contexts = context && route.value.component
? context.children : parentContexts;\n
    const children: {[outletName: string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(route);\n    for
(const childOutlet of Object.keys(children)) {\n    this.deactivateRouteAndItsChildren(children[childOutlet],
contexts);\n    }\n\n    if (context && context.outlet) {\n    // Destroy the component\n
context.outlet.deactivate();\n    // Destroy the contexts for all the outlets that were in the component\n
context.children.onOutletDeactivated();\n    // Clear the information about the attached component on the context
but keep the reference to\n    // the outlet.\n    context.attachRef = null;\n    context.resolver = null;\n
context.route = null;\n    }\n }\n\n private activateChildRoutes(\n    futureNode: TreeNode<ActivatedRoute>,
currNode: TreeNode<ActivatedRoute>|null,\n    contexts: ChildrenOutletContexts): void {\n    const children:
{[outlet: string]: TreeNode<ActivatedRoute>} = nodeChildrenAsMap(currNode);\n
futureNode.children.forEach(c
=> {\n    this.activateRoutes(c, children[c.value.outlet], contexts);\n    this.forwardEvent(new
ActivationEnd(c.value.snapshot));\n    });\n    if (futureNode.children.length) {\n    this.forwardEvent(new
ChildActivationEnd(futureNode.value.snapshot));\n    }\n }\n\n private activateRoutes(\n    futureNode:
TreeNode<ActivatedRoute>, currNode: TreeNode<ActivatedRoute>,\n    parentContexts:
ChildrenOutletContexts): void {\n    const future = futureNode.value;\n    const curr = currNode ? currNode.value :
null;\n\n    advanceActivatedRoute(future);\n\n    // reusing the node\n    if (future === curr) {\n    if
(future.component) {\n    // If we have a normal route, we need to go through an outlet.\n    const context =
parentContexts.getOrCreateContext(future.outlet);\n    this.activateChildRoutes(futureNode, currNode,
context.children);\n    } else {\n    // if we have a componentless route, we recurse but keep the same outlet
map.\n    this.activateChildRoutes(futureNode,
currNode, parentContexts);\n    }\n    } else {\n    if (future.component) {\n    // if we have a normal route, we
need to place the component into the outlet and recurse.\n    const context =
parentContexts.getOrCreateContext(future.outlet);\n\n    if
(this.routeReuseStrategy.shouldAttach(future.snapshot)) {\n    const stored =\n
(<DetachedRouteHandleInternal>this.routeReuseStrategy.retrieve(future.snapshot));\n
this.routeReuseStrategy.store(future.snapshot, null);\n
context.children.onOutletReAttached(stored.contexts);\n    context.attachRef = stored.componentRef;\n
context.route = stored.route.value;\n    if (context.outlet) {\n    // Attach right away when the outlet has
already been instantiated\n    // Otherwise attach from `RouterOutlet.ngOnInit` when it is instantiated\n
context.outlet.attach(stored.componentRef, stored.route.value);\n    }\n\n
advanceActivatedRoute(stored.route.value);\n    this.activateChildRoutes(futureNode, null,
context.children);\n    } else {\n    const injector = getClosestRouteInjector(future.snapshot);\n    const
cmpFactoryResolver = injector?.get(ComponentFactoryResolver) ?? null;\n    context.attachRef = null;\n
context.route = future;\n    context.resolver = cmpFactoryResolver;\n    context.injector = injector;\n    if
(context.outlet) {\n    // Activate the outlet when it has already been instantiated\n    // Otherwise it will get
activated from its `ngOnInit` when instantiated\n    context.outlet.activateWith(future, context.injector);\n
}\n\n    this.activateChildRoutes(futureNode, null, context.children);\n    }\n    } else {\n    // if we have a
componentless route, we recurse but keep the same outlet map.\n    this.activateChildRoutes(futureNode, null,
parentContexts);\n
}\n }\n }\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {Injector, ProviderToken, isInjectable as isInjectable} from '@angular/core';\n\nimport

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{RunGuardsAndResolvers} from './models';\nimport {ChildrenOutletContexts, OutletContext} from
 './router_outlet_context';\nimport {ActivatedRouteSnapshot, equalParamsAndUrlSegments, RouterStateSnapshot}
 from './router_state';\nimport {equalPath} from './url_tree';\nimport {forEach, shallowEqual} from
 './utils/collection';\nimport {nodeChildrenAsMap, TreeNode} from './utils/tree';\n\nexport class CanActivate {\n
 readonly route: ActivatedRouteSnapshot;\n  constructor(public path: ActivatedRouteSnapshot[]) {\n    this.route =
 this.path[this.path.length - 1];\n  }\n}\n\nexport class CanDeactivate {\n  constructor(public component: Object|null,
 public route:
 ActivatedRouteSnapshot) {}\n}\n\nexport declare type Checks = {\n  canDeactivateChecks: CanDeactivate[],\n
 canActivateChecks: CanActivate[],\n};\n\nexport function getAllRouteGuards(\n  future: RouterStateSnapshot,
 curr: RouterStateSnapshot,\n  parentContexts: ChildrenOutletContexts) {\n  const futureRoot = future._root;\n
 const currRoot = curr ? curr._root : null;\n\n  return getChildRouteGuards(futureRoot, currRoot, parentContexts,
 [futureRoot.value]);\n}\n\nexport function getCanActivateChild(p: ActivatedRouteSnapshot):\n  {node:
 ActivatedRouteSnapshot, guards: any[]}|null {\n  const canActivateChild = p.routeConfig ?
 p.routeConfig.canActivateChild : null;\n  if (!canActivateChild || canActivateChild.length === 0) return null;\n
 return {node: p, guards: canActivateChild};\n}\n\nexport function getTokenOrFunctionIdentity<T>(\n
 tokenOrFunction: Function|ProviderToken<T>, injector: Injector): Function|T {\n  const NOT_FOUND =
 Symbol();\n  const result = injector.get<T>|Symbol>(tokenOrFunction,
 NOT_FOUND);\n  if (result === NOT_FOUND) {\n    if (typeof tokenOrFunction === 'function' &&
 !isInjectable(tokenOrFunction)) {\n      // We think the token is just a function so return it as-is\n      return
 tokenOrFunction;\n    } else {\n      // This will throw the not found error\n      return
 injector.get<T>(tokenOrFunction);\n    }\n  }\n  return result as T;\n}\n\nfunction getChildRouteGuards(\n
 futureNode: TreeNode<ActivatedRouteSnapshot>, currNode: TreeNode<ActivatedRouteSnapshot>|null,\n
 contexts: ChildrenOutletContexts|null, futurePath: ActivatedRouteSnapshot[], checks: Checks = {\n
 canDeactivateChecks: [],\n  canActivateChecks: []\n }): Checks {\n  const prevChildren =
 nodeChildrenAsMap(currNode);\n\n  // Process the children of the future route\n  futureNode.children.forEach(c =>
 {\n    getRouteGuards(c, prevChildren[c.value.outlet], contexts, futurePath.concat([c.value]), checks);\n    delete
 prevChildren[c.value.outlet];\n  });\n\n  // Process any children left from the current route (not active for the future route)\n  forEach(\n    prevChildren,\n
 (v: TreeNode<ActivatedRouteSnapshot>, k: string) =>\n      deactivateRouteAndItsChildren(v,
 contexts!.getContext(k), checks);\n  );\n\n  return checks;\n}\n\nfunction getRouteGuards(\n  futureNode:
 TreeNode<ActivatedRouteSnapshot>, currNode: TreeNode<ActivatedRouteSnapshot>,\n  parentContexts:
 ChildrenOutletContexts|null, futurePath: ActivatedRouteSnapshot[],\n  checks: Checks = {\n
 canDeactivateChecks: [],\n  canActivateChecks: []\n }): Checks {\n  const future = futureNode.value;\n  const
 curr = currNode ? currNode.value : null;\n  const context = parentContexts ?
 parentContexts.getContext(futureNode.value.outlet) : null;\n\n  // reusing the node\n  if (curr && future.routeConfig
 === curr.routeConfig) {\n    const shouldRun =\n      shouldRunGuardsAndResolvers(curr, future,
 future.routeConfig!.runGuardsAndResolvers);\n    if (shouldRun) {\n      checks.canActivateChecks.push(new CanActivate(futurePath));\n    } else {\n      // we need to set the data\n
 future.data = curr.data;\n      future._resolvedData = curr._resolvedData;\n    }\n  }\n\n  // If we have a component, we
 need to go through an outlet.\n  if (future.component) {\n    getChildRouteGuards(\n      futureNode, currNode,
 context ? context.children : null, futurePath, checks);\n\n    // if we have a componentless route, we recurse but
 keep the same outlet map.\n  } else {\n    getChildRouteGuards(futureNode, currNode, parentContexts,
 futurePath, checks);\n  }\n\n  if (shouldRun && context && context.outlet && context.outlet.isActive) {\n
 checks.canDeactivateChecks.push(new CanDeactivate(context.outlet.component, curr));\n  }\n  } else {\n    if
 (curr) {\n      deactivateRouteAndItsChildren(currNode, context, checks);\n    }\n\n    checks.canActivateChecks.push(new CanActivate(futurePath));\n    // If we have a component, we need to
 go through an outlet.\n    if (future.component) {\n      getChildRouteGuards(futureNode, null, context ?
 context.children : null, futurePath, checks);\n    }\n\n    // if we have a componentless route, we recurse but keep the same

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outlet map.\n  } else {\n    getChildRouteGuards(futureNode, null, parentContexts, futurePath, checks);\n  }\n}\n\nreturn checks;\n}\n\nfunction shouldRunGuardsAndResolvers(\n  curr: ActivatedRouteSnapshot, future: ActivatedRouteSnapshot,\n  mode: RunGuardsAndResolvers|undefined): boolean {\n  if (typeof mode === 'function') {\n    return mode(curr, future);\n  }\n  switch (mode) {\n    case 'pathParamsChange':\n      return !equalPath(curr.url, future.url);\n    case 'pathParamsOrQueryParamsChange':\n      return !equalPath(curr.url, future.url) ||\n        !shallowEqual(curr.queryParams, future.queryParams);\n    case 'always':\n      return true;\n    case 'paramsOrQueryParamsChange':\n      return !equalParamsAndUrlSegments(curr, future)\n        ||\n        !shallowEqual(curr.queryParams, future.queryParams);\n    case 'paramsChange':\n      default:\n        return !equalParamsAndUrlSegments(curr, future);\n  }\n}\n\nfunction deactivateRouteAndItsChildren(\n  route: TreeNode<ActivatedRouteSnapshot>, context: OutletContext|null, checks: Checks): void {\n  const children = nodeChildrenAsMap(route);\n  const r = route.value;\n  forEach(children, (node: TreeNode<ActivatedRouteSnapshot>, childName: string) => {\n    if (!r.component) {\n      deactivateRouteAndItsChildren(node, context, checks);\n    } else if (context) {\n      deactivateRouteAndItsChildren(node, context.children.getContext(childName), checks);\n    } else {\n      deactivateRouteAndItsChildren(node, null, checks);\n    }\n  });\n  if (!r.component) {\n    checks.canDeactivateChecks.push(new CanDeactivate(null, r));\n  } else if (context && context.outlet && context.outlet.isActivated) {\n    checks.canDeactivateChecks.push(new CanDeactivate(context.outlet.component, r));\n  } else {\n    checks.canDeactivateChecks.push(new CanDeactivate(null, r));\n  }\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {EmptyError} from 'rxjs';\nimport {CanActivate, CanActivateChild, CanDeactivate, CanLoad, CanMatch} from './models';\nimport {NAVIGATION_CANCELING_ERROR, NavigationCancelingError, RedirectingNavigationCancelingError} from './navigation_canceling_error';\nimport {isUrlTree} from './url_tree';\n\n/**\n * Simple function check, but generic so type inference will flow. Example:\n * function product(a: number, b: number) {\n *   return a * b;\n * }\n * if (isFunction<product>(fn)) {\n *   return fn(1, 2);\n * } else {\n *   throw `Must provide the `product` function`;\n * }\n */\nexport function isFunction<T>(v: any): v is T {\n  return typeof v === 'function';\n}\n\nexport function isBoolean(v: any): v is boolean {\n  return typeof v === 'boolean';\n}\n\nexport function isCanLoad(guard: any): guard is CanLoad {\n  return guard && isFunction<CanLoad>(guard.canLoad);\n}\n\nexport function isCanActivate(guard: any): guard is CanActivate {\n  return guard && isFunction<CanActivate>(guard.canActivate);\n}\n\nexport function isCanActivateChild(guard: any): guard is CanActivateChild {\n  return guard && isFunction<CanActivateChild>(guard.canActivateChild);\n}\n\nexport function isCanDeactivate<T>(guard: any): guard is CanDeactivate<T> {\n  return guard && isFunction<CanDeactivate<T>>(guard.canDeactivate);\n}\n\nexport function isCanMatch(guard: any): guard is CanMatch {\n  return guard && isFunction<CanMatch>(guard.canMatch);\n}\n\nexport function isRedirectingNavigationCancelingError(\n  error: unknown|\n  RedirectingNavigationCancelingError): error is RedirectingNavigationCancelingError {\n  return isNavigationCancelingError(error) && isUrlTree((error as any).url);\n}\n\nexport function isNavigationCancelingError(error: unknown): error is NavigationCancelingError {\n  return error && (error as any)[NAVIGATION_CANCELING_ERROR];\n}\n\nexport function isEmptyError(e: Error): e is EmptyError {\n  return e instanceof EmptyError || e?.name === 'EmptyError';\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {combineLatest, Observable, OperatorFunction} from 'rxjs';\nimport {filter, map, scan, startWith, switchMap, take} from 'rxjs/operators';\nimport {isUrlTree, UrlTree} from './url_tree';\n\nconst INITIAL_VALUE = Symbol('INITIAL_VALUE');\ndeclare type INTERIM_VALUES = typeof INITIAL_VALUE | boolean | UrlTree;\n\nexport function prioritizedGuardValue():\n  OperatorFunction<Observable<boolean|UrlTree>[], boolean|UrlTree> {\n  return switchMap(obs =>

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    {\n    return combineLatest(obs.map(o => o.pipe(take(1), startWith(INITIAL_VALUE as
INTERIM_VALUES))))\n    .pipe(\n        map((results: INTERIM_VALUES[]) => {\n            for (const result
of results) {\n                if (result === true) {\n                    // If result is true, check the next one\n
continue;\n                } else if (result === INITIAL_VALUE) {\n                    // If guard has not finished, we need to
stop processing.\n                    return INITIAL_VALUE;\n                } else if (result === false || result instanceof
UrlTree) {\n                    // Result finished and was not true. Return the result.\n                    // Note that we only allow
false/UrlTree. Other values are considered invalid and\n                    // ignored.\n                    return result;\n                }\n            }\n            // Everything resolved to true. Return true.\n            return true;\n        })),\n    filter((item):
item is boolean|UrlTree => item !== INITIAL_VALUE),\n    take(1),\n    );\n  });\n}\n", "/*\n * @license\n
* Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {EnvironmentInjector,
ProviderToken} from '@angular/core';\nimport {concat, defer, from, MonoTypeOperatorFunction, Observable, of,
OperatorFunction, pipe} from 'rxjs';\nimport {concatMap, first, map, mergeMap, tap} from
'rxjs/operators';\nimport {ActivationStart, ChildActivationStart, Event} from './events';\nimport
{CanActivateChild, CanActivateChildFn, CanActivateFn, Route} from './models';\nimport
{redirectingNavigationError} from './navigation_canceling_error';\nimport {NavigationTransition} from
'./router';\nimport {ActivatedRouteSnapshot, RouterStateSnapshot} from './router_state';\nimport {isUrlTree,
UrlSegment, UrlSerializer, UrlTree} from './url_tree';\nimport
{wrapIntoObservable} from './utils/collection';\nimport {getClosestRouteInjector} from './utils/config';\nimport
{CanActivate, CanDeactivate, getCanActivateChild, getTokenOrFunctionIdentity} from
'./utils/preactivation';\nimport {isBoolean, isCanActivate, isCanActivateChild, isCanDeactivate, isCanLoad,
isCanMatch} from './utils/type_guards';\nimport {prioritizedGuardValue} from
'./prioritized_guard_value';\n\nexport function checkGuards(injector: EnvironmentInjector, forwardEvent?: (evt:
Event) => void):\n  MonoTypeOperatorFunction<NavigationTransition> {\n    return mergeMap(t => {\n    const
{targetSnapshot, currentSnapshot, guards: {canActivateChecks, canDeactivateChecks}} = t;\n    if
(canDeactivateChecks.length === 0 && canActivateChecks.length === 0) {\n    return of({...t, guardsResult:
true});\n    }\n    return runCanDeactivateChecks(canDeactivateChecks, targetSnapshot!, currentSnapshot,
injector)\n    .pipe(\n        mergeMap(canDeactivate => {\n
            return canDeactivate && isBoolean(canDeactivate) ?\n                runCanActivateChecks(targetSnapshot!,
canActivateChecks, injector, forwardEvent) :\n                of(canDeactivate);\n            })),\n        map(guardsResult
=> ({...t, guardsResult}));\n    });\n  }\n\nfunction runCanDeactivateChecks(\n    checks: CanDeactivate[], futureRSS:
RouterStateSnapshot, currRSS: RouterStateSnapshot,\n    injector: EnvironmentInjector) {\n    return
from(checks).pipe(\n        mergeMap(\n            check => runCanDeactivate(check.component, check.route, currRSS,
futureRSS, injector)),\n        first(result => {\n            return result !== true;\n        }, true as boolean |
UrlTree));\n  }\n\nfunction runCanActivateChecks(\n    futureSnapshot: RouterStateSnapshot, checks: CanActivate[],
injector: EnvironmentInjector,\n    forwardEvent?: (evt: Event) => void) {\n    return from(checks).pipe(\n
concatMap((check: CanActivate) => {\n        return concat(\n            fireChildActivationStart(check.route.parent,
forwardEvent),\n            fireActivationStart(check.route, forwardEvent),\n            runCanActivateChild(futureSnapshot, check.path, injector),\n            runCanActivate(futureSnapshot, check.route,
injector));\n        })),\n        first(result => {\n            return result !== true;\n        }, true as boolean |
UrlTree));\n  }\n\n/**\n * This should fire off `ActivationStart` events for each route being activated at this\n * level.\n * In other words, if
you're activating `a` and `b` below, `path` will contain the\n * `ActivatedRouteSnapshot`s for both and we will fire
`ActivationStart` for both. Always\n * return\n * `true` so checks continue to run.\n */\nfunction
fireActivationStart(\n    snapshot: ActivatedRouteSnapshot|null,\n    forwardEvent?: (evt: Event) => void):
Observable<boolean> {\n    if (snapshot !== null && forwardEvent) {\n        forwardEvent(new
ActivationStart(snapshot));\n    }\n    return of(true);\n  }\n\n/**\n * This should fire off `ChildActivationStart`

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events for each route being activated at this\n * level.\n * In other words, if you're activating `a` and `b` below,
`path` will contain the\n * `ActivatedRouteSnapshot`s for both and we will fire `ChildActivationStart` for both.
Always\n * return\n * `true` so checks continue to run.\n */\nfunction fireChildActivationStart(\n  snapshot:
ActivatedRouteSnapshot|null,\n  forwardEvent?: (evt: Event) => void): Observable<boolean> {\n  if (snapshot !==
null && forwardEvent) {\n    forwardEvent(new ChildActivationStart(snapshot));\n  }\n  return
of(true);\n}\n\nfunction runCanActivate(\n  futureRSS: RouterStateSnapshot, futureARS:
ActivatedRouteSnapshot,\n  injector: EnvironmentInjector): Observable<boolean|UrlTree> {\n  const canActivate
= futureARS.routeConfig ? futureARS.routeConfig.canActivate : null;\n  if (!canActivate || canActivate.length ===
0) return of(true);\n\n  const canActivateObservables =\n    canActivate.map((canActivate:
CanActivateFn|ProviderToken<unknown>)
=> {\n    return defer(() => {\n      const closestInjector = getClosestRouteInjector(futureARS) ?? injector;\n
      const guard = getTokenOrFunctionIdentity<CanActivate>(canActivate, closestInjector);\n      const guardVal =
isCanActivate(guard) ?\n        guard.canActivate(futureARS, futureRSS) :\n        closestInjector.runInContext(() => (guard as CanActivateFn)(futureARS, futureRSS));\n      return
wrapIntoObservable(guardVal).pipe(first());\n    });\n  });\n  return
of(canActivateObservables).pipe(prioritizedGuardValue());\n}\n\nfunction runCanActivateChild(\n  futureRSS:
RouterStateSnapshot, path: ActivatedRouteSnapshot[],\n  injector: EnvironmentInjector):
Observable<boolean|UrlTree> {\n  const futureARS = path[path.length - 1];\n  const canActivateChildGuards =
path.slice(0, path.length - 1)\n    .reverse()\n    .map(p =>
getCanActivateChild(p))\n    .filter(_ => _ !== null);\n\n  const canActivateChildGuardsMapped =
canActivateChildGuards.map((d: any) => {\n    return defer(() => {\n      const guardsMapped =\n        d.guards.map((canActivateChild: CanActivateChildFn|ProviderToken<unknown>) => {\n      const
closestInjector = getClosestRouteInjector(d.node) ?? injector;\n      const guard =\n        getTokenOrFunctionIdentity<CanActivateChild>(canActivateChild, closestInjector);\n      const guardVal =
isCanActivateChild(guard) ?\n        guard.canActivateChild(futureARS, futureRSS) :\n        closestInjector.runInContext(() => guard(futureARS, futureRSS));\n      return
wrapIntoObservable(guardVal).pipe(first());\n    });\n  });\n  return
of(guardsMapped).pipe(prioritizedGuardValue());\n});\n\nreturn
of(canActivateChildGuardsMapped).pipe(prioritizedGuardValue());\n}\n\nfunction runCanDeactivate(\n
component: Object|null, currARS: ActivatedRouteSnapshot,\n  currRSS: RouterStateSnapshot,\n  futureRSS: RouterStateSnapshot, injector: EnvironmentInjector):
Observable<boolean|UrlTree> {\n  const canDeactivate = currARS && currARS.routeConfig ?
currARS.routeConfig.canDeactivate : null;\n  if (!canDeactivate || canDeactivate.length === 0) return of(true);\n
const canDeactivateObservables = canDeactivate.map((c: any) => {\n    const closestInjector =
getClosestRouteInjector(currARS) ?? injector;\n    const guard = getTokenOrFunctionIdentity<any>(c,
closestInjector);\n    const guardVal = isCanDeactivate(guard) ?\n      guard.canDeactivate(component, currARS,
currRSS, futureRSS) :\n      closestInjector.runInContext<boolean|UrlTree>(() => guard(component,
currARS, currRSS, futureRSS));\n    return wrapIntoObservable(guardVal).pipe(first());\n  });\n  return
of(canDeactivateObservables).pipe(prioritizedGuardValue());\n}\n\nexport function runCanLoadGuards(\n
injector: EnvironmentInjector, route: Route, segments:
UrlSegment[],\n  urlSerializer: UrlSerializer): Observable<boolean> {\n  const canLoad = route.canLoad;\n  if
(canLoad === undefined || canLoad.length === 0) {\n    return of(true);\n  }\n\n  const canLoadObservables =
canLoad.map((injectionToken: any) => {\n    const guard = getTokenOrFunctionIdentity<any>(injectionToken,
injector);\n    const guardVal = isCanLoad(guard) ?\n      guard.canLoad(route, segments) :\n      injector.runInContext<boolean|UrlTree>(() => guard(route, segments));\n    return wrapIntoObservable(guardVal);\n  });\n  return of(canLoadObservables)\n    .pipe(\n      prioritizedGuardValue(),\n      redirectIfUrlTree(urlSerializer),\n    );\n}\n\nfunction redirectIfUrlTree(urlSerializer: UrlSerializer):\n

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OperatorFunction<UrlTree|boolean, boolean> {\n  return pipe(\n    tap((result: UrlTree|boolean) => {\n      if
(!isUrlTree(result)) return;\n      throw redirectingNavigationError(urlSerializer, result);\n    })),\n    map(result
=> result === true),\n  );\n}\n\nexport function runCanMatchGuards(\n  injector: EnvironmentInjector, route:
Route, segments: UrlSegment[],\n  urlSerializer: UrlSerializer): Observable<boolean> {\n  const canMatch =
route.canMatch;\n  if (!canMatch || canMatch.length === 0) return of(true);\n  const canMatchObservables =
canMatch.map(injectionToken => {\n    const guard = getTokenOrFunctionIdentity(injectionToken, injector);\n
const guardVal = isCanMatch(guard) ?\n      guard.canMatch(route, segments) :\n    injector.runInContext<boolean|UrlTree>(() => guard(route, segments));\n    return wrapIntoObservable(guardVal);\n
});\n  return of(canMatchObservables)\n    .pipe(\n      prioritizedGuardValue(),\n      redirectIfUrlTree(urlSerializer),\n    );\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n
*\n\nimport {EnvironmentInjector, Injector} from '@angular/core';\nimport {Observable, of} from 'rxjs';\nimport
{map} from 'rxjs/operators';\nimport {Route} from './models';\nimport {runCanMatchGuards} from
'./operators/check_guards';\nimport {defaultUrlMatcher, PRIMARY_OUTLET} from './shared';\nimport
{UrlSegment, UrlSegmentGroup, UrlSerializer} from './url_tree';\nimport {forEach} from './collection';\nimport
{getOrCreateRouteInjectorIfNeeded, getOutlet} from './config';\n\nexport interface MatchResult {\n  matched:
boolean;\n  consumedSegments: UrlSegment[];\n  remainingSegments: UrlSegment[];\n  parameters: {[k: string]:
string};\n  positionalParamSegments: {[k: string]: UrlSegment};\n}\n\nconst noMatch: MatchResult = {\n  matched:
false,\n  consumedSegments: [],\n  remainingSegments: [],\n  parameters: {},\n  positionalParamSegments:
{};\n}\n\nexport function matchWithChecks(\n  segmentGroup: UrlSegmentGroup, route: Route, segments:
UrlSegment[],\n  injector: EnvironmentInjector,\n  urlSerializer: UrlSerializer): Observable<MatchResult> {\n  const result = match(segmentGroup, route,
segments);\n  if (!result.matched) {\n    return of(result);\n  }\n  // Only create the Route's `EnvironmentInjector` if
it matches the attempted\n  // navigation\n  injector = getOrCreateRouteInjectorIfNeeded(route, injector);\n  return
runCanMatchGuards(injector, route, segments, urlSerializer)\n    .pipe(\n      map((v) => v === true ? result :
{...noMatch}),\n    );\n}\n\nexport function match(\n  segmentGroup: UrlSegmentGroup, route: Route, segments:
UrlSegment[]): MatchResult {\n  if (route.path === "") {\n    if (route.pathMatch === 'full' &&
(segmentGroup.hasChildren() || segments.length > 0)) {\n      return {...noMatch};\n    }\n    return {\n      matched:
true,\n      consumedSegments: [],\n      remainingSegments: segments,\n      parameters: {},\n      positionalParamSegments: {};\n    };\n  }\n  const matcher = route.matcher || defaultUrlMatcher;\n  const res = matcher(segments, segmentGroup, route);\n  if (!res) return {...noMatch};\n  const posParams: {[n:
string]: string} = {};\n  forEach(res.posParams!, (v: UrlSegment, k: string) => {\n    posParams[k] = v.path;\n  });\n  const parameters = res.consumed.length > 0 ?\n    {...posParams, ...res.consumed[res.consumed.length -
1].parameters} :\n    posParams;\n  return {\n    matched: true,\n    consumedSegments: res.consumed,\n    remainingSegments: segments.slice(res.consumed.length),\n    // TODO(atscott): investigate combining parameters
and positionalParamSegments\n    parameters,\n    positionalParamSegments: res.posParams ?? {};\n  };\n}\n\nexport
function split(\n  segmentGroup: UrlSegmentGroup, consumedSegments: UrlSegment[], slicedSegments:
UrlSegment[],\n  config: Route[], relativeLinkResolution: 'legacy'|'corrected' = 'corrected') {\n  if
(slicedSegments.length > 0 &&\n    containsEmptyPathMatchesWithNamedOutlets(segmentGroup,
slicedSegments, config))\n    {\n      const s = new UrlSegmentGroup(\n        consumedSegments,\n        createChildrenForEmptyPaths(\n          segmentGroup, consumedSegments, config,\n            new UrlSegmentGroup(slicedSegments,
segmentGroup.children)),\n        s._sourceSegment = segmentGroup;\n        s._segmentIndexShift =
consumedSegments.length;\n      return {segmentGroup: s, slicedSegments: []};\n    }\n    if (slicedSegments.length
=== 0 &&\n      containsEmptyPathMatches(segmentGroup, slicedSegments, config))\n    {\n      const s = new
UrlSegmentGroup(\n        segmentGroup.segments,\n        addEmptyPathsToChildrenIfNeeded(\n          segmentGroup, consumedSegments, slicedSegments, config, segmentGroup.children,\n

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relativeLinkResolution));\n  s._sourceSegment = segmentGroup;\n  s._segmentIndexShift =
consumedSegments.length;\n  return {segmentGroup: s, slicedSegments};\n }\n\n const s = new
UrlSegmentGroup(segmentGroup.segments, segmentGroup.children);\n  s._sourceSegment = segmentGroup;\n
s._segmentIndexShift = consumedSegments.length;\n  return {segmentGroup: s, slicedSegments};\n }\n\nfunction
addEmptyPathsToChildrenIfNeeded(\n  segmentGroup: UrlSegmentGroup, consumedSegments: UrlSegment[],
slicedSegments: UrlSegment[],\n  routes: Route[], children: {[name: string]: UrlSegmentGroup},\n
relativeLinkResolution: 'legacy'|'corrected'): {[name: string]: UrlSegmentGroup} {\n  const res: {[name: string]:
UrlSegmentGroup} = {};\n  for (const r of routes) {\n    if (emptyPathMatch(segmentGroup, slicedSegments, r) &&
!children[getOutlet(r)]) {\n      const s = new UrlSegmentGroup([], {});\n      s._sourceSegment = segmentGroup;\n
      if (relativeLinkResolution === 'legacy') {\n        s._segmentIndexShift = segmentGroup.segments.length;\n        if
(typeof ngDevMode === 'undefined' || !ngDevMode) {\n          s._segmentIndexShiftCorrected =
consumedSegments.length;\n        }\n      } else {\n        s._segmentIndexShift = consumedSegments.length;\n      }\n
      res[getOutlet(r)]
= s;\n    }\n  }\n  return {...children, ...res};\n }\n\nfunction createChildrenForEmptyPaths(\n  segmentGroup:
UrlSegmentGroup, consumedSegments: UrlSegment[], routes: Route[],\n  primarySegment: UrlSegmentGroup):
{[name: string]: UrlSegmentGroup} {\n  const res: {[name: string]: UrlSegmentGroup} = {};\n
res[PRIMARY_OUTLET] = primarySegment;\n  primarySegment._sourceSegment = segmentGroup;\n
primarySegment._segmentIndexShift = consumedSegments.length;\n\n  for (const r of routes) {\n    if (r.path === "
&& getOutlet(r) !== PRIMARY_OUTLET) {\n      const s = new UrlSegmentGroup([], {});\n      s._sourceSegment
= segmentGroup;\n      s._segmentIndexShift = consumedSegments.length;\n      res[getOutlet(r)] = s;\n    }\n  }\n
return res;\n }\n\nfunction containsEmptyPathMatchesWithNamedOutlets(\n  segmentGroup: UrlSegmentGroup,
slicedSegments: UrlSegment[], routes: Route[]): boolean {\n  return routes.some(\n    r =>
emptyPathMatch(segmentGroup, slicedSegments, r) &&
getOutlet(r) !== PRIMARY_OUTLET);\n }\n\nfunction containsEmptyPathMatches(\n  segmentGroup:
UrlSegmentGroup, slicedSegments: UrlSegment[], routes: Route[]): boolean {\n  return routes.some(r =>
emptyPathMatch(segmentGroup, slicedSegments, r));\n }\n\nfunction emptyPathMatch(\n  segmentGroup:
UrlSegmentGroup, slicedSegments: UrlSegment[], r: Route): boolean {\n  if ((segmentGroup.hasChildren() ||
slicedSegments.length > 0) && r.pathMatch === 'full') {\n    return false;\n  }\n  return r.path === ";\n }\n\n/n/n/*\n *
Determines if `route` is a path match for the `rawSegment`, `segments`, and `outlet` without\n * verifying that its
children are a full match for the remainder of the `rawSegment` children as\n * well.\n * ^\nexport function
isImmediateMatch(\n  route: Route, rawSegment: UrlSegmentGroup, segments: UrlSegment[], outlet: string):
boolean {\n  // We allow matches to empty paths when the outlets differ so we can match a url like `/(b:b)` to\n // a
config like\n // * `{path:
", children: [{path: 'b', outlet: 'b'}]}`\n // or even\n // * `{path: ", outlet: 'a', children: [{path: 'b', outlet: 'b'}]}`\n // ^\n
// The exception here is when the segment outlet is for the primary outlet. This would\n // result in a match inside
the named outlet because all children there are written as primary\n // outlets. So we need to prevent child named
outlet matches in a url like `/b` in a config like\n // * `{path: ", outlet: 'x' children: [{path: 'b'}]}`\n // This should
only match if the url is `/(x:b)`.\n  if (getOutlet(route) !== outlet &&\n    (outlet === PRIMARY_OUTLET ||
!emptyPathMatch(rawSegment, segments, route))) {\n    return false;\n  }\n  if (route.path === '**') {\n    return
true;\n  }\n  return match(rawSegment, route, segments).matched;\n }\n\nexport function noLeftoversInUrl(\n
segmentGroup: UrlSegmentGroup, segments: UrlSegment[], outlet: string): boolean {\n  return segments.length ===
0 && !segmentGroup.children[outlet];\n }\n\n", "/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{EnvironmentInjector, RuntimeError as RuntimeError} from '@angular/core';\nimport {from, Observable, of,
throwError} from 'rxjs';\nimport {catchError, concatMap, first, last, map, mergeMap, scan, switchMap, tap} from
'rxjs/operators';\nimport {RuntimeErrorCode} from './errors';\nimport {NavigationCancellationCode} from
'./events';\nimport {LoadedRouterConfig, Route, Routes} from './models';\nimport {navigationCancelingError} from

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'/navigation_canceling_error';\nimport {runCanLoadGuards} from './operators/check_guards';\nimport
{RouterConfigLoader} from './router_config_loader';\nimport {Params, PRIMARY_OUTLET} from
'/shared';\nimport {createRoot, squashSegmentGroup, UrlSegment, UrlSegmentGroup, UrlSerializer, UrlTree} from
'/url_tree';\nimport {forEach} from './utils/collection';\nimport
{getOrCreateRouteInjectorIfNeeded, getOutlet, sortByMatchingOutlets} from './utils/config';\nimport
{isImmediateMatch, match, matchWithChecks, noLeftoversInUrl, split} from './utils/config_matching';\nimport
{isEmptyError} from './utils/type_guards';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
ngDevMode;\n\nclass NoMatch {\n  public segmentGroup: UrlSegmentGroup|null;\n\n  constructor(segmentGroup?: UrlSegmentGroup) {\n    this.segmentGroup = segmentGroup || null;\n  }\n}\n\nclass
AbsoluteRedirect {\n  constructor(public urlTree: UrlTree) {\n  }\n}\n\nfunction noMatch(segmentGroup:
UrlSegmentGroup): Observable<UrlSegmentGroup> {\n  return throwError(new
NoMatch(segmentGroup));\n}\n\nfunction absoluteRedirect(newTree: UrlTree): Observable<any> {\n  return
throwError(new AbsoluteRedirect(newTree));\n}\n\nfunction namedOutletsRedirect(redirectTo: string):
Observable<any> {\n  return throwError(new RuntimeError(\n
RuntimeErrorCode.NAMED_OUTLET_REDIRECT,\n
  NG_DEV_MODE &&\n    `Only absolute redirects can have named outlets. redirectTo:
'${redirectTo}'));\n}\n\nfunction canLoadFails(route: Route): Observable<LoadedRouterConfig> {\n  return
throwError(navigationCancelingError(\n  NG_DEV_MODE &&\n    `Cannot load children because the guard
of the route \"path: '${\n    route.path}'\" returned false`,\n  NavigationCancellationCode.GuardRejected));\n}\n\n/**\n * Returns the `UrlTree` with the redirection applied.\n
*\n * Lazy modules are loaded along the way.\n */\nexport function applyRedirects(\n  injector:
EnvironmentInjector, configLoader: RouterConfigLoader, urlSerializer: UrlSerializer,\n  urlTree: UrlTree, config:
Routes): Observable<UrlTree> {\n  return new ApplyRedirects(injector, configLoader, urlSerializer, urlTree,
config).apply();\n}\n\nclass ApplyRedirects {\n  private allowRedirects: boolean = true;\n\n  constructor(\n
private injector: EnvironmentInjector, private configLoader: RouterConfigLoader,\n
  private urlSerializer: UrlSerializer, private urlTree: UrlTree, private config: Routes) {\n\n  apply():
Observable<UrlTree> {\n    const splitGroup = split(this.urlTree.root, [], [], this.config).segmentGroup;\n    //
TODO(atscott): creating a new segment removes the _sourceSegment _segmentIndexShift, which is\n    // only
necessary to prevent failures in tests which assert exact object matches. The `split` is\n    // now shared between
`applyRedirects` and `recognize` but only the `recognize` step needs these\n    // properties. Before the
implementations were merged, the `applyRedirects` would not assign\n    // them. We should be able to remove this
logic as a \"breaking change\" but should do some more\n    // investigation into the failures first.\n    const
rootSegmentGroup = new UrlSegmentGroup(splitGroup.segments, splitGroup.children);\n\n    const expanded$ =\n      this.expandSegmentGroup(this.injector, this.config, rootSegmentGroup, PRIMARY_OUTLET);\n\n    const urlTrees$ = expanded$.pipe(map((rootSegmentGroup: UrlSegmentGroup) => {\n      return
this.createUrlTree(\n        squashSegmentGroup(rootSegmentGroup), this.urlTree.queryParams,\n        this.urlTree.fragment);\n    }));\n    return urlTrees$.pipe(catchError((e: any) => {\n      if (e instanceof
AbsoluteRedirect) {\n        // After an absolute redirect we do not apply any more redirects!\n        // If this
implementation changes, update the documentation note in `redirectTo`.\n        this.allowRedirects = false;\n        //
we need to run matching, so we can fetch all lazy-loaded modules\n        return this.match(e.urlTree);\n      }\n    }));\n\n    if (e instanceof NoMatch) {\n      throw this.noMatchError(e);\n    }\n\n    throw e;\n  }));\n  }\n\n  private
match(tree: UrlTree): Observable<UrlTree> {\n    const expanded$ =\n      this.expandSegmentGroup(this.injector,
this.config, tree.root, PRIMARY_OUTLET);\n    const mapped$ = expanded$.pipe(map((rootSegmentGroup:
UrlSegmentGroup)
=> {\n      return this.createUrlTree(\n        squashSegmentGroup(rootSegmentGroup), tree.queryParams,\n        tree.fragment);\n    }));\n    return mapped$.pipe(catchError((e: any): Observable<UrlTree> => {\n      if (e
instanceof NoMatch) {\n        throw this.noMatchError(e);\n      }\n      throw e;\n    }));\n  }\n\n  private
noMatchError(e: NoMatch): any {\n    return new RuntimeError(\n      RuntimeErrorCode.NO_MATCH,\n

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NG_DEV_MODE && `Cannot match any routes. URL Segment: '${e.segmentGroup}');\n }\n\n private
createUrlTree(rootCandidate: UrlSegmentGroup, queryParams: Params, fragment: string|null):\n UrlTree {\n
const root = createRoot(rootCandidate);\n return new UrlTree(root, queryParams, fragment);\n }\n\n private
expandSegmentGroup(\n injector: EnvironmentInjector, routes: Route[], segmentGroup: UrlSegmentGroup,\n outlet: string): Observable<UrlSegmentGroup> {\n if (segmentGroup.segments.length === 0 &&
segmentGroup.hasChildren())
{\n return this.expandChildren(injector, routes, segmentGroup)\n .pipe(map((children: any) => new
UrlSegmentGroup([], children));\n }\n\n return this.expandSegment(injector, segmentGroup, routes,
segmentGroup.segments, outlet, true);\n }\n\n // Recursively expand segment groups for all the child outlets\n
private expandChildren(\n injector: EnvironmentInjector, routes: Route[],\n segmentGroup:
UrlSegmentGroup): Observable<{[name: string]: UrlSegmentGroup}> {\n // Expand outlets one at a time, starting
with the primary outlet. We need to do it this way\n // because an absolute redirect from the primary outlet takes
precedence.\n const childOutlets: string[] = [];\n for (const child of Object.keys(segmentGroup.children)) {\n
if (child === 'primary') {\n childOutlets.unshift(child);\n } else {\n childOutlets.push(child);\n }\n
}\n\n return from(childOutlets)\n .pipe(\n concatMap(childOutlet
=> {\n const child = segmentGroup.children[childOutlet];\n // Sort the routes so routes with outlets
that match the segment appear // first, followed by routes for other outlets, which might match if they have
an // empty path.\n const sortedRoutes = sortByMatchingOutlets(routes, childOutlet);\n
return this.expandSegmentGroup(injector, sortedRoutes, child, childOutlet)\n .pipe(map(s => ({segment:
s, outlet: childOutlet}));\n },\n scan(\n (children, expandedChild) => {\n
children[expandedChild.outlet] = expandedChild.segment;\n return children;\n },\n {}
as {[outlet: string]: UrlSegmentGroup})),\n last(),\n );\n }\n\n private expandSegment(\n injector:
EnvironmentInjector, segmentGroup: UrlSegmentGroup, routes: Route[],\n segments: UrlSegment[], outlet:
string,\n allowRedirects: boolean): Observable<UrlSegmentGroup> {\n return from(routes).pipe(\n concatMap(r
=> {\n const expanded$ = this.expandSegmentAgainstRoute(\n injector, segmentGroup, routes, r,
segments, outlet, allowRedirects);\n return expanded$.pipe(catchError((e: any) => {\n if (e instanceof
NoMatch) {\n return of(null);\n } else {\n throw e;\n });\n })),\n first((s: s is
UrlSegmentGroup => !!s), catchError((e: any, _: any) => {\n if (isEmptyError(e)) {\n if
(noLeftoversInUrl(segmentGroup, segments, outlet)) {\n return of(new UrlSegmentGroup([], {}));\n
}\n return noMatch(segmentGroup);\n } else {\n throw e;\n });\n }));\n }\n\n private
expandSegmentAgainstRoute(\n injector: EnvironmentInjector, segmentGroup: UrlSegmentGroup, routes:
Route[], route: Route,\n paths: UrlSegment[], outlet: string,
allowRedirects: boolean): Observable<UrlSegmentGroup> {\n if (!isImmediateMatch(route, segmentGroup,
paths, outlet)) {\n return noMatch(segmentGroup);\n }\n\n if (route.redirectTo === undefined) {\n return
this.matchSegmentAgainstRoute(injector, segmentGroup, route, paths, outlet);\n }\n\n if (allowRedirects &&
this.allowRedirects) {\n return this.expandSegmentAgainstRouteUsingRedirect(\n injector, segmentGroup,
routes, route, paths, outlet);\n }\n\n return noMatch(segmentGroup);\n }\n\n private
expandSegmentAgainstRouteUsingRedirect(\n injector: EnvironmentInjector, segmentGroup: UrlSegmentGroup,
routes: Route[], route: Route,\n segments: UrlSegment[], outlet: string): Observable<UrlSegmentGroup> {\n
if (route.path === '**') {\n return this.expandWildcardWithParamsAgainstRouteUsingRedirect(\n injector,
routes, route, outlet);\n }\n\n return this.expandRegularSegmentAgainstRouteUsingRedirect(\n injector,
segmentGroup, routes, route, segments, outlet);\n }\n\n private
expandWildcardWithParamsAgainstRouteUsingRedirect(\n injector: EnvironmentInjector, routes: Route[],
route: Route,\n outlet: string): Observable<UrlSegmentGroup> {\n const newTree =
this.applyRedirectCommands([], route.redirectTo!, {});\n if (route.redirectTo!.startsWith('/')) {\n return
absoluteRedirect(newTree);\n }\n\n return this.linalizeSegments(route,
newTree).pipe(mergeMap((newSegments: UrlSegment[]) => {\n const group = new

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UrlSegmentGroup(newSegments, {});\n    return this.expandSegment(injector, group, routes, newSegments, outlet,
false);\n    }));\n    }\n\n    private expandRegularSegmentAgainstRouteUsingRedirect(\n        injector:
EnvironmentInjector, segmentGroup: UrlSegmentGroup, routes: Route[], route: Route,\n        segments:
UrlSegment[], outlet: string): Observable<UrlSegmentGroup> {\n        const { matched, consumedSegments,
remainingSegments, positionalParamSegments }
        =\n            match(segmentGroup, route, segments);\n        if (!matched) return noMatch(segmentGroup);\n        const
newTree =\n            this.applyRedirectCommands(consumedSegments, route.redirectTo!,
positionalParamSegments);\n        if (route.redirectTo!.startsWith('/')) {\n            return absoluteRedirect(newTree);\n        }\n        return this.linalizeSegments(route, newTree).pipe(mergeMap((newSegments: UrlSegment[]) => {\n
return this.expandSegment(\n            injector, segmentGroup, routes, newSegments.concat(remainingSegments),
outlet, false);\n        }));\n    }\n\n    private matchSegmentAgainstRoute(\n        injector: EnvironmentInjector,
rawSegmentGroup: UrlSegmentGroup, route: Route,\n        segments: UrlSegment[], outlet: string):
Observable<UrlSegmentGroup> {\n        if (route.path === '**') {\n            // Only create the Route's
`EnvironmentInjector` if it matches the attempted navigation\n            injector =
getOrCreateRouteInjectorIfNeeded(route, injector);\n            if (route.loadChildren) {\n
                const loaded$ = route._loadedRoutes ?\n                    of({ routes: route._loadedRoutes, injector: route._loadedInjector })
:\n                    this.configLoader.loadChildren(injector, route);\n                return loaded$.pipe(map((cfg:
LoadedRouterConfig) => {\n                    route._loadedRoutes = cfg.routes;\n                    route._loadedInjector = cfg.injector;\n
                    return new UrlSegmentGroup(segments, {});\n                }));\n            }\n            return of(new
UrlSegmentGroup(segments, {}));\n        }\n        return matchWithChecks(rawSegmentGroup, route, segments,
injector, this.urlSerializer)\n            .pipe(\n                switchMap(({ matched, consumedSegments, remainingSegments })
=> {\n                    if (!matched) return noMatch(rawSegmentGroup);\n                    // If the route has an injector created
from providers, we should start using that.\n                    injector = route._injector ?? injector;\n                    const
childConfig$ = this.getChildConfig(injector, route, segments);\n                    return
childConfig$.pipe(mergeMap((routerConfig:
LoadedRouterConfig) => {\n                        const childInjector = routerConfig.injector ?? injector;\n                        const
childConfig = routerConfig.routes;\n                        const { segmentGroup: splitSegmentGroup, slicedSegments } =\n                            split(rawSegmentGroup, consumedSegments, remainingSegments, childConfig);\n                        // See comment
on the other call to `split` about why this is necessary.\n                        const segmentGroup =\n                            new
UrlSegmentGroup(splitSegmentGroup.segments, splitSegmentGroup.children);\n                        if
(slicedSegments.length === 0 && segmentGroup.hasChildren()) {\n                            const expanded$ =
this.expandChildren(childInjector, childConfig, segmentGroup);\n                            return expanded$.pipe(\n
                                map((children: any) => new UrlSegmentGroup(consumedSegments, children));\n                            }\n                        }\n                        if
(childConfig.length === 0 && slicedSegments.length
                        === 0) {\n                            return of(new UrlSegmentGroup(consumedSegments, {}));\n                        }\n                        const
matchedOnOutlet = getOutlet(route) === outlet;\n                        const expanded$ = this.expandSegment(\n
                            childInjector, segmentGroup, childConfig, slicedSegments,\n                            matchedOnOutlet ? PRIMARY_OUTLET
: outlet, true);\n                        return expanded$.pipe(\n                            map((cs: UrlSegmentGroup) => new
UrlSegmentGroup(\n                                consumedSegments.concat(cs.segments), cs.children));\n                        }));\n                    }
                ),\n            );\n    }\n\n    private getChildConfig(injector: EnvironmentInjector, route: Route, segments:
UrlSegment[]):\n        Observable<LoadedRouterConfig> {\n        if (route.children) {\n            // The children belong to the
same module\n            return of({ routes: route.children, injector });\n        }\n        if (route.loadChildren) {\n            // lazy
children belong to the loaded module\n            if
(route._loadedRoutes !== undefined) {\n                return of({ routes: route._loadedRoutes, injector:
route._loadedInjector });\n            }\n            return runCanLoadGuards(injector, route, segments, this.urlSerializer)\n                .pipe(mergeMap((shouldLoadResult: boolean) => {\n                    if (shouldLoadResult) {\n                        return
this.configLoader.loadChildren(injector, route)\n                            .pipe(tap((cfg: LoadedRouterConfig) => {\n
                                route._loadedRoutes = cfg.routes;\n                                route._loadedInjector = cfg.injector;\n                            }));\n                    }\n                }));\n        }\n    }\n

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    return canLoadFails(route);\n    });\n  }\n\n  return of({routes: [], injector});\n }\n\n private
linalizeSegments(route: Route, urlTree: UrlTree): Observable<UrlSegment[]> {\n  let res: UrlSegment[] = [];\n  let c = urlTree.root;\n  while (true) {\n    res = res.concat(c.segments);\n    if (c.numberOfChildren === 0) {\n      return of(res);\n    }\n    if (c.numberOfChildren
> 1 || !c.children[PRIMARY_OUTLET]) {\n      return namedOutletsRedirect(route.redirectTo!);\n    }\n    c =
c.children[PRIMARY_OUTLET];\n  }\n }\n\n private applyRedirectCommands(\n  segments: UrlSegment[],
redirectTo: string, posParams: {[k: string]: UrlSegment}): UrlTree {\n  return this.applyRedirectCreateUrlTree(\n
redirectTo, this.urlSerializer.parse(redirectTo), segments, posParams);\n }\n\n private
applyRedirectCreateUrlTree(\n  redirectTo: string, urlTree: UrlTree, segments: UrlSegment[],\n  posParams:
{[k: string]: UrlSegment}): UrlTree {\n  const newRoot = this.createSegmentGroup(redirectTo, urlTree.root,
segments, posParams);\n  return new UrlTree(\n    newRoot, this.createQueryParams(urlTree.queryParams,
this.urlTree.queryParams),\n    urlTree.fragment);\n }\n\n private createQueryParams(redirectToParams: Params,
actualParams: Params): Params {\n  const res: Params = {};\n  forEach(redirectToParams, (v:
any, k: string) => {\n    const copySourceValue = typeof v === 'string' && v.startsWith(':');\n    if
(copySourceValue) {\n      const sourceName = v.substring(1);\n      res[k] = actualParams[sourceName];\n    }
else {\n      res[k] = v;\n    }\n  });\n  return res;\n }\n\n private createSegmentGroup(\n  redirectTo: string,
group: UrlSegmentGroup, segments: UrlSegment[],\n  posParams: {[k: string]: UrlSegment}): UrlSegmentGroup
{\n  const updatedSegments = this.createSegments(redirectTo, group.segments, segments, posParams);\n  let
children: {[n: string]: UrlSegmentGroup} = {};\n  forEach(group.children, (child: UrlSegmentGroup, name: string)
=> {\n    children[name] = this.createSegmentGroup(redirectTo, child, segments, posParams);\n  });\n  return
new UrlSegmentGroup(updatedSegments, children);\n }\n\n private createSegments(\n  redirectTo: string,
redirectToSegments: UrlSegment[], actualSegments: UrlSegment[],\n  posParams: {[k:
string]: UrlSegment}): UrlSegment[] {\n  return redirectToSegments.map(\n    s => s.path.startsWith(':') ?
this.findPosParam(redirectTo, s, posParams) :\n    this.findOrReturn(s, actualSegments));\n }\n\n private findPosParam(\n  redirectTo: string, redirectToUrlSegment: UrlSegment,\n  posParams: {[k:
string]: UrlSegment}): UrlSegment {\n  const pos = posParams[redirectToUrlSegment.path.substring(1)];\n  if
(!pos)\n    throw new RuntimeError(\n      RuntimeErrorCode.MISSING_REDIRECT,\n      NG_DEV_MODE
&&\n      `Cannot redirect to '${redirectTo}'. Cannot find '${redirectToUrlSegment.path}'.`);\n  return pos;\n
}\n\n private findOrReturn(redirectToUrlSegment: UrlSegment, actualSegments: UrlSegment[]): UrlSegment {\n
let idx = 0;\n  for (const s of actualSegments) {\n    if (s.path === redirectToUrlSegment.path) {\n
actualSegments.splice(idx);\n    return s;\n    }\n    idx++;\n  }\n  return redirectToUrlSegment;\n }\n }\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport {EnvironmentInjector} from '@angular/core';\nimport
{MonoTypeOperatorFunction} from 'rxjs';\nimport {map, switchMap} from 'rxjs/operators';\nimport
{applyRedirects as applyRedirectsFn} from './apply_redirects';\nimport {Routes} from './models';\nimport
{NavigationTransition} from './router';\nimport {RouterConfigLoader} from './router_config_loader';\nimport
{UrlSerializer} from './url_tree';\n\nexport function applyRedirects(\n  environmentInjector: EnvironmentInjector,
configLoader: RouterConfigLoader,\n  urlSerializer: UrlSerializer, config: Routes):
MonoTypeOperatorFunction<NavigationTransition> {\n  return switchMap(\n    t =>\n    applyRedirectsFn(environmentInjector, configLoader, urlSerializer, t.extractedUrl,
config)\n      .pipe(map(urlAfterRedirects => ({...t, urlAfterRedirects})))));\n }\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {EnvironmentInjector, Type,
RuntimeError as RuntimeError} from '@angular/core';\nimport {EmptyError, from, Observable, Observer, of} from
'rxjs';\nimport {catchError, concatMap, defaultIfEmpty, first, last as rxjsLast, map, scan, switchMap, takeWhile}
from 'rxjs/operators';\nimport {RuntimeErrorCode} from './errors';\nimport {Data, ResolveData, Route, Routes}
from './models';\nimport {ActivatedRouteSnapshot, inheritedParamsDataResolve, ParamsInheritanceStrategy,

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RouterStateSnapshot} from './router_state';\nimport {PRIMARY_OUTLET} from './shared';\nimport {UrlSegment,
UrlSegmentGroup, UrlSerializer, UrlTree} from './url_tree';\nimport {last} from './utils/collection';\nimport
{getOutlet, sortByMatchingOutlets} from './utils/config';\nimport {isImmediateMatch, matchWithChecks,
noLeftoversInUrl, split} from './utils/config_matching';\nimport {TreeNode} from './utils/tree';\nimport
{isEmptyError} from './utils/type_guards';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
!!ngDevMode;\n\nclass NoMatch {} \n\nfunction newObservableError(e: unknown):
Observable<RouterStateSnapshot> {\n // TODO(atscott): This pattern is used throughout the router code and can be
`throwError` instead.\n return new Observable<RouterStateSnapshot>((obs: Observer<RouterStateSnapshot>) =>
obs.error(e));\n}\n\nexport function recognize(\n injector: EnvironmentInjector, rootComponentType:
Type<any>|null, config: Routes,\n urlTree: UrlTree, url: string, urlSerializer: UrlSerializer,\n paramsInheritanceStrategy: ParamsInheritanceStrategy = 'emptyOnly',\n relativeLinkResolution:
'legacy'|'corrected' = 'legacy'): Observable<RouterStateSnapshot> {\n return new Recognizer(\n
injector, rootComponentType, config, urlTree, url, paramsInheritanceStrategy,\n
relativeLinkResolution, urlSerializer)\n .recognize()\n .pipe(switchMap(result => {\n if (result === null)
{\n return newObservableError(new NoMatch());\n } else {\n return of(result);\n }\n
}));\n}\n\nexport class Recognizer {\n constructor(\n private injector: EnvironmentInjector, private
rootComponentType: Type<any>|null,\n private config: Routes, private urlTree: UrlTree, private url: string,\n
private paramsInheritanceStrategy: ParamsInheritanceStrategy,\n private relativeLinkResolution:
'legacy'|'corrected',\n private readonly urlSerializer: UrlSerializer) {} \n\n recognize():
Observable<RouterStateSnapshot|null> {\n const rootSegmentGroup =\n split(\n this.urlTree.root, [],
[], this.config.filter(c => c.redirectTo === undefined),\n this.relativeLinkResolution)\n
.segmentGroup;\n\n return this.processSegmentGroup(this.injector, this.config, rootSegmentGroup,
PRIMARY_OUTLET)\n .pipe(map(children => {\n if (children === null) {\n return null;\n
}\n\n // Use Object.freeze to prevent readers of the Router state from modifying it outside of a\n //
navigation, resulting in the router being out of sync with the browser.\n const root = new
ActivatedRouteSnapshot(\n [], Object.freeze({}), Object.freeze({...this.urlTree.queryParams}),\n
this.urlTree.fragment, {}, PRIMARY_OUTLET, this.rootComponentType, null,\n this.urlTree.root, -1,
{});\n\n const rootNode = new TreeNode<ActivatedRouteSnapshot>(root, children);\n const routeState =
new RouterStateSnapshot(this.url, rootNode);\n this.inheritParamsAndData(routeState._root);\n return
routeState;\n }));\n }\n\n inheritParamsAndData(routeNode:
TreeNode<ActivatedRouteSnapshot>): void {\n const route = routeNode.value;\n\n const i =
inheritedParamsDataResolve(route, this.paramsInheritanceStrategy);\n route.params = Object.freeze(i.params);\n
route.data = Object.freeze(i.data);\n\n routeNode.children.forEach(n => this.inheritParamsAndData(n));\n }\n\n
processSegmentGroup(\n injector: EnvironmentInjector, config: Route[], segmentGroup: UrlSegmentGroup,\n
outlet: string): Observable<TreeNode<ActivatedRouteSnapshot>[]|null> {\n if (segmentGroup.segments.length
=== 0 && segmentGroup.hasChildren()) {\n return this.processChildren(injector, config, segmentGroup);\n
}\n\n return this.processSegment(injector, config, segmentGroup, segmentGroup.segments, outlet);\n }\n\n /**\n
* Matches every child outlet in the `segmentGroup` to a `Route` in the config. Returns `null` if\n
* we cannot find a match for _any_ of the children.\n
* @param config - The `Routes` to match against\n
* @param
segmentGroup - The `UrlSegmentGroup` whose children need to be matched against the\n
* config.\n
*/\n
processChildren(injector: EnvironmentInjector, config: Route[], segmentGroup: UrlSegmentGroup):\n
Observable<TreeNode<ActivatedRouteSnapshot>[]|null> {\n return from(Object.keys(segmentGroup.children))\n
.pipe(\n concatMap(childOutlet => {\n const child = segmentGroup.children[childOutlet];\n
\n // Sort the config so that routes with outlets that match the one being activated\n // appear first, followed by
routes for other outlets, which might match if they have\n // an empty path.\n const sortedConfig =
sortByMatchingOutlets(config, childOutlet);\n return this.processSegmentGroup(injector, sortedConfig,
child, childOutlet);\n })),\n scan((children, outletChildren) => {\n if (!children ||
!outletChildren) return null;\n children.push(...outletChildren);\n

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        return children;\n        }},\n        takeWhile(children => children !== null),\n        defaultIfEmpty(null as TreeNode<ActivatedRouteSnapshot>[] | null),\n        rxjsLast(),\n        map(children =>
{\n        if (children === null) return null;\n        // Because we may have matched two outlets to the same
empty path segment, we can have\n        // multiple activated results for the same outlet. We should merge the
children of\n        // these results so the final return value is only one `TreeNode` per outlet.\n        const
mergedChildren = mergeEmptyPathMatches(children);\n        if (NG_DEV_MODE) {\n        // This should
really never happen - we are only taking the first match for each\n        // outlet and merge the empty path
matches.\n        checkOutletNameUniqueness(mergedChildren);\n        }\n        sortActivatedRouteSnapshots(mergedChildren);\n
        return mergedChildren;\n        }},\n        );\n    }\n\n    processSegment(\n        injector: EnvironmentInjector,\n        routes: Route[], segmentGroup: UrlSegmentGroup,\n        segments: UrlSegment[], outlet: string):
Observable<TreeNode<ActivatedRouteSnapshot>[]|null> {\n        return from(routes).pipe(\n        concatMap(r => {\n
        return this.processSegmentAgainstRoute(\n        r._injector ?? injector, r, segmentGroup, segments,\n
outlet);\n        }},\n        first((x: x is TreeNode<ActivatedRouteSnapshot>[] => !!x), catchError(e => {\n        if
(isEmptyError(e)) {\n        if (noLeftoversInUrl(segmentGroup, segments, outlet)) {\n        return of([]);\n
        }\n        return of(null);\n        }\n        throw e;\n        }));\n    }\n\n    processSegmentAgainstRoute(\n
injector: EnvironmentInjector, route: Route, rawSegment: UrlSegmentGroup,\n        segments: UrlSegment[], outlet:
string): Observable<TreeNode<ActivatedRouteSnapshot>[]|null>
{\n        if (route.redirectTo || !isImmediateMatch(route, rawSegment, segments, outlet)) return of(null);\n        let
matchResult: Observable<{\n        snapshot: ActivatedRouteSnapshot,\n        consumedSegments: UrlSegment[],\n
remainingSegments: UrlSegment[],\n        }|null>;\n        if (route.path === '**') {\n        const params = segments.length
> 0 ? last(segments)!.parameters : {};\n        const pathIndexShift = getPathIndexShift(rawSegment) +
segments.length;\n        const snapshot = new ActivatedRouteSnapshot(\n        segments, params,\n
Object.freeze({...this.urlTree.queryParams}), this.urlTree.fragment,\n        getData(route), getOutlet(route),\n
route.component ?? route._loadedComponent ?? null,\n        route, getSourceSegmentGroup(rawSegment),\n
pathIndexShift, getResolve(route),\n        // NG_DEV_MODE is used to prevent the getCorrectedPathIndexShift
function from affecting\n        // production bundle size. This value is intended only to surface a
warning to users\n        // depending on `relativeLinkResolution: 'legacy` in dev mode.\n        (NG_DEV_MODE
? getCorrectedPathIndexShift(rawSegment) + segments.length :\n        pathIndexShift));\n        matchResult
= of({\n        snapshot,\n        consumedSegments: [],\n        remainingSegments: [],\n        });\n        } else {\n
matchResult =\n        matchWithChecks(rawSegment, route, segments, injector, this.urlSerializer)\n
.pipe(map(({matched, consumedSegments, remainingSegments, parameters}) => {\n        if (!matched) {\n
        return null;\n        }\n        const pathIndexShift = getPathIndexShift(rawSegment) +
consumedSegments.length;\n        const snapshot = new ActivatedRouteSnapshot(\n
consumedSegments, parameters, Object.freeze({...this.urlTree.queryParams}),\n        this.urlTree.fragment,\n
getData(route), getOutlet(route),\n        route.component
?? route._loadedComponent ?? null, route,\n        getSourceSegmentGroup(rawSegment), pathIndexShift,\n
getResolve(route),\n        (NG_DEV_MODE ?\n        getCorrectedPathIndexShift(rawSegment) +
consumedSegments.length :\n        pathIndexShift));\n        return {snapshot, consumedSegments,\n
remainingSegments};\n        }));\n    }\n\n    return matchResult.pipe(switchMap((result) => {\n        if (result ===
null) {\n        return of(null);\n        }\n        const {snapshot, consumedSegments, remainingSegments} = result;\n        //
If the route has an injector created from providers, we should start using that.\n        injector = route._injector ??
injector;\n        const childInjector = route._loadedInjector ?? injector;\n        const childConfig: Route[] =
getChildConfig(route);\n        const {segmentGroup, slicedSegments} = split(\n        rawSegment,\n
consumedSegments, remainingSegments,\n        // Filter
out routes with redirectTo because we are trying to create activated route\n        // snapshots and don't handle
redirects here. That should have been done in\n        // `applyRedirects`.\n        childConfig.filter(c => c.redirectTo
=== undefined), this.relativeLinkResolution);\n        if (slicedSegments.length === 0 &&

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segmentGroup.hasChildren()) {\n    return this.processChildren(childInjector, childConfig,
segmentGroup).pipe(map(children => {\n    if (children === null) {\n    return null;\n    }\n    return
[new TreeNode<ActivatedRouteSnapshot>(snapshot, children)];\n    }));\n    }\n\n    if (childConfig.length ===
0 && slicedSegments.length === 0) {\n    return of([new TreeNode<ActivatedRouteSnapshot>(snapshot, [])]);\n
    }\n\n    const matchedOnOutlet = getOutlet(route) === outlet;\n    // If we matched a config due to empty path
match on a different outlet, we need to\n    // continue passing the current outlet for
the segment rather than switch to PRIMARY.\n    // Note that we switch to primary when we have a match
because outlet configs look like\n    // this: {path: 'a', outlet: 'a', children: [\n    // {path: 'b', component: B},\n    //
{path: 'c', component: C},\n    // ]}\n    // Notice that the children of the named outlet are configured with the
primary outlet\n    return this\n    .processSegment(\n    childInjector, childConfig, segmentGroup,
slicedSegments,\n    matchedOnOutlet ? PRIMARY_OUTLET : outlet)\n    .pipe(map(children => {\n
    if (children === null) {\n    return null;\n    }\n    return [new
TreeNode<ActivatedRouteSnapshot>(snapshot, children)];\n    }));\n    }));\n    }\n\n\nfunction
sortActivatedRouteSnapshots(nodes: TreeNode<ActivatedRouteSnapshot>[]): void {\n nodes.sort((a, b) => {\n if
(a.value.outlet === PRIMARY_OUTLET) return -1;\n if (b.value.outlet === PRIMARY_OUTLET) return
1;\n return a.value.outlet.localeCompare(b.value.outlet);\n });\n }\n\nfunction getChildConfig(route: Route):
Route[] {\n if (route.children) {\n return route.children;\n }\n\n if (route.loadChildren) {\n return
route._loadedRoutes!;\n }\n\n return [];\n }\n\nfunction hasEmptyPathConfig(node:
TreeNode<ActivatedRouteSnapshot>) {\n const config = node.value.routeConfig;\n return config && config.path
=== '' && config.redirectTo === undefined;\n }\n\n\n/**\n * Finds `TreeNode`s with matching empty path route
configs and merges them into `TreeNode` with\n * the children from each duplicate. This is necessary because
different outlets can match a\n * single empty path route config and the results need to then be merged.\n
*/\nfunction mergeEmptyPathMatches(nodes: Array<TreeNode<ActivatedRouteSnapshot>>):\n
Array<TreeNode<ActivatedRouteSnapshot>> {\n const result: Array<TreeNode<ActivatedRouteSnapshot>> =
[];\n // The set of nodes which contain children that were merged
from two duplicate empty path nodes.\n const mergedNodes: Set<TreeNode<ActivatedRouteSnapshot>> = new
Set();\n\n for (const node of nodes) {\n if (!hasEmptyPathConfig(node)) {\n result.push(node);\n
continue;\n }\n\n const duplicateEmptyPathNode =\n result.find(resultNode => node.value.routeConfig ===
resultNode.value.routeConfig);\n if (duplicateEmptyPathNode !== undefined) {\n
duplicateEmptyPathNode.children.push(...node.children);\n mergedNodes.add(duplicateEmptyPathNode);\n
}\n else {\n result.push(node);\n }\n }\n // For each node which has children from multiple sources, we need to
recompute a new `TreeNode`\n // by also merging those children. This is necessary when there are multiple empty
path configs\n // in a row. Put another way: whenever we combine children of two nodes, we need to also check\n
// if any of those children can be combined into a single node as well.\n for (const mergedNode of mergedNodes)
{\n const
mergedChildren = mergeEmptyPathMatches(mergedNode.children);\n result.push(new
TreeNode(mergedNode.value, mergedChildren));\n }\n return result.filter(n =>
!mergedNodes.has(n));\n }\n\nfunction checkOutletNameUniqueness(nodes:
TreeNode<ActivatedRouteSnapshot>[]): void {\n const names: {[k: string]: ActivatedRouteSnapshot} = {};\n
nodes.forEach(n => {\n const routeWithSameOutletName = names[n.value.outlet];\n if
(routeWithSameOutletName) {\n const p = routeWithSameOutletName.url.map(s => s.toString()).join('/');\n
const c = n.value.url.map(s => s.toString()).join('/');\n throw new RuntimeError(\n
RuntimeErrorCode.TWO_SEGMENTS_WITH_SAME_OUTLET,\n NG_DEV_MODE && `Two segments
cannot have the same outlet name: '${p}' and '${c}'.`);\n }\n names[n.value.outlet] = n.value;\n
});\n }\n\nfunction getSourceSegmentGroup(segmentGroup: UrlSegmentGroup): UrlSegmentGroup {\n let s =
segmentGroup;\n while (s._sourceSegment) {\n s = s._sourceSegment;\n
}\n return s;\n }\n\nfunction getPathIndexShift(segmentGroup: UrlSegmentGroup): number {\n let s =
segmentGroup;\n let res = s._segmentIndexShift ?? 0;\n while (s._sourceSegment) {\n s = s._sourceSegment;\n
}

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res += s._segmentIndexShift ?? 0;\n } \n return res - 1;\n}\n\nfunction getCorrectedPathIndexShift(segmentGroup:
UrlSegmentGroup): number {\n let s = segmentGroup;\n let res = s._segmentIndexShiftCorrected ??
s._segmentIndexShift ?? 0;\n while (s._sourceSegment) {\n s = s._sourceSegment;\n res +=
s._segmentIndexShiftCorrected ?? s._segmentIndexShift ?? 0;\n } \n return res - 1;\n}\n\nfunction getData(route:
Route): Data {\n return route.data || {};\n}\n\nfunction getResolve(route: Route): ResolveData {\n return
route.resolve || {};\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n\nimport
{EnvironmentInjector, Type} from '@angular/core';\nimport {MonoTypeOperatorFunction} from 'rxjs';\nimport
{map, mergeMap} from 'rxjs/operators';\nimport {Route} from './models';\nimport {recognize as recognizeFn}
from './recognize';\nimport {NavigationTransition} from './router';\nimport {UrlSerializer} from
'./url_tree';\n\nexport function recognize(\n injector: EnvironmentInjector, rootComponentType: Type<any>|null,
config: Route[],\n serializer: UrlSerializer, paramsInheritanceStrategy: 'emptyOnly'|'always',\n
relativeLinkResolution: 'legacy'|'corrected'): MonoTypeOperatorFunction<NavigationTransition> {\n return
mergeMap(\n t => recognizeFn(\n injector, rootComponentType, config, t.urlAfterRedirects!,\n
serializer.serialize(t.urlAfterRedirects!), serializer, paramsInheritanceStrategy,\n
relativeLinkResolution)\n
.pipe(map(targetSnapshot => ({...t, targetSnapshot})));)\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n * \n\nimport {EnvironmentInjector, ProviderToken}
from '@angular/core';\nimport {EMPTY, from, MonoTypeOperatorFunction, Observable, of, throwError} from
'rxjs';\nimport {catchError, concatMap, first, map, mapTo, mergeMap, takeLast, tap} from
'rxjs/operators';\nimport {ResolveData, Route} from './models';\nimport {NavigationTransition} from
'./router';\nimport {ActivatedRouteSnapshot, inheritedParamsDataResolve, RouterStateSnapshot} from
'./router_state';\nimport {RouteTitleKey} from './shared';\nimport {wrapIntoObservable} from
'./utils/collection';\nimport {getClosestRouteInjector} from './utils/config';\nimport {getTokenOrFunctionIdentity}
from './utils/preactivation';\nimport {isEmptyError} from './utils/type_guards';\n\nexport function resolveData(\n
paramsInheritanceStrategy: 'emptyOnly'|'always',\n
injector: EnvironmentInjector): MonoTypeOperatorFunction<NavigationTransition> {\n return mergeMap(t =>
{\n const {targetSnapshot, guards: {canActivateChecks}} = t;\n\n if (!canActivateChecks.length) {\n return
of(t);\n }\n\n let canActivateChecksResolved = 0;\n return from(canActivateChecks)\n
.pipe(\n
concatMap(\n check =>\n runResolve(check.route, targetSnapshot!,
paramsInheritanceStrategy, injector)),\n
tap(() => canActivateChecksResolved++),\n
takeLast(1),\n
mergeMap(_ => canActivateChecksResolved === canActivateChecks.length ? of(t) : EMPTY),\n
));\n}\n}\n\nfunction runResolve(\n futureARS: ActivatedRouteSnapshot, futureRSS: RouterStateSnapshot,\n
paramsInheritanceStrategy: 'emptyOnly'|'always', injector: EnvironmentInjector) {\n const config =
futureARS.routeConfig;\n const resolve = futureARS._resolve;\n if (config?.title !== undefined &&
!hasStaticTitle(config))
{\n resolve[RouteTitleKey] = config.title;\n }\n\n return resolveNode(resolve, futureARS, futureRSS,
injector).pipe(map((resolvedData: any) => {\n futureARS._resolvedData = resolvedData;\n futureARS.data =
inheritedParamsDataResolve(futureARS, paramsInheritanceStrategy).resolve;\n if (config &&
hasStaticTitle(config)) {\n futureARS.data[RouteTitleKey] = config.title;\n }\n\n return null;\n
}));\n}\n\nfunction resolveNode(\n resolve: ResolveData, futureARS: ActivatedRouteSnapshot, futureRSS:
RouterStateSnapshot,\n injector: EnvironmentInjector): Observable<any> {\n const keys =
getDataKeys(resolve);\n if (keys.length === 0) {\n return of({});\n }\n\n const data: {[k: string|symbol]: any} =
{};\n return from(keys).pipe(\n
mergeMap(\n key => getResolver(resolve[key], futureARS, futureRSS,
injector)\n
.pipe(first(), tap((value: any) => {\n
data[key] = value;\n
}))),\n
takeLast(1),\n
mapTo(data),\n
catchError((e: unknown) => isEmptyError(e as Error) ? EMPTY :
throwError(e)),\n
);\n}\n\nfunction getDataKeys(obj: Object): Array<string|symbol> {\n return

```

```

[...Object.keys(obj), ...Object.getOwnPropertySymbols(obj)];\n\nfunction getResolver(\n  injectionToken:
ProviderToken<any>|Function, futureARS: ActivatedRouteSnapshot,\n  futureRSS: RouterStateSnapshot, injector:
EnvironmentInjector): Observable<any> {\n  const closestInjector = getClosestRouteInjector(futureARS) ??
injector;\n  const resolver = getTokenOrFunctionIdentity(injectionToken, closestInjector);\n  const resolverValue =
resolver.resolve ?\n  resolver.resolve(futureARS, futureRSS) :\n  closestInjector.runInContext(() =>
resolver(futureARS, futureRSS));\n  return wrapIntoObservable(resolverValue);\n}\n\nfunction
hasStaticTitle(config: Route) {\n  return typeof config.title === 'string' || config.title === null;\n}\n\n",/**\n *
@license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {from, MonoTypeOperatorFunction,
ObservableInput, of} from 'rxjs';\nimport {map, switchMap} from 'rxjs/operators';\n\n/**\n * Perform a side effect
through a switchMap for every emission on the source Observable,\n * but return an Observable that is identical to
the source. It's essentially the same as\n * the `tap` operator, but if the side effectful `next` function returns an
ObservableInput,\n * it will wait before continuing with the original value.\n */\n\nexport function
switchTap<T>(next: (x: T) => void|ObservableInput<any>):\n  MonoTypeOperatorFunction<T> {\n  return
switchMap(v => {\n  const nextResult = next(v);\n  if (nextResult) {\n  return from(nextResult).pipe(map(() =>
v));\n  }\n  return of(v);\n  });\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {inject, Injectable} from '@angular/core';\nimport {Title} from
'@angular/platform-browser';\nimport {ActivatedRouteSnapshot, RouterStateSnapshot} from
'./router_state';\nimport {PRIMARY_OUTLET, RouteTitleKey} from './shared';\n\n/**\n * Provides a strategy for
setting the page title after a router navigation.\n *\n * The built-in implementation traverses the router state snapshot
and finds the deepest primary\n * outlet with `title` property. Given the `Routes` below, navigating to\n *
`/base/child(popup:aux)` would result in the document title being set to `child`.\n *\n * ``\n * [\n *   {path: 'base', title:
'base', children: [\n *     {path: 'child', title: 'child'},\n *   ],\n *   {path: 'aux', outlet: 'popup', title: 'popupTitle'}\n *
]\n * ``\n *\n * This class can be used as a base class for custom title strategies. That is, you
can create your\n * own class that extends the `TitleStrategy`. Note that in the above example, the `title` from
the named outlet is never used. However, a custom strategy might be implemented to\n * incorporate titles in named
outlets.\n *\n * @publicApi\n * @see [Page title guide](guide/router#setting-the-page-title)\n
*/\n\n@Injectable({providedIn: 'root', useFactory: () => inject(DefaultTitleStrategy)})\n\nexport abstract class
TitleStrategy {\n  /** Performs the application title update. */\n  abstract updateTitle(snapshot:
RouterStateSnapshot): void;\n\n  /**\n * @returns The `title` of the deepest primary route.\n */\n  abstract
buildTitle(snapshot: RouterStateSnapshot): string|undefined {\n  let pageTitle: string|undefined;\n  let route:
ActivatedRouteSnapshot|undefined = snapshot.root;\n  while (route !== undefined) {\n  pageTitle =
this.getResolvedTitleForRoute(route) ?? pageTitle;\n  route = route.children.find(child => child.outlet ===
PRIMARY_OUTLET);\n  }\n\n  return pageTitle;\n  }\n\n  /**\n * Given an `ActivatedRouteSnapshot`, returns the final value of the\n *
`Route.title` property, which can either be a static string or a resolved value.\n */\n  abstract
getResolvedTitleForRoute(snapshot: ActivatedRouteSnapshot) {\n  return snapshot.data[RouteTitleKey];\n
}\n}\n\n/**\n * The default `TitleStrategy` used by the router that updates the title using the `Title` service.\n
*/\n\n@Injectable({providedIn: 'root'})\n\nexport class DefaultTitleStrategy extends TitleStrategy {\n  constructor(readonly title: Title) {\n  super();\n  }\n\n  /**\n * Sets the title of the browser to the given value.\n
*/\n  * @param title The `pageTitle` from the deepest primary route.\n */\n  override updateTitle(snapshot:
RouterStateSnapshot): void {\n  const title = this.buildTitle(snapshot);\n  if (title !== undefined) {\n
this.title.setTitle(title);\n  }\n  }\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n/**\n * Exists to aid internal migration off of the deprecated relativeLinkResolution

```

```

option.\n *\/nextport function assignRelativeLinkResolution(\n  router: {relativeLinkResolution:
'legacy'|'corrected'}): void {\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\/\n\nimport {ComponentRef} from '@angular/core';\n\nimport {OutletContext} from
'./router_outlet_context';\n\nimport {ActivatedRoute, ActivatedRouteSnapshot} from './router_state';\n\nimport
{TreeNode} from './utils/tree';\n\n/**\n * @description\n *\n * Represents the detached route tree.\n *\n * This is an
opaque value the router will give to a custom route reuse strategy\n * to store and retrieve later on.\n *\n *
@publicApi\n *\/\n\nexport type
DetachedRouteHandle = {};\n\n/** @internal */\n\nexport type DetachedRouteHandleInternal = {\n  contexts:
Map<string, OutletContext>,\n  componentRef: ComponentRef<any>,\n  route:
TreeNode<ActivatedRoute>,\n};\n\n/**\n * @description\n *\n * Provides a way to customize when activated
routes get reused.\n *\n * @publicApi\n *\/\n\nexport abstract class RouteReuseStrategy {\n  /** Determines if this
route (and its subtree) should be detached to be reused later *\n  abstract shouldDetach(route:
ActivatedRouteSnapshot): boolean;\n\n  /**\n   * Stores the detached route.\n   *\n   * Storing a `null` value should
erase the previously stored value.\n   *\n   abstract store(route: ActivatedRouteSnapshot, handle:
DetachedRouteHandle|null): void;\n\n  /** Determines if this route (and its subtree) should be reattached *\n
  abstract shouldAttach(route: ActivatedRouteSnapshot): boolean;\n\n  /** Retrieves the previously stored route *\n
  abstract retrieve(route: ActivatedRouteSnapshot): DetachedRouteHandle|null;\n\n
  /** Determines if a route should be reused *\n
  abstract shouldReuseRoute(future: ActivatedRouteSnapshot, curr:
ActivatedRouteSnapshot): boolean;\n}\n\n/**\n * @description\n *\n * This base route reuse strategy only reuses
routes when the matched router configs are\n * identical. This prevents components from being destroyed and
recreated\n * when just the route parameters, query parameters or fragment change\n * (that is, the existing
component is `_reused_`).\n *\n * This strategy does not store any routes for later reuse.\n *\n * Angular uses this
strategy by default.\n *\n * It can be used as a base class for custom route reuse strategies, i.e. you can create
your own\n * class that extends the `BaseRouteReuseStrategy` one.\n * @publicApi\n *\/\n\nexport abstract class
BaseRouteReuseStrategy implements RouteReuseStrategy {\n  /**\n   * Whether the given route should detach for
later reuse.\n   * Always returns false for `BaseRouteReuseStrategy`.\n   **\/\n   shouldDetach(route:
ActivatedRouteSnapshot): boolean {\n    return false;\n  }\n\n  /**\n   * A no-op; the route is never stored since this
strategy never detaches routes for later re-use.\n   *\n   store(route: ActivatedRouteSnapshot, detachedTree:
DetachedRouteHandle): void {\n  }\n\n  /** Returns `false`, meaning the route (and its subtree) is never reattached *\n
  shouldAttach(route: ActivatedRouteSnapshot): boolean {\n    return false;\n  }\n\n  /** Returns `null` because this
strategy does not store routes for later re-use. *\n
  retrieve(route: ActivatedRouteSnapshot):
DetachedRouteHandle|null {\n    return null;\n  }\n\n  /**\n   * Determines if a route should be reused.\n   * This
strategy returns `true` when the future route config and current route config are\n   * identical.\n   *\n   shouldReuseRoute(future: ActivatedRouteSnapshot, curr: ActivatedRouteSnapshot): boolean {\n    return
future.routeConfig === curr.routeConfig;\n  }\n}\n\nexport class DefaultRouteReuseStrategy extends
BaseRouteReuseStrategy {\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\/\n\nimport {InjectionToken} from '@angular/core';\n\nimport {UrlSerializer, UrlTree}
from './url_tree';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' || !!ngDevMode;\n\n/**\n *
Error handler that is invoked when a navigation error occurs.\n *\n * If the handler returns a value, the navigation
Promise is resolved with this value.\n *\n * If the handler throws an exception, the navigation Promise is rejected with\n
* the exception.\n *\n * @publicApi\n *\/\n\nexport type ErrorHandler = (error: any) => any;\n\n/**\n * Allowed
values in an `ExtraOptions` object that configure\n * when the router performs the initial navigation operation.\n *\n
* * `enabledNonBlocking` - (default) The initial navigation starts after the\n * root component has been created.
The bootstrap is not blocked on the completion of the initial\n * navigation.\n * * * `enabledBlocking` - The initial
navigation starts before the root component is created.\n * The bootstrap is blocked until the initial navigation is
complete. This value is required\n * for [server-side rendering](guide/universal) to work.\n * * * `disabled` - The initial

```

navigation is not performed. The location listener is set up before the root component gets created. Use if there is a reason to have more control over when the router starts its initial navigation due to some complex initialization logic.

```

@see `forRoot()`
@publicApi
export type InitialNavigation =
  'disabled'|'enabledBlocking'|'enabledNonBlocking';

```

Extra configuration options that can be used with the `withRouterConfig`` function.

```

@publicApi
@developerPreview
export interface
RouterConfigOptions {
  /**
   * Configures how the Router attempts to restore state when a navigation
   is cancelled.
   * 'replace' - Always uses `location.replaceState` to set the browser state to the state of the
   router before the navigation started. This means that if the URL of the browser is updated
   before the navigation is canceled, the Router will simply replace the item in history rather
   than trying to restore to the previous location in the session history. This happens most
   frequently with `urlUpdateStrategy: 'eager'` and navigations with the browser back/forward
   buttons.
   * 'computed' - Will attempt to return to the same index in the session history that corresponds
   to the Angular route when the navigation gets cancelled. For example, if the browser back
   button is clicked and the navigation is cancelled, the Router will trigger a forward
   navigation and vice versa.
   * Note: the 'computed' option is incompatible with any `UrlHandlingStrategy` which only
   handles a portion of the URL because the history restoration navigates to the previous place in
   the browser history rather than simply resetting a portion of the URL.
   * The default value is `replace` when not set.
   canceledNavigationResolution?:
   'replace'|'computed';
  /**
   * Define what the router should do if it receives a navigation request to the current
   URL.
   * Default is `ignore`, which causes the router ignores the navigation.
   * This can disable features such as a `refresh` button.
   * Use this option to configure the behavior when navigating to the current URL.
   Default is `ignore`.
   onSameUrlNavigation?: 'reload'|'ignore';
  /**
   * Defines how the router merges parameters, data, and resolved data from parent to child
   routes. By default ('emptyOnly'), inherits parent parameters only for
   path-less or component-less routes.
   * Set to 'always' to enable unconditional inheritance of parent parameters.
   * Note that when dealing with matrix parameters, `parent` refers to the parent `Route`
   config which does not necessarily mean the `URL segment to the left`. When the `Route`
   `path` contains multiple segments, the matrix parameters must appear on the last segment.
   For example, matrix parameters for `{path: 'a/b', component: MyComp}` should appear as
   `a/b;foo=bar` and not `a;foo=bar/b`.
   paramsInheritanceStrategy?:
   'emptyOnly'|'always';
  /**
   * Defines when the router updates the browser URL. By default ('deferred'),
   update after successful navigation.
   * Set to 'eager' if prefer to update the URL at the beginning of navigation.
   * Updating the URL early allows you to handle a failure of navigation by showing an error
   message with the URL that failed.
   urlUpdateStrategy?: 'deferred'|'eager';
}

```

Configuration options for the scrolling feature which can be used with `withInMemoryScrolling`` function.

```

@publicApi
@developerPreview
export interface InMemoryScrollingOptions {
  /**
   * When set to 'enabled', scrolls to the anchor element when the URL has a fragment.
   * Anchor scrolling is disabled by default.
   * Anchor scrolling does not happen on 'popstate'. Instead, we restore the position that we
   stored or scroll to the top.
   anchorScrolling?: 'disabled'|'enabled';
  /**
   * Configures if the scroll position needs to be restored when navigating back.
   * 'disabled' - (Default) Does nothing. Scroll position is maintained on navigation.
   * 'top' - Sets the scroll position to x = 0, y = 0 on all navigation.
   * 'enabled' - Restores the previous scroll position on backward navigation, else sets the
   position to the anchor if one is provided, or sets the scroll position to [0, 0]
   (forward navigation). This option will be the default in the future.
   * You can implement custom scroll restoration behavior by adapting the enabled
   behavior as in the following example.
   ```typescript
   class AppComponent {
     movieData: any;
     constructor(private router: Router, private viewportScroller: ViewportScroller,
       changeDetectorRef: ChangeDetectorRef) {
       router.events.pipe(filter((event: Event): event is Scroll => event instanceof
       Scroll)).subscribe(e => {
         fetch('http://example.com/movies.json').then(response => {
           this.movieData = response.json();
           // update the template with the data before restoring scroll
           changeDetectorRef.detectChanges();
           if (e.position) {

```

```

viewportScroller.scrollToPosition(e.position);\n *   }\n *   });\n *   });\n *   }\n *   }\n *   ```\n *^\n
scrollPositionRestoration?: 'disabled'|'enabled'|'top';\n}\n\n/**\n * A set of configuration options for a router module,
provided in the\n * `forRoot()` method.\n *\n * @see `forRoot()`\n
*\n *\n * @publicApi\n */\nexport interface ExtraOptions extends InMemoryScrollingOptions,
RouterConfigOptions {\n /**\n * When true, log all internal navigation events to the console.\n * Use for
debugging.\n */\n enableTracing?: boolean;\n\n /**\n * When true, enable the location strategy that uses the
URL fragment\n * instead of the history API.\n */\n useHash?: boolean;\n\n /**\n * One of `enabled`,
`enabledBlocking`, `enabledNonBlocking` or `disabled`.\n * When set to `enabled` or `enabledBlocking`, the
initial navigation starts before the root\n * component is created. The bootstrap is blocked until the initial
navigation is complete. This\n * value is required for [server-side rendering](guide/universal) to work. When set
to\n * `enabledNonBlocking`, the initial navigation starts after the root component has been created.\n * The
bootstrap is not blocked on the completion of the initial navigation. When set to\n * `disabled`, the initial
navigation
is not performed. The location listener is set up before the\n * root component gets created. Use if there is a reason
to have more control over when the router\n * starts its initial navigation due to some complex initialization
logic.\n */\n initialNavigation?: InitialNavigation;\n\n /**\n * A custom error handler for failed navigations.\n *
If the handler returns a value, the navigation Promise is resolved with this value.\n * If the handler throws an
exception, the navigation Promise is rejected with the exception.\n *\n */\n errorHandler?: ErrorHandler;\n\n
/**\n * Configures a preloading strategy.\n * One of `PreloadAllModules` or `NoPreloading` (the default).\n */\n
preloadingStrategy?: any;\n\n /**\n * Configures the scroll offset the router will use when scrolling to an
element.\n *\n * When given a tuple with x and y position value,\n * the router uses that offset each time it
scrolls.\n *\n * When given a function, the router invokes the
function every time\n * it restores scroll position.\n */\n scrollOffset?: [number, number]|(( ) => [number,
number]);\n\n /**\n * A custom handler for malformed URI errors. The handler is invoked when `encodedURI`
contains\n * invalid character sequences.\n * The default implementation is to redirect to the root URL,
dropping\n * any path or parameter information. The function takes three parameters:\n *\n * - `URLError` -
Error thrown when parsing a bad URL.\n * - `UrlSerializer` - UrlSerializer that's configured with the router.\n * -
`url` - The malformed URL that caused the URLError\n *\n */\n malformedUriErrorHandler?: (error:
URLError, urlSerializer: UrlSerializer, url: string) => UriTree;\n\n /**\n * Enables a bug fix that corrects relative
link resolution in components with empty paths.\n * Example:\n *\n * ```\n * const routes = [\n *   {\n *
path: '',\n *   component: ContainerComponent,\n *   children: [\n *
*     {\n *       path: 'a', component: AComponent },\n *     {\n *       path: 'b', component: BComponent },\n *     ]\n *   }\n *
];\n * ```\n *\n * From the `ContainerComponent`, you should be able to navigate to `AComponent` using\n *
the following `routerLink`, but it will not work if `relativeLinkResolution` is set\n * to `legacy`:\n *\n * <a
[routerLink]='["./a"]">Link to A</a>\n *\n * However, this will work:\n *\n * <a
[routerLink]='["./a"]">Link to A</a>\n *\n * In other words, you're required to use `.` rather than `./` when the
relative link\n * resolution is set to `legacy`.\n *\n * The default in v11 is `corrected`.\n *\n * @deprecated\n
*/\n relativeLinkResolution?: 'legacy'|'corrected';\n}\n\n/**\n * A [DI token](guide/glossary/#di-token) for the
router service.\n *\n * @publicApi\n */\nexport const ROUTER_CONFIGURATION =\n new
InjectionToken<ExtraOptions>(NG_DEV_MODE ? 'router config' : '', {\n   providedIn: 'root',\n   factory: () => ({}),\n });\n\n /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n
*/\nimport { Compiler, EnvironmentInjector, Injectable, InjectFlags, InjectionToken,
Injector, NgModuleFactory, Type } from '@angular/core';\nimport { ConnectableObservable, from, Observable, of,
Subject } from 'rxjs';\nimport { catchError, finalize, map, mergeMap, refCount, tap } from 'rxjs/operators';\nimport
{ LoadChildren, LoadedRouterConfig, Route, Routes } from './models';\nimport { flatten, wrapIntoObservable } from
'./utils/collection';\nimport { assertStandalone, standardizeConfig, validateConfig } from './utils/config';\n\nconst
NG_DEV_MODE = typeof ngDevMode === 'undefined' || !ngDevMode;\n\n /**\n * The [DI

```



token](guide/glossary/#di-token) for a router configuration.

`ROUTES` is a low level API for router configuration via dependency injection.

We recommend that in almost all cases to use higher level APIs such as `RouterModule.forRoot()`, `RouterModule.forChild()`, `provideRoutes`, or `Router.resetConfig()`.

```

@publicApi
export const ROUTES = new InjectionToken<Route[]>('ROUTES');
type ComponentLoader = Observable<Type<unknown>>;
@Injectable({providedIn: 'root'})
export class RouterConfigLoader {
  private componentLoaders = new WeakMap<Route, ComponentLoader>();
  private childrenLoaders = new WeakMap<Route, Observable<LoadedRouterConfig>>();
  onLoadStartListener?: (r: Route) => void;
  onLoadEndListener?: (r: Route) => void;
  constructor(
    private injector: Injector,
    private compiler: Compiler,
  ) {}
  loadComponent(route: Route): Observable<Type<unknown>> {
    if (this.componentLoaders.get(route))
      return this.componentLoaders.get(route)!;
    else if (route._loadedComponent)
      return of(route._loadedComponent);
    else if (this.onLoadStartListener)
      this.onLoadStartListener(route);
    const loadRunner = wrapIntoObservable(route.loadComponent!()).pipe(
      tap(component => {
        if (this.onLoadEndListener)
          this.onLoadEndListener(route);
        NG_DEV_MODE && assertStandalone(route.path ?? "", component);
        route._loadedComponent = component;
        this.componentLoaders.delete(route);
      }),
      finalize(() => {
        this.componentLoaders.delete(route);
      }),
    );
    // Use custom ConnectableObservable as share in runners pipe increasing the bundle size too much
    const loader = new ConnectableObservable(loadRunner, () => new Subject<Type<unknown>>()).pipe(refCount());
    this.componentLoaders.set(route, loader);
    return loader;
  }
  loadChildren(parentInjector: Injector, route: Route): Observable<LoadedRouterConfig> {
    if (this.childrenLoaders.get(route))
      return this.childrenLoaders.get(route)!;
    else if (route._loadedRoutes)
      return of({routes: route._loadedRoutes, injector: route._loadedInjector});
    else if (this.onLoadStartListener)
      this.onLoadStartListener(route);
    const moduleFactoryOrRoutes$ = this.loadModuleFactoryOrRoutes(route.loadChildren!);
    const loadRunner = moduleFactoryOrRoutes$.pipe(
      map((factoryOrRoutes: NgModuleFactory<any>|Routes) => {
        if (this.onLoadEndListener)
          this.onLoadEndListener(route);
        // This injector comes from the `NgModuleRef` when lazy loading an `NgModule`. There is no injector associated with lazy loading a `Route` array.
        let injector: EnvironmentInjector|undefined;
        let rawRoutes: Route[];
        let requireStandaloneComponents = false;
        if (Array.isArray(factoryOrRoutes))
          rawRoutes = factoryOrRoutes;
          requireStandaloneComponents = true;
        else
          injector = factoryOrRoutes.create(parentInjector).injector;
          // When loading a module that doesn't provide `RouterModule.forChild()` preloader // will get stuck in an infinite loop. The child module's Injector will look to // its parent `Injector` when it doesn't find any ROUTES so it will return routes // for it's parent module instead.
          rawRoutes = flatten(injector.get(ROUTES, [], InjectFlags.Self | InjectFlags.Optional));
        const routes = rawRoutes.map(standardizeConfig);
        NG_DEV_MODE && validateConfig(routes, route.path, requireStandaloneComponents);
        return {routes, injector};
      }),
      finalize(() => {
        this.childrenLoaders.delete(route);
      }),
    );
    // Use custom ConnectableObservable as share in runners pipe increasing the bundle size too much
    const loader = new ConnectableObservable(loadRunner, () => new Subject<LoadedRouterConfig>()).pipe(refCount());
    this.childrenLoaders.set(route, loader);
    return loader;
  }
  private loadModuleFactoryOrRoutes(loadChildren: LoadChildren): Observable<NgModuleFactory<any>|Routes> {
    return wrapIntoObservable(loadChildren()).pipe(mergeMap((t) => {
      if (t instanceof NgModuleFactory || Array.isArray(t))
        return of(t);
      else
        return from(this.compiler.compileModuleAsync(t));
    }));
  }
}

```

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```

* @description\n *\n * Provides a way to migrate AngularJS applications to Angular.\n *\n * @publicApi\n
*\nexport abstract class UrlHandlingStrategy {\n /**\n * Tells the router if this URL should be processed.\n *\n
* When it returns true, the router will execute the regular navigation.\n * When it returns false, the router will set
the router state to an empty state.\n * As a result, all the active components will be destroyed.\n *\n */\n
shouldProcessUrl(url: UrlTree): boolean;\n\n /**\n * Extracts the part of the URL that should be handled by the
router.\n * The rest of the URL will remain untouched.\n */\n
extract(url: UrlTree): UrlTree;\n\n /**\n * Merges the URL fragment with the rest of the URL.\n */\n
merge(newUrlPart: UrlTree, rawUrl: UrlTree): UrlTree;\n}\n\n/**\n * @publicApi\n */\nexport class DefaultUrlHandlingStrategy implements
UrlHandlingStrategy {\n
shouldProcessUrl(url: UrlTree): boolean\n
return true;\n}\n
extract(url: UrlTree): UrlTree {\n
return url;\n}\n
merge(newUrlPart: UrlTree, wholeUrl: UrlTree): UrlTree {\n
return newUrlPart;\n}\n}\n\n",/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {Location} from '@angular/common';\nimport {Compiler,
inject, Injectable, Injector, NgModuleRef, NgZone, Type, Console as Console, RuntimeError as RuntimeError}\n
from '@angular/core';\nimport {BehaviorSubject, combineLatest, EMPTY, Observable, of, Subject,
SubscriptionLike} from 'rxjs';\nimport {catchError, defaultIfEmpty, filter, finalize, map, switchMap, take, tap} from
'rxjs/operators';\nimport {createRouterState} from './create_router_state';\nimport {createUrlTree} from
'./create_url_tree';\nimport {RuntimeErrorCode} from './errors';\nimport {Event, GuardsCheckEnd,
GuardsCheckStart, NavigationCancel, NavigationCancellationCode, NavigationEnd, NavigationError, NavigationStart,
NavigationTrigger, ResolveEnd, ResolveStart, RouteConfigLoadEnd, RouteConfigLoadStart, RoutesRecognized} from
'./events';\nimport {NavigationBehaviorOptions, QueryParamsHandling, Route, Routes} from './models';\nimport
{isNavigationCancelingError, isRedirectingNavigationCancelingError, redirectingNavigationError} from
'./navigation_canceling_error';\nimport {activateRoutes} from './operators/activate_routes';\nimport
{applyRedirects} from './operators/apply_redirects';\nimport {checkGuards} from
'./operators/check_guards';\nimport {recognize} from './operators/recognize';\nimport {resolveData} from
'./operators/resolve_data';\nimport {switchTap} from './operators/switch_tap';\nimport {DefaultTitleStrategy,
TitleStrategy} from './page_title_strategy';\nimport {assignRelativeLinkResolution} from
'./patchable_relative_link_resolution';\nimport {DefaultRouteReuseStrategy, RouteReuseStrategy} from
'./route_reuse_strategy';\nimport
{ErrorHandler, ExtraOptions, ROUTER_CONFIGURATION} from './router_config';\nimport
{RouterConfigLoader, ROUTES} from './router_config_loader';\nimport {ChildrenOutletContexts} from
'./router_outlet_context';\nimport {ActivatedRoute, ActivatedRouteSnapshot, createEmptyState, RouterState,
RouterStateSnapshot} from './router_state';\nimport {Params} from './shared';\nimport
{DefaultUrlHandlingStrategy, UrlHandlingStrategy} from './url_handling_strategy';\nimport {containsTree,
createEmptyUrlTree, IsActiveMatchOptions, isUrlTree, UrlSerializer, UrlTree} from './url_tree';\nimport {flatten}
from './utils/collection';\nimport {standardizeConfig, validateConfig} from './utils/config';\nimport {Checks,
getAllRouteGuards} from './utils/preactivation';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined'\n
|| !ngDevMode;\n\n/**\n * @description\n *\n * Options that modify the `Router` URL.\n * Supply an object
containing any of these properties to a `Router` navigation
function to\n * control how the target URL should be constructed.\n *\n * @see [Router.navigate()
method](api/router/Router#navigate)\n *\n * @see [Router.createUrlTree() method](api/router/Router#createurltree)\n
*\n * @see [Routing and Navigation guide](guide/router)\n *\n * @publicApi\n */\nexport interface UrlCreationOptions
{\n /**\n * Specifies a root URI to use for relative navigation.\n *\n * For example, consider the following route
configuration where the parent route\n * has two children.\n *\n * ```\n * [{\n * path: 'parent',\n *
component: ParentComponent,\n * children: [{\n * path: 'list',\n * component: ListComponent\n * }, {\n
* path: 'child',\n * component: ChildComponent\n * }]\n * }]\n * ```\n *\n * The following `go()`
function navigates to the `list` route by\n * interpreting the destination URI as relative to the activated `child`

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being parsed with `UrlSerializer.extract()`.  
`extractedUrl: UrlTree;`  
 \* The extracted URL after redirects have been applied.  
 \* This URL may not be available immediately, therefore this property can be `undefined`.  
 \* It is guaranteed to be set after the `RoutesRecognized` event fires.  
`finalUrl?: UrlTree;`  
 \* Identifies how this navigation was triggered.  
 \* `'imperative'`--Triggered by `router.navigateByUrl` or `router.navigate`.  
 \* `'popstate'`--Triggered by a popstate event.  
 \* `'hashchange'`--Triggered by a hashchange event.  
`trigger: 'imperative'|'popstate'|'hashchange';`  
 \* Options that controlled the strategy used for this navigation.  
 \* See `NavigationExtras`.  
`extras: NavigationExtras;`  
 \* The previously successful `Navigation` object. Only one previous navigation is available, therefore this previous `Navigation` object has a `null` value for its own `previousNavigation`.  
`previousNavigation: Navigation|null;`  
 export interface NavigationTransition {  
`id: number;`  
`targetPageId: number;`  
`currentUrlTree: UrlTree;`  
`currentRawUrl: UrlTree;`  
`extractedUrl: UrlTree;`  
`urlAfterRedirects?: UrlTree;`  
`rawUrl: UrlTree;`  
`extras: NavigationExtras;`  
`resolve: any;`  
`reject: any;`  
`promise: Promise<boolean>;`  
`source: NavigationTrigger;`  
`restoredState: RestoredState|null;`  
`currentSnapshot: RouterStateSnapshot;`  
`targetSnapshot: RouterStateSnapshot|null;`  
`currentRouterState: RouterState;`  
`targetRouterState: RouterState|null;`  
`guards: Checks;`  
`guardsResult: boolean|UrlTree|null;`  
 }  
 \* The equivalent `IsActiveMatchOptions` options for `Router.isActive` is called with `true` (exact = true).  
 export const exactMatchOptions: IsActiveMatchOptions = {  
`paths: 'exact',`  
`fragment: 'ignored',`  
`matrixParams: 'ignored',`  
`queryParams: 'exact'`  
 };  
 \* The equivalent `IsActiveMatchOptions` options for `Router.isActive` is called with `false` (exact = false).  
 export const subsetMatchOptions: IsActiveMatchOptions = {  
`paths: 'subset',`  
`fragment: 'ignored',`  
`matrixParams: 'ignored',`  
`queryParams: 'subset'`  
 };  
 export function assignExtraOptionsToRouter(opts: ExtraOptions, router: Router): void {  
`if (opts.errorHandler) {`  
 `router.errorHandler = opts.errorHandler;`  
`}`  
`if (opts.malformedUriErrorHandler) {`  
 `router.malformedUriErrorHandler = opts.malformedUriErrorHandler;`  
`}`  
`if (opts.onSameUrlNavigation) {`  
 `router.onSameUrlNavigation = opts.onSameUrlNavigation;`  
`}`  
`if (opts.paramsInheritanceStrategy) {`  
 `router.paramsInheritanceStrategy = opts.paramsInheritanceStrategy;`  
`}`  
`if (opts.relativeLinkResolution) {`  
 `router.relativeLinkResolution = opts.relativeLinkResolution;`  
`}`  
`if (opts.urlUpdateStrategy) {`  
 `router.urlUpdateStrategy = opts.urlUpdateStrategy;`  
`}`  
`if (opts.canceledNavigationResolution) {`  
 `router.canceledNavigationResolution = opts.canceledNavigationResolution;`  
`}`  
 }  
 export function setupRouter() {  
`const urlSerializer = inject(UrlSerializer);`  
`const contexts = inject(ChildrenOutletContexts);`  
`const location = inject(Location);`  
`const injector = inject(Injector);`  
`const compiler = inject(Compiler);`  
`const config = inject(ROUTES, { optional: true }) ?? [];`  
`const opts = inject(ROUTER_CONFIGURATION, { optional: true }) ?? {};`  
`const defaultTitleStrategy = inject(DefaultTitleStrategy);`  
`const titleStrategy = inject(TitleStrategy, { optional: true });`  
`const urlHandlingStrategy = inject(UrlHandlingStrategy, { optional: true });`  
`const routeReuseStrategy = inject(RouteReuseStrategy, { optional: true });`  
`const router = new Router(null, urlSerializer, contexts, location, injector, compiler, flatten(config));`  
`if (urlHandlingStrategy) {`  
 `router.urlHandlingStrategy = urlHandlingStrategy;`  
`}`  
`if (routeReuseStrategy) {`  
 `router.routeReuseStrategy = routeReuseStrategy;`  
`}`  
`router.titleStrategy = titleStrategy ?? defaultTitleStrategy;`  
`assignExtraOptionsToRouter(opts, router);`  
`assignRelativeLinkResolution(router);`  
`return router;`  
 }  
 \* @description  
 \* A service that provides navigation among views and URL manipulation capabilities.  
 \* @see `Route`.  
 \* @see [Routing and Navigation Guide](guide/router).  
 \* @ngModule RouterModule  
 \* @publicApi  
 \* @Injectable({  
`providedIn: 'root',`  
`useFactory: setupRouter,`  
 })  
 export class Router {  
 \* Represents the activated `UrlTree` that the `Router` is configured to handle (through `UrlHandlingStrategy`). That is, after we find the route config tree that we're going to activate, run guards, and are just about to activate the route, we set the `currentUrlTree`.  
 \* This should match the `browserUrlTree` when a navigation succeeds. If the `UrlHandlingStrategy.shouldProcessUrl` is `false`, only the `browserUrlTree`

is updated.\n \*/\n private currentUrlTree: UrlTree;\n /\*\*\n \* Meant to represent the entire browser url after a successful navigation. In the life of a\n \* navigation transition:\n \* 1. The rawUrl represents the full URL that's being navigated to\n \* 2. We apply redirects, which might only apply to \_part\_ of the URL (due to\n \* `UrlHandlingStrategy`).\n \* 3. Right before activation (because we assume activation will succeed), we update the\n \* rawUrlTree to be a combination of the urlAfterRedirects (again, this might only apply to part\n \* of the initial url) and the rawUrl of the transition (which was the original navigation url in\n \* its full form).\n \*/\n private rawUrlTree: UrlTree;\n /\*\*\n \* Meant to represent the part of the browser url that the `Router` is set up to handle (via the\n \* `UrlHandlingStrategy`). This value is updated immediately after the browser url is updated (or\n \* the browser url update is skipped via `skipLocationChange`).

With that, note that\n \* `browserUrlTree` \_may not\_ reflect the actual browser URL for two reasons:\n \*\n \* 1. `UrlHandlingStrategy` only handles part of the URL\n \* 2. `skipLocationChange` does not update the browser url.\n \*\n \* So to reiterate, `browserUrlTree` only represents the Router's internal understanding of the\n \* current route, either before guards with `urlUpdateStrategy === 'eager'` or right before\n \* activation with `deferred`.\n \*\n \* This should match the `currentUrlTree` when the navigation succeeds.\n \*/\n private browserUrlTree: UrlTree;\n private readonly transitions: BehaviorSubject<NavigationTransition>;\n private navigations: Observable<NavigationTransition>;\n private lastSuccessfulNavigation: Navigation|null = null;\n private currentNavigation: Navigation|null = null;\n private disposed = false;\n private locationSubscription?: SubscriptionLike;\n private navigationId: number = 0;\n /\*\*\n \* The id of the currently active page in the router.\n \* Updated to the transition's target id on a successful navigation.\n \*\n \* This is used to track what page the router last activated. When an attempted navigation fails,\n \* the router can then use this to compute how to restore the state back to the previously active\n \* page.\n \*/\n private currentPageId: number = 0;\n /\*\*\n \* The routerPageId of whatever page is currently active in the browser history. This is\n \* important for computing the target page id for new navigations because we need to ensure each\n \* page id in the browser history is 1 more than the previous entry.\n \*/\n private get browserPageId(): number|undefined {\n return (this.location.getState() as RestoredState | null)?.routerPageId;\n }\n private configLoader: RouterConfigLoader;\n private ngModule: NgModuleRef<any>;\n private console: Console;\n private isNgZoneEnabled: boolean = false;\n /\*\*\n \* An event stream for routing events in this NgModule.\n \*/

\*/\n public readonly events: Observable<Event> = new Subject<Event>();\n /\*\*\n \* The current state of routing in this NgModule.\n \*/\n public readonly routerState: RouterState;\n /\*\*\n \* A handler for navigation errors in this NgModule.\n \*/\n errorHandler: ErrorHandler = defaultErrorHandler;\n /\*\*\n \* A handler for errors thrown by `Router.parseUrl(url)`\n \* when `url` contains an invalid character.\n \* The most common case is a `%` sign\n \* that's not encoded and is not part of a percent encoded sequence.\n \*/\n malformedUriErrorHandler: (error: URIError, urlSerializer: UrlSerializer, url: string) => UrlTree = defaultMalformedUriErrorHandler;\n /\*\*\n \* True if at least one navigation event has occurred,\n \* false otherwise.\n \*/\n navigated: boolean = false;\n private lastSuccessfulId: number = -1;\n /\*\*\n \* Hook that enables you to pause navigation after the preactivation phase.\n \* Used by `RouterModule`.\n \*/\n

\* @internal\n \*/\n afterPreactivation: () => Observable<void> = () => of(void 0);\n /\*\*\n \* A strategy for extracting and merging URLs.\n \* Used for AngularJS to Angular migrations.\n \*/\n urlHandlingStrategy: UrlHandlingStrategy = new DefaultUrlHandlingStrategy();\n /\*\*\n \* A strategy for re-using routes.\n \*/\n routeReuseStrategy: RouteReuseStrategy = new DefaultRouteReuseStrategy();\n /\*\*\n \* A strategy for setting the title based on the `routerState`.\n \*/\n titleStrategy?: TitleStrategy;\n /\*\*\n \* How to handle a navigation request to the current URL. One of:\n \*\n \* - `ignore` : The router ignores the request.\n \* - `reload` : The router reloads the URL. Use to implement a `refresh` feature.\n \*\n \* Note that this only configures whether the Route reprocesses the URL and triggers related\n \* action and events like redirects, guards, and resolvers. By default, the router re-uses a\n \* component instance when it re-navigates

to the same component type without visiting a different\n \* component first. This behavior is configured by the `RouteReuseStrategy`. In order to reload\n \* routed components on same url navigation, you need to set `onSameUrlNavigation` to `reload`\n \* and\_ provide a `RouteReuseStrategy` which returns `false` for

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`shouldReuseRoute`\n *^\n onSameUrlNavigation: 'reload'|'ignore' = 'ignore';\n\n /**\n * How to merge
parameters, data, resolved data, and title from parent to child\n * routes. One of:\n *\n * - `emptyOnly` : Inherit
parent parameters, data, and resolved data\n * for path-less or component-less routes.\n * - `always` : Inherit
parent parameters, data, and resolved data\n * for all child routes.\n *^\n paramsInheritanceStrategy:
'emptyOnly'|'always' = 'emptyOnly';\n\n /**\n * Determines when the router updates the browser URL.\n * By
default (`"deferred"`), updates the browser URL after navigation has finished.\n * Set to `eager`
to update the browser URL at the beginning of navigation.\n * You can choose to update early so that, if
navigation fails,\n * you can show an error message with the URL that failed.\n *^\n urlUpdateStrategy:
'deferred'|'eager' = 'deferred';\n\n /**\n * Enables a bug fix that corrects relative link resolution in components with
empty paths.\n * @see `RouterModule`\n *\n * @deprecated\n *^\n relativeLinkResolution: 'legacy'|'corrected'
= 'corrected';\n\n /**\n * Configures how the Router attempts to restore state when a navigation is cancelled.\n
*\n * 'replace' - Always uses `location.replaceState` to set the browser state to the state of the\n * router before the
navigation started. This means that if the URL of the browser is updated\n * _before_ the navigation is canceled,
the Router will simply replace the item in history rather\n * than trying to restore to the previous location in the
session history. This happens most\n * frequently with `urlUpdateStrategy:
'eager` and navigations with the browser back/forward\n * buttons.\n *\n * 'computed' - Will attempt to return
to the same index in the session history that corresponds\n * to the Angular route when the navigation gets
cancelled. For example, if the browser back\n * button is clicked and the navigation is cancelled, the Router will
trigger a forward navigation\n * and vice versa.\n *\n * Note: the 'computed' option is incompatible with any
`UrlHandlingStrategy` which only\n * handles a portion of the URL because the history restoration navigates to the
previous place in\n * the browser history rather than simply resetting a portion of the URL.\n *\n * The default
value is `replace`.\n *\n *^\n canceledNavigationResolution: 'replace'|'computed' = 'replace';\n\n /**\n * Creates
the router service.\n *^\n // TODO: vsavkin make internal after the final is out.\n constructor(\n private
rootComponentType: Type<any>|null, private urlSerializer:
UrlSerializer,\n private rootContexts: ChildrenOutletContexts, private location: Location, injector: Injector,\n
compiler: Compiler, public config: Routes) {\n const onLoadStart = (r: Route) => this.triggerEvent(new
RouteConfigLoadStart(r));\n const onLoadEnd = (r: Route) => this.triggerEvent(new RouteConfigLoadEnd(r));\n
this.configLoader = injector.get(RouterConfigLoader);\n this.configLoader.onLoadEndListener = onLoadEnd;\n
this.configLoader.onLoadStartListener = onLoadStart;\n\n this.ngModule = injector.get(NgModuleRef);\n
this.console = injector.get(Console);\n const ngZone = injector.get(NgZone);\n this.isNgZoneEnabled = ngZone
instanceof NgZone && NgZone.isInAngularZone();\n\n this.resetConfig(config);\n this.currentUrlTree =
createEmptyUrlTree();\n this.rawUrlTree = this.currentUrlTree;\n this.browserUrlTree = this.currentUrlTree;\n\n
this.routerState = createEmptyState(this.currentUrlTree, this.rootComponentType);\n\n
this.transitions = new BehaviorSubject<NavigationTransition>({\n id: 0,\n targetPageId: 0,\n
currentUrlTree: this.currentUrlTree,\n currentRawUrl: this.currentUrlTree,\n extractedUrl:
this.urlHandlingStrategy.extract(this.currentUrlTree),\n urlAfterRedirects:
this.urlHandlingStrategy.extract(this.currentUrlTree),\n rawUrl: this.currentUrlTree,\n extras: {},\n
resolve: null,\n reject: null,\n promise: Promise.resolve(true),\n source: 'imperative',\n restoredState:
null,\n currentSnapshot: this.routerState.snapshot,\n targetSnapshot: null,\n currentRouterState:
this.routerState,\n targetRouterState: null,\n guards: {canActivateChecks: [], canDeactivateChecks: []},\n
guardsResult: null,\n });\n this.navigations = this.setupNavigations(this.transitions);\n\n
this.processNavigations();\n }\n\n private setupNavigations(transitions: Observable<NavigationTransition>):\n
Observable<NavigationTransition>\n {\n const eventsSubject = (this.events as Subject<Event>);\n return transitions.pipe(\n
filter(t => t.id
!== 0),\n\n // Extract URL\n map(t =>\n ({...t, extractedUrl:
this.urlHandlingStrategy.extract(t.rawUrl)} as\n NavigationTransition)),\n\n // Using
switchMap so we cancel executing navigations when a new one comes in\n
switchMap(overallTransitionState => {\n let completed = false;\n let errored = false;\n

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return of(overallTransitionState)\n                .pipe(\n                // Store the Navigation object\n
tap(t => {\n                this.currentNavigation = {\n                id: t.id,\n                initialUrl:\n
t.rawUrl,\n                extractedUrl: t.extractedUrl,\n                trigger:\n
t.source,\n                extras: t.extras,\n                previousNavigation: this.lastSuccessfulNavigation\n
?}\n                {...this.lastSuccessfulNavigation, previousNavigation: null} :}\n                null\n
                });\n                })),\n                switchMap(t => {\n                const browserUrlTree =\n
this.browserUrlTree.toString();\n                const urlTransition = !this.navigated ||\n
t.extractedUrl.toString() !== browserUrlTree ||\n                // Navigations which succeed or ones which fail\n
and are cleaned up\n                // correctly should result in `browserUrlTree` and `currentUrlTree`\n
                // matching. If this is not the case, assume something went wrong and\n                // try\n
processing the URL again.\n
                browserUrlTree !== this.currentUrlTree.toString());\n                const processCurrentUrl =\n
                (this.onSameUrlNavigation === 'reload' ? true : urlTransition) &&\n
this.urlHandlingStrategy.shouldProcessUrl(t.rawUrl);\n                if (processCurrentUrl) {\n
                // If the source of the navigation is from a browser event, the URL is\n                // already updated. We\n
already need to sync the internal state.\n                if (isBrowserTriggeredNavigation(t.source)) {\n
                this.browserUrlTree = t.extractedUrl;\n                }\n                return of(t).pipe(\n
                // Fire NavigationStart event\n                switchMap(t => {\n                const transition\n
= this.transitions.getValue();\n
                eventsSubject.next(new NavigationStart(\n                t.id, this.serializeUrl(t.extractedUrl),\n
t.source,\n                t.restoredState));\n                if (transition !==\n
this.transitions.getValue()) {\n                return EMPTY;\n                }\n
                // This delay is required to match old behavior that forced\n                // navigation to always be\n
async\n                return Promise.resolve(t);\n                })),\n                //\n
ApplyRedirects\n                applyRedirects(\n                this.ngModule.injector,\n
this.configLoader, this.urlSerializer,\n                this.config),\n                // Update the\n
currentNavigation\n
                // `urlAfterRedirects` is guaranteed to be set after this point\n                tap(t => {\n
                this.currentNavigation = {\n                ...this.currentNavigation!,\n                finalUrl:\n
t.urlAfterRedirects\n                });\n                overallTransitionState.urlAfterRedirects =\n
t.urlAfterRedirects;\n                },\n                // Recognize\n                recognize(\n
                this.ngModule.injector, this.rootComponentType, this.config,\n
this.urlSerializer, this.paramsInheritanceStrategy,\n                this.relativeLinkResolution),\n
                // Update URL if in `eager` update mode\n                tap(t => {\n
                overallTransitionState.targetSnapshot = t.targetSnapshot;\n                if (this.urlUpdateStrategy ===\n
'eager') {\n                if (!t.extras.skipLocationChange) {\n                const rawUrl =\n
this.urlHandlingStrategy.merge(\n                t.urlAfterRedirects!, t.rawUrl);\n
                this.setBrowserUrl(rawUrl, t);\n                }\n                this.browserUrlTree =\n
t.urlAfterRedirects!\n                });\n                // Fire RoutesRecognized\n
                const routesRecognized = new RoutesRecognized(\n                t.id,\n
this.serializeUrl(t.extractedUrl),\n                this.serializeUrl(t.urlAfterRedirects!),\n
t.targetSnapshot!);\n                eventsSubject.next(routesRecognized);\n
                }));\n                } else {\n                const processPreviousUrl = urlTransition &&\n
this.rawUrlTree &&\n                this.urlHandlingStrategy.shouldProcessUrl(this.rawUrlTree);\n
                /* When the current URL shouldn't be processed, but the previous one\n                * was, we handle\n
this `error condition` by navigating to the\n                * previously successful URL, but leaving the URL\n
intact.*\n                if (processPreviousUrl) {\n                const {id, extractedUrl, source,\n
restoredState, extras} = t;\n                const navStart = new NavigationStart(\n                id,\n

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this.serializeUrl(extractedUrl), source, restoredState);\n                eventsSubject.next(navStart);\n        const targetSnapshot =\n            createEmptyState(extractedUrl, this.rootComponentType).snapshot);\n        overallTransitionState = {\n            ...t,\n            targetSnapshot,\n            urlAfterRedirects: extractedUrl,\n            extras: {...extras, skipLocationChange: false, replaceUrl:\n                false},\n        };\n        return of(overallTransitionState); } else {\n            /* When neither the current or previous URL can be processed, do\n            * nothing\n            other than update router's internal reference to the\n            * current \"settled\" URL. This way the next\n            navigation will be coming\n            * from the current URL in the browser.\n            */\n            this.rawUrlTree\n            = t.rawUrl;\n            t.resolve(null);\n            return EMPTY;\n        }\n    },\n    // --- GUARDS ---\n    tap(t => {\n        const guardsStart = new GuardsCheckStart(\n            t.id, this.serializeUrl(t.extractedUrl),\n            this.serializeUrl(t.urlAfterRedirects!), t.targetSnapshot!);\n            this.triggerEvent(guardsStart);\n        },\n        map(t => {\n            overallTransitionState = {\n                ...t,\n                guards: getAllRouteGuards(\n                    t.targetSnapshot!, t.currentSnapshot,\n                    this.rootContexts)\n                });\n            return overallTransitionState;\n        },\n        checkGuards(\n            this.ngModule.injector, (evt: Event) =>\n            this.triggerEvent(evt)),\n            tap(t => {\n                overallTransitionState.guardsResult =\n                t.guardsResult;\n                if (isUrlTree(t.guardsResult)) {\n                    throw\n                    redirectingNavigationError(this.urlSerializer, t.guardsResult);\n                }\n                const\n                guardsEnd = new GuardsCheckEnd(\n                    t.id, this.serializeUrl(t.extractedUrl),\n                    this.serializeUrl(t.urlAfterRedirects!), t.targetSnapshot!,\n                    !!t.guardsResult);\n                this.triggerEvent(guardsEnd);\n            },\n            filter(t => {\n                if\n                (!t.guardsResult) {\n                    this.restoreHistory(t);\n                    this.cancelNavigationTransition(\n                        t, \"NavigationCancellationCode.GuardRejected);\n                    return false;\n                }\n                return true;\n            })),\n            // --\n            - RESOLVE ---\n            switchTap(t => {\n                if (t.guards.canActivateChecks.length) {\n                    return of(t.pipe(\n                        tap(t => {\n                            const resolveStart = new\n                            ResolveStart(\n                                t.id, this.serializeUrl(t.extractedUrl),\n                                this.serializeUrl(t.urlAfterRedirects!), t.targetSnapshot!);\n                                this.triggerEvent(resolveStart);\n                            },\n                            switchMap(t => {\n                                let dataResolved = false;\n                                return of(t.pipe(\n                                    resolveData(\n  this.paramsInheritanceStrategy, this.ngModule.injector),\n  tap({\n  next: () => dataResolved = true,\n  complete: () => {\n  if\n  (!dataResolved) {\n  this.restoreHistory(t);\n  this.cancelNavigationTransition(\n  t,\n  NG_DEV_MODE ?\n  `At least one route resolver didn't emit any value.` :\n  \"NavigationCancellationCode.NoDataFromResolver);\n  }\n  }\n  })),\n  const resolveEnd = new ResolveEnd(\n  t.id, this.serializeUrl(t.extractedUrl),\n  this.serializeUrl(t.urlAfterRedirects!),\n  t.targetSnapshot!);\n  this.triggerEvent(resolveEnd);\n  }));\n                    }\n                }\n            },\n            // --- LOAD COMPONENTS ---\n            switchTap((t: NavigationTransition) => {\n                const loadComponents =\n                (route: ActivatedRouteSnapshot): Array<Observable<void>> => {\n

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const loaders: Array<Observable<void>> = [];\n
if (route.routeConfig?.loadComponent\n
&&\n
!route.routeConfig._loadedComponent) {\n
loaders.push(this.configLoader.loadComponent(route.routeConfig)\n
.pipe(\n
tap(loadedComponent => {\n
route.component =\n
loadedComponent;\n
}),\n
map(() => void 0)),\n
));\n
}\n
for (const child of route.children)\n
{\n
loaders.push(...loadComponents(child));\n
}\n
return loaders;\n
};\n
return combineLatest(loadComponents(t.targetSnapshot!.root))\n
.pipe(defaultIfEmpty(), take(1));\n
}\n\n
switchTap(() =>\n
this.afterPreactivation()),\n\n
map((t: NavigationTransition) => {\n
const\n
targetRouterState = createRouterState(\n
this.routeReuseStrategy, t.targetSnapshot!,\n
t.currentRouterState);\n
overallTransitionState = {...t, targetRouterState};\n
return\n
(overallTransitionState);\n
}),\n\n
/* Once here, we are about to activate\n
synchronously. The assumption is\n
this will succeed, and user code may read from the Router\n
service.\n
Therefore before activation, we need to update router properties storing\n
the current URL and the RouterState, as well as updated the browser URL.\n
All\n
this should happen *before* activating. *\n
tap((t: NavigationTransition) => {\n
this.currentUrlTree = t.urlAfterRedirects!;\n
this.rawUrlTree =\n
this.urlHandlingStrategy.merge(t.urlAfterRedirects!, t.rawUrl);\n\n
(this as {routerState:\n
RouterState}).routerState = t.targetRouterState!;\n\n
if (this.urlUpdateStrategy === 'deferred') {\n
if (!t.extras.skipLocationChange) {\n
this.setBrowserUrl(this.rawUrlTree, t);\n
}\n
this.browserUrlTree = t.urlAfterRedirects!;\n
}\n
}),\n\n
activateRoutes(\n
this.rootContexts, this.routeReuseStrategy,\n
(evt: Event) => this.triggerEvent(evt)),\n\n
tap({\n
next() {\n
completed = true;\n
},\n
complete() {\n
completed = true;\n
}),\n
finalize() => {\n
/* When the navigation stream finishes either through error or success,\n
* we set the `completed` or `errored` flag. However, there are some\n
* situations where we\n
could get here without either of those being set.\n
* For instance, a redirect during NavigationStart.\n
Therefore, this is a\n
* catch-all to make sure the NavigationCancel event is fired when a\n
* navigation\n
gets cancelled but not caught by other means. *\n
if (!completed && !errored) {\n
const cancellationReason = NG_DEV_MODE ?\n
`Navigation ID ${\n
overallTransitionState\n
.id} is not equal to the current navigation id ${\n
this.navigationId}` :\n
"";\n
this.cancelNavigationTransition(\n
overallTransitionState, cancellationReason,\n
NavigationCancellationCode.SupersededByNewNavigation);\n
}\n
// Only clear\n
current navigation if it is still set to the one that\n
// finalized.\n
if\n
(this.currentNavigation?.id === overallTransitionState.id) {\n
this.currentNavigation = null;\n
},\n
}),\n\n
catchError((e) => {\n
errored = true;\n
/* This error type is issued during Redirect, and is handled as a\n
* cancellation rather than an error. *\n
if (isNavigationCancelingError(e)) {\n
if (!isRedirectingNavigationCancelingError(e)) {\n
// Set property only if we're not redirecting.\n
If we landed on a page\n
// and redirect to `^` route, the new navigation is going to see the\n
// `^` isn't a change from the default currentUrlTree and won't\n
// navigate. This is\n
only applicable with initial navigation, so\n
// setting `navigated` only when not redirecting\n
resolves this\n

```

```

        // scenario.\n                this.navigated = true;\n
this.restoreHistory(overallTransitionState, true);\n                }\n                const navCancel = new
NavigationCancel(\n                overallTransitionState.id,\n
this.serializeUrl(overallTransitionState.extractedUrl), e.message,\n                e.cancellationCode);\n
        eventsSubject.next(navCancel);\n                // When redirecting, we need to delay resolving the
navigation\n                // promise and push it to the redirect navigation\n                if
(!isRedirectingNavigationCancelingError(e)) {\n                overallTransitionState.resolve(false);\n
        } else {\n                const mergedTree =\n
this.urlHandlingStrategy.merge(e.url,\n                this.rawUrlTree);\n                const extras = {\n                skipLocationChange:\n
        overallTransitionState.extras.skipLocationChange,\n                // The URL is already updated at this
point if we have 'eager' URL\n                // updates or if the navigation was triggered by the browser
(back\n                // button, URL bar, etc). We want to replace that item in history\n                //
if the navigation is rejected.\n                replaceUrl: this.urlUpdateStrategy === 'eager' ||\n
        isBrowserTriggeredNavigation(overallTransitionState.source)\n                });\n
this.scheduleNavigation(mergedTree, 'imperative', null, extras, {\n                resolve:\n
overallTransitionState.resolve,\n
                reject: overallTransitionState.reject,\n                promise:\n
overallTransitionState.promise\n                });\n                }\n                /* All other errors
should reset to the router's internal URL reference\n                * to the pre-error state. */\n                }
else {\n                this.restoreHistory(overallTransitionState, true);\n                const navError = new
NavigationError(\n                overallTransitionState.id,\n
this.serializeUrl(overallTransitionState.extractedUrl), e,\n                overallTransitionState.targetSnapshot
?? undefined);\n                eventsSubject.next(navError);\n                try {\n
overallTransitionState.resolve(this.errorHandler(e));\n
        } catch (ee) {\n                overallTransitionState.reject(ee);\n                }\n
        }\n                return EMPTY;\n                });\n                // TODO(jasonaden): remove cast once g3
is on updated TypeScript\n                ))) as any as Observable<NavigationTransition>;\n                }\n                /**\n                * @internal\n
* TODO: this should be removed once the constructor of the router made internal\n                */\n
resetRootComponentType(rootComponentType: Type<any>): void {\n                this.rootComponentType =
rootComponentType;\n                // TODO: vsavkin router 4.0 should make the root component set to null\n                // this will
simplify the lifecycle of the router.\n                this.routerState.root.component = this.rootComponentType;\n                }\n                private
setTransition(t: Partial<NavigationTransition>): void {\n                this.transitions.next({...this.transitions.value, ...t});\n
        }\n                /**\n                * Sets up the location change
listener and performs the initial navigation.\n                */\n                initialNavigation(): void {\n
this.setUpLocationChangeListener();\n                if (this.navigationId === 0) {\n
this.navigateByUrl(this.location.path(true), {replaceUrl: true});\n                }\n                }\n                /**\n                * Sets up the location change
listener. This listener detects navigations triggered from outside\n                * the Router (the browser back/forward buttons,
for example) and schedules a corresponding Router\n                * navigation so that the correct events, guards, etc. are
triggered.\n                */\n                setUpLocationChangeListener(): void {\n                // Don't need to use Zone.wrap any more, because
zone.js\n                // already patch onPopState, so location change callback will\n                // run into ngZone\n                if
(!this.locationSubscription) {\n                this.locationSubscription = this.location.subscribe(event => {\n                const source
= event['type'] === 'popstate' ? 'popstate' : 'hashchange';\n                if (source === 'popstate') {\n                // The
`setTimeout` was added
in #12160 and is likely to support Angular/AngularJS\n                // hybrid apps.\n                setTimeout(() => {\n
const extras: NavigationExtras = {replaceUrl: true};\n                // Navigations coming from Angular router have a
navigationId state\n                // property. When this exists, restore the state.\n                const state =
event.state?.navigationId ? event.state : null;\n                if (state) {\n                const stateCopy = {...state} as

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Partial<RestoredState>;\n      delete stateCopy.navigationId;\n      delete stateCopy.routerPageId;\n  if (Object.keys(stateCopy).length !== 0) {\n      extras.state = stateCopy;\n      }\n      }\n      const\n  urlTree = this.parseUrl(event['url']);\n      this.scheduleNavigation(urlTree, source, state, extras);\n      }, 0);\n      }\n      }\n      }\n      /** The current URL. *\n      get url(): string {\n      return\n  this.serializeUrl(this.currentUrlTree);\n      }\n      }\n      /**\n      * Returns the current `Navigation` object when the router is navigating,\n      * and `null` when idle.\n      *\n      getCurrentNavigation(): Navigation|null {\n      return this.currentNavigation;\n      }\n      }\n      /** @internal *\n      triggerEvent(event: Event): void {\n      (this.events as Subject<Event>).next(event);\n      }\n      }\n      /**\n      * Resets the route configuration used for navigation and generating links.\n      *\n      * @param config The route array for the new configuration.\n      *\n      * @usageNotes\n      *\n      * ``\n      * router.resetConfig([\n      * { path: 'team/:id', component: TeamCmp, children: [\n      * { path: 'simple', component: SimpleCmp },\n      * { path: 'user/:name', component: UserCmp }\n      * ]}\n      * ]);\n      * ``\n      *\n      resetConfig(config: Routes): void {\n      NG_DEV_MODE &&\n  validateConfig(config);\n      this.config = config.map(standardizeConfig);\n      this.navigated = false;\n  this.lastSuccessfulId = -1;\n      }\n      }\n      /** @nodoc *\n      ngOnDestroy(): void {\n      this.dispose();\n      }\n      }\n      /** Disposes of the router. *\n      dispose(): void {\n      this.transitions.complete();\n      if\n  (this.locationSubscription) {\n      this.locationSubscription.unsubscribe();\n      this.locationSubscription =\n  undefined;\n      }\n      this.disposed = true;\n      }\n      }\n      /**\n      * Appends URL segments to the current URL tree to create a new URL tree.\n      *\n      * @param commands An array of URL fragments with which to construct the new URL tree.\n      *\n      * If the path is static, can be the literal URL string. For a dynamic path, pass an array of path\n      * segments, followed by the parameters for each segment.\n      *\n      * The fragments are applied to the current URL tree or the one provided in the `relativeTo`\n      * property of the options object, if supplied.\n      *\n      * @param navigationExtras Options that control the navigation strategy.\n      *\n      * @returns The new URL tree.\n      *\n      * @usageNotes\n      *\n      * ``\n      * create /team/33/user/11\n      * router.createUrlTree(['/team',\n  33, 'user', 11]);\n      *\n      * // create /team/33;expand=true/user/11\n      * router.createUrlTree(['/team', 33, {expand: true}, 'user', 11]);\n      *\n      * // you can collapse static segments like this (this works only with the first passed-in\n  value):\n      * router.createUrlTree(['/team/33/user', userId]);\n      *\n      * // If the first segment can contain slashes, and you do not want the router to split it,\n      * // you can do the following:\n      * router.createUrlTree([{segmentPath: 'one/two'}]);\n      *\n      * // create /team/33/(user/11/right:chat)\n      * router.createUrlTree(['/team', 33, {outlets: {primary: 'user/11', right: 'chat'}}]);\n      *\n      * // remove the right secondary node\n      * router.createUrlTree(['/team', 33, {outlets: {primary: 'user/11', right: null}}]);\n      *\n      * // assuming the current url is `/team/33/user/11` and the route points to `user/11`\n      *\n      * // navigate to /team/33/user/11/details\n      * router.createUrlTree(['details', {relativeTo: route}]);\n      *\n      * //\n  navigate to /team/33/user/22\n      * router.createUrlTree(['../22'], {relativeTo: route});\n      *\n      * // navigate to /team/44/user/22\n      * router.createUrlTree(['../team/44/user/22'], {relativeTo: route});\n      *\n      * Note that a value of `null` or `undefined` for `relativeTo` indicates that the\n      * tree should be created relative to the root.\n      * ``\n      *\n      createUrlTree(commands: any[], navigationExtras: UrlCreationOptions = {}): UrlTree {\n      const {relativeTo, queryParams, fragment, queryParamsHandling, preserveFragment} =\n  navigationExtras;\n      const a = relativeTo || this.routerState.root;\n      const f = preserveFragment ? this.currentUrlTree.fragment : fragment;\n      let\n  q: Params|null = null;\n      switch (queryParamsHandling) {\n      case 'merge':\n      q = {...this.currentUrlTree.queryParams, ...queryParams};\n      break;\n      case 'preserve':\n      q = this.currentUrlTree.queryParams;\n      break;\n      default:\n      q = queryParams || null;\n      }\n      if (q !== null) {\n      q = this.removeEmptyProps(q);\n      }\n      return createUrlTree(a, this.currentUrlTree, commands, q, f ?? null);\n      }\n      }\n      /**\n      * Navigates to a view using an absolute route path.\n      *\n      * @param url An absolute path for a defined route. The function does not apply any delta to the\n      * current URL.\n      *\n      * @param extras An object containing properties that modify the navigation strategy.\n      *\n      * @returns A Promise that resolves to 'true' when navigation succeeds,\n      * to 'false' when navigation fails, or is rejected on error.\n      *\n      * @usageNotes\n      *\n      * The following calls request navigation to an absolute path.\n      *\n      * ``\n      * router.navigateByUrl('/team/33/user/11');\n      *\n      * // Navigate without updating the URL\n      *

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router.navigateByUrl("\team/33/user/11\", { skipLocationChange: true });\n *```\n *\n * @see [Routing and Navigation guide](guide/router)\n *\n *\n navigateByUrl(url: string|UrlTree,
  extras: NavigationBehaviorOptions = {\n  skipLocationChange: false\n }): Promise<boolean> {\n  if (typeof ngDevMode === 'undefined' ||\n    ngDevMode && this.isNgZoneEnabled && !NgZone.isInAngularZone()) {\n    this.console.warn(\n      `Navigation triggered outside Angular zone, did you forget to call 'ngZone.run()'`);\n  }\n  const urlTree = isUrlTree(url) ? url : this.parseUrl(url);\n  const mergedTree =
this.urlHandlingStrategy.merge(urlTree, this.rawUrlTree);\n  return this.scheduleNavigation(mergedTree,
'imperative', null, extras);\n }\n /**\n * Navigate based on the provided array of commands and a starting
point.\n * If no starting route is provided, the navigation is absolute.\n *\n * @param commands An array of
URL fragments with which to construct the target URL.\n * If the path is static, can be the literal URL string. For a
dynamic path, pass an array of path\n * segments, followed by the parameters for each segment.\n * The
fragments are applied to the current URL or the one provided in the `relativeTo` property\n * of the options
object, if supplied.\n * @param extras An options object that determines how the URL should be constructed or\n
* interpreted.\n *\n * @returns A Promise that resolves to `true` when navigation succeeds, to `false` when
navigation\n * fails,\n * or is rejected on error.\n *\n * @usageNotes\n *\n * The following calls request
navigation to a dynamic route path relative to the current URL.\n *\n * ```\n * router.navigate(['team', 33, 'user',
11], {relativeTo: route});\n *\n * // Navigate without updating the URL, overriding the default behavior\n *
router.navigate(['team', 33, 'user', 11], {relativeTo: route, skipLocationChange: true});\n *```\n *\n * @see
[Routing and Navigation guide](guide/router)\n *\n *\n navigate(commands: any[], extras: NavigationExtras =
{skipLocationChange: false});\n  Promise<boolean> {\n  validateCommands(commands);\n
  return this.navigateByUrl(this.createUrlTree(commands, extras), extras);\n }\n /** Serializes a `UrlTree` into a
string\n */\n serializeUrl(url: UrlTree): string {\n  return this.urlSerializer.serialize(url);\n }\n /** Parses a string
into a `UrlTree`\n */\n parseUrl(url: string): UrlTree {\n  let urlTree: UrlTree;\n  try {\n    urlTree =
this.urlSerializer.parse(url);\n  } catch (e) {\n    urlTree = this.malformedUriErrorHandler(e as URIError,
this.urlSerializer, url);\n  }\n  return urlTree;\n }\n /**\n * Returns whether the url is activated.\n *\n *
@deprecated\n * Use `IsActiveMatchOptions` instead.\n *\n * - The equivalent `IsActiveMatchOptions` for
`true` is\n * `{paths: 'exact', queryParams: 'exact', fragment: 'ignored', matrixParams: 'ignored'}`.\n * - The
equivalent for `false` is\n * `{paths: 'subset', queryParams: 'subset', fragment: 'ignored', matrixParams:
'ignored'}`.\n *\n */\n isActive(url: string|UrlTree,
  exact: boolean): boolean;\n /**\n * Returns whether the url is activated.\n *\n */\n isActive(url: string|UrlTree,
  matchOptions: IsActiveMatchOptions): boolean;\n /** @internal\n */\n isActive(url: string|UrlTree, matchOptions:
boolean|IsActiveMatchOptions): boolean;\n isActive(url: string|UrlTree, matchOptions:
boolean|IsActiveMatchOptions): boolean {\n  let options: IsActiveMatchOptions;\n  if (matchOptions === true)
{\n    options = {...exactMatchOptions};\n  } else if (matchOptions === false) {\n    options =
{...subsetMatchOptions};\n  } else {\n    options = matchOptions;\n  }\n  if (isUrlTree(url)) {\n    return
containsTree(this.currentUrlTree, url, options);\n  }\n  const urlTree = this.parseUrl(url);\n  return
containsTree(this.currentUrlTree, urlTree, options);\n }\n private removeEmptyProps(params: Params): Params
{\n  return Object.keys(params).reduce((result: Params, key: string) => {\n    const value: any = params[key];\n
    if (value !== null && value !== undefined) {\n      result[key] = value;\n    }\n    return result;\n }, {});\n
}\n private processNavigations(): void {\n  this.navigations.subscribe(\n    t => {\n      this.navigated =
true;\n      this.lastSuccessfulId = t.id;\n      this.currentPageId = t.targetPageId;\n      (this.events as
Subject<Event>)\n        .next(new NavigationEnd(\n          t.id, this.serializeUrl(t.extractedUrl),
this.serializeUrl(this.currentUrlTree));\n      this.lastSuccessfulNavigation = this.currentNavigation;\n
this.titleStrategy?.updateTitle(this.routerState.snapshot);\n      t.resolve(true);\n    },\n    e => {\n
this.console.warn(`Unhandled Navigation Error: ${e}`);\n    });\n }\n private scheduleNavigation(\n
  rawUrl: UrlTree, source: NavigationTrigger, restoredState: RestoredState|null,\n  extras: NavigationExtras,\n
  priorPromise?: {resolve: any, reject:

```

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any, promise: Promise<boolean>}); Promise<boolean> {\n  if (this.disposed) {\n    return
Promise.resolve(false);\n  }\n\n  let resolve: any;\n  let reject: any;\n  let promise: Promise<boolean>;\n  if
(priorPromise) {\n    resolve = priorPromise.resolve;\n    reject = priorPromise.reject;\n    promise =
priorPromise.promise;\n\n  } else {\n    promise = new Promise<boolean>((res, rej) => {\n      resolve = res;\n
      reject = rej;\n    });\n  }\n\n  const id = ++this.navigationId;\n  let targetPageId: number;\n  if
(this.canceledNavigationResolution === 'computed') {\n    const isInitialPage = this.currentPageId === 0;\n    if
(isInitialPage) {\n      restoredState = this.location.getState() as RestoredState | null;\n    }\n    // If the
`routerPageId` exist in the state then `targetpageId` should have the value of\n    // `routerPageId`. This is the case
for something like a page refresh where we assign the\n    // target id to
the previously set value for that page.\n    if (restoredState && restoredState.routerPageId) {\n      targetPageId =
restoredState.routerPageId;\n    } else {\n      // If we're replacing the URL or doing a silent navigation, we do not
want to increment the\n      // page id because we aren't pushing a new entry to history.\n      if (extras.replaceUrl ||
extras.skipLocationChange) {\n        targetPageId = this.browserPageId ?? 0;\n      } else {\n        targetPageId =
(this.browserPageId ?? 0) + 1;\n      }\n    } else {\n      // This is unused when
`canceledNavigationResolution` is not computed.\n      targetPageId = 0;\n    }\n\n    this.setTransition({\n      id,\n
targetPageId,\n      source,\n      restoredState,\n      currentUrlTree: this.currentUrlTree,\n      currentRawUrl:
this.rawUrlTree,\n      rawUrl,\n      extras,\n      resolve,\n      reject,\n      promise,\n      currentSnapshot:
this.routerState.snapshot,\n      currentRouterState:
this.routerState\n    });\n\n    // Make sure that the error is propagated even though `processNavigations` catch\n    //
handler does not rethrow\n    return promise.catch((e: any) => {\n      return Promise.reject(e);\n    });\n  }\n\n
private setBrowserUrl(url: UrlTree, t: NavigationTransition) {\n    const path = this.urlSerializer.serialize(url);\n
const state = {...t.extras.state, ...this.generateNgRouterState(t.id, t.targetPageId)};\n    if
(this.location.isCurrentPathEqualTo(path) || !!t.extras.replaceUrl) {\n      this.location.replaceState(path, "", state);\n
    } else {\n      this.location.go(path, "", state);\n    }\n  }\n\n  /**\n   * Performs the necessary rollback action to restore
the browser URL to the\n   * state before the transition.\n   */\n  private restoreHistory(t: NavigationTransition,
restoringFromCaughtError = false) {\n    if (this.canceledNavigationResolution === 'computed') {\n      const
targetPagePosition = this.currentPageId - t.targetPageId;\n
      // The navigator change the location before triggered the browser event,\n      // so we need to go back to the
current url if the navigation is canceled.\n      // Also, when navigation gets cancelled while using url update strategy
eager, then we need to\n      // go back. Because, when `urlUpdateStrategy` is `eager`; `setBrowserUrl` method is
called\n      // before any verification.\n      const browserUrlUpdateOccurred =\n        (t.source === 'popstate' ||
this.urlUpdateStrategy === 'eager') ||\n        this.currentUrlTree === this.currentNavigation?.finalUrl);\n      if
(browserUrlUpdateOccurred && targetPagePosition !== 0) {\n        this.location.historyGo(targetPagePosition);\n
      } else if (\n        this.currentUrlTree === this.currentNavigation?.finalUrl && targetPagePosition === 0) {\n      //
We got to the activation stage (where currentUrlTree is set to the navigation's\n      // finalUrl), but we weren't
moving anywhere in history (skipLocationChange
or replaceUrl).\n      // We still need to reset the router state back to what it was when the navigation started.\n
this.resetState(t);\n      // TODO(atscott): resetting the `browserUrlTree` should really be done in `resetState`.\n
// Investigate if this can be done by running TGP.\n      this.browserUrlTree = t.currentUrlTree;\n
this.resetUrlToCurrentUrlTree();\n    } else {\n      // The browser URL and router state was not updated before the
navigation cancelled so\n      // there's no restoration needed.\n    }\n  } else if
(this.canceledNavigationResolution === 'replace') {\n    // TODO(atscott): It seems like we should _always_ reset
the state here. It would be a no-op\n    // for `deferred` navigations that haven't change the internal state yet because
guards\n    // reject. For 'eager' navigations, it seems like we also really should reset the state\n    // because the
navigation was cancelled. Investigate if this can be done
by running TGP.\n    if (restoringFromCaughtError) {\n      this.resetState(t);\n    }\n
this.resetUrlToCurrentUrlTree();\n  }\n}\n\nprivate resetState(t: NavigationTransition): void {\n  (this as
{routerState: RouterState}).routerState = t.currentRouterState;\n  this.currentUrlTree = t.currentUrlTree;\n  //

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Note here that we use the urlHandlingStrategy to get the reset `rawUrlTree` because it may be
// configured to handle only part of the navigation URL. This means we would only want to reset
// the part of the navigation handled by the Angular router rather than the whole URL. In
// addition, the URLHandlingStrategy may be configured to specifically preserve parts of the URL
// when merging, such as the query params so they are not lost on a refresh.
this.rawUrlTree = this.urlHandlingStrategy.merge(this.currentUrlTree, t.rawUrl);
}
private resetUrlToCurrentUrlTree(): void {
  this.location.replaceState(
    this.urlSerializer.serialize(this.rawUrlTree),
    "",
    this.generateNgRouterState(this.lastSuccessfulId, this.currentPageId));
}
private cancelNavigationTransition(
  t: NavigationTransition, reason: string, code: NavigationCancellationCode) {
  const navCancel = new NavigationCancel(t.id, this.serializeUrl(t.extractedUrl), reason, code);
  this.triggerEvent(navCancel);
  t.resolve(false);
}
private generateNgRouterState(navigationId: number, routerPageId?: number) {
  if (this.canceledNavigationResolution === 'computed') {
    return {navigationId, routerPageId};
  }
  return {navigationId};
}
function validateCommands(commands: string[]): void {
  for (let i = 0; i < commands.length; i++) {
    const cmd = commands[i];
    if (cmd == null) {
      throw new RuntimeError(
        RuntimeErrorCode.NULLISH_COMMAND,
        NG_DEV_MODE && `The requested path contains ${cmd} segment at index ${i}`);
    }
  }
}
function isBrowserTriggeredNavigation(source: 'imperative'|'popstate'|'hashchange') {
  return source !== 'imperative';
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import {LocationStrategy} from '@angular/common';
import {Attribute, Directive, ElementRef, HostBinding, HostListener, Input, OnChanges, OnDestroy, Renderer2, SimpleChanges, coerceToBoolean as coerceToBoolean} from '@angular/core';
import {Subject, Subscription} from 'rxjs';
import {Event, NavigationEnd} from './events';
import {QueryParamsHandling} from './models';
import {Router} from './router';
import {ActivatedRoute} from './router_state';
import {Params} from './shared';
import {UrlTree} from './url_tree';
/**
 * @description
 * When applied to an element in a template, makes that element a
 * link
 * that initiates navigation
 * to a route. Navigation opens one or more routed components
 * in one or more `<router-outlet>` locations on the page.
 * Given a route configuration `{ path: 'user/:name', component: UserCmp }`,
 * the following creates a static link to the route:
 * <a routerLink="/user/bob">link to user component</a>
 * You can use dynamic values to generate the link.
 * For a dynamic link, pass an array of path segments,
 * followed by the params for each segment.
 * For example, `['/team', teamId, 'user', userName, {details: true}]`
 * generates a link to `/team/11/user/bob;details=true`.
 * Multiple static segments can be merged into one term and combined
 * with dynamic segments.
 * For example, `['/team/11/user', userName, {details: true}]`
 * The input that you provide to the link is treated as a delta to the current URL.
 * For instance, suppose the current URL is
 * /user/(box//aux:team).
 * The link <a [routerLink]="['/user/jim']">Jim</a>
 * creates the URL
 * /user/(jim//aux:team).
 * See {@link Router#createUrlTree createUrlTree} for more information.
 *
 * @usageNotes
 * You can use absolute or relative paths in a link, set query parameters,
 * control how parameters are handled, and keep a history of navigation states.
 *
 * ### Relative link paths
 *
 * The first segment name can be prepended with `^`, `./`, or `../`.
 *
 * * If the first segment begins with `^`, the router looks up the route from the root of the
 * app.
 *
 * * If the first segment begins with `./`, or doesn't begin with a slash, the router
 * looks in the children of the current activated route.
 *
 * * If the first segment begins with `../`, the router goes up one level in the route tree.
 *
 * ### Setting and handling query params and fragments
 *
 * The following link adds a query parameter and a fragment to the generated URL:
 * <a
 [routerLink]="['/user/bob']" [queryParams]="{debug: true}" fragment="/education">
 * link
 to user component
 </a>
 *
 * By default, the directive constructs the new URL using the given query
 parameters.
 * The example generates the link: /user/bob?debug=true#education.
 * You can instruct the directive to handle query parameters differently
 * by specifying the `queryParamsHandling` option in the link.
 * Allowed values are:
 *
 * - `merge`: Merge the given `queryParams` into the current query params.
 *
 * -

```

```

`preserve`: Preserve the current query params.\n * For example:\n * <a [routerLink]=["/user/bob"]\n [queryParams]={"debug: true"}\n queryParamsHandling="merge">\n * link to user component\n * </a>\n * See { @link UrlCreationOptions.queryParamsHandling UrlCreationOptions#queryParamsHandling}.\n * ### Preserving navigation history\n * You can provide a `state` value to be persisted to the browser's\n [History.state` property](https://developer.mozilla.org/en-US/docs/Web/API/History#Properties).\n * For example:\n * <a [routerLink]=["/user/bob"] [state]="{tracingId: 123}">\n * link to user component\n * </a>\n * Use { @link Router.getCurrentNavigation() Router#getCurrentNavigation} to retrieve a saved\n * navigation-state value. For example, to capture the `tracingId` during the `NavigationStart`\n * event:\n * // Get NavigationStart events\n * router.events.pipe(filter(e => e instanceof\n NavigationStart)).subscribe(e => {\n * const navigation = router.getCurrentNavigation();\n * tracingService.trace({id: navigation.extras.state.tracingId});\n * });\n * @NgModule RouterModule\n * @publicApi\n * @Directive({\n selector: '.not(a):not(area)[routerLink]',\n standalone: true,\n})\nexport class\n RouterLink implements OnChanges {\n private _preserveFragment = false;\n private _skipLocationChange =\n false;\n private _replaceUrl = false;\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree} as\n part of the\n * `UrlCreationOptions`.\n * @see { @link UrlCreationOptions#queryParams\n UrlCreationOptions#queryParams}\n * @see { @link Router#createUrlTree Router#createUrlTree}\n * @Input() queryParams?: Params|null;\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree} as\n part of the\n * `UrlCreationOptions`.\n * @see { @link UrlCreationOptions#fragment\n UrlCreationOptions#fragment}\n * @see { @link Router#createUrlTree Router#createUrlTree}\n * @Input()\n fragment?: string;\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see { @link UrlCreationOptions#queryParamsHandling\n UrlCreationOptions#queryParamsHandling}\n * @see { @link Router#createUrlTree Router#createUrlTree}\n * @Input() queryParamsHandling?: QueryParamsHandling|null;\n /**\n * Passed to { @link\n Router#navigateByUrl Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see { @link\n NavigationBehaviorOptions#state\n NavigationBehaviorOptions#state}\n * @see { @link Router#navigateByUrl Router#navigateByUrl}\n * @Input() state?: {[k: string]: any};\n /**\n * Passed to { @link Router#createUrlTree Router#createUrlTree} as\n part of the\n * `UrlCreationOptions`.\n * Specify a value here when you do not want to use the default value\n * for `routerLink`, which is the current activated route.\n * Note that a value of `undefined` here will use the\n `routerLink` default.\n * @see { @link UrlCreationOptions#relativeTo UrlCreationOptions#relativeTo}\n * @see\n { @link Router#createUrlTree Router#createUrlTree}\n * @Input() relativeTo?: ActivatedRoute|null;\n\n private commands: any[]|null = null;\n /** @internal\n * onChanges = new Subject<RouterLink>();\n\n constructor(\n private router: Router, private route: ActivatedRoute,\n @Attribute('tabindex') private readonly\n tabIndexAttribute: string|null|undefined,\n private readonly renderer: Renderer2,\n private readonly el: ElementRef) {\n this.setTabIndexIfNotOnNativeEl(0);\n }\n /**\n * Passed to { @link\n Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see { @link\n UrlCreationOptions#preserveFragment\n UrlCreationOptions#preserveFragment}\n * @see { @link\n Router#createUrlTree Router#createUrlTree}\n * @Input()\n set preserveFragment(preserveFragment:\n boolean|string|null|undefined) {\n this._preserveFragment = coerceToBoolean(preserveFragment);\n }\n get\n preserveFragment(): boolean {\n return this._preserveFragment;\n }\n /**\n * Passed to { @link\n Router#navigateByUrl Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see { @link\n NavigationBehaviorOptions#skipLocationChange\n NavigationBehaviorOptions#skipLocationChange}\n * @see\n { @link Router#navigateByUrl Router#navigateByUrl}\n * @Input()\n set\n skipLocationChange(skipLocationChange: boolean|string|null|undefined) {\n this._skipLocationChange = coerceToBoolean(skipLocationChange);\n }\n get\n skipLocationChange(): boolean {\n return this._skipLocationChange;\n }\n /**\n * Passed to { @link Router#navigateByUrl\n Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see { @link

```

```

NavigationBehaviorOptions#replaceUrl NavigationBehaviorOptions#replaceUrl}\n * @see {@link
Router#navigateByUrl Router#navigateByUrl}\n */\n @Input()\n set replaceUrl(replaceUrl:
boolean|string|null|undefined) {\n this._replaceUrl = coerceToBoolean(replaceUrl);\n }\n\n get replaceUrl():
boolean {\n return this._replaceUrl;\n }\n\n /**\n * Modifies the tab index if there was not a tabindex attribute
on the element during\n * instantiation.\n */\n private setTabIndexIfNotOnNativeEl(newTabIndex: string|null)
{\n if (this.tabIndexAttribute != null /* both `null` and `undefined` */) {\n return;\n }\n const renderer =
this.renderer;\n const nativeElement = this.el.nativeElement;\n
if (newTabIndex !== null) {\n renderer.setAttribute(nativeElement, 'tabindex', newTabIndex);\n } else {\n
renderer.removeAttribute(nativeElement, 'tabindex');\n }\n }\n\n /** @nodoc */\n ngOnChanges(changes:
SimpleChanges) {\n // This is subscribed to by `RouterLinkActive` so that it knows to update when there are
changes\n // to the RouterLinks it's tracking.\n this.onChanges.next(this);\n }\n\n /**\n * Commands to pass to
{@link Router#createUrlTree Router#createUrlTree}.\n * - **array***: commands to pass to {@link
Router#createUrlTree Router#createUrlTree}.\n * - **string***: shorthand for array of commands with just the
string, i.e. `['/route']`\n * - **null|undefined***: effectively disables the `routerLink`\n * @see {@link
Router#createUrlTree Router#createUrlTree}\n */\n @Input()\n set routerLink(commands:
any[]|string|null|undefined) {\n if (commands != null) {\n this.commands = Array.isArray(commands)
? commands : [commands];\n this.setTabIndexIfNotOnNativeEl('0');\n } else {\n this.commands = null;\n
this.setTabIndexIfNotOnNativeEl(null);\n }\n }\n\n /** @nodoc */\n @HostListener('click')\n onClick():
boolean {\n if (this.urlTree === null) {\n return true;\n }\n\n const extras = {\n skipLocationChange:
this.skipLocationChange,\n replaceUrl: this.replaceUrl,\n state: this.state,\n };\n
this.router.navigateByUrl(this.urlTree, extras);\n return true;\n }\n\n get urlTree(): UrlTree|null {\n if
(this.commands === null) {\n return null;\n }\n return this.router.createUrlTree(this.commands, {\n // If
the `relativeTo` input is not defined, we want to use `this.route` by default.\n // Otherwise, we should use the
value provided by the user in the input.\n relativeTo: this.relativeTo !== undefined ? this.relativeTo : this.route,\n
queryParams: this.queryParams,\n fragment: this.fragment,\n
queryParamsHandling: this.queryParamsHandling,\n preserveFragment: this.preserveFragment,\n });\n
}\n\n\n/**\n * @description\n */\n * Lets you link to specific routes in your app.\n */\n * See `RouterLink` for more
information.\n */\n * @ngModule RouterModule\n */\n * @publicApi\n */\n @Directive({selector:
'a[routerLink],area[routerLink]', standalone: true})\n export class RouterLinkWithHref implements OnChanges,
OnDestroy {\n private _preserveFragment = false;\n private _skipLocationChange = false;\n private _replaceUrl =
false;\n\n // TODO(issue/24571): remove '!'.\n @HostBinding('attr.target') @Input() target!: string;\n /**\n *
Passed to {@link Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see
{@link UrlCreationOptions#queryParams UrlCreationOptions#queryParams}\n * @see {@link
Router#createUrlTree Router#createUrlTree}\n */\n @Input() queryParams?: Params|null;\n /**\n * Passed to
{@link Router#createUrlTree
Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see {@link UrlCreationOptions#fragment
UrlCreationOptions#fragment}\n * @see {@link Router#createUrlTree Router#createUrlTree}\n */\n @Input()
fragment?: string;\n /**\n * Passed to {@link Router#createUrlTree Router#createUrlTree} as part of the\n *
`UrlCreationOptions`.\n * @see {@link UrlCreationOptions#queryParamsHandling
UrlCreationOptions#queryParamsHandling}\n * @see {@link Router#createUrlTree Router#createUrlTree}\n
*/\n @Input() queryParamsHandling?: QueryParamsHandling|null;\n /**\n * Passed to {@link
Router#navigateByUrl Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see {@link
NavigationBehaviorOptions#state NavigationBehaviorOptions#state}\n * @see {@link Router#navigateByUrl
Router#navigateByUrl}\n */\n @Input() state?: {[k: string]: any};\n /**\n * Passed to {@link
Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n
* Specify a value here when you do not want to use the default value\n * for `routerLink`, which is the current
activated route.\n * Note that a value of `undefined` here will use the `routerLink` default.\n * @see {@link
UrlCreationOptions#relativeTo UrlCreationOptions#relativeTo}\n * @see {@link Router#createUrlTree

```



```

Router#createUrlTree}\n *\/\n @Input() relativeTo?: ActivatedRoute|null;\n\n private commands: any[]|null =
null;\n private subscription: Subscription;\n\n // the url displayed on the anchor element.\n\n //
@HostBinding('attr.href') is used rather than @HostBinding() because it removes the\n // href attribute when it
becomes `null`.\n @HostBinding('attr.href') href: string|null = null;\n\n /** @internal */\n onChanges = new
Subject<RouterLinkWithHref>();\n\n constructor(\n private router: Router, private route: ActivatedRoute,\n private locationStrategy: LocationStrategy) {\n this.subscription = router.events.subscribe((s:
Event) => {\n if (s instanceof NavigationEnd) {\n this.updateTargetUrlAndHref();\n } });\n }\n\n /**\n * Passed to {@link Router#createUrlTree Router#createUrlTree} as part of the\n * `UrlCreationOptions`.\n * @see {@link UrlCreationOptions#preserveFragment UrlCreationOptions#preserveFragment}\n * @see {@link
Router#createUrlTree Router#createUrlTree}\n */\n @Input()\n set preserveFragment(preserveFragment:
boolean|string|null|undefined) {\n this._preserveFragment = coerceToBoolean(preserveFragment);\n }\n\n get
preserveFragment(): boolean {\n return this._preserveFragment;\n }\n\n /**\n * Passed to {@link
Router#navigateByUrl Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see {@link
NavigationBehaviorOptions#skipLocationChange NavigationBehaviorOptions#skipLocationChange}\n * @see
{@link Router#navigateByUrl Router#navigateByUrl}\n */\n @Input()\n set
skipLocationChange(skipLocationChange: boolean|string|null|undefined)
{\n this._skipLocationChange = coerceToBoolean(skipLocationChange);\n }\n\n get skipLocationChange():
boolean {\n return this._skipLocationChange;\n }\n\n /**\n * Passed to {@link Router#navigateByUrl
Router#navigateByUrl} as part of the\n * `NavigationBehaviorOptions`.\n * @see {@link
NavigationBehaviorOptions#replaceUrl NavigationBehaviorOptions#replaceUrl}\n * @see {@link
Router#navigateByUrl Router#navigateByUrl}\n */\n @Input()\n set replaceUrl(replaceUrl:
boolean|string|null|undefined) {\n this._replaceUrl = coerceToBoolean(replaceUrl);\n }\n\n get replaceUrl():
boolean {\n return this._replaceUrl;\n }\n\n /**\n * Commands to pass to {@link Router#createUrlTree
Router#createUrlTree}.\n * - **array**: commands to pass to {@link Router#createUrlTree
Router#createUrlTree}.\n * - **string**: shorthand for array of commands with just the string, i.e. `['/route']`\n *
- **null|undefined**: Disables the link by removing
the `href`\n * @see {@link Router#createUrlTree Router#createUrlTree}\n */\n @Input()\n set
routerLink(commands: any[]|string|null|undefined) {\n if (commands != null) {\n this.commands =
Array.isArray(commands) ? commands : [commands];\n } else {\n this.commands = null;\n }\n }\n\n /**
@nodoc */\n ngOnChanges(changes: SimpleChanges): any {\n this.updateTargetUrlAndHref();\n
this.onChanges.next(this);\n }\n\n /** @nodoc */\n ngOnDestroy(): any {\n this.subscription.unsubscribe();\n
}\n\n /** @nodoc */\n @HostListener(\n 'click',\n ['$event.button', '$event.ctrlKey', '$event.shiftKey',
'$event.altKey', '$event.metaKey'])\n onClick(button: number, ctrlKey: boolean, shiftKey: boolean, altKey:
boolean, metaKey: boolean):\n boolean {\n if (button !== 0 || ctrlKey || shiftKey || altKey || metaKey) {\n
return true;\n }\n\n if (typeof this.target === 'string' && this.target !== '_self' || this.urlTree === null) {\n
return
true;\n }\n\n const extras = {\n skipLocationChange: this.skipLocationChange,\n replaceUrl:
this.replaceUrl,\n state: this.state\n }; \n this.router.navigateByUrl(this.urlTree, extras);\n return false;\n
}\n\n private updateTargetUrlAndHref(): void {\n this.href = this.urlTree !== null ?\n
this.locationStrategy.prepareExternalUrl(this.router.serializeUrl(this.urlTree)) :\n null;\n }\n\n get urlTree():
UrlTree|null {\n if (this.commands === null) {\n return null;\n }\n return
this.router.createUrlTree(this.commands, {\n // If the `relativeTo` input is not defined, we want to use `this.route`
by default.\n // Otherwise, we should use the value provided by the user in the input.\n relativeTo:
this.relativeTo !== undefined ? this.relativeTo : this.route,\n queryParams: this.queryParams,\n fragment:
this.fragment,\n queryParamsHandling: this.queryParamsHandling,\n preserveFragment:
this.preserveFragment,\n
});\n }\n }\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n

```

```

import {AfterContentInit, ChangeDetectorRef, ContentChildren, Directive, ElementRef, EventEmitter, Input,
OnChanges, OnDestroy, Optional, Output, QueryList, Renderer2, SimpleChanges} from '@angular/core';
import {from, of, Subscription} from 'rxjs';
import {mergeAll} from 'rxjs/operators';
import {Event, NavigationEnd} from './events';
import {Router} from './router';
import {IsActiveMatchOptions} from './url_tree';
import {RouterLink, RouterLinkWithHref} from './router_link';

/**
 * Tracks whether the linked route of an element is currently active, and allows you to specify one or more CSS classes to add to the element when the linked route is active.
 * Use this directive to create a visual distinction for elements associated with an active route.
 * For example, the following code highlights the word "Bob" when the router activates the associated route:
 * <a routerLink="/user/bob" routerLinkActive="active-link">Bob</a>
 * Whenever the URL is either '/user' or '/user/bob', the "active-link" class is added to the anchor tag. If the URL changes, the class is removed.
 * You can set more than one class using a space-separated string or an array.
 * For example:
 * <a routerLink="/user/bob" routerLinkActive="class1 class2">Bob</a>
 * <a routerLink="/user/bob" [routerLinkActive]="['class1', 'class2']">Bob</a>
 * To add the classes only when the URL matches the link exactly, add the option `exact: true`:
 * <a routerLink="/user/bob" routerLinkActive="active-link" [routerLinkActiveOptions]="{exact: true}">Bob</a>
 * To directly check the `isActive` status of the link, assign the `RouterLinkActive` instance to a template variable.
 * For example, the following checks the status without assigning any CSS classes:
 * <a routerLink="/user/bob" routerLinkActive #rla="routerLinkActive"> Bob {{ rla.isActive ? '(already open)' : '' }}</a>
 * You can apply the `RouterLinkActive` directive to an ancestor of linked elements.
 * For example, the following sets the active-link class on the `<div>` parent tag when the URL is either '/user/jim' or '/user/bob'.
 * <div routerLinkActive="active-link" [routerLinkActiveOptions]="{exact: true}">
 *   <a routerLink="/user/jim">Jim</a>
 *   <a routerLink="/user/bob">Bob</a>
 * </div>
 * The `RouterLinkActive` directive can also be used to set the aria-current attribute to provide an alternative distinction for active elements to visually impaired users.
 * For example, the following code adds the 'active' class to the Home Page link when it is indeed active and in such case also sets its aria-current attribute to 'page':
 * <a routerLink="/" routerLinkActive="active" ariaCurrentWhenActive="page">Home Page</a>
 * @NgModule RouterModule
 * @publicApi
 * @Directive({
 *   selector: '[routerLinkActive]',
 *   exportAs: 'routerLinkActive',
 *   standalone: true,
 * })
 * export class RouterLinkActive implements OnChanges, OnDestroy, AfterContentInit {
 *   @ContentChildren(RouterLink, {descendants: true}) links!: QueryList<RouterLink>;
 *   @ContentChildren(RouterLinkWithHref, {descendants: true}) linksWithHrefs!: QueryList<RouterLinkWithHref>;
 *   private classes: string[] = [];
 *   private routerEventsSubscription: Subscription;
 *   private linkInputChangesSubscription?: Subscription;
 *   public readonly isActive: boolean = false;
 *   /**
 *    * Options to configure how to determine if the router link is active.
 *    * These options are passed to the `Router.isActive()` function.
 *    * @see Router.isActive
 *    * @Input() routerLinkActiveOptions: {exact: boolean}|IsActiveMatchOptions = {exact: false};
 *    * Aria-current attribute to apply when the router link is active.
 *    * Possible values: `page` | `step` | `location` | `date` | `time` | `true` | `false`.
 *    * @see {@link https://developer.mozilla.org/en-US/docs/Web/Accessibility/ARIA/Attributes/aria-current}
 *    * @Input() ariaCurrentWhenActive?: `page`|`step`|`location`|`date`|`time`|`true`|`false`;
 *    * You can use the output `isActiveChange` to get notified each time the link becomes active or inactive.
 *    * Emits:
 *    * true -> Route is active
 *    * false -> Route is inactive
 *    * <a routerLink="/user/bob" routerLinkActive="active-link" (isActiveChange)="this.onRouterLinkActive($event)">Bob</a>
 *    * @Output() readonly isActiveChange: EventEmitter<boolean>
 *    = new EventEmitter();
 *    constructor(
 *      private router: Router, private element: ElementRef, private renderer: Renderer2,
 *      private readonly cdr: ChangeDetectorRef, @Optional() private link?: RouterLink,

```

```

@Optional() private linkWithHref?: RouterLinkWithHref) {\n  this.routerEventsSubscription =
router.events.subscribe((s: Event) => {\n    if (s instanceof NavigationEnd) {\n      this.update();\n    }\n  });\n}\n\n/** @nodoc */\nngAfterContentInit(): void {\n  // `of(null)` is used to force subscribe body to execute once
immediately (like `startWith`).\n  of(this.links.changes, this.linksWithHrefs.changes,
of(null)).pipe(mergeAll()).subscribe(_ => {\n    this.update();\n    this.subscribeToEachLinkOnChanges();\n  });\n}\n\nprivate subscribeToEachLinkOnChanges() {\n  this.linkInputChangesSubscription?.unsubscribe();\n  const allLinkChanges =\n    [...this.links.toArray(), ...this.linksWithHrefs.toArray(), this.link, this.linkWithHref]\n    .filter((link): link is RouterLink|RouterLinkWithHref => !!link)\n    .map(link => link.onChanges);\n  this.linkInputChangesSubscription = from(allLinkChanges).pipe(mergeAll()).subscribe(link => {\n    if
(this.isActive !== this.isLinkActive(this.router)(link)) {\n      this.update();\n    }\n  });\n}\n\n@Input()\nset
routerLinkActive(data: string[]|string) {\n  const classes = Array.isArray(data) ? data : data.split(' ');\n  this.classes
= classes.filter(c => !!c);\n}\n\n/** @nodoc */\nngOnChanges(changes: SimpleChanges): void {\n  this.update();\n}\n\n/** @nodoc */\nngOnDestroy(): void {\n  this.routerEventsSubscription.unsubscribe();\n  this.linkInputChangesSubscription?.unsubscribe();\n}\n\nprivate update(): void {\n  if (!this.links ||
!this.linksWithHrefs || !this.router.navigated) return;\n  Promise.resolve().then(() => {\n    const hasActiveLinks =
this.hasActiveLinks();\n    if (this.isActive !== hasActiveLinks)\n      {\n        (this as any).isActive = hasActiveLinks;\n        this.cdr.markForCheck();\n        this.classes.forEach((c) =>
{\n          if (hasActiveLinks) {\n            this.renderer.addClass(this.element.nativeElement, c);\n          } else {\n
            this.renderer.removeClass(this.element.nativeElement, c);\n          }\n        });\n        if (hasActiveLinks &&
this.ariaCurrentWhenActive !== undefined) {\n          this.renderer.setAttribute(\n
this.element.nativeElement, 'aria-current', this.ariaCurrentWhenActive.toString());\n        } else {\n
          this.renderer.removeAttribute(this.element.nativeElement, 'aria-current');\n        }\n        // Emit on isActiveChange
after classes are updated\n        this.isActiveChange.emit(hasActiveLinks);\n      }\n    });\n  }\n\nprivate
isLinkActive(router: Router): (link: (RouterLink|RouterLinkWithHref)) => boolean {\n  const options:
boolean|IsActiveMatchOptions =\n    isActiveMatchOptions(this.routerLinkActiveOptions)\n    ?\n      this.routerLinkActiveOptions :\n      // While the types should disallow `undefined` here, it's possible
without strict inputs\n      (this.routerLinkActiveOptions.exact || false);\n  return (link:
RouterLink|RouterLinkWithHref) =>{\n    link.urlTree ? router.isActive(link.urlTree, options) : false;\n  }\n}\n\nprivate
hasActiveLinks(): boolean {\n  const isActiveCheckFn = this.isLinkActive(this.router);\n  return this.link
&& isActiveCheckFn(this.link) ||\n    this.linkWithHref && isActiveCheckFn(this.linkWithHref) ||\n
this.links.some(isActiveCheckFn) || this.linksWithHrefs.some(isActiveCheckFn);\n}\n}\n\n/**\n * Use instead of
`paths` in options` to be compatible with property renaming\n */\nfunction isActiveMatchOptions(options: { exact:
boolean})\n  IsActiveMatchOptions): options is IsActiveMatchOptions {\n  return !(options as
IsActiveMatchOptions).paths;\n}\n\n/**\n * @license\n *\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { Compiler,
createEnvironmentInjector, EnvironmentInjector, Injectable, OnDestroy } from '@angular/core';\nimport { from,
Observable, of, Subscription } from 'rxjs';\nimport { catchError, concatMap, filter, mergeAll, mergeMap } from
'rxjs/operators';\nimport { Event, NavigationEnd } from './events';\nimport { LoadedRouterConfig, Route, Routes }
from './models';\nimport { Router } from './router';\nimport { RouterConfigLoader } from
'./router_config_loader';\n\n/**\n * @description\n * Provides a preloading strategy.\n * @publicApi\n */\nexport abstract class PreloadingStrategy {\n  abstract preload(route: Route, fn: () => Observable<any>):
Observable<any>;\n}\n\n/**\n * @description\n * Provides a preloading strategy that preloads all modules as
quickly as possible.\n * RouterModule.forRoot(ROUTES,
{preloadingStrategy: PreloadAllModules})\n * @publicApi\n */\n@Injectable({providedIn:
'root'})\nexport class PreloadAllModules implements PreloadingStrategy {\n  preload(route: Route, fn: () =>
Observable<any>): Observable<any> {\n    return fn().pipe(catchError(() => of(null))); \n  }\n}\n\n/**\n *
@description\n * Provides a preloading strategy that does not preload any modules.\n * This strategy is

```

enabled by default.

```

 * @publicApi
 * @Injectable({providedIn: 'root'})
export class NoPreloading
implements PreloadingStrategy {
  preload(route: Route, fn: () => Observable<any>): Observable<any> {
    return of(null);
  }
}

```

The preloader optimistically loads all router configurations to make navigations into lazily-loaded sections of the application faster. The preloader runs in the background. When the router bootstraps, the preloader starts listening to all navigation events. After every such event, the preloader

will check if any configurations can be loaded lazily. If a route is protected by `canLoad` guards, the preloaded will not load it.

```

 * @publicApi
 * @Injectable({providedIn: 'root'})
export class
RouterPreloader implements OnDestroy {
  private subscription?: Subscription;
  constructor(
    private router: Router,
    private compiler: Compiler,
    private injector: EnvironmentInjector,
    private preloadingStrategy:
PreloadingStrategy,
    private loader: RouterConfigLoader) {}
  setUpPreloading(): void {
    this.subscription =
      this.router.events
        .pipe(filter((e: Event) => e instanceof NavigationEnd),
concatMap(() =>
this.preload()))
        .subscribe(() => {});
  }
  preload(): Observable<any> {
    return
this.processRoutes(this.injector, this.router.config);
  }
}

```

```

/** @nodoc */
ngOnDestroy(): void {
  if
(this.subscription) {
    this.subscription.unsubscribe();
  }
  private processRoutes(injector:
EnvironmentInjector, routes: Routes): Observable<void> {
  const res: Observable<any>[] = [];
  for (const
route of routes) {
    if (route.providers && !route._injector) {
      route._injector =
createEnvironmentInjector(route.providers, injector, `Route: ${route.path}`);
    }
    const
injectorForCurrentRoute = route._injector ?? injector;
    const injectorForChildren = route._loadedInjector ??
injectorForCurrentRoute;
    // Note that `canLoad` is only checked as a condition that prevents `loadChildren`
and not `loadComponent`. `canLoad` guards only block loading of child routes by design. This
happens as a consequence of needing to descend into children for route matching immediately
while
component loading is deferred until route activation. Because `canLoad` guards can
have side effects, we
cannot execute them here so we instead skip preloading altogether
when present. Lastly, it remains
to be decided whether `canLoad` should behave this way
at all. Code splitting and lazy loading is separate
from client-side authorization checks
and should not be used as a security measure to prevent loading of
code.
if ((route.loadChildren && !route._loadedRoutes && route.canLoad === undefined) ||
(route.loadComponent && !route._loadedComponent)) {
  res.push(this.preloadConfig(injectorForCurrentRoute, route));
} else if (route.children || route._loadedRoutes) {
  res.push(this.processRoutes(injectorForChildren, (route.children ?? route._loadedRoutes)!));
}
}
return from(res).pipe(mergeAll());
}
private preloadConfig(injector: EnvironmentInjector, route: Route):
Observable<void> {
  return this.preloadingStrategy.preload(route, () => {
    let loadedChildren$:
Observable<LoadedRouterConfig|null>;
    if (route.loadChildren && route.canLoad === undefined) {
      loadedChildren$ = this.loader.loadChildren(injector,
route);
    } else {
      loadedChildren$ = of(null);
    }
    const recursiveLoadChildren$ =
loadedChildren$.pipe(mergeMap((config: LoadedRouterConfig|null) => {
      if (config === null) {
        return of(void 0);
      }
      route._loadedRoutes = config.routes;
      route._loadedInjector =
config.injector;
      // If the loaded config was a module, use that as the module/module injector going
// forward. Otherwise, continue using the current module/module injector.
return
this.processRoutes(config.injector ?? injector, config.routes);
}));
    if (route.loadComponent &&
!route._loadedComponent) {
      const loadComponent$ = this.loader.loadComponent(route);
      return
from([recursiveLoadChildren$, loadComponent$]).pipe(mergeAll());
    } else {
      return
recursiveLoadChildren$;
    }
  });
}
}

```

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```

import {ViewportScroller} from
'@angular/common';
import {Injectable, InjectionToken, OnDestroy} from '@angular/core';
import
{Unsubscribable} from 'rxjs';
import {NavigationEnd, NavigationStart, Scroll} from './events';
import {Router}
from './router';
export const ROUTER_SCROLLER = new

```

```

InjectionToken<RouterScroller>(");
@Injectable()
export class RouterScroller implements OnDestroy {
  // TODO(issue/24571): remove '!'.
  private routerEventsSubscription!: Unsubscribable;
  // TODO(issue/24571):
  remove '!'.
  private scrollEventsSubscription!: Unsubscribable;
  private lastId = 0;
  private lastSource:
  'imperative'|'popstate'|'hashchange'|undefined = 'imperative';
  private restoredId = 0;
  private store: {[key: string]:
  [number, number]} = {};
  constructor(
    private router: Router,
    /** @docsNotRequired */ public readonly viewportScroller: ViewportScroller,
    private options: {
      scrollPositionRestoration?: 'disabled'|'enabled'|'top',
      anchorScrolling?: 'disabled'|'enabled'
    } = {}) {
    // Default both options to 'disabled'
    options.scrollPositionRestoration =
    options.scrollPositionRestoration || 'disabled';
    options.anchorScrolling = options.anchorScrolling || 'disabled';
  }
  init(): void {
    // we want to disable the automatic scrolling because having two places
    // responsible for scrolling results race conditions, especially given
    // that browser don't implement this behavior consistently
    if (this.options.scrollPositionRestoration !== 'disabled') {
      this.viewportScroller.setHistoryScrollRestoration('manual');
      this.routerEventsSubscription =
      this.createScrollEvents();
      this.scrollEventsSubscription = this.consumeScrollEvents();
    }
    private
    createScrollEvents()
    {
      return this.router.events.subscribe(e => {
        if (e instanceof NavigationStart) {
          // store the scroll
          position of the current stable navigations.
          this.store[this.lastId] = this.viewportScroller.getScrollPosition();
          this.lastSource = e.navigationTrigger;
          this.restoredId = e.restoredState ? e.restoredState.navigationId : 0;
        } else if (e instanceof NavigationEnd) {
          this.lastId = e.id;
          this.scheduleScrollEvent(e,
          this.router.parseUrl(e.urlAfterRedirects).fragment);
        }
      });
    }
    private
    consumeScrollEvents() {
      return this.router.events.subscribe(e => {
        if (!(e instanceof Scroll)) return;
        // a popstate event. The pop
        state event will always ignore anchor scrolling.
        if (e.position) {
          if (this.options.scrollPositionRestoration
          === 'top') {
            this.viewportScroller.scrollToPosition([0, 0]);
          } else if
          (this.options.scrollPositionRestoration === 'enabled')
          {
            this.viewportScroller.scrollToPosition(e.position);
          }
          // imperative navigation "forward"
        } else {
          if (e.anchor && this.options.anchorScrolling === 'enabled') {
            this.viewportScroller.scrollToAnchor(e.anchor);
          } else if (this.options.scrollPositionRestoration !==
          'disabled') {
            this.viewportScroller.scrollToPosition([0, 0]);
          }
        }
      });
    }
    private
    scheduleScrollEvent(routerEvent: NavigationEnd, anchor: string|null): void {
      this.router.triggerEvent(new
      Scroll(
        routerEvent,
        this.lastSource === 'popstate' ? this.store[this.restoredId] : null,
        anchor));
    }
  }
  /**
  @nodoc
  */
  ngOnDestroy() {
    if (this.routerEventsSubscription) {
      this.routerEventsSubscription.unsubscribe();
    }
    if (this.scrollEventsSubscription) {
      this.scrollEventsSubscription.unsubscribe();
    }
  }
}
"/**
  * @license
  * Copyright Google LLC All
  Rights Reserved.
  *
  * Use of this source code is governed by an MIT-style license that can be
  found in the LICENSE file at
  https://angular.io/license
  */
import {LOCATION_INITIALIZED, ViewportScroller} from
 '@angular/common';
import {APP_BOOTSTRAP_LISTENER, APP_INITIALIZER, ApplicationRef,
ComponentRef, ENVIRONMENT_INITIALIZER, inject, InjectFlags, InjectionToken, Injector, Provider, Type}
from '@angular/core';
import {of, Subject} from 'rxjs';
import {filter, map, take} from 'rxjs/operators';
import {Event, NavigationCancel, NavigationCancellationCode, NavigationEnd, NavigationError, stringifyEvent} from
 './events';
import {Routes} from './models';
import {Router} from './router';
import {InMemoryScrollingOptions,
ROUTER_CONFIGURATION, RouterConfigOptions} from './router_config';
import {ROUTES} from
 './router_config_loader';
import {PreloadingStrategy, RouterPreloader} from './router_preloader';
import {
ROUTER_SCROLLER, RouterScroller} from './router_scroller';
import {ActivatedRoute}
from './router_state';
const NG_DEV_MODE = typeof ngDevMode === 'undefined' || ngDevMode;
/**
  * Sets up providers necessary to enable `Router` functionality for the application.
  * Allows to configure a set of
  routes as well as extra features that should be enabled.
  *
  * @usageNotes
  *
  * Basic example of how you can
  add a Router to your application:
  *
  *
  * const appRoutes: Routes = [];
  *
  *
  */

```

```
bootstrapApplication(AppComponent, {\n * providers: [provideRouter(appRoutes)]\n * });\n * ```\n * You can also enable optional features in the Router by adding functions from the `RouterFeatures`\n * type:\n * ```\n * const appRoutes: Routes = [];\n * bootstrapApplication(AppComponent,\n * {\n * providers: [\n * provideRouter(appRoutes,\n * withDebugTracing(),\n * withRouterConfig({paramsInheritanceStrategy: 'always'}))\n * ]\n * });\n * @see `RouterFeatures`\n * @publicApi\n * @developerPreview\n * @param routes
```

A set of `Route`s to use for the application routing table.\n \* @param features Optional features to configure additional router behaviors.\n \* @returns A set of providers to setup a Router.\n \*/\nexport function provideRouter(routes: Routes, ...features: RouterFeatures[]): Provider[] {\n return [\n provideRoutes(routes),\n {provide: ActivatedRoute, useFactory: rootRoute, deps: [Router]},\n {provide: APP\_BOOTSTRAP\_LISTENER, multi: true, useFactory: getBootstrapListener},\n features.map(feature => feature.providers),\n // TODO: All options used by the `assignExtraOptionsToRouter` factory need to be reviewed for\n // how we want them to be configured. This API doesn't currently have a way to configure them\n // and we should decide what the \_best\_ way to do that is rather than just sticking with the\n // status quo of how it's done today.\n ];\n }\n\nexport function rootRoute(router: Router): ActivatedRoute {\n return router.routerState.root;\n }\n\n/\*\*\n \* Helper type to represent a Router feature.\n \* @publicApi\n \* @developerPreview\n \*/\nexport interface RouterFeature<FeatureKind extends RouterFeatureKind> {\n kind: FeatureKind;\n providers: Provider[];\n }\n\n/\*\*\n \* Helper function to create an object that represents a Router feature.\n \*/\nfunction routerFeature<FeatureKind extends RouterFeatureKind>(\n kind: FeatureKind, providers: Provider[]): RouterFeature<FeatureKind> {\n return {kind: kind, providers: providers};\n }\n\n/\*\*\n \* Registers a [DI provider](guide/glossary#provider) for a set of routes.\n \* @param routes The route configuration to provide.\n \* @usageNotes\n \* ```\n \* @NgModule({\n \* providers: [provideRoutes(ROUTES)]\n \* })\n \* class LazyLoadedChildModule {\n \* ```\n \* @publicApi\n \*/\nexport function provideRoutes(routes: Routes): Provider[] {\n return [\n {provide: ROUTES, multi: true, useValue: routes},\n ];\n }\n\n/\*\*\n \* A type alias for providers returned by `withInMemoryScrolling` for use with `provideRouter`.\n \* @see `withInMemoryScrolling`\n \* @see `provideRouter`\n \* @publicApi\n \* @developerPreview\n \*/\nexport type InMemoryScrollingFeature = RouterFeature<RouterFeatureKind.InMemoryScrollingFeature>;\n\n/\*\*\n \* Enables customizable scrolling behavior for router navigations.\n \* @usageNotes\n \* Basic example of how you can enable scrolling feature:\n \* ```\n \* const appRoutes: Routes = [];\n \* bootstrapApplication(AppComponent,\n \* {\n \* providers: [\n \* provideRouter(appRoutes, withInMemoryScrolling())\n \* ]\n \* });\n \* @see `provideRouter`\n \* @see `ViewportScroller`\n \* @publicApi\n \* @developerPreview\n \* @param options Set of configuration parameters to customize scrolling behavior, see\n \* `InMemoryScrollingOptions` for additional information.\n \* @returns A set of providers for use with `provideRouter`.\n \*/\nexport function withInMemoryScrolling(options: InMemoryScrollingOptions = {}):\n InMemoryScrollingFeature {\n const providers = [{\n provide: ROUTER\_SCROLLER,\n useFactory: () => {\n const router = inject(Router);\n const viewportScroller = inject(ViewportScroller);\n return new RouterScroller(router, viewportScroller, options);\n },\n }];\n return routerFeature(RouterFeatureKind.InMemoryScrollingFeature, providers);\n }\n\nexport function getBootstrapListener() {\n const injector = inject(Injector);\n return (bootstrappedComponentRef: ComponentRef<unknown>) => {\n const ref = injector.get(ApplicationRef);\n\n if (bootstrappedComponentRef !== ref.components[0]) {\n return;\n }\n\n const router = injector.get(Router);\n const bootstrapDone = injector.get(BOOTSTRAP\_DONE);\n\n if (injector.get(INITIAL\_NAVIGATION) === InitialNavigation.EnabledNonBlocking) {\n router.initialNavigation();\n }\n\n injector.get(ROUTER\_PRELOADER, null, InjectFlags.Optional)?.setUpPreloading();\n injector.get(ROUTER\_SCROLLER, null, InjectFlags.Optional)?.init();\n router.resetRootComponentType(ref.componentTypes[0]);\n\n if (!bootstrapDone.closed) {\n bootstrapDone.next();\n bootstrapDone.unsubscribe();\n }\n };\n }\n\n/\*\*\n \* A subject used to indicate that the bootstrapping phase is done. When initial navigation is\n \* `enabledBlocking`, the

```

first navigation waits until bootstrapping is finished before continuing\n * to the activation phase.\n */\nconst
BOOTSTRAP_DONE =\n  new InjectionToken<Subject<void>>(NG_DEV_MODE ? 'bootstrap done indicator' :
', {\n  factory: () => {\n    return new Subject<void>();\n  }\n });\n\n/**\n * This and the
INITIAL_NAVIGATION token are used internally only. The public API side of this is\n * configured through the
`ExtraOptions`.\n *\n * When set to `EnabledBlocking`, the initial navigation starts before the root\n * component is
created. The bootstrap is blocked until the initial navigation is complete. This\n * value is required for [server-side
rendering](guide/universal) to work.\n *\n * When set to `EnabledNonBlocking`, the initial navigation starts after
the root component has been\n * created. The bootstrap is not blocked on the completion of the initial navigation.\n
*\n * When set to `Disabled`, the initial navigation is not performed. The location listener is set up\n * before the
root component gets created. Use if there is a reason to have more control over when\n * the router starts its initial
navigation due to some complex initialization logic.\n *\n * @see `ExtraOptions`\n */\nconst enum
InitialNavigation {\n  EnabledBlocking,\n  EnabledNonBlocking,\n  Disabled,\n}\n\nconst
INITIAL_NAVIGATION = new InjectionToken<InitialNavigation>(\n  NG_DEV_MODE ? 'initial navigation' :
',\n  {\n    providedIn: 'root', factory: () => InitialNavigation.EnabledNonBlocking});\n\n/**\n * A type alias for
providers returned by `withEnabledBlockingInitialNavigation` for use with\n * `provideRouter`.\n *\n * @see
`withEnabledBlockingInitialNavigation`\n
* @see `provideRouter`\n *\n * @publicApi\n * @developerPreview\n */\nexport type
EnabledBlockingInitialNavigationFeature =\n
RouterFeature<RouterFeatureKind.EnabledBlockingInitialNavigationFeature>;\n\n/**\n * A type alias for providers
returned by `withEnabledBlockingInitialNavigation` or\n * `withDisabledInitialNavigation` functions for use with
`provideRouter`.\n *\n * @see `withEnabledBlockingInitialNavigation`\n * @see `withDisabledInitialNavigation`\n
* @see `provideRouter`\n *\n * @publicApi\n * @developerPreview\n */\nexport type InitialNavigationFeature =\n
EnabledBlockingInitialNavigationFeature|DisabledInitialNavigationFeature;\n\n/**\n * Configures initial
navigation to start before the root component is created.\n *\n * The bootstrap is blocked until the initial navigation
is complete. This value is required for\n * [server-side rendering](guide/universal) to work.\n *\n * @usageNotes\n
*\n * Basic example of how you can enable this navigation
behavior:\n * ```\n * const appRoutes: Routes = [];\n * bootstrapApplication(AppComponent,\n *   {\n *
providers: [\n *     provideRouter(appRoutes, withEnabledBlockingInitialNavigation())\n *   ]\n * });\n *
```\n *\n * @see `provideRouter`\n *\n * @publicApi\n * @developerPreview\n * @returns A set of providers for
use with `provideRouter`.\n */\nexport function withEnabledBlockingInitialNavigation():
EnabledBlockingInitialNavigationFeature {\n  const providers = [\n    {provide: INITIAL_NAVIGATION,\n      useValue:
InitialNavigation.EnabledBlocking},\n    {\n      provide: APP_INITIALIZER,\n      multi: true,\n      deps:
[Injector],\n      useFactory: (injector: Injector) => {\n        const locationInitialized: Promise<any> =\n
injector.get(LOCATION_INITIALIZED, Promise.resolve());\n        let initNavigation = false;\n\n        /**\n
* Performs the given action once the router finishes its next/current navigation.\n
* \n * If the navigation
is canceled or errors without a redirect, the navigation is considered\n
* complete. If the `NavigationEnd` event
emits, the navigation is also considered complete.\n
* \n * function afterNextNavigation(action: () => void)\n
{\n      const router = injector.get(Router);\n      router.events\n        .pipe(\n          filter(\n
(e): e is NavigationEnd|NavigationCancel|NavigationError =>\n            e instanceof NavigationEnd || e
instanceof NavigationCancel ||\n              e instanceof NavigationError),\n          map(e => {\n
if (e instanceof NavigationEnd) {\n              // Navigation assumed to succeed if we get `ActivationStart`\n
return true;\n            }\n          }\n        ),\n        const redirecting = e instanceof NavigationCancel ?\n
(e.code === NavigationCancellationCode.Redirect ||\n
e.code === NavigationCancellationCode.SupersededByNewNavigation) :\n          false;\n      return redirecting ?
null : false;\n    },\n    filter((result): result is boolean => result !== null),\n    take(1),\n  )\n  ).subscribe(() => {\n    action();\n  });\n}\n\nreturn ()
=> {\n  return locationInitialized.then(() => {\n    return new Promise(resolve => {\n      const router
= injector.get(Router);\n      const bootstrapDone = injector.get(BOOTSTRAP_DONE);\n

```

```

afterNextNavigation(() => {\n          // Unblock APP_INITIALIZER in case the initial navigation was canceled
or errored\n          // without a redirect.\n          resolve(true);\n          initNavigation = true;\n
});\n\n  router.afterPreactivation = () => {\n          // Unblock APP_INITIALIZER
once we get to `afterPreactivation`. At this point, we\n          // assume activation will complete successfully
(even though this is not\n          // guaranteed).\n          resolve(true);\n          // only the initial navigation
should be delayed until bootstrapping is done.\n          if (!initNavigation) {\n          return
bootstrapDone.closed ? of(void 0) : bootstrapDone;\n          // subsequent navigations should not be delayed\n
} else {\n          return of(void 0);\n          }\n          };\n          router.initialNavigation();\n
});\n  });\n  };\n  }\n  ];\n  return
routerFeature(RouterFeatureKind.EnabledBlockingInitialNavigationFeature, providers);\n}\n\n/**\n * A type alias
for providers returned by `withDisabledInitialNavigation` for use with\n * `provideRouter`. \n *\n * @see
`withDisabledInitialNavigation`\n * @see `provideRouter`\n *\n * @publicApi\n * @developerPreview\n */\nexport type DisabledInitialNavigationFeature =\nRouterFeature<RouterFeatureKind.DisabledInitialNavigationFeature>;\n\n/**\n * Disables initial navigation.\n *\n * Use if there is a reason to have more control over when the router starts its initial navigation\n * due to some
complex initialization logic.\n *\n * @usageNotes\n *\n * Basic example of how you can disable initial
navigation:\n * ```\n * const appRoutes: Routes = [];\n * bootstrapApplication(AppComponent, {\n *
  providers: [\n *    provideRouter(appRoutes, withDisabledInitialNavigation())\n *  ]\n * });\n * ```\n *\n * @see `provideRouter`\n *\n * @returns A set of providers for use with `provideRouter`. \n *\n * @publicApi\n *
@developerPreview\n */\nexport function withDisabledInitialNavigation(): DisabledInitialNavigationFeature {\n
const providers = [\n  {\n    provide: APP_INITIALIZER,\n    multi: true,\n    useFactory: () => {\n      const
router = inject(Router);\n      return () => {\n        router.setUpLocationChangeListener();\n      };\n    }\n  },\n  {\n    provide: INITIAL_NAVIGATION, useValue: InitialNavigation.Disabled\n  };\n];\n  return
routerFeature(RouterFeatureKind.DisabledInitialNavigationFeature, providers);\n}\n\n/**\n * A type alias for
providers returned by `withDebugTracing` for use with `provideRouter`. \n *\n * @see `withDebugTracing`\n *
@see `provideRouter`\n *\n * @publicApi\n * @developerPreview\n */\nexport type DebugTracingFeature =
RouterFeature<RouterFeatureKind.DebugTracingFeature>;\n\n/**\n * Enables logging of all internal navigation
events to the console.\n * Extra logging might be useful for debugging purposes to inspect Router event sequence.\n
*\n * @usageNotes\n *\n * Basic example of how you can enable debug tracing:\n * ```\n * const appRoutes: Routes
= [];\n * bootstrapApplication(AppComponent, {\n *   providers: [\n *     provideRouter(appRoutes,
withDebugTracing())\n *   ]\n * });\n * ```\n *\n * @see `provideRouter`\n *\n * @returns A set of providers for use with
`provideRouter`. \n *\n * @publicApi\n * @developerPreview\n */\nexport function withDebugTracing():
DebugTracingFeature {\n  let providers: Provider[] = [];\n  if (NG_DEV_MODE) {\n    providers = [{\n      provide:
ENVIRONMENT_INITIALIZER,\n      multi: true,\n      useFactory: () => {\n        const router = inject(Router);\n
        return () => router.events.subscribe((e: Event) => {\n          // tslint:disable:no-console\n
console.group?.(`Router Event: ${(<any>e.constructor).name}`);\n          console.log(stringifyEvent(e));\n
console.log(e);\n          console.groupEnd?.();\n          // tslint:enable:no-console\n        });\n      };\n    };\n  } else {\n
providers = [];\n  }\n  return routerFeature(RouterFeatureKind.DebugTracingFeature, providers);\n}\n\nconst
ROUTER_PRELOADER = new InjectionToken<RouterPreloader>(NG_DEV_MODE ? 'router preloader'
: '');\n\n/**\n * A type alias that represents a feature which enables preloading in Router.\n * The type is used to
describe the return value of the `withPreloading` function.\n *\n * @see `withPreloading`\n *\n * @see
`provideRouter`\n *\n * @publicApi\n * @developerPreview\n */\nexport type PreloadingFeature =
RouterFeature<RouterFeatureKind.PreloadingFeature>;\n\n/**\n * Allows to configure a preloading strategy to use.
The strategy is configured by providing a\n * reference to a class that implements a `PreloadingStrategy`. \n *\n *
@usageNotes\n *\n * Basic example of how you can configure preloading:\n * ```\n * const appRoutes: Routes =
[];\n * bootstrapApplication(AppComponent, {\n *   providers: [\n *     provideRouter(appRoutes,
withPreloading(PreloadAllModules))\n *   ]\n * });\n * ```\n *\n * @see `provideRouter`\n *\n * @param

```



```

preloadingStrategy A reference to a class that implements a `PreloadingStrategy` that
  should be used.
  @returns A set of providers
  for use with `provideRouter`.
  @publicApi
  @developerPreview
  ^/nexport function
withPreloading(preloadingStrategy: Type<PreloadingStrategy>): PreloadingFeature {
  const providers = [
    {provide: ROUTER_PRELOADER, useExisting: RouterPreloader},
    {provide: PreloadingStrategy, useExisting:
preloadingStrategy},
  ];
  return routerFeature(RouterFeatureKind.PreloadingFeature, providers);
}
  A type alias for providers returned by `withRouterConfig` for use with `provideRouter`.
  @see
  `withRouterConfig`
  @see `provideRouter`
  @publicApi
  @developerPreview
  ^/nexport type
RouterConfigurationFeature =
  RouterFeature<RouterFeatureKind.RouterConfigurationFeature>;
  A type alias that represents
  all Router features available for use with `provideRouter`.
  Features can be enabled by adding special functions
  to the `provideRouter` call.
  See documentation for each symbol to find corresponding function name.
  See also
  `provideRouter`
  documentation on how to use those functions.
  @see `provideRouter`
  @publicApi
  @developerPreview
  ^/nexport type RouterFeatures =
  PreloadingFeature|DebugTracingFeature|InitialNavigationFeature|
  InMemoryScrollingFeature|RouterConfigurationFeature;
  The list of features as an enum to uniquely type
  each feature.
  ^/nexport const enum RouterFeatureKind {
  PreloadingFeature,
  DebugTracingFeature,
  EnabledBlockingInitialNavigationFeature,
  DisabledInitialNavigationFeature,
  InMemoryScrollingFeature,
  RouterConfigurationFeature
}
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  Use
  of this source code is governed by an MIT-style license that can be
  found in the LICENSE file at
  https://angular.io/license
  @license
  @ngmodule
  RouterModule {
    HashLocationStrategy, Location, LocationStrategy, PathLocationStrategy,
    ViewportScroller
  } from '@angular/common';
  @ngmodule
  RouterModule {
    APP_BOOTSTRAP_LISTENER, ComponentRef, inject,
    Inject, InjectionToken, ModuleWithProviders, NgModule, NgProbeToken,
    Optional, Provider, SkipSelf, RuntimeError as RuntimeError
  } from '@angular/core';
  @ngmodule
  RouterModule {
    EmptyOutletComponent
  } from './components/empty_outlet';
  @ngmodule
  RouterModule {
    RouterLink, RouterLinkWithHref
  } from './directives/router_link';
  @ngmodule
  RouterModule {
    RouterLinkActive
  } from './directives/router_link_active';
  @ngmodule
  RouterModule {
    RouterOutlet
  } from './directives/router_outlet';
  @ngmodule
  RouterModule {
    RuntimeErrorCode
  } from './errors';
  @ngmodule
  RouterModule {
    Routes
  } from './models';
  @ngmodule
  RouterModule {
    getBootstrapListener, provideRoutes, rootRoute, withDebugTracing,
    withDisabledInitialNavigation, withEnabledBlockingInitialNavigation, withPreloading
  } from './provide_router';
  @ngmodule
  RouterModule {
    Router, setupRouter
  } from './router';
  @ngmodule
  RouterModule {
    ExtraOptions,
    ROUTER_CONFIGURATION
  } from './router_config';
  @ngmodule
  RouterModule {
    RouterConfigLoader
  } from './router_config_loader';
  @ngmodule
  RouterModule {
    ChildrenOutletContexts
  } from './router_outlet_context';
  @ngmodule
  RouterModule {
    ROUTER_SCROLLER, RouterScroller
  } from './router_scroller';
  @ngmodule
  RouterModule {
    ActivatedRoute
  } from './router_state';
  @ngmodule
  RouterModule {
    DefaultUrlSerializer,
    UrlSerializer
  } from './url_tree';
  const NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
  ngDevMode;
  The directives defined in the `RouterModule`.
  const ROUTER_DIRECTIVES = [
    RouterOutlet, RouterLink, RouterLinkWithHref, RouterLinkActive, EmptyOutletComponent
  ];
  @docsNotRequired
  ^/nexport const ROUTER_FORROOT_GUARD = new InjectionToken<void>(
  NG_DEV_MODE ? 'router duplicate forRoot guard' : 'ROUTER_FORROOT_GUARD');
  TODO(atscott): All

```

of these except `ActivatedRoute` are `providedIn: 'root'`. They are only kept here to avoid a breaking change whereby the provider order matters based on where the `RouterModule`/`RouterTestingModule` is imported. These can/should be removed as a "breaking" change in a major version.

```

export const
ROUTER_PROVIDERS: Provider[] = [
  Location,
  { provide: UrlSerializer, useClass: DefaultUrlSerializer },
  { provide: Router, useFactory: setupRouter },
  ChildrenOutletContexts,
  { provide: ActivatedRoute, useFactory: rootRoute, deps: [Router] },
  RouterConfigLoader,
];

export function routerNgProbeToken() {
  return new NgProbeToken('Router', Router);
}

/**
 * @description
 * Adds directives and providers for in-app navigation among views defined in an application.
 * Use the Angular `Router` service to declaratively specify application states and manage state transitions.
 * You can import this NgModule multiple times, once for each lazy-loaded bundle.
 * However, only one `Router` service can be active.
 * To ensure this, there are two ways to register routes when importing this module:
 * * The `forRoot()` method creates an `NgModule` that contains all the directives, the given routes, and the `Router` service itself.
 * * The `forChild()` method creates an `NgModule` that contains all the directives and the given routes, but does not include the `Router` service.
 * @see [Routing and Navigation guide](guide/router) for an overview of how the `Router` service should be used.
 */
@publicApi
@NgModule({
  imports: ROUTER_DIRECTIVES,
  exports: ROUTER_DIRECTIVES,
})
export class RouterModule {
  constructor(
    @Optional() @Inject(ROUTER_FORROOT_GUARD) guard: any
  ) {}

  /**
   * Creates and configures a module with all the router providers and directives.
   * Optionally sets up an application listener to perform an initial navigation.
   * When registering the NgModule at the root, import as follows:
   *
   * ```
   * @NgModule({
   *   imports: [RouterModule.forRoot(ROUTES)]
   * })
   * class MyNgModule {}
   *
   * @param routes An array of `Route` objects that define the navigation paths for the application.
   * @param config An `ExtraOptions` configuration object that controls how navigation is performed.
   * @return The new `NgModule`.
   */
  static forRoot(routes: Routes, config?: ExtraOptions): ModuleWithProviders<RouterModule> {
    return {
      ngModule: RouterModule,
      providers: [
        ROUTER_PROVIDERS,
        NG_DEV_MODE ? (config?.enableTracing ? withDebugTracing().providers : []) : [],
        provideRoutes(routes),
        {
          provide: ROUTER_FORROOT_GUARD,
          useFactory: provideForRootGuard,
          deps: [[Router, new Optional(), new SkipSelf()]],
        },
        {
          provide: ROUTER_CONFIGURATION,
          useValue: config ? config : {}
        },
        config?.useHash ? provideHashLocationStrategy() : providePathLocationStrategy(),
        provideRouterScroller(),
        config?.preloadingStrategy ? withPreloading(config.preloadingStrategy).providers : [],
        {
          provide: NgProbeToken,
          multi: true,
          useFactory: routerNgProbeToken,
        },
        config?.initialNavigation ? provideInitialNavigation(config) : [],
        provideRouterInitializer(),
      ],
    };
  }

  /**
   * Creates a module with all the router directives and a provider registering routes, without creating a new Router service.
   * When registering for submodules and lazy-loaded submodules, create the NgModule as follows:
   *
   * ```
   * @NgModule({
   *   imports: [RouterModule.forChild(ROUTES)]
   * })
   * class MyNgModule {}
   *
   * @param routes An array of `Route` objects that define the navigation paths for the submodule.
   * @return The new NgModule.
   */
  static forChild(routes: Routes): ModuleWithProviders<RouterModule> {
    return {
      ngModule: RouterModule,
      providers: [provideRoutes(routes)];
    };
  }
}

/**
 * For internal use by `RouterModule` only. Note that this differs from `withInMemoryRouterScroller` because it reads from the `ExtraOptions` which should not be used in the standalone world.
 */
export function provideRouterScroller(): Provider {
  return {
    provide: ROUTER_SCROLLER,
    useFactory: () => {
      const router = inject(Router);
      const viewportScroller = inject(ViewportScroller);
      const config: ExtraOptions = inject(ROUTER_CONFIGURATION);
      if (config.scrollOffset) {
        viewportScroller.setOffset(config.scrollOffset);
      }
      return new RouterScroller(router, viewportScroller, config);
    },
  };
}

/**
 * Note: For internal use only with `RouterModule`. Standalone setup via `provideRouter` should provide hash location directly via `{provide: LocationStrategy, useClass: HashLocationStrategy}`.
 */
function provideHashLocationStrategy(): Provider {
  return {
    provide:

```

```

LocationStrategy, useClass: HashLocationStrategy};\n}\n\n// Note: For internal use only with `RouterModule`.  

Standalone setup via `provideRouter` does not\n// need this at all because `PathLocationStrategy` is the default  

factory for `LocationStrategy`.\nfunction providePathLocationStrategy(): Provider {\n  return {provide:  

LocationStrategy, useClass: PathLocationStrategy};\n}\n\nexport function provideForRootGuard(router: Router):  

any {\n  if (NG_DEV_MODE && router) {\n    throw new RuntimeError(\n  

      RuntimeErrorCode.FOR_ROOT_CALLED_TWICE,\n      `The Router was provided more than once. This  

      can happen if 'forRoot' is used outside of the root injector.` +\n      ` Lazy loaded modules should use  

      RouterModule.forChild() instead.`);\n  }\n  return 'guarded';\n}\n\n// Note: For internal use only with  

`RouterModule`. Standalone router setup with `provideRouter`\n// users call `withXInitialNavigation`  

directly.\nfunction provideInitialNavigation(config: Pick<ExtraOptions, 'initialNavigation'>): Provider[] {\n  return  

[\n    config.initialNavigation === 'disabled' ? withDisabledInitialNavigation().providers : [],\n    config.initialNavigation === 'enabledBlocking' ?\n      withEnabledBlockingInitialNavigation().providers :\n    [],\n  ];\n}\n\n// TODO(atscott): This should not be in the public API\n/**\n * A [DI token](guide/glossary/#di-  

token) for the router initializer that\n * is called after the app is bootstrapped.\n * @publicApi\n */\nexport const  

ROUTER_INITIALIZER = new InjectionToken<(compRef: ComponentRef<any>) => void>(\n  

  NG_DEV_MODE ? 'Router Initializer' : '');\n\nfunction provideRouterInitializer(): Provider[] {\n  return [\n    //  

ROUTER_INITIALIZER token should be removed. It's public API but shouldn't be. We can just\n    // have  

`getBootstrapListener` directly attached to APP_BOOTSTRAP_LISTENER.\n    {provide:  

ROUTER_INITIALIZER, useFactory: getBootstrapListener},\n    {provide: APP_BOOTSTRAP_LISTENER,  

multi: true, useExisting: ROUTER_INITIALIZER},\n  ];\n}\n\n"/**\n * @license\n * Copyright Google LLC All  

Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the  

LICENSE file at https://angular.io/license\n */\n\n/**\n * @module\n * @description\n * Entry point for all public  

APIs of the router package.\n */\nimport {Version} from '@angular/core';\n/**\n * @publicApi\n */\nexport  

const VERSION = new Version('14.3.0');\n"/**\n * @license\n * Copyright  

Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n *  

found in the LICENSE file at https://angular.io/license\n */\n\nexport {EmptyOutletComponent} from  

'./components/empty_outlet';\nexport {withPreloading as withPreloading} from './provide_router';\nexport  

{assignExtraOptionsToRouter as assignExtraOptionsToRouter, RestoredState as RestoredState} from  

'./router';\nexport {ROUTER_PROVIDERS as ROUTER_PROVIDERS} from './router_module';\nexport {flatten as  

flatten} from './utils/collection';\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use  

of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at  

https://angular.io/license\n */\n\nexport {createUrlTreeFromSnapshot} from './create_url_tree';\nexport  

{RouterLink, RouterLinkWithHref} from './directives/router_link';\nexport {RouterLinkActive} from  

'./directives/router_link_active';\nexport {RouterOutlet,  

RouterOutletContract} from './directives/router_outlet';\nexport {ActivationEnd, ActivationStart,  

ChildActivationEnd, ChildActivationStart, Event, EventType, GuardsCheckEnd, GuardsCheckStart,  

NavigationCancel, NavigationCancellationCode as NavigationCancellationCode, NavigationEnd, NavigationError,  

NavigationStart, ResolveEnd, ResolveStart, RouteConfigLoadEnd, RouteConfigLoadStart, RouterEvent,  

RoutesRecognized, Scroll} from './events';\nexport {CanActivate, CanActivateChild, CanActivateChildFn,  

CanActivateFn, CanDeactivate, CanDeactivateFn, CanLoad, CanLoadFn, CanMatch, CanMatchFn, Data,  

LoadChildren, LoadChildrenCallback, NavigationBehaviorOptions, QueryParamsHandling, Resolve, ResolveData,  

ResolveFn, Route, Routes, RunGuardsAndResolvers, UrlMatcher, UrlMatchResult} from './models';\nexport  

{DefaultTitleStrategy, TitleStrategy} from './page_title_strategy';\nexport {DebugTracingFeature,  

DisabledInitialNavigationFeature, EnabledBlockingInitialNavigationFeature, InitialNavigationFeature,  

InMemoryScrollingFeature, PreloadingFeature, provideRouter, provideRoutes, RouterConfigurationFeature,  

RouterFeature, RouterFeatures, withDebugTracing, withDisabledInitialNavigation,  

withEnabledBlockingInitialNavigation, withInMemoryScrolling, withPreloading, withRouterConfig} from  

'./provide_router';\nexport {BaseRouteReuseStrategy, DetachedRouteHandle, RouteReuseStrategy} from

```



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No license file was found, but licenses were detected in source scan.

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No license file was found, but licenses were detected in source scan.

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{ "version":3,"file":"testing.mjs","sources":["../../../../../packages/router/testing/src/extra_router_testing_providers.ts", "../../../../../packages/router/testing/src/router_testing_module.ts", "../../../../../packages/router/testing/src/spy_ng_module_factory_loader.ts", "../../../../../packages/router/testing/src/testing.ts", "../../../../../packages/router/testing/public_api.ts", "../../../../../packages/router/testing/index.ts", "../../../../../packages/router/testing/testing.ts"],"sourceContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n This file exists to easily patch the SpyNgModuleFactoryLoader into g3\nexport const\nEXTRA_ROUTER_TESTING_PROVIDERS = [];\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {Location, LocationStrategy} from '@angular/common';\nimport {MockLocationStrategy, SpyLocation} from '@angular/common/testing';\nimport {Compiler, Injector, ModuleWithProviders, NgModule, Optional} from '@angular/core';\nimport {ChildrenOutletContexts, ExtraOptions, NoPreloading, provideRoutes, Route, Router, ROUTER_CONFIGURATION, RouteReuseStrategy, RouterModule, ROUTES, Routes, TitleStrategy, UrlHandlingStrategy, UrlSerializer, assignExtraOptionsToRouter as assignExtraOptionsToRouter, flatten as flatten, ROUTER_PROVIDERS as ROUTER_PROVIDERS, withPreloading as withPreloading} from '@angular/router';\n\nimport {EXTRA_ROUTER_TESTING_PROVIDERS} from './extra_router_testing_providers';\n\nfunction isUrlHandlingStrategy(opts: ExtraOptions\n                                UrlHandlingStrategy): opts is UrlHandlingStrategy {\n  // This property check is needed because UrlHandlingStrategy is an interface and doesn't exist at\n  // runtime.\n  return 'shouldProcessUrl' in opts;\n}\n\n/**\n * Router setup factory function used for testing. Only used internally to keep the factory that's\n * marked as publicApi cleaner (i.e. not having `TitleStrategy` and `DefaultTitleStrategy`).\n *\nexport function setupTestingRouterInternal(\n  urlSerializer: UrlSerializer,\n  contexts: ChildrenOutletContexts,\n  location: Location,\n  compiler: Compiler,\n  injector: Injector,\n  routes: Route[][],\n  titleStrategy: TitleStrategy,\n  opts?: ExtraOptions|UrlHandlingStrategy,\n  urlHandlingStrategy?: UrlHandlingStrategy,\n  routeReuseStrategy?: RouteReuseStrategy,\n) {\n  return setupTestingRouter(\n    urlSerializer, contexts, location, compiler, injector, routes, opts, urlHandlingStrategy,\n    routeReuseStrategy, titleStrategy);\n}\n\n/**\n * Router setup factory function used for testing.\n *\n * @publicApi\n *\nexport function setupTestingRouter(\n  urlSerializer: UrlSerializer, contexts: ChildrenOutletContexts, location: Location,\n  compiler: Compiler, injector: Injector, routes: Route[][],\n  opts?: ExtraOptions|UrlHandlingStrategy|null, urlHandlingStrategy?: UrlHandlingStrategy,\n  routeReuseStrategy?:
```





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# 1.201 @angular/localize 14.3.0

## 1.201.1 Available under license :

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 * Copyright Google LLC All Rights Reserved.  
 *  
 * Use of this source code is governed by an MIT-style license that can be  
 * found in the LICENSE file at https://angular.io/license
```

\*/

Found in path(s):

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- \*
- /opt/cola/permits/1784583521\_1693546611.9589572/0/localize-14-3-0-tgz/package/esm2020/index.mjs
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{"version":3,"file":"localize.mjs","sources":["../../../../../../packages/localize/src/utils/src/constants.ts", "../../../../../../packages/localize/src/utils/src/messages.ts", "../../../../../../packages/localize/src/utils/src/translations.ts", "../../../../../../packages/localize/src/utils/index.ts", "../../../../../../packages/localize/src/translate.ts", "../../../../../../packages/localize/src/localize/src/global.ts", "../../../../../../packages/localize/src/localize/src/localize.ts", "../../../../../../packages/localize/src/localize/index.ts", "../../../../../../packages/localize/private.ts", "../../../../../../packages/localize/localize.ts", "../../../../../../packages/localize/index.ts"],"sourcesContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\n * The character used to mark the start and end of a \"block\" in a `localize` tagged string.\n * A block can indicate metadata about the message or specify a name of a placeholder for a\n * substitution expressions.\n *\n * For example:\n *\n * `ts\n * localize`Hello, ${title}:title:!\n * localize`meaning|description@ @id:source message text`;\n *\n * `^nexport const BLOCK_MARKER = ';\n */\n\n * The marker used to separate a message's\n * \"meaning\" from its \"description\" in a metadata block.\n *\n * For example:\n *\n * `ts\n * localize\n * :correct|Indicates that the user got the answer correct: Right!`;\n * localize `:movement|Button label for moving to the right: Right!`;\n *\n * `^nexport const MEANING_SEPARATOR = '|`\n */\n\n * The marker used to separate a message's custom\n * \"id\" from its \"description\" in a metadata block.\n *\n * For example:\n *\n * `ts\n * localize `:A welcome message on the home page@ @myApp-homepage-welcome: Welcome!`;\n *\n * `^nexport const ID_SEPARATOR = '@@';\n */\n\n * The marker used to separate legacy message ids from the rest of a\n * metadata block.\n *\n * For example:\n *\n * `ts\n * localize `:@custom-id2df64767cd895a8fabe3e18b94b5b6b6f9e2e3f0: Welcome!`;\n *\n * `^n\n * Note that this character is the \"\n * symbol for the unit separator\n * \" () not the \"unit separator\n * character\n * \" itself, since that has no visual representation. See\n * https://graphemica.com/%E2%90%9F.\n *\n * Here is some background for the original \"unit separator\n * character\n * \":\n * https://stackoverflow.com/questions/8695118/whats-the-file-group-record-unit-separator-control-characters-and-its-usage\n *\n * `^nexport const LEGACY_ID_INDICATOR = '\\u241F';\n */\n\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license\n * that can be\n * found in the LICENSE file at https://angular.io/license\n *\n * import { computeMsgId } from '@angular/compiler';\n *\n * import { BLOCK_MARKER, ID_SEPARATOR,
```

```

LEGACY_ID_INDICATOR, MEANING_SEPARATOR} from './constants';\n\n/**\n * Re-export this helper
function so that users of `@angular/localize` don't need to actively import\n * from `@angular/compiler`. \n
*\nexport {computeMsgId} from '@angular/compiler';\n\n/**\n * A string containing a translation source
message.\n *\n * I.E. the message that indicates what will be translated from.\n *\n * Uses `{placeholder-name}` to
indicate a placeholder.\n *\nexport type SourceMessage = string;\n\n/**\n * A string containing a translation target
message.\n *\n * I.E. the message that indicates what will be translated to.\n *\n * Uses `{placeholder-name}` to
indicate a placeholder.\n *\nexport type TargetMessage = string;\n\n/**\n * A string that uniquely identifies a
message, to be used for matching translations.\n *\nexport type MessageId = string;\n\n/**\n * Declares a copy of
the `AbsoluteFsPath` branded type in `@angular/compiler-cli` to avoid an\n * import into `@angular/compiler-cli`.
The compiler-cli's declaration files are not necessarily\n * compatible with web environments that use
`@angular/localize`, and would inadvertently include\n * `typescript` declaration files in any compilation unit that
uses `@angular/localize` (which\n * increases parsing time and memory usage during builds) using a default import
that only\n * type-checks when `allowSyntheticDefaultImports` is enabled.\n *\n * @see
https://github.com/angular/angular/issues/45179\n
*\nexport type AbsoluteFsPathLocalizeCopy = string & { _brand:
'AbsoluteFsPath'};\n\n/**\n * The location of the message in the source file.\n *\n * The `line` and `column` values
for the `start` and `end` properties are zero-based.\n *\nexport interface SourceLocation {\n  start: {line: number,
column: number};\n  end: {line: number, column: number};\n  file: AbsoluteFsPathLocalizeCopy;\n  text?:
string;\n}\n\n/**\n * Additional information that can be associated with a message.\n *\nexport interface
MessageMetadata {\n  /**\n   * A human readable rendering of the message\n   *\n   text: string;\n  /**\n   * Legacy message ids, if provided.\n
*\n   * In legacy message formats the message id can only be computed directly from the original\n   * template
source.\n   *\n   * Since this information is not available in `$localize` calls, the legacy message ids may be\n   *
attached by the compiler to the `$localize` metablock so it can be used if needed at the point\n   * of translation if the
translations are encoded using the legacy message id.\n   *\n   legacyIds?: string[];\n  /**\n   * The id of the
`message` if a custom one was specified explicitly.\n   *\n   * This id overrides any computed or legacy ids.\n   *\n   customId?: string;\n  /**\n   * The meaning of the `message`, used to distinguish identical `messageString`s.\n   *\n   meaning?: string;\n  /**\n   * The description of the `message`, used to aid translation.\n   *\n   description?:
string;\n  /**\n   * The location of the message in the source.\n
*\n   location?: SourceLocation;\n}\n\n/**\n * Information parsed from a `$localize` tagged string that is used to
translate it.\n *\n * For example:\n *\n * ```\n * const name = 'Jo Bloggs';\n * $localize`Hello
${name}:title@@ID:!\n * `;\n * May be parsed into:\n *\n * ```\n * {\n *   id: '6998194507597730591',\n *
substitutions: { title: 'Jo Bloggs' },\n *   messageString: 'Hello {title}!',\n *   placeholderNames: ['title'],\n *
associatedMessageIds: { title: 'ID' },\n * }\n * ```\n *\nexport interface ParsedMessage extends MessageMetadata {\n
/**\n * The key used to look up the appropriate translation target.\n *\n id: MessageId;\n /**\n * A
mapping of placeholder names to substitution values.\n *\n substitutions: Record<string, any>;\n /**\n * An
optional mapping of placeholder names to associated MessageIds.\n * This can be used to match ICU placeholders
to the message that contains the ICU.\n *\n associatedMessageIds?: Record<string,
MessageId>;\n /**\n * An optional mapping of placeholder names to source locations\n *\n substitutionLocations?:
Record<string, SourceLocation|undefined>;\n /**\n * The static parts of the message.\n
*\n messageParts: string[];\n /**\n * An optional mapping of message parts to source locations\n *\n
messagePartLocations?: (SourceLocation|undefined)[];\n /**\n * The names of the placeholders that will be
replaced with substitutions.\n *\n placeholderNames: string[];\n}\n\n/**\n * Parse a `$localize` tagged string into
a structure that can be used for translation or\n * extraction.\n *\n * See `ParsedMessage` for an example.\n
*\nexport function parseMessage(\n  messageParts: TemplateStringsArray, expressions?: readonly any[],\n  location?:
SourceLocation,\n  messagePartLocations?: (SourceLocation|undefined)[],\n  expressionLocations:
(SourceLocation|undefined)[] = []): ParsedMessage {\n  const substitutions: {[placeholderName: string]: any} =
{};\n  const

```

```

substitutionLocations: {[placeholderName: string]: SourceLocation|undefined} = {};
const associatedMessageIds: {[placeholderName: string]: MessageId} = {};
const metadata = parseMetadata(messageParts[0], messageParts.raw[0]);
const cleanedMessageParts: string[] = [metadata.text];
const placeholderNames: string[] = [];
let messageString = metadata.text;
for (let i = 1; i < messageParts.length; i++) {
  const {messagePart, placeholderName = computePlaceholderName(i), associatedMessageId} =
  parsePlaceholder(messageParts[i], messageParts.raw[i]);
  messageString += `$$${placeholderName}$$${messagePart}`;
  if (expressions !== undefined) {
    substitutions[placeholderName] = expressions[i - 1];
    substitutionLocations[placeholderName] = expressionLocations[i - 1];
  }
  placeholderNames.push(placeholderName);
  if (associatedMessageId !== undefined) {
    associatedMessageIds[placeholderName] = associatedMessageId;
  }
  cleanedMessageParts.push(messagePart);
}
const messageId = metadata.customId || computeMsgId(messageString, metadata.meaning || "");
const legacyIds = metadata.legacyIds ? metadata.legacyIds.filter(id => id !== messageId) : [];
return {
  id: messageId,
  legacyIds,
  substitutions,
  substitutionLocations,
  text: messageString,
  customId: metadata.customId,
  meaning: metadata.meaning || "",
  description: metadata.description || "",
  messageParts: cleanedMessageParts,
  messagePartLocations,
  placeholderNames,
  associatedMessageIds,
  location,
};
}

/**
 * Parse the given message part (`cooked` + `raw`) to extract the message metadata from the text.
 *
 * If the message part has a metadata block this function will extract the `meaning`, `description`, `customId` and `legacyId` (if provided) from the block. These metadata properties are serialized in the string delimited by `|`, `@` and `` respectively.
 *
 * (Note that `` is the `LEGACY_ID_INDICATOR` - see `constants.ts`.)
 *
 * For example:
 *
 * `meaning|description@@custom-id:`
 *
 * `meaning|@custom-id:`
 *
 * `description@@custom-id:`
 *
 * `meaning|:description:`
 *
 * `:@custom-id:`
 *
 * `meaning|description@@custom-idlegacy-id-1legacy-id-2:`
 *
 * @param cooked The cooked version of the message part to parse.
 * @param raw The raw version of the message part to parse.
 * @returns A object containing any metadata that was parsed from the message part.
 */
export function parseMetadata(cooked: string, raw: string): MessageMetadata {
  const {text: messageString, block} = splitBlock(cooked, raw);
  if (block === undefined) {
    return {text: messageString};
  } else {
    const [meaningDescAndId, ...legacyIds] = block.split(LEGACY_ID_INDICATOR);
    const [meaningAndDesc, customId] = meaningDescAndId.split(ID_SEPARATOR, 2);
    let [meaning, description]: (string|undefined)[] = meaningAndDesc.split(MEANING_SEPARATOR, 2);
    if (description === undefined) {
      description = meaning;
      meaning = undefined;
    }
    if (description === "") {
      description = undefined;
    }
    return {text: messageString, meaning, description, customId, legacyIds};
  }
}

/**
 * Parse the given message part (`cooked` + `raw`) to extract any placeholder metadata from the text.
 *
 * If the message part has a metadata block this function will extract the `placeholderName` and `associatedMessageId` (if provided) from the block.
 *
 * These metadata properties are serialized in the string delimited by `@@`.
 *
 * For example:
 *
 * `placeholder-name@@associated-id:`
 *
 * @param cooked The cooked version of the message part to parse.
 * @param raw The raw version of the message part to parse.
 * @returns A object containing the metadata (`placeholderName` and `associatedMessageId`) of the preceding placeholder, along with the static text that follows.
 */
export function parsePlaceholder(cooked: string, raw: string): {messagePart: string; placeholderName?: string; associatedMessageId?: string;} {
  const {text: messagePart, block} = splitBlock(cooked, raw);
  if (block === undefined) {
    return {messagePart};
  } else {
    const [placeholderName, associatedMessageId] = block.split(ID_SEPARATOR);
    return {messagePart, placeholderName, associatedMessageId};
  }
}

/**
 * Split a message part (`cooked` + `raw`) into an optional delimited "block" off the front and the rest of the text of the message part.
 *
 * Blocks appear at the start of message parts. They are delimited by a colon `:` character at the start and end of the block.
 *
 * If the block is in the first message part then it will be metadata about the whole message: meaning, description, id. Otherwise it will be metadata about the immediately preceding substitution: placeholder
 */

```

```

name.\n * Since blocks are optional, it is possible that the content of a message block actually starts\n * with a
block marker. In this case the marker must be escaped `\\:`.\n * @param cooked The cooked version of the
message part to parse.\n * @param raw The raw version of the message part to parse.\n * @returns An object
containing the `text` of the message part and the text of the `block`, if it\n * exists.\n * @throws an error if the
`block` is unterminated\n */\nexport function splitBlock(cooked: string, raw: string): {text: string, block?: string}
{\n  if (raw.charAt(0) !== BLOCK_MARKER) {\n    return {text: cooked};\n  } else {\n    const endOfBlock =
findEndOfBlock(cooked, raw);\n    return {\n      block: cooked.substring(1, endOfBlock),\n      text:
cooked.substring(endOfBlock + 1),\n    }; }\n}\n\nfunction computePlaceholderName(index: number) {\n
return index === 1 ? 'PH' : `PH_${index - 1}`;\n}\n\n/**\n * Find the end of a \"marked block\" indicated by
the first non-escaped colon.\n */\n * @param cooked The cooked string (where escaped chars have been
processed)\n * @param raw The raw string (where escape sequences are still in place)\n */\n * @returns the index of
the end of block marker\n * @throws an error if the block is unterminated\n */\nexport function
findEndOfBlock(cooked: string, raw: string): number {\n  for (let cookedIndex = 1, rawIndex = 1; cookedIndex <
cooked.length; cookedIndex++, rawIndex++) {\n    if (raw[rawIndex] === '\\\\:') {\n      rawIndex++; }\n    } else if
(cooked[cookedIndex] === BLOCK_MARKER) {\n      return cookedIndex;\n    } }\n  throw new
Error(`Unterminated $localize metadata block in \"${raw}\"`);\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\nimport {BLOCK_MARKER} from './constants';\nimport
{MessageId, MessageMetadata, ParsedMessage,
parseMessage, TargetMessage} from './messages';\n\n/**\n * A translation message that has been processed to
extract the message parts and placeholders.\n */\nexport interface ParsedTranslation extends MessageMetadata {\n
messageParts: TemplateStringsArray;\n placeholderNames: string[];\n}\n\n/**\n * The internal structure used by
the runtime localization to translate messages.\n */\nexport type ParsedTranslations = Record<MessageId,
ParsedTranslation>;\n\nexport class MissingTranslationError extends Error {\n  private readonly type =
'MissingTranslationError';\n  constructor(readonly parsedMessage: ParsedMessage) {\n    super(`No translation
found for ${describeMessage(parsedMessage)}`);\n  }\n}\n\nexport function isMissingTranslationError(e: any): e is
MissingTranslationError {\n  return e.type === 'MissingTranslationError';\n}\n\n/**\n * Translate the text of the
`$localize` tagged-string (i.e. `messageParts` and\n * `substitutions`) using the given `translations`.\n * The
tagged-string is parsed to extract its `messageId` which is used to find an appropriate\n * `ParsedTranslation`. If this
doesn't match and there are legacy ids then try matching a\n * translation using those.\n * If one is found then it
is used to translate the message into a new set of `messageParts` and\n * `substitutions`.\n * The translation may
reorder (or remove) substitutions as appropriate.\n * If there is no translation with a matching message id then an
error is thrown.\n * If a translation contains a placeholder that is not found in the message being translated then an\n
* error is thrown.\n */\nexport function translate(\n  translations: Record<string, ParsedTranslation>, messageParts:
TemplateStringsArray,\n  substitutions: readonly any[]): [TemplateStringsArray, readonly any[]] {\n  const
message = parseMessage(messageParts, substitutions);\n  // Look up the translation using the messageId, and then
the legacyId if available.\n  let translation = translations[message.id];\n\n  // If the messageId did not match a translation, try matching the legacy ids instead\n  if (message.legacyIds !==
undefined) {\n    for (let i = 0; i < message.legacyIds.length && translation === undefined; i++) {\n      translation =
translations[message.legacyIds[i];\n    } }\n  if (translation === undefined) {\n    throw new
MissingTranslationError(message);\n  }\n  return [\n    translation.messageParts,\n    translation.placeholderNames.map(placeholder => {\n      if (message.substitutions.hasOwnProperty(placeholder))
{\n        return message.substitutions[placeholder];\n      } else {\n        throw new Error(`There is a
placeholder name mismatch with the translation provided for the message ${\n
describeMessage(message)}.\n` +\n          `The translation contains a placeholder with name ${\n
placeholder}, which does not exist in the message.`);\n      } }\n  ]);\n}\n\n/**\n * Parse the `messageParts` and
`placeholderNames`

```

```

    out of a target `message`.
    * Used by `loadTranslations()` to convert target message strings into a structure that
    is more appropriate for doing translation.
    * @param message the message to be parsed.
    * @export
    function parseTranslation(messageString: TargetMessage): ParsedTranslation {
    const parts =
    messageString.split(/\${[^}]*}/);
    const messageParts = [parts[0]];
    const placeholderNames: string[] = [];
    for (let i = 1; i < parts.length - 1; i += 2) {
    placeholderNames.push(parts[i]);
    messageParts.push(`${parts[i +
    1]}`);
    }
    const rawMessageParts =
    messageParts.map(part => part.charAt(0) === BLOCK_MARKER ?
    '\\\\' + part : part);
    return {
    text: messageString,
    messageParts: makeTemplateObject(messageParts,
    rawMessageParts),
    placeholderNames,
    };
    }
    * Create a `ParsedTranslation` from a set of
    `messageParts` and `placeholderNames`.
    * @param messageParts The message parts to appear in the
    ParsedTranslation.
    * @param placeholderNames The names of the placeholders to intersperse between the
    `messageParts`.
    * @export
    function makeParsedTranslation(
    messageParts: string[], placeholderNames:
    string[] = []): ParsedTranslation {
    let messageString = messageParts[0];
    for (let i = 0; i <
    placeholderNames.length; i++) {
    messageString += `${placeholderNames[i]}${messageParts[i + 1]}`;
    }
    return {
    text: messageString,
    messageParts: makeTemplateObject(messageParts, messageParts),
    placeholderNames,
    };
    }
    * Create the specialized array that is passed to tagged-string tag functions.
    * @param cooked The message parts with their escape codes processed.
    * @param raw The message parts with
    their escaped codes as-is.
    * @export
    function makeTemplateObject(cooked: string[], raw: string[]):
    TemplateStringsArray {
    Object.defineProperty(cooked, 'raw', { value: raw });
    return cooked as
    any;
    }
    function describeMessage(message:
    ParsedMessage): string {
    const meaningString = message.meaning && ` - "${message.meaning}"`;
    const
    legacy = message.legacyIds && message.legacyIds.length > 0 ?
    ` [${message.legacyIds.map(l =>
    ` "${l}"` )}.join(', ')] :
    ` `;
    return ` "${message.id}"${legacy}
    ("${message.text}"${meaningString})`;
    }
    * @license
    * Copyright Google LLC All Rights
    Reserved.
    * Use of this source code is governed by an MIT-style license that can be
    found in the
    LICENSE file at https://angular.io/license
    * @export
    * from './src/constants';
    * @export
    * from
    './src/messages';
    * @export
    * from './src/translations';
    * @license
    * Copyright Google LLC All Rights
    Reserved.
    * Use of this source code is governed by an MIT-style license that can be
    found in the
    LICENSE file at https://angular.io/license
    * @import { LocalizeFn } from './localize';
    * @import { MessageId,
    ParsedTranslation,
    parseTranslation,
    TargetMessage,
    translate as _translate } from
    './utils';
    * We augment the `Localize` object to also store the translations.
    * Note that because the
    TRANSLATIONS are attached to a global object, they will be shared between
    all applications that are running
    in a single page of the browser.
    * declare const Localize: LocalizeFn & { TRANSLATIONS: Record<MessageId,
    ParsedTranslation> };
    * Load translations for use by `Localize`, if doing runtime translation.
    * If the
    `Localize` tagged strings are not going to be replaced at compiled time, it is possible
    to load a set of translations
    that will be applied to the `Localize` tagged strings at runtime,
    in the browser.
    * Loading a new translation
    will overwrite a previous translation if it has the same `MessageId`.
    * Note that `Localize` messages are only
    processed once, when the tagged string is first
    encountered, and does not provide dynamic language changing
    without refreshing the browser.
    * Loading new translations later
    in the application life-cycle will not change the translated text
    of messages that have already been translated.
    * The message IDs and translations are in the same format as that rendered to
    simple JSON
    translation
    files when extracting messages. In particular, placeholders in messages are rendered
    using the
    `${PLACEHOLDER_NAME}` syntax. For example the message from the following template:
    <div i18n>pre<span>inner-pre<b>bold</b>inner-post</span>post</div>
    would have the following
    form in the `translations` map:
    {
    "2932901491976224757":
    "pre${START_TAG_SPAN}inner-pre${START_BOLD_TEXT}bold${CLOSE_BOLD_TEXT}inner-
    post${CLOSE_TAG_SPAN}post"
    }
    * @param translations A map from message ID to translated
    message.
    * These messages are processed and added to a lookup based on their `MessageId`.
    * @see
    `clearTranslations()` for removing translations loaded using this function.

```



```

* @see `\$localize` for tagging messages as needing to be translated.\n * @publicApi\n * ^\nexport function
loadTranslations(translations: Record<MessageId, TargetMessage>) {\n // Ensure the translate function exists\n if
(!\$localize.translate) {\n \$localize.translate = translate;\n }\n if (!\$localize.TRANSLATIONS) {\n
\$localize.TRANSLATIONS = {};\n }\n Object.keys(translations).forEach(key => {\n
\$localize.TRANSLATIONS[key] = parseTranslation(translations[key]);\n });\n}\n\n/**\n * Remove all translations
for `\$localize`, if doing runtime translation.\n *\n * All translations that had been loading into memory using
`loadTranslations()` will be removed.\n *\n * @see `loadTranslations()` for loading translations at runtime.\n *
@see `\$localize` for tagging messages as needing to be translated.\n *\n * @publicApi\n * ^\nexport function
clearTranslations() {\n \$localize.translate = undefined;\n \$localize.TRANSLATIONS = {};\n}\n\n/**\n * Translate
the text of the given
message, using the loaded translations.\n *\n * This function may reorder (or remove) substitutions as indicated in
the matching translation.\n * ^\nexport function translate(messageParts: TemplateStringsArray, substitutions:
readonly any[]):\n [TemplateStringsArray, readonly any[]] {\n try {\n return
_translate(\$localize.TRANSLATIONS, messageParts, substitutions);\n } catch (e) {\n console.warn((e as
Error).message);\n return [messageParts, substitutions];\n }\n}\n\n",/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n *\n\n//
*****\n\n// This code to access the global object is mostly copied from `packages/core/src/util/global.ts`\n\n\ndeclare global
{\n // The definition of `WorkerGlobalScope` must be compatible with the one in `lib.webworker.d.ts`,\n
// because all files under `packages/` are compiled together as part of the\n // [legacy-unit-tests-saucelabs][1] CI
job, including the `lib.webworker.d.ts` typings brought in\n // by [service-worker/worker/src/service-
worker.d.ts][2].\n //\n // [1]:\n //
https://github.com/angular/angular/blob/ffea63f43e6a7fd46be4a8cd5a5d254c98dea08/.circleci/config.yml#L681\n
// [2]:\n // https://github.com/angular/angular/blob/316dc2f12ce8931f5ff66fa5f8da21c0d251a337/packages/service-
worker/worker/src/service-worker.d.ts#L9\n interface WorkerGlobalScope extends EventTarget,
WindowOrWorkerGlobalScope {\n\n var WorkerGlobalScope: {prototype: WorkerGlobalScope; new ():
WorkerGlobalScope};\n}\n\n// Always use __globalThis if available, which is the spec-defined global variable
across all\n// environments, then fallback to __global first, because in Node tests both __global and\n// __window
may be defined and __global should be __global in that case. Note: Typeof/Instanceof\n//
checks are considered side-effects in Terser. We explicitly mark this as side-effect free:\n//
https://github.com/terser/terser/issues/250.\nexport const __global: any = (/^ @__PURE__ */ (\n () => (typeof
globalThis !== 'undefined' && globalThis) ||\n (typeof global !== 'undefined' && global) || (typeof window !==
'undefined' && window) ||\n (typeof self !== 'undefined' && typeof WorkerGlobalScope !== 'undefined' &&\n
self instanceof WorkerGlobalScope && self))());\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {findEndOfBlock} from '../utils';\n\n/** @nodoc
*\nexport interface LocalizeFn {\n (messageParts: TemplateStringsArray, ...expressions: readonly any[]):
string;\n}\n\n/**\n * A function that converts an input `message with expressions` into a translated `message
with\n
* expressions`.\n *\n * The conversion may be done in place, modifying the array passed to the function, so\n
* don't assume that this has no side-effects.\n *\n * The expressions must be passed in since it might be they need
to be reordered for\n * different translations.\n *\n translate?: TranslateFn;\n /**\n * The current locale of the
translated messages.\n *\n * The compile-time translation inliner is able to replace the following code:\n *\n *
```\n * typeof \$localize !== "undefined" && \$localize.locale\n * ```\n *\n * with a string literal of the current
locale. E.g.\n *\n * ```\n * "fr"\n * ```\n *\n locale?: string;\n}\n\n/** @nodoc *\nexport interface
TranslateFn {\n (messageParts: TemplateStringsArray,\n expressions: readonly any[]): [TemplateStringsArray,
readonly any[]];\n}\n\n/**\n * Tag a template literal string for localization.\n *\n * For example:\n *\n * ```\n *
ts\n *

```

\$localize `some string to localize`\n \* ```\n

\*\n \* \*\*Providing meaning, description and id\*\*\n \*\n \* You can optionally specify one or more of `meaning`, `description` and `id` for a localized\n \* string by pre-pending it with a colon delimited block of the form:\n \*\n \* ```\n \* \$localize`:meaning|description@`@id:source message text`;\n \*\n \* \$localize`:meaning|:source message text`;\n \*\n \* \$localize`:description:source message text`;\n \*\n \* \$localize`:@`@id:source message text`;\n \* ```\n \*\n \* This format is the same as that used for `i18n` markers in Angular templates. See the\n \* [Angular i18n guide](guide/i18n-common-prepare#mark-text-in-component-template).\n \*\n \* \*\*Naming placeholders\*\*\n \*\n \* If the template literal string contains expressions, then the expressions will be automatically\n \* associated with placeholder names for you.\n \*\n \* For example:\n \*\n \* ```\n \* \$localize `Hi \${name}! There are \${items.length} items.`;\n \* ```\n \*\n \* will generate a message-source of `Hi {PH}! There are {PH\_1} items`. \n \*\n \* The recommended practice is to name the placeholder associated with each expression though.\n \*\n \* Do this by providing the placeholder name wrapped in `` characters directly after the\n \* expression. These placeholder names are stripped out of the rendered localized string.\n \*\n \* For example, to name the `items.length` expression placeholder `itemCount` you write:\n \*\n \* ```\n \* \$localize `There are \${items.length}:itemCount: items`;\n \* ```\n \*\n \* \*\*Escaping colon markers\*\*\n \*\n \* If you need to use a `` character directly at the start of a tagged string that has no\n \* metadata block, or directly after a substitution expression that has no name you must escape\n \* the `` by preceding it with a backslash.\n \*\n \* For example:\n \*\n \* ```\n \* // message has a metadata block so no need to escape colon\n \* \$localize `:some description::this message starts with a colon (:)`;\n \* // no metadata block so the colon must be escaped\n \* \$localize `\\:this message starts with a colon (:)`;\n \* ```\n \*\n \* ```\n \* // named substitution so no need to escape colon\n \* \$localize `\${label}:label:: \${}`\n \* // anonymous substitution so colon must be escaped\n \* \$localize `\${label}\\: \${}`\n \* ```\n \*\n \* \*\*Processing localized strings\*\*\n \*\n \* There are three scenarios:\n \*\n \* \*\*compile-time inlining\*\*\n \* the `\$localize` tag is transformed at compile time by a\n \* transpiler, removing the tag and replacing the template literal string with a translated\n \* literal string from a collection of translations provided to the transpilation tool.\n \*\n \* \*\*run-time evaluation\*\*\n \* the `\$localize` tag is a run-time function that replaces and\n \* reorders the parts (static strings and expressions) of the template literal string with strings\n \* from a collection of translations loaded at run-time.\n \*\n \* \*\*pass-through evaluation\*\*\n \* the `\$localize` tag is a run-time function that simply evaluates\n \* the original template literal string without applying any translations to the parts. This\n \* version is used during development or where there is no need to translate the localized\n \* template literals.\n \*\n \* @param messageParts a collection of the static parts of the template string.\n \* @param expressions a collection of the values of each placeholder in the template string.\n \* @returns the translated string, with the `messageParts` and `expressions` interleaved together.\n \*\n \* @globalApi\n \* @publicApi\n \*/\nexport const \$localize: LocalizeFn = function(\n messageParts: TemplateStringsArray, ...expressions: readonly any[]) {\n if (\$localize.translate) {\n // Don't use array expansion here to avoid the compiler adding `\_\_read()` helper unnecessarily.\n const translation = \$localize.translate(messageParts, expressions);\n messageParts = translation[0];\n expressions = translation[1];\n }\n let message = stripBlock(messageParts[0], messageParts.raw[0]);\n for (let i = 1; i < messageParts.length; i++) {\n message += expressions[i - 1] + stripBlock(messageParts[i], messageParts.raw[i]);\n }\n return message;\n};\n\nconst BLOCK\_MARKER = ':';\n\n/\*\*\n \* Strip a delimited "block" from the start of the `messagePart`, if it is found.\n \*\n \* If a marker character (:) actually appears in the content at the start of a tagged string or\n \* after a substitution expression, where a block has not been provided the character must be\n \* escaped with a backslash, `\\:`. This function checks for this by looking at the `raw`\n \* messagePart, which should still contain the backslash.\n \*\n \* @param messagePart The cooked message part to process.\n \* @param rawMessagePart The raw message part to check.\n \* @returns the message part with the placeholder name stripped, if found.\n \* @throws an error if the block is unterminated\n \*/\nfunction stripBlock(messagePart: string, rawMessagePart: string) {\n return rawMessagePart.charAt(0) === BLOCK\_MARKER ?\n messagePart.substring(findEndOfBlock(messagePart, rawMessagePart) + 1) :\n messagePart;\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at

```
https://angular.io/license\n *\/nexport { _global } from './src/global';\nexport { $localize, LocalizeFn, TranslateFn }  
from './src/localize';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source  
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n// This file exports all the `utils` as private exports so that other parts of `@angular/localize`\n// can make use  
of them.\nexport { $localize as $localize, _global as _global, LocalizeFn as LocalizeFn, TranslateFn as TranslateFn }  
from './src/localize';\nexport { computeMsgId as computeMsgId, findEndOfBlock as findEndOfBlock,  
isMissingTranslationError as isMissingTranslationError, makeParsedTranslation as makeParsedTranslation,  
makeTemplateObject as makeTemplateObject, MissingTranslationError as MissingTranslationError,  
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ParsedTranslations, parseMessage as parseMessage, parseMetadata as parseMetadata, parseTranslation as  
parseTranslation, SourceLocation as SourceLocation, SourceMessage as SourceMessage, splitBlock as splitBlock,  
translate as translate } from './src/utils';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at  
https://angular.io/license\n *\n\n// This file contains the public API of the `@angular/localize` entry-point\nexport  
{ clearTranslations, loadTranslations } from './src/translate';\nexport { MessageId, TargetMessage } from  
'./src/utils';\n\n// Exports that are not part of the public API\nexport * from './private';\n", "/*\n * @license\n *  
Copyright Google LLC  
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in  
the LICENSE file at https://angular.io/license\n *\n\n// DO NOT ADD public exports to this file.\n// The public  
API exports are specified in the `./localize` module, which is checked by the\n// public_api_guard rules\nexport *  
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in path(s):

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No license file was found, but licenses were detected in source scan.

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https://angular.io/license\n */\n\n
```

```
 * The character used to mark the start and end of a `block` in a `localize` tagged string. A block can indicate  
metadata about the message or specify a name of a placeholder for substitution expressions. For  
example: `ts` `localize` Hello, ${title}:title!; `localize`:meaning|description@id:source message  
text; ` ` `next` export const BLOCK_MARKER = `;` ` ` The marker used to separate a message's  
`meaning` from its `description` in a metadata block. For example: `ts` `localize  
:correct|Indicates that the user got the answer correct: Right!; `localize`:movement|Button label for moving to  
the right: Right!; ` ` `next` export const MEANING_SEPARATOR = `|` ` ` The marker used to separate  
a message's custom `id` from its `description` in a metadata block. For example: `ts` `localize  
:A welcome message on the home page@@myApp-homepage-welcome: Welcome!; ` ` `next`  
export const ID_SEPARATOR = `@@` ` ` The marker used to separate legacy message ids from the rest of a  
metadata block. For example: `ts` `localize`:@@custom-  
id2df64767cd895a8fabe3e18b94b5b6b6f9e2e3f0: Welcome!; ` ` ` Note that this character is the ` ` symbol  
for the unit separator` ` ` not the `unit separator` character` itself, since that has no visual representation. See  
https://graphemica.com/%E2%90%9F. Here is some background for the original `unit separator  
character`: ` ` https://stackoverflow.com/questions/8695118/whats-the-file-group-record-unit-separator-control-  
characters-and-its-usage ` `next` export const LEGACY_ID_INDICATOR = `\\u241F` ` `, ` ` ` @license\n *  
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license  
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { computeMsgId } from  
`@angular/compiler`;\nimport { BLOCK_MARKER, ID_SEPARATOR,  
LEGACY_ID_INDICATOR, MEANING_SEPARATOR } from `./constants`;\n\n * Re-export this helper  
function so that users of `angular/localize` don't need to actively import\n * from `angular/compiler`.\n *next` export { computeMsgId } from `@angular/compiler`;\n * A string containing a translation source  
message. I.E. the message that indicates what will be translated from. Uses `{ $placeholder-name }`  
to indicate a placeholder. `next` export type SourceMessage = string;\n * A string containing a translation target  
message. I.E. the message that indicates what will be translated to. Uses `{ $placeholder-name }`  
to indicate a placeholder. `next` export type TargetMessage = string;\n * A string that uniquely identifies a  
message, to be used for matching translations. `next` export type MessageId = string;\n * Declares a copy of  
the `AbsoluteFsPath` branded type in `angular/compiler-cli` to avoid an\n * import into `angular/compiler-cli`.  
The compiler-cli's declaration files are not necessarily\n * compatible with web environments that use  
`angular/localize`, and would inadvertently include\n * `typescript` declaration files in any compilation unit that  
uses `angular/localize` (which\n * increases parsing time and memory usage during builds) using a default import  
that only\n * type-checks when `allowSyntheticDefaultImports` is enabled.\n * ` @see  
https://github.com/angular/angular/issues/45179\n *next` type AbsoluteFsPathLocalizeCopy = string & { _brand:  
'AbsoluteFsPath'};\n * The location of the message in the source file. The `line` and `column` values  
for the `start` and `end` properties are zero-based. `next` interface SourceLocation {  
start: {line: number,  
column: number};  
end: {line: number, column: number};  
file: AbsoluteFsPathLocalizeCopy;  
text?:
```

```

string;\n\n\n/**\n * Additional information that can be associated with a message.\n */\nexport interface
MessageMetadata {\n /**\n
 * A human readable rendering of the message\n */\n text: string;\n /**\n * Legacy message ids, if provided.\n
*\n * In legacy message formats the message id can only be computed directly from the original\n * template
source.\n *\n * Since this information is not available in `localize` calls, the legacy message ids may be\n *
attached by the compiler to the `localize` metablock so it can be used if needed at the point\n * of translation if the
translations are encoded using the legacy message id.\n */\n legacyIds?: string[];\n /**\n * The id of the
`message` if a custom one was specified explicitly.\n *\n * This id overrides any computed or legacy ids.\n */\n
customId?: string;\n /**\n * The meaning of the `message`, used to distinguish identical `messageString`s.\n */\n
meaning?: string;\n /**\n * The description of the `message`, used to aid translation.\n */\n description?:
string;\n /**\n * The location of the message in the source.\n
*/\n location?: SourceLocation;\n}\n\n\n/**\n * Information parsed from a `localize` tagged string that is used to
translate it.\n *\n * For example:\n *\n * ```\n * const name = 'Jo Bloggs';\n * $localize`Hello
${name}:title@@ID:!'`; \n * ```\n *\n * May be parsed into:\n *\n * ```\n * {\n *   id: '6998194507597730591',\n *
substitutions: { title: 'Jo Bloggs' },\n *   messageString: 'Hello {title}!',\n *   placeholderNames: ['title'],\n *
associatedMessageIds: { title: 'ID' },\n * }\n * ```\n */\nexport interface ParsedMessage extends MessageMetadata
{\n /**\n * The key used to look up the appropriate translation target.\n */\n id: MessageId;\n /**\n * A
mapping of placeholder names to substitution values.\n */\n substitutions: Record<string, any>;\n /**\n * An
optional mapping of placeholder names to associated MessageIds.\n * This can be used to match ICU placeholders
to the message that contains the ICU.\n */\n associatedMessageIds?: Record<string,
MessageId>;\n /**\n * An optional mapping of placeholder names to source locations\n */\n
substitutionLocations?: Record<string, SourceLocation|undefined>;\n /**\n * The static parts of the message.\n
*/\n messageParts: string[];\n /**\n * An optional mapping of message parts to source locations\n */\n
messagePartLocations?: (SourceLocation|undefined)[];\n /**\n * The names of the placeholders that will be
replaced with substitutions.\n */\n placeholderNames: string[];\n}\n\n\n/**\n * Parse a `localize` tagged string into
a structure that can be used for translation or\n * extraction.\n *\n * See `ParsedMessage` for an example.\n
*/\nexport function parseMessage(\n messageParts: TemplateStringsArray, expressions?: readonly any[],\n
location?: SourceLocation,\n messagePartLocations?: (SourceLocation|undefined)[],\n expressionLocations:
(SourceLocation|undefined)[] = []): ParsedMessage {\n const substitutions: {[placeholderName: string]: any} =
{};\n const
substitutionLocations: {[placeholderName: string]: SourceLocation|undefined} = {};\n const
associatedMessageIds: {[placeholderName: string]: MessageId} = {};\n const metadata =
parseMetadata(messageParts[0], messageParts.raw[0]);\n const cleanedMessageParts: string[] = [metadata.text];\n
const placeholderNames: string[] = [];\n let messageString = metadata.text;\n for (let i = 1; i < messageParts.length;\n
i++) {\n const {messagePart, placeholderName = computePlaceholderName(i), associatedMessageId} =\n
parsePlaceholder(messageParts[i], messageParts.raw[i]);\n messageString +=
`${placeholderName}${messagePart}`;\n if (expressions !== undefined) {\n
substitutions[placeholderName] = expressions[i - 1];\n substitutionLocations[placeholderName] =
expressionLocations[i - 1];\n }\n placeholderNames.push(placeholderName);\n if (associatedMessageId !==
undefined) {\n associatedMessageIds[placeholderName] = associatedMessageId;\n }\n
cleanedMessageParts.push(messagePart);\n
}\n const messageId = metadata.customId || computeMsgId(messageString, metadata.meaning || '');\n const
legacyIds = metadata.legacyIds ? metadata.legacyIds.filter(id => id !== messageId) : [];\n return {\n id:
messageId,\n legacyIds,\n substitutions,\n substitutionLocations,\n text: messageString,\n customId:
metadata.customId,\n meaning: metadata.meaning || '',\n description: metadata.description || '',\n messageParts:
cleanedMessageParts,\n messagePartLocations,\n placeholderNames,\n associatedMessageIds,\n location,\n
};\n}\n\n\n/**\n * Parse the given message part (`cooked` + `raw`) to extract the message metadata from the text.\n
*\n * If the message part has a metadata block this function will extract the `meaning`,\n * `description`, `customId`

```

and `legacyId` (if provided) from the block. These metadata properties are serialized in the string delimited by `|`, `@` and `` respectively.

(Note that `` is the `LEGACY\_ID\_INDICATOR` - see `constants.ts`.)

For example:

```

:meaning|description@@custom-id:`
:meaning|@custom-id:`
:meaning|description:`
:description@@custom-id:`
:meaning|:`
:description:`
:@custom-id:`
:meaning|description@@custom-idlegacy-id-1legacy-id-2:`

```

The cooked version of the message part to parse.

The raw version of the message part to parse.

Returns A object containing any metadata that was parsed from the message part.

```

export function parseMetadata(cooked: string, raw: string): MessageMetadata {
  const {text: messageString, block} = splitBlock(cooked, raw);
  if (block === undefined) {
    return {text: messageString};
  } else {
    const [meaningDescAndId, ...legacyIds] = block.split(LEGACY_ID_INDICATOR);
    const [meaningAndDesc, customId] = meaningDescAndId.split(ID_SEPARATOR, 2);
    let [meaning, description]: (string|undefined)[] = meaningAndDesc.split(MEANING_SEPARATOR, 2);
    if (description === undefined) {
      description = meaning;
      meaning = undefined;
    }
    if (description === "") {
      description = undefined;
    }
    return {text: messageString, meaning, description, customId, legacyIds};
  }
}

```

Parse the given message part (`cooked` + `raw`) to extract any placeholder metadata from the text.

If the message part has a metadata block this function will extract the `placeholderName` and `associatedMessageId` (if provided) from the block.

These metadata properties are serialized in the string delimited by `@@`.

For example:

```

placeholder-name@@associated-id:`

```

The cooked version of the message part to parse.

The raw version of the message part to parse.

Returns A object containing the metadata (`placeholderName` and `associatedMessageId`) of the preceding placeholder, along with the static text that follows.

```

export function parsePlaceholder(cooked: string, raw: string): {
  messagePart: string;
  placeholderName?: string;
  associatedMessageId?: string;
} {
  const {text: messagePart, block} = splitBlock(cooked, raw);
  if (block === undefined) {
    return {messagePart};
  } else {
    const [placeholderName, associatedMessageId] = block.split(ID_SEPARATOR);
    return {messagePart, placeholderName, associatedMessageId};
  }
}

```

Split a message part (`cooked` + `raw`) into an optional delimited "block" off the front and the rest of the text of the message part.

Blocks appear at the start of message parts. They are delimited by a colon `:` character at the start and end of the block.

If the block is in the first message part then it will be metadata about the whole message: meaning, description, id. Otherwise it will be metadata about the immediately preceding substitution: placeholder name.

Since blocks are optional, it is possible that the content of a message block actually starts with a block marker. In this case the marker must be escaped `:`.

The cooked version of the message part to parse.

The raw version of the message part to parse.

Returns An object containing the `text` of the message part and the text of the `block`, if it exists.

Throws an error if the `block` is unterminated.

```

export function splitBlock(cooked: string, raw: string): {text: string, block?: string} {
  if (raw.charAt(0) !== BLOCK_MARKER) {
    return {text: cooked};
  } else {
    const endOfBlock = findEndOfBlock(cooked, raw);
    return {
      block: cooked.substring(1, endOfBlock),
      text: cooked.substring(endOfBlock + 1),
    };
  }
}

```

function computePlaceholderName(index: number) {
 return index === 1 ? 'PH' : `PH\_\${index - 1}`;
}

Find the end of a "marked block" indicated by the first non-escaped colon.

The cooked string (where escaped chars have been processed).

The raw string (where escape sequences are still in place).

Returns the index of the end of block marker.

Throws an error if the block is unterminated.

```

export function findEndOfBlock(cooked: string, raw: string): number {
  for (let cookedIndex = 1, rawIndex = 1; cookedIndex < cooked.length; cookedIndex++, rawIndex++) {
    if (raw[rawIndex] === '\\') {
      rawIndex++;
    } else if (cooked[cookedIndex] === BLOCK_MARKER) {
      return cookedIndex;
    }
  }
  throw new Error(`Unterminated $localize metadata block in "${raw}"`);
}

```

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```

import {BLOCK_MARKER} from './constants';

```



```

{MessageId, MessageMetadata, ParsedMessage,
 parseMessage, TargetMessage} from './messages';\n\n/**\n * A translation message that has been processed to
 extract the message parts and placeholders.\n */\nexport interface ParsedTranslation extends MessageMetadata {\n
 messageParts: TemplateStringsArray;\n placeholderNames: string[];\n}\n\n/**\n * The internal structure used by
 the runtime localization to translate messages.\n */\nexport type ParsedTranslations = Record<MessageId,
 ParsedTranslation>;\n\nexport class MissingTranslationError extends Error {\n private readonly type =
 'MissingTranslationError';\n constructor(readonly parsedMessage: ParsedMessage) {\n super(`No translation
 found for ${describeMessage(parsedMessage)}.`);\n }\n}\n\nexport function isMissingTranslationError(e: any): e is
 MissingTranslationError {\n return e.type === 'MissingTranslationError';\n}\n\n/**\n * Translate the text of the
 `localize` tagged-string (i.e. `messageParts` and\n * `substitutions`) using the given `translations`. \n * The
 tagged-string is parsed to extract its `messageId` which is used to find an appropriate\n * `ParsedTranslation`. If
 this doesn't match and there are legacy ids then try matching a\n * translation using those.\n * If one is found then it
 is used to translate the message into a new set of `messageParts` and\n * `substitutions`. \n * The translation may
 reorder (or remove) substitutions as appropriate.\n * If there is no translation with a matching message id then an
 error is thrown.\n * If a translation contains a placeholder that is not found in the message being translated then an
 error is thrown.\n */\nexport function translate(\n translations: Record<string, ParsedTranslation>, messageParts:
 TemplateStringsArray,\n substitutions: readonly any[]): [TemplateStringsArray, readonly any[]] {\n const
 message = parseMessage(messageParts, substitutions);\n // Look up the translation using the messageId, and then
 the legacyId if available.\n let translation = translations[message.id];\n\n // If the messageId did not match a
 translation, try matching the legacy ids instead\n if (message.legacyIds !==\n undefined) {\n for (let i = 0; i <
 message.legacyIds.length && translation === undefined; i++) {\n translation =
 translations[message.legacyIds[i)];\n }\n }\n if (translation === undefined) {\n throw new
 MissingTranslationError(message);\n }\n return [\n translation.messageParts,\n
 translation.placeholderNames.map(placeholder => {\n if (message.substitutions.hasOwnProperty(placeholder))\n
 {\n return message.substitutions[placeholder];\n } else {\n throw new Error(\n `There is a
 placeholder name mismatch with the translation provided for the message ${\n
 describeMessage(message)}.\n` +\n `The translation contains a placeholder with name ${\n
 placeholder}, which does not exist in the message.`);\n }\n });\n ];\n}\n\n/**\n * Parse the `messageParts` and
 `placeholderNames`\n out of a target `message`. \n * Used by `loadTranslations()` to convert target message strings
 into a structure that\n is more\n * appropriate for doing translation.\n * @param message the message to be
 parsed.\n */\nexport function parseTranslation(messageString: TargetMessage): ParsedTranslation {\n const parts =
 messageString.split(/\\$([^\$]*)/);\n const messageParts = [parts[0)];\n const placeholderNames: string[] = [];\n
 for (let i = 1; i < parts.length - 1; i += 2) {\n placeholderNames.push(parts[i]);\n messageParts.push(`${parts[i] +
 1}`);\n }\n const rawMessageParts =\n messageParts.map(part => part.charAt(0) === BLOCK_MARKER ?\n
 '\\\\' + part : part);\n return {\n text: messageString,\n messageParts: makeTemplateObject(messageParts,\n
 rawMessageParts),\n placeholderNames,\n };\n}\n\n/**\n * Create a `ParsedTranslation` from a set of
 `messageParts` and `placeholderNames`. \n * @param messageParts The message parts to appear in the
 ParsedTranslation.\n * @param placeholderNames The names of the placeholders to intersperse between the
 `messageParts`. \n */\nexport function makeParsedTranslation(\n messageParts: string[], placeholderNames:
 string[] = []): ParsedTranslation {\n let messageString = messageParts[0];\n for (let i = 0; i <
 placeholderNames.length; i++) {\n messageString += `$$${placeholderNames[i]}${messageParts[i + 1]}`;\n }\n
 return {\n text: messageString,\n messageParts: makeTemplateObject(messageParts, messageParts),\n
 placeholderNames,\n };\n}\n\n/**\n * Create the specialized array that is passed to tagged-string tag functions.\n
 * @param cooked The message parts with their escape codes processed.\n * @param raw The message parts with
 their escaped codes as-is.\n */\nexport function makeTemplateObject(cooked: string[], raw: string[]):\n
 TemplateStringsArray {\n Object.defineProperty(cooked, 'raw', { value: raw });\n return cooked as\n any;\n}\n\nfunction describeMessage(message:

```

```

ParsedMessage): string {\n  const meaningString = message.meaning && `-${message.meaning}`;\n  const
legacy = message.legacyIds && message.legacyIds.length > 0 ?\n    `${message.legacyIds.map(l =>
`${l}`)}.join(', ')` :\n    '';\n  return `${message.id}`}${legacy}
(`${message.text}`}${meaningString});\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nexport * from './src/constants';\nexport * from
 './src/messages';\nexport * from './src/translations';\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nimport { LocalizeFn } from './localize';\nimport { MessageId,
ParsedTranslation, parseTranslation, TargetMessage, translate as _translate } from
 './utils';\n\n/**\n * We augment the `Localize` object to also store the translations.\n *\n * Note that because the
TRANSLATIONS are attached to a global object, they will be shared between\n * all applications that are running
in a single page of the browser.\n *\ndeclare const Localize: LocalizeFn & { TRANSLATIONS: Record<MessageId,
ParsedTranslation>};\n\n/**\n * Load translations for use by `Localize`, if doing runtime translation.\n *\n * If the
`Localize` tagged strings are not going to be replaced at compiled time, it is possible\n * to load a set of translations
that will be applied to the `Localize` tagged strings at runtime,\n * in the browser.\n *\n * Loading a new translation
will overwrite a previous translation if it has the same `MessageId`.\n *\n * Note that `Localize` messages are only
processed once, when the tagged string is first\n * encountered, and does not provide dynamic language changing
without refreshing the browser.\n *\n * Loading new translations later
in the application life-cycle will not change the translated text\n * of messages that have already been translated.\n
*\n * The message IDs and translations are in the same format as that rendered to `simple JSON`\n * translation
files when extracting messages. In particular, placeholders in messages are rendered\n * using the
`${PLACEHOLDER_NAME}` syntax. For example the message from the following template:\n *\n * ``html\n *
<div i18n>pre<span>inner-pre<b>bold</b>inner-post</span>post</div>\n * ``\n *\n * would have the following
form in the `translations` map:\n *\n * ``ts\n * {\n *   \"2932901491976224757\":\n *
pre{ $START_TAG_SPAN }inner-pre{ $START_BOLD_TEXT }bold{ $CLOSE_BOLD_TEXT }inner-
post{ $CLOSE_TAG_SPAN }post`\n * }\n * ``\n *\n * @param translations A map from message ID to translated
message.\n *\n * These messages are processed and added to a lookup based on their `MessageId`.\n *\n * @see
`clearTranslations()` for removing translations loaded using this function.\n
*\n * @see `Localize` for tagging messages as needing to be translated.\n *\n * @publicApi\n *\nexport function
loadTranslations(translations: Record<MessageId, TargetMessage>) {\n  // Ensure the translate function exists\n  if
(!$localize.translate) {\n    $localize.translate = translate;\n  }\n  if (!$localize.TRANSLATIONS) {\n
$localize.TRANSLATIONS = {};\n  }\n  Object.keys(translations).forEach(key => {\n
$localize.TRANSLATIONS[key] = parseTranslation(translations[key]);\n  });\n}\n\n/**\n * Remove all translations
for `Localize`, if doing runtime translation.\n *\n * All translations that had been loading into memory using
`loadTranslations()` will be removed.\n *\n * @see `loadTranslations()` for loading translations at runtime.\n
*\n * @see `Localize` for tagging messages as needing to be translated.\n *\n * @publicApi\n *\nexport function
clearTranslations() {\n  $localize.translate = undefined;\n  $localize.TRANSLATIONS = {};\n}\n\n/**\n * Translate
the text of the given
message, using the loaded translations.\n *\n * This function may reorder (or remove) substitutions as indicated in
the matching translation.\n *\nexport function translate(messageParts: TemplateStringsArray, substitutions:
readonly any[]):\n  [TemplateStringsArray, readonly any[]] {\n  try {\n    return
_translate($localize.TRANSLATIONS, messageParts, substitutions);\n  } catch (e) {\n    console.warn((e as
Error).message);\n    return [messageParts, substitutions];\n  }\n}\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n *\n\n*****
*\n// This code to access the global object is mostly copied from `packages/core/src/util/global.ts`\nndeclare global

```

```

{\n // The definition of `WorkerGlobalScope` must be compatible with the one in `lib.webworker.d.ts`,\n
// because all files under `packages/` are compiled together as part of the\n // [legacy-unit-tests-saucelabs][1] CI
job, including the `lib.webworker.d.ts` typings brought in\n // by [service-worker/worker/src/service-
worker.d.ts][2].\n //\n // [1]:\n //
https://github.com/angular/angular/blob/ffeea63f43e6a7fd46be4a8cd5a5d254c98dea08/.circleci/config.yml#L681\n
// [2]:\n // https://github.com/angular/angular/blob/316dc2f12ce8931f5ff66fa5f8da21c0d251a337/packages/service-
worker/worker/src/service-worker.d.ts#L9\n interface WorkerGlobalScope extends EventTarget,\n
WindowOrWorkerGlobalScope {\n\n var WorkerGlobalScope: {prototype: WorkerGlobalScope; new ():\n
WorkerGlobalScope;};\n}\n\n// Always use __globalThis if available, which is the spec-defined global variable
across all\n// environments, then fallback to __global first, because in Node tests both __global and\n// __window
may be defined and __global should be __global in that case. Note: Typeof/Instanceof\n//
checks are considered side-effects in Terser. We explicitly mark this as side-effect free:\n//
https://github.com/terser/terser/issues/250.\nexport const _global: any = (/^ @__PURE__ */ (\n () => (typeof
globalThis !== 'undefined' && globalThis) ||\n (typeof global !== 'undefined' && global) || (typeof window !==
'undefined' && window) ||\n (typeof self !== 'undefined' && typeof WorkerGlobalScope !== 'undefined' &&\n
self instanceof WorkerGlobalScope && self)));\n", /**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {findEndOfBlock} from '../utils';\n\n/** @nodoc
*/\n\nexport interface LocalizeFn {\n (messageParts: TemplateStringsArray, ...expressions: readonly any[]):\n
string;\n\n /**\n * A function that converts an input `message with expressions` into a translated `message
with\n
* expressions`.\n *\n * The conversion may be done in place, modifying the array passed to the function, so\n
* don't assume that this has no side-effects.\n *\n * The expressions must be passed in since it might be they need
to be reordered for\n * different translations.\n */\n translate?: TranslateFn;\n\n /**\n * The current locale of the
translated messages.\n *\n * The compile-time translation inliner is able to replace the following code:\n *\n *
```\n * typeof $localize !== "undefined" && $localize.locale\n * ```\n *\n * with a string literal of the current
locale. E.g.\n *\n * ```\n * `fr`\n * ```\n *\n * locale?: string;\n}\n\n/** @nodoc */\n\nexport interface
TranslateFn {\n (messageParts: TemplateStringsArray,\n expressions: readonly any[]): [TemplateStringsArray,\n
readonly any[]];\n}\n\n/**\n * Tag a template literal string for localization.\n *\n * For example:\n *\n * ``ts\n *
$localize `some string to localize`\n * ```\n
*\n * **Providing meaning, description and id**\n *\n * You can optionally specify one or more of `meaning`,
`description`\n * and `id` for a localized\n * string by pre-pending it with a colon delimited block of the form:\n
*\n * ``ts\n * $localize `:meaning|description@@id:source message text`;\n *\n * $localize `:meaning|:source message
text`;\n *\n * $localize `:description:source message text`;\n *\n * $localize `:@id:source message text`;\n *\n *
```\n *\n * This format is the same as that used for `i18n` markers in Angular templates. See the\n * [Angular i18n
guide](guide/i18n-common-prepare#mark-text-in-component-template).\n *\n * **Naming placeholders**\n *\n * If
the template literal string contains expressions, then the expressions will be automatically\n * associated with
placeholder names for you.\n *\n * For example:\n *\n * ``ts\n * $localize `Hi ${name}! There are ${items.length}
items.`;\n *\n * ```\n *\n * will generate a message-source of `Hi {SPH}! There are {SPH_1} items`.\n *\n * The
recommended practice is to name the placeholder associated with each expression though.\n *\n * Do this by
providing the placeholder name wrapped in `` characters directly after the\n * expression. These placeholder names
are stripped out of the rendered localized string.\n *\n * For example, to name the `items.length` expression
placeholder `itemCount` you write:\n *\n * ``ts\n * $localize `There are ${items.length}:itemCount: items.`;\n *\n
* ```\n *\n * **Escaping colon markers**\n *\n * If you need to use a `` character directly at the start of a tagged
string that has no\n * metadata block, or directly after a substitution expression that has no name you must escape\n
* the `` by preceding it with a backslash:\n *\n * For example:\n *\n * ``ts\n * // message has a metadata block so
no need to escape colon\n * $localize `:some description::this message starts with a colon (:)`;\n *\n * // no metadata
block so the colon must be escaped\n * $localize `\\:this message starts with a colon

```

(:);\n \* ```\n \*\n \* ```\ts\n \* // named substitution so no need to escape colon\n \* \$localize `\${label}:label:: \${}`\n \*  
 // anonymous substitution so colon must be escaped\n \* \$localize `\${label}\\: \${}`\n \* ```\n \*\n \* \*\*Processing  
 localized strings:\*\*\n \*\n \* There are three scenarios:\n \*\n \* \*\*compile-time inlining\*\*\n \* the `\$localize` tag is  
 transformed at compile time by a\n \* transpiler, removing the tag and replacing the template literal string with a  
 translated\n \* literal string from a collection of translations provided to the transpilation tool.\n \*\n \* \*\*run-time  
 evaluation\*\*\n \* the `\$localize` tag is a run-time function that replaces and\n \* reorders the parts (static strings and  
 expressions) of the template literal string with strings\n \* from a collection of translations loaded at run-time.\n \*\n \* \*\*pass-through evaluation\*\*\n \* the `\$localize` tag is a run-time function that simply evaluates\n \* the original  
 template literal string without applying any translations to

the parts. This\n \* version is used during development or where there is no need to translate the localized\n \*  
 template literals.\n \*\n \* @param messageParts a collection of the static parts of the template string.\n \* @param  
 expressions a collection of the values of each placeholder in the template string.\n \* @returns the translated string,  
 with the `messageParts` and `expressions` interleaved together.\n \*\n \* @globalApi\n \* @publicApi\n \* ^\nexport  
 const \$localize: LocalizeFn = function(\n messageParts: TemplateStringsArray, ...expressions: readonly any[]) {\n  
 if (\$localize.translate) {\n // Don't use array expansion here to avoid the compiler adding `\_\_read()` helper  
 unnecessarily.\n const translation = \$localize.translate(messageParts, expressions);\n messageParts =  
 translation[0];\n expressions = translation[1];\n }\n let message = stripBlock(messageParts[0],  
 messageParts.raw[0]);\n for (let i = 1; i < messageParts.length; i++) {\n message += expressions[i  
 - 1] + stripBlock(messageParts[i], messageParts.raw[i]);\n }\n return message;\n};\n\nconst BLOCK\_MARKER =  
 ':';\n\n/\*\*\n \* Strip a delimited `block` from the start of the `messagePart`, if it is found.\n \*\n \* If a marker  
 character (:) actually appears in the content at the start of a tagged string or\n \* after a substitution expression, where  
 a block has not been provided the character must be\n \* escaped with a backslash, `\\`. This function checks for this  
 by looking at the `raw`\n \* messagePart, which should still contain the backslash.\n \*\n \* @param messagePart The  
 cooked message part to process.\n \* @param rawMessagePart The raw message part to check.\n \* @returns the  
 message part with the placeholder name stripped, if found.\n \* @throws an error if the block is unterminated\n \*  
 ^\nfunction stripBlock(messagePart: string, rawMessagePart: string) {\n return rawMessagePart.charAt(0) ===  
 BLOCK\_MARKER ?\n messagePart.substring(findEndOfBlock(messagePart, rawMessagePart)  
 + 1) :\n messagePart;\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of  
 this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at  
<https://angular.io/license>\n \* ^\nexport { \$global } from './src/global';\nexport { \$localize, LocalizeFn, TranslateFn }  
 from './src/localize';\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source  
 code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n \*  
 ^\n\n// This file exports all the `utils` as private exports so that other parts of `@angular/localize` can make use  
 of them.\nexport { \$localize as \$localize, \$global as \$global, LocalizeFn as LocalizeFn, TranslateFn as TranslateFn }  
 from './src/localize';\nexport { computeMsgId as computeMsgId, findEndOfBlock as findEndOfBlock,  
 isMissingTranslationError as isMissingTranslationError, makeParsedTranslation as makeParsedTranslation,  
 makeTemplateObject as makeTemplateObject, MissingTranslationError as MissingTranslationError,  
 ParsedMessage as ParsedMessage, ParsedTranslation as ParsedTranslation, ParsedTranslations as  
 ParsedTranslations, parseMessage as parseMessage, parseMetadata as parseMetadata, parseTranslation as  
 parseTranslation, SourceLocation as SourceLocation, SourceMessage as SourceMessage, splitBlock as splitBlock,  
 translate as translate } from './src/utils';\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \*  
 Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at  
<https://angular.io/license>\n \* ^\n\n// This file contains the public API of the `@angular/localize` entry-point\nexport  
 { clearTranslations, loadTranslations } from './src/translate';\nexport { MessageId, TargetMessage } from  
 './src/utils';\n\n// Exports that are not part of the public API\nexport \* from './private';\n\n"/\*\*\n \* @license\n \*  
 Copyright Google LLC

All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in  
 the LICENSE file at <https://angular.io/license>\n \* ^\n\n// DO NOT ADD public exports to this file.\n\n// The public

API exports are specified in the `./localize` module, which is checked by the `public\_api\_guard` rules from

```
'./localize';\n", "names":["BLOCK_MARKER", "translate", "_translate", "$localize"], "mappings": ";;;;;;;;;AAAA;;;;;;;;;\nAAMG;AAEH;;;;;;;;;AAWG;AACI,MAAMA,cAAY,GAAG,GAAG,CAAC;AAEHc;;;;;;;;;AASG;AACI,MAAM,\niBAAiB,GAAG,GAAG,CAAC;AAErC;;;;;;;;;AAQG;AACI,MAAM,YAAY,GAAG,IAAI,CAAC;AAEjC;;;;;;;;;AAcG;AACI,MAAM,mBAAmB,GAAG,QAAQ;;AC5D3C;;;;;;;;;AAMG;AAuJH;;;;;;;;;AAKG;AACa,SAAA,YAAY,C\nACxB,YAAkC,EAAE,WAA4B,EAAE,QAAyB,EAC3F,oBAAmD,EACnD,mBAAA,GAAoD,EAAE,EAAA;IACx\nD,MAAM,aAAa,GAAqC,EAAE,CAAC;IAC3D,MAAM,qBAaqB,GAA0D,EAAE,CAAC;IACxF,MAAM,oBAAo\nB,GAA2C,EAAE,CAAC;AACxE,IAAA,MAAM,QAAQ,GAAG,aAAa,CAAC,YAAY,CAAC,CAAC,CAAC,EAA\nE,YAAY,CAAC,GAAG,CAAC,CAAC,CAAC,CAAC;AACrE,IAAA,MAAM,mBAAmB,GAAa,CAAC,QA\nAQ,CAAC,IAAI,CAAC,CAAC;IACtD,MAAM,gBAAgB,GAAa,EAAE,CAAC;AACtC,IAAA,IAAI,aAAa,GAAG,\nQAAQ,CAAC,IAAI,CAAC;AACIC,IAAA,KAAK,IAAI,CAAC,GAAG,CAAC,EAAE,CAAC,GAAG,YAAY,CAA\nC,MAAM,EAAE,CAAC,EAAE,EAAE;QAC5C,MAAM,EAAC,WAAW,EAAE,eAAe,GAAG,sBAAsB,CAAC,CA\nAC,CAAC,EAAE,mBAAmB,EAAC,GACjF,gBAAgB,CAAC,YAAY,CAAC,CAAC,CAAC,EAAE,YAAY,CAAC,\nGAAG,CAAC,CAAC,CAAC,CAAC,CAAC;AAC3D,QAAA,aAAa,IAAI,CAAK,EAAA,EAAA,eAAe,CAAI,CAA\nA,EAAA,WAAW,EAAE,CAAC;QACvD,IAAI,WAAW,KAAK,SAAS,EAAE;YAC7B,aAAa,CAAC,eAAe,CAAC,\nGAAG,WAAW,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC;YACpD,qBAaqB,CAAC,eAAe,CAAC,GAAG,mBA\nAmB,CAAC,CAAC,GAAG,CAAC,CAAC,CAAC;AACrE,SAAA;AACD,QAAA,gBAAgB,CAAC,IAAI,CAAC,e\nAAe,CAAC,CAAC;QACvC,IAAI,mBAAmB,KAAK,SAAS,EAAE;AACrC,YAAA,oBAAoB,CAAC,eAAe,CAAC,\nGAAG,mBAAmB,CAAC;AAC7D,SAAA;AACD,QAAA,mBAAmB,CAAC,IAAI,CAAC,WAAW,CAAC,CAAC;\nAACvC,KAAA;AACD,IAAA,MAAM,SAAS,GAAG,QAAQ,CAAC,QAAQ,IAAI,YAAY,CAAC,aAAa,EAAE,QA\nAQ,CAAC,OAAO,IAAI,EAAE,CAAC,CAAC;IAC3F,MAAM,SAAS,GAAG,QAAQ,CAAC,SAAS,GAAG,QAAQ\n,CAAC,SAAS,CAAC,MAAM,CAAC,EAAE,IAAI,EAAE,KAAK,SAAS,CAAC,GAAG,EAAE,CAAC;IAC9F,OA\nAO;AACL,QAAA,EAAE,EAAE,SAAS;QACb,SAAS;QACT,aAAa;QACb,qBAaqB;AACrB,QAAA,IAAI,EAAE,\naAAa;QACnB,QAAQ,EAAE,QAAQ,CAAC,QAAQ;AAC3B,QAAA,OAAO,EAAE,QAAQ,CAAC,OAAO,IAAI,E\nAAE;AAC/B,QAAA,WAAW,EAAE,QAAQ,CAAC,WAAW,IAAI,EAAE;AACvC,QAAA,YAAY,EAAE,mBAAm\nB;QACjC,oBAAoB;QACpB,gBAAgB;QACbB,oBAAoB;QACpB,QAAQ;KACT,CAAC;AACJ,CAAC;AAED;;;;;;;;\n;;;;;;;;;AAyBG;AACa,SAAA,aAAa,CAAC,MAAc,EAAE,GAAW,EAAA;AACvD,IAAA,MAAM,EAAC,IA\nAI,EAAE,aAAa,EAAE,KAAK,EAAC,GAAG,UAAU,CAAC,MAAM,EAAE,GAAG,CAAC,CAAC;IAC7D,IAAI,\nKAAK,KAAK,SAAS,EAAE;AACvB,QAAA,OAAO,EAAC,IAAI,EAAE,aAAa,EAAC,CAAC;AAC9B,KAAA;A\nAAM,SAAA;AACL,QAAA,MAAM,CAAC,gBAAgB,EAAE,GAAG,SAAS,CAAC,GAAG,KAAK,CAAC,KAAK,\nCAAC,mBAAmB,CAAC,CAAC;AAC1E,QAAA,MAAM,CAAC,cAAc,EAAE,QAAQ,CAAC,GAAG,gBAAgB,C\nAAC,KAAK,CAAC,YAAY,EAAE,CAAC,CAAC,CAAC;AAC3E,QAAA,IAAI,CAAC,OAAO,EAAE,WAAW,CA\nAC,GAAyB,cAAc,CAAC,KAAK,CAAC,iBAAiB,EAAE,CAAC,CAAC,CAAC;QAC9F,IAAI,WAAW,KAAK,SA\nAS,EAAE;YAC7B,WAAW,GAAG,OAAO,CAAC;YACtB,OAAO,GAAG,SAAS,CAAC;AACrB,SAAA;QACD,IA\nAI,WAAW,KAAK,EAAE,EAAE;YACtB,WAAW,GAAG,SAAS,CAAC;AACzB,SAAA;AACD,QAAA,OAAO,\nEAAC,IAAI,EAAE,aAAa,EAAE,OAAO,EAAE,WAAW,EAAE,QAAQ,EAAE,SAAS,EAAC,CAAC;AACzE,KAA\nA;AACH,CAAC;AAED;;;;;;;;;AAmBG;AACa,SAAA,gBAAgB,CAAC,MAAc,EAAE,GAAW,EAAA;AAE\nID,IAAA,MAAM,EAAC,IAAI,EAAE,WAAW,EAAE,KAAK,EAAC,GAAG,UAAU,CAAC,MAAM,EAAE,GAA\nG,CAAC,CAAC;IAC3D,IAAI,KAAK,KAAK,SAAS,EAAE;QACvB,OAAO,EAAC,WAAW,EAAC,CAAC;AACt\nB,KAAA;AAAM,SAAA;AACL,QAAA,MAAM,CAAC,eAAe,EAAE,mBAAmB,CAAC,GAAG,KAAK,CAAC,K\nAAK,CAAC,YAAY,CAAC,CAAC;AACzE,QAAA,OAAO,EAAC,WAAW,EAAE,eAAe,EAAE,mBAAmB,EAAC\n,CAAC;AAC5D,KAAA;AACH,CAAC;AAED;;;;;;;;;AAmBG;AACa,SAAA,UAAU,CAAC,MAAc,EAAE,G\nAAW,EAAA;IACpD,IAAI,GAAG,CAAC,MAAM,CAAC,CAAC,CAAC,KAAKA,cAAY,EAAE;AACIC,QAAA,O\nAAO,EAAC,IAAI,EAAE,MAAM,EAAC,CAAC;AACvB,KAAA;AAAM,SAAA;QACL,MAAM,UAAU,GAAG,c\nAAc,CAAC,MAAM,EAAE,GAAG,CAAC,CAAC;QAC/C,OAAO;YACL,KAAK,EAAE,MAAM,CAAC,SAAS,C\nAAC,CAAC,EAAE,UAAU,CAAC;YACtC,IAAI,EAAE,MAAM,CAAC,SAAS,CAAC,UAAU,GAAG,CAAC,CA\nAC;SACvC,CAAC;AACH,KAAA;AACH,CAAC;AAGD,SAAS,sBAAsB,CAAC,KAAa,EAAA;AAC3C,IAAA,O
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Found

in path(s):

\* /opt/cola/permits/1784583521\_1693546611.9589572/0/localize-14-3-0-tgz/package/fesm2015/localize.mjs.map

No license file was found, but licenses were detected in source scan.

```
{"version":3,"file":"init.mjs","sources":["../..../..../packages/localize/init/index.ts"],"sourcesContent":["/**\n *  
 * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-  
 * style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \nimport { $localize as  
 $localize, _global as _global, LocalizeFn as LocalizeFn, TranslateFn as TranslateFn } from  
'@angular/localize';\n\nexport { $localize, LocalizeFn, TranslateFn }; \n\n// Attach $localize to the global context, as a  
 * side-effect of this module.\n * _global.$localize = $localize;\n * \n// `declare global` allows us to escape the current  
 * module and place types on the global namespace\n * \ndeclare global { \n * /**\n * * Tag a template literal string for  
 * localization.\n * \n * \n * For example:\n * \n * ``ts\n * $localize `some string to localize`\n * ``\n * \n * **Providing meaning, description  
 * \n * and id*\n * \n * You can optionally specify one or more of `meaning`, `description` and `id` for a localized\n * * string by pre-pending it with a colon delimited block of the form:\n * \n * ``ts\n * *\n * $localize`meaning|description@@id:source message text`;\n * \n * $localize`meaning|:source message text`;\n * \n * $localize`:description:source message text`;\n * \n * $localize`:@id:source message text`;\n * \n * This  
 * format is the same as that used for `i18n` markers in Angular templates. See the\n * [Angular i18n  
 * guide](guide/i18n-common-prepare#mark-text-in-component-template).\n * \n * **Naming placeholders**\n * \n * \n * If the template literal string contains expressions, then the expressions will be automatically\n * associated with
```

placeholder names for you.  
 For example:  
`$localize `Hi ${name}! There are ${items.length} items.``  
 will generate a message-source of ``Hi {SPH}! There are {SPH_1} items``.  
 The recommended practice is to name the placeholder associated with each expression though.  
 Do this by providing the placeholder name wrapped in ``:`` characters directly after the expression. These placeholder names are stripped out of the rendered localized string.  
 For example, to name the ``items.length`` expression placeholder ``itemCount`` you write:  
`$localize `There are ${items.length}:itemCount: items``  
 Escaping colon markers  
 If you need to use a ``:`` character directly at the start of a tagged string that has no metadata block, or directly after a substitution expression that has no name you must escape the ``:`` by preceding it with a backslash.  
 For example:  
`// message has a metadata block so no need to escape colon $localize `:some description::this message starts with a colon (:)``  
`// no metadata block so the colon must be escaped $localize `\:this message starts with a colon (:)``  
`// named substitution so no need to escape colon $localize `${label}:label: ${}``  
`// anonymous substitution so colon must be escaped $localize `${label}\: ${}``  
 Processing localized strings  
 There are three scenarios:  
 compile-time inlining: the ``$localize`` tag is transformed at compile time by a transpiler, removing the tag and replacing the template literal string with a translated literal string from a collection of translations provided to the transpilation tool.  
 run-time evaluation: the ``$localize`` tag is a run-time function that replaces and reorders the parts (static strings and expressions) of the template literal string with strings from a collection of translations loaded at run-time.  
 pass-through evaluation: the ``$localize`` tag is a run-time function that simply evaluates the original template literal string without applying any translations to the parts. This version is used during development or where there is no need to translate the localized template literals.  
 @param messageParts a collection of the static parts of the template string.  
 @param expressions a collection of the values of each placeholder in the template string.  
 @returns the translated string, with the ``messageParts`` and ``expressions`` interleaved together.  
`const $localize: LocalizeFn;
names:["_global","$localize"],"mappings":":;:::;AAAA;:::;AAMG;AAKH;AACAA,QAAO,CAAC,SAAS,GAAGC,UAAS"}`

Found in path(s):

`*/opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/fesm2020/init.mjs.map`  
`*/opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/fesm2015/init.mjs.map`

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Angular

=====

The sources for this package are in the main [Angular](https://github.com/angular/angular) repo. Please file issues and pull requests against that repo.

Usage information and reference details can be found in [Angular documentation](https://angular.io/docs).

License: MIT

Found in path(s):

`*/opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/README.md`

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/\*\*



```
* @license
* Copyright Google LLC All Rights Reserved.
*
* Use of this source code is governed by an MIT-style license that can be
* found in the LICENSE file at https://angular.io/license
*
* @fileoverview Schematics for ng-new project that builds with Bazel.
*/
```

Found in path(s):

```
* /opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/schematics/ng-add/index.d.ts
* /opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/schematics/ng-add/index.js
No license file was found, but licenses were detected in source scan.
```

```
/**
```

```
* @license Angular v14.3.0
* (c) 2010-2022 Google LLC. https://angular.io/
* License: MIT
*/
```

Found in path(s):

```
* /opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/index.d.ts
No license file was found, but licenses were detected in source scan.
```

```
/**
```

```
* @license Angular v14.3.0
* (c) 2010-2022 Google LLC. https://angular.io/
* License: MIT
*/
```

```
/**
```

```
* @license
* Copyright Google LLC All Rights Reserved.
*
* Use of this source code is governed by an MIT-style license that can be
* found in the LICENSE file at https://angular.io/license
*/
```

Found in path(s):

```
* /opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/fesm2015/localize.mjs
* /opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/fesm2015/init.mjs
* /opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/fesm2020/localize.mjs
* /opt/cola/permits/1784583521_1693546611.9589572/0/localize-14-3-0-tgz/package/fesm2020/init.mjs
```

## 1.202 angular-compiler-cli 14.3.0

## 1.202.1 Available under license :

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```
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 *
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 * found in the LICENSE file at https://angular.io/license
 */
/**
 * An `AliasingHost` which exports directives from any file containing an NgModule in which they're
 * declared/exported, under a private symbol name.
 *
 * These exports support cases where an NgModule is imported deeply from an absolute module path
 * (that is, it's not part of an Angular Package Format entrypoint), and the compiler needs to
 * import any matched directives/pipes from the same path (to the NgModule file). See README.md for
 * more details.
 */
```

Found in path(s):

```
* /opt/cola/permits/1784583472_1693546594.4395707/0/compiler-cli-14-3-0-1-
tgz/package/src/ngtsc/imports/src/alias.d.ts
```

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```
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
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 * found in the LICENSE file at https://angular.io/license
 */
/**
 * A host backed by a build system which has a unified view of the module namespace.
 *
 * Such a build system supports the `fileNameToModuleName` method provided by certain build system
 * integrations (such as the integration with Bazel). See the docs on `fileNameToModuleName` for
 * more details.
 */
```

Found in path(s):

```
* /opt/cola/permits/1784583472_1693546594.4395707/0/compiler-cli-14-3-0-1-
tgz/package/src/ngtsc/core/api/src/interfaces.d.ts
```

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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-7YHMCUJT.js

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/ts\_compatibility/src/ts\_cross\_version\_utils.d.ts

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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/partial\_evaluator/src/interpreter.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/logging/src/logger.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/execution/cluster/executor.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/diagnostics/src/id.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/extract\_i18n.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/resource/index.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/path\_mappings.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/transformers/compiler\_host.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/scope/src/component\_scope.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/transformers/i18n.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/perf/src/recorder.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/execution/tasks/queues/base\_task\_queue.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-

tgz/package/ngcc/src/host/commonjs\_host.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/diagnostics/src/extended\_template\_diagnostic\_name.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/partial\_evaluator/src/synthetic.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/transform/src/trait.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/ast/ast\_host.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/locking/async\_locker.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/src/api/import\_generator.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/semantic\_graph/src/util.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/index.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/private/localize.js  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/partial\_evaluator/src/builtin.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/type\_emitter.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/src/typescript\_ast\_factory.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/index.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/rendering/rendering\_formatter.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/rendering/umd\_rendering\_formatter.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/packages/source\_file\_cache.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-V45KD7YD.js  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/shims/src/summary\_generator.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/logging/src/console\_logger.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/rendering/renderer.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/src/api/ast\_factory.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/api/completion.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/cycles/src/imports.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/sourcemaps/src/raw\_source\_map.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/writing/package\_json\_updater.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/imports/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/common/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/needs\_linking.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/host/delegating\_host.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/partial\_linkers/partial\_linker.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/rendering/utils.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/common/src/metadata.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/imports/src/reexport.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/scope/src/typecheck.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/transform/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/src/pipe.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/get\_source\_file.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/core/src/host.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/private/localize.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/tcb\_util.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/metadata/src/property\_mapping.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/scope/src/standalone.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/semantic\_graph/src/graph.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/entry\_point\_finder/interface.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/diagnostics/src/error\_code.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/imports/src/emitter.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/src/injectable.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/shims/src/util.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/api/api.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/util/src/visitor.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/core/api/src/options.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/line\_mappings.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/file\_system/src/util.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/common/src/evaluation.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/src/incremental.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/xi18n/index.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/transform/src/utils.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/perf/src/clock.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/execution/single\_process\_executor.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/private/bazel.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/api/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/emit\_scopes/local\_emit\_scope.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/babel/src/es2015\_linker\_plugin.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/execution/cluster/ngcc\_cluster\_worker.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/ast/ast\_value.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/reflection/src/host.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/entry\_point\_finder/tracing\_entry\_point\_finder.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/api/scope.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/checks/text\_attribute\_not\_binding/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/babel/src/ast/babel\_ast\_host.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-Q7TXFDI7.js

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/xi18n/src/context.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-UZLFREET.js

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/execution/cluster/master.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/linker/babel/index.js

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/imports/src/default.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/babel/src/babel\_declaration\_scope.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/partial\_linkers/partial\_injectable\_linker\_1.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/writing/cleaning/package\_cleaner.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/indexer/src/context.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/writing/in\_place\_file\_writer.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/ngcc/index.js

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/component/src/util.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/metadata/src/inheritance.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/src/dependency\_tracking.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/partial\_linkers/partial\_directive\_linker\_1.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/host/esm5\_host.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/private/migrations.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/entry\_point\_finder/directory\_walker\_entry\_point\_finder.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/migrations/migration.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/checks/suffix\_not\_supported/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-

2HPI44CB.js  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/perf/index.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/index.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-5TUGYFIJ.js  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/api.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/src/translator.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/transformers/api.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/src/typescript\_translator.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/common/src/di.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-CYVTLM4Z.js  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/src/type\_translator.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/writing/file\_writer.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/tsc\_plugin.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/ngcc/src/locking/lock\_file\_with\_child\_process/ngcc\_lock\_unlocker.js  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/indexer/src/transform.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/src/bin/ng\_xi18n.js  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/analysis/ngcc\_trait\_compiler.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/src/strategy.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/transformers/program.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/writing/cleaning/utils.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/source.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/ng\_module/index.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/packages/entry\_point\_bundle.d.ts



- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/component/src/symbol.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/private/migrations.js
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/metadata/src/registry.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/scope/index.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/indexer/src/api.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/private/babel.d.ts
- \*
- /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/constants.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/version.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/entry\_point\_finder/targeted\_entry\_point\_finder.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/partial\_linkers/util.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/execution/tasks/queues/parallel\_task\_queue.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/component/src/metadata.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/shims/index.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-L2QFSPXM.js
- \*
- /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/api/index.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/perf/src/noop.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/type\_check\_block.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/bin/ngc.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/checks/missing\_ngforof\_let/index.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/scope/src/dependency.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/partial\_evaluator/src/ts\_helpers.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/ng\_module/src/module\_with\_providers.d.ts
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- /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/oob.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/babel/src/linker\_plugin\_options.d.ts
- \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-

tgz/package/ngcc/src/host/ngcc\_host.d.ts  
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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/common/src/diagnostics.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/checks/missing\_control\_flow\_directive/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/component/src/handler.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/shims/src/expando.d.ts

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/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/component/src/resources.d.ts

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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/partial\_linkers/partial\_pipe\_linker\_1.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/perform\_watch.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/linker\_import\_generator.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/annotations/common/src/api.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/index.js

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/core/api/src/adapter.d.ts

\*

/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/partial\_evaluator/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/translator/src/context.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/private/bazel.js

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/ast/typescript/typescript\_ast\_host.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/extended/checks/optional\_chain\_not\_nullable/index.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/partial\_linkers/partial\_component\_linker\_1.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/template\_symbol\_builder.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/api/context.d.ts

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/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/file\_system/src/invalid\_file\_system.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/host/commonjs\_umd\_utils.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/transformers/util.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/src/environment.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/writing/cleaning/cleaning\_strategies.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/linker/src/file\_linker/translator.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/indexer/src/template.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/incremental/src/state.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/metadata/src/dts.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/file\_system/src/logical.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/ts\_compatibility/index.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/rendering/esm5\_rendering\_formatter.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/execution/cluster/api.d.ts  
\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/packages/transformer.d.ts  
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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/scope/src/api.d.ts  
\*  
/opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/sourcemaps/index.d.ts  
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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/partial\_evaluator/src/dynamic.d.ts  
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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/bundles/chunk-WAZH2LJQ.js  
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 TOKOIBI.js  
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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/metadata/src/resource\_registry.d.ts  
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 \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/analysis/ngcc\_references\_registry.d.ts  
 \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/transform/src/alias.d.ts  
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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/host/utills.d.ts  
 \* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/reflection/src/util.d.ts  
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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/transformers/downlevel\_decorators\_transform/patch\_alias\_reference\_resolution.d.ts

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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/imports/src/core.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/diagnostics/src/docs.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/private/tooling.d.ts

\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/ngcc/src/dependencies/dependency\_resolver.d.ts

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\* /opt/cola/permits/1784583472\_1693546594.4395707/0/compiler-cli-14-3-0-1-tgz/package/src/ngtsc/typecheck/api/checker.d.ts

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tgz/package/ngcc/src/migrations/missing_injectable_migration.d.ts

```

## 1.203 angular-animations 14.3.0

### 1.203.1 Available under license :

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*

```

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\*/

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* /opt/cola/permits/1784583507_1693546602.9302073/0/animations-14-3-0-1-
tgz/package/esm2020/browser/testing/index.mjs
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tgz/package/esm2020/src/animations.mjs
```

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## Angular

=====

The sources for this package are in the main [Angular](<https://github.com/angular/angular>) repo. Please file issues and pull requests against that repo.

Usage information and reference details can be found in [Angular documentation](<https://angular.io/docs>).

License: MIT

Found in path(s):

```
* /opt/cola/permits/1784583507_1693546602.9302073/0/animations-14-3-0-1-tgz/package/README.md
```

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```
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```

<https://angular.io/license>

```

import { AnimationMetadata, AnimationOptions }
from './animation_metadata';
import { AnimationPlayer } from './players/animation_player';

```

An injectable service that produces an animation sequence programmatically within an Angular component or directive. Provided by the `BrowserAnimationsModule` or `NoopAnimationsModule`.

**@usageNotes**

To use this service, add it to your component or directive as a dependency. The service is instantiated along with your component. Apps do not typically need to create their own animation players, but if you do need to, follow these steps:

- Use the `[AnimationBuilder.build](api/animations/AnimationBuilder#build)` method to create a programmatic animation. The method returns an `AnimationFactory` instance.
- Use the factory object to create an `AnimationPlayer` and attach it to a DOM element.
- Use the player object to control the animation programmatically.

For example:

```

// import the service from BrowserAnimationsModule
import { AnimationBuilder } from '@angular/animations';
// require the service as a dependency
class MyCmp {
  constructor(private _builder: AnimationBuilder) {}
  makeAnimation(element: any) {
    // first define a reusable animation
    const myAnimation =
      this._builder.build([
        style({ width: 0 }),
        animate(1000, style({ width: '100px' })),
      ]);
    // use the returned factory object to create a player
    const player = myAnimation.create(element);
    player.play();
  }
}

```

**@publicApi**

**AnimationBuilder** abstract class

Builds a factory for producing a defined animation.

**@param** animation A reusable animation definition.

**@returns** A factory object that can create a player for the defined animation.

**@see** `animate()`

**AnimationBuilder** abstract

```

build(animation: AnimationMetadata|AnimationMetadata[]): AnimationFactory;

```

A factory object returned from the

```

[AnimationBuilder.build](api/animations/AnimationBuilder#build)()

```

method.

**AnimationFactory** abstract class

Creates an `AnimationPlayer` instance for the reusable animation defined by the

```

[AnimationBuilder.build](api/animations/AnimationBuilder#build)()

```

method that created this factory and attaches the new player a DOM element.

**@param** element The DOM element to which to attach the player.

**@param** options A set of options that can include a time delay and additional developer-defined parameters.

**AnimationFactory** abstract

```

create(element: any, options?: AnimationOptions):
  AnimationPlayer;

```

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**StyleData** interface

Represents a set of CSS styles for use in an animation style as a generic.

```

interface StyleData {
  [key: string]: string|number;
}

```

**StyleDataMap** type

Represents a set of CSS styles for use in an animation style as a Map.

```

type StyleDataMap = Map<string, string|number>;

```

**AnimateTimings** type

Represents animation-step timing parameters for an animation step.

**@see** `animate()`

**AnimateTimings** type

declare type AnimateTimings = {

**duration:** number

The full duration of an animation step. A number and optional time unit, such as `"1s"` or `"10ms"` for one second and 10 milliseconds, respectively. The default unit is milliseconds.

**delay:** number

The delay in applying an animation step. A number and optional time unit. The default unit is milliseconds.

**easing:** string | null

An easing style that controls how an animations step accelerates and decelerates during its run time. An easing function such as `cubic-bezier()` or one of the following constants:

- `"ease-in"`
- `"ease-out"`
- `"ease-in-and-out"`

**@description** Options that control animation styling and timing.

The following animation functions accept `AnimationOptions` data:

- `transition()`
- `sequence()`
- `@link animations/group group()`
- `query()`
- `animation()`
- `useAnimation()`
- `animateChild()`

Programmatic animations built using the `AnimationBuilder` service also make use of `AnimationOptions`.

**AnimationOptions** interface

Sets a time-delay for initiating an animation action.

**delay:** number

A number and optional time unit, such as `"1s"` or `"10ms"` for one second and 10 milliseconds, respectively. The default unit is milliseconds. Default value is 0, meaning no delay.

`delay?: number|string;` `/**` `*` A set of developer-defined parameters that modify styling and timing `\n` `*` when an animation action starts. An array of key-value pairs, where the provided value `\n` `*` is used as a default. `\n` `*` `\n` `params?: {[name: string]: any};` `\n` `\n` `/**` `*` Adds duration options to control animation styling and timing for a child animation. `\n` `*` `\n` `*` `@see`animateChild()`` `\n` `*` `\n` `*` `@publicApi` `\n` `*` `\n` `*` `@next` export declare interface `AnimateChildOptions` extends `AnimationOptions` { `\n` `duration?: number|string;` `\n` `\n` `/**` `*` `@description` Constants for the categories of parameters that can be defined for animations. `\n` `*` `\n` `*` A corresponding function defines a set of parameters for each category, and `\n` `*` collects them into a corresponding ``AnimationMetadata`` object. `\n` `*` `\n` `*` `@publicApi` `\n` `*` `@next` export const enum `AnimationMetadataType` { `\n` `/**` `*` Associates a named animation state with a set of CSS styles. `\n` `*` See `[`state()`](api/animations/state)` `\n` `*` `\n` `*` `State = 0,` `\n` `/**` `*` Data for a transition from one animation state to another. `\n` `*` See ``transition()`` `\n` `*` `\n` `*` `Transition = 1,` `\n` `/**` `*` Contains a set of animation steps. `\n` `*` See ``sequence()`` `\n` `*` `\n` `*` `Sequence = 2,` `\n` `/**` `*` Contains a set of animation steps. `\n` `*` See ``{@link animations/group group()}`` `\n` `*` `\n` `*` `Group = 3,` `\n` `/**` `*` Contains an animation step. `\n` `*` See ``animate()`` `\n` `*` `\n` `*` `Animate = 4,` `\n` `/**` `*` Contains a set of animation steps. `\n` `*` See ``keyframes()`` `\n` `*` `\n` `*` `Keyframes = 5,` `\n` `/**` `*` Contains a set of CSS property-value pairs into a named style. `\n` `*` See ``style()`` `\n` `*` `\n` `*` `Style = 6,` `\n` `/**` `*` Associates an animation with an entry trigger that can be attached to an element. `\n` `*` See ``trigger()`` `\n` `*` `\n` `*` `Trigger = 7,` `\n` `/**` `*` Contains a re-usable animation. `\n` `*` See ``animation()`` `\n` `*` `\n` `*` `Reference = 8,` `\n` `/**` `*` Contains data to use in executing child animations returned by a query. `\n` `*` See ``animateChild()`` `\n` `*` `\n` `*` `AnimateChild = 9,` `\n` `/**` `*` Contains animation parameters for a re-usable animation. `\n` `*` See ``useAnimation()`` `\n` `*` `\n` `*` `AnimateRef = 10,` `\n` `/**` `*` Contains child-animation query data. `\n` `*` See ``query()`` `\n` `*` `\n` `*` `Query = 11,` `\n` `/**` `*` Contains data for staggering an animation sequence. `\n` `*` See ``stagger()`` `\n` `*` `\n` `*` `Stagger = 12` `\n` `\n` `\n` `/**` `*` Specifies automatic styling. `\n` `*` `\n` `*` `@publicApi` `\n` `*` `@next` export const `AUTO_STYLE = '*'`; `\n` `\n` `/**` `*` Base for animation data structures. `\n` `*` `\n` `*` `@publicApi` `\n` `*` `@next` export interface `AnimationMetadata` { `\n` `type: AnimationMetadataType;` `\n` `\n` `/**` `*` Contains an animation trigger. Instantiated and returned by the `\n` `*` ``trigger()`` function. `\n` `*` `\n` `*` `@publicApi` `\n` `*` `@next` export interface `AnimationTriggerMetadata` extends `AnimationMetadata` { `\n` `/**` `*` The trigger name, used to associate it with an element. Unique within the component. `\n` `*` `\n` `*` `name: string;` `\n` `/**` `*` An animation definition object, containing an array of state and transition declarations. `\n` `*` `\n` `*` `definitions: AnimationMetadata[];` `\n` `/**` `*` An options object containing a delay and `\n` `*` developer-defined parameters that provide styling defaults and `\n` `*` can be overridden on invocation. Default delay is 0. `\n` `*` `\n` `*` `options: {params?: {[name: string]: any}}|null;` `\n` `\n` `\n` `/**` `*` Encapsulates an animation state by associating a state name with a set of CSS styles. `\n` `*` Instantiated and returned by the `[`state()`](api/animations/state)` function. `\n` `*` `\n` `*` `@publicApi` `\n` `*` `@next` export interface `AnimationStateMetadata` extends `AnimationMetadata` { `\n` `/**` `*` The state name, unique within the component. `\n` `*` `\n` `*` `name: string;` `\n` `/**` `*` The CSS styles associated with this state. `\n` `*` `\n` `*` `styles: AnimationStyleMetadata;` `\n` `/**` `*` An options object containing `\n` `*` developer-defined parameters that provide styling defaults and `\n` `*` can be overridden on invocation. `\n` `*` `\n` `*` `options?: {params: {[name: string]: any}};` `\n` `\n` `\n` `/**` `*` Encapsulates an animation transition. Instantiated and returned by the `\n` `*` ``transition()`` function. `\n` `*` `\n` `*` `@publicApi` `\n` `*` `@next` export interface `AnimationTransitionMetadata` extends `AnimationMetadata` { `\n` `/**` `*` An expression that describes a state change. `\n` `*` `\n` `*` `expr: string|\n` `((fromState: string, toState: string, element?: any, \n` `params?: {[key: string]: any}) => boolean);` `\n` `/**` `*` One or more animation objects to which this transition applies. `\n` `*` `\n` `*` `animation: AnimationMetadata|AnimationMetadata[];` `\n` `/**` `*` An options object containing a delay and `\n` `*` developer-defined parameters that provide styling defaults and `\n` `*` can be overridden on invocation. Default delay is 0. `\n` `*` `\n` `*` `options: AnimationOptions|null;` `\n` `\n` `\n` `/**` `*` Encapsulates a reusable animation, which is a collection of individual animation steps. `\n` `*` Instantiated and returned by the ``animation()`` function, and `\n` `*` passed to the ``useAnimation()`` function. `\n` `*` `\n` `*` `@publicApi` `\n` `*` `@next` export interface `AnimationReferenceMetadata` extends `AnimationMetadata` { `\n` `/**` `*` One or more animation step objects. `\n` `*` `\n` `*` `animation: AnimationMetadata|AnimationMetadata[];` `\n`

```

/**\n * An options object containing a delay and\n * developer-defined parameters that provide styling defaults
and\n * can be overridden on invocation. Default delay is 0.\n *\n options: AnimationOptions|null;\n}\n\n/**\n *
Encapsulates an animation query. Instantiated and returned by\n * the `query()` function.\n *\n * @publicApi\n
*\nexport interface AnimationQueryMetadata extends AnimationMetadata {\n /**\n * The CSS selector for this
query.\n *\n selector: string;\n /**\n * One or more animation step objects.\n *\n animation:
AnimationMetadata|AnimationMetadata[];\n /**\n * A query options object.\n *\n options:
AnimationQueryOptions|null;\n}\n\n/**\n * Encapsulates a keyframes sequence. Instantiated and returned by\n * the
`keyframes()` function.\n *\n * @publicApi\n *\nexport interface AnimationKeyframesSequenceMetadata extends
AnimationMetadata {\n /**\n * An array of animation styles.\n *\n steps:
AnimationStyleMetadata[];\n}\n\n/**\n
* Encapsulates an animation style. Instantiated and returned by\n * the `style()` function.\n *\n * @publicApi\n
*\nexport interface AnimationStyleMetadata extends AnimationMetadata {\n /**\n * A set of CSS style
properties.\n *\n styles: '*'|{[key: string]: string | number}|Array<{[key: string]: string | number}|*';\n /**\n
* A percentage of the total animate time at which the style is to be applied.\n *\n offset: number|null;\n}\n\n/**\n
* Encapsulates an animation step. Instantiated and returned by\n * the `animate()` function.\n *\n * @publicApi\n
*\nexport interface AnimationAnimateMetadata extends AnimationMetadata {\n /**\n * The timing data for the
step.\n *\n timings: string|number|AnimateTimings;\n /**\n * A set of styles used in the step.\n *\n styles:
AnimationStyleMetadata|AnimationKeyframesSequenceMetadata|null;\n}\n\n/**\n * Encapsulates a child
animation, that can be run explicitly when the parent is run.\n * Instantiated and
returned by the `animateChild` function.\n *\n * @publicApi\n *\nexport interface
AnimationAnimateChildMetadata extends AnimationMetadata {\n /**\n * An options object containing a delay
and\n * developer-defined parameters that provide styling defaults and\n * can be overridden on invocation.
Default delay is 0.\n *\n options: AnimationOptions|null;\n}\n\n/**\n * Encapsulates a reusable animation.\n *
Instantiated and returned by the `useAnimation()` function.\n *\n * @publicApi\n *\nexport interface
AnimationAnimateRefMetadata extends AnimationMetadata {\n /**\n * An animation reference object.\n *\n
animation: AnimationReferenceMetadata;\n /**\n * An options object containing a delay and\n * developer-
defined parameters that provide styling defaults and\n * can be overridden on invocation. Default delay is 0.\n
*\n options: AnimationOptions|null;\n}\n\n/**\n * Encapsulates an animation sequence.\n * Instantiated and
returned by the `sequence()` function.\n
*\n * @publicApi\n *\nexport interface AnimationSequenceMetadata extends AnimationMetadata {\n /**\n *
An array of animation step objects.\n *\n steps: AnimationMetadata[];\n /**\n * An options object containing a
delay and\n * developer-defined parameters that provide styling defaults and\n * can be overridden on invocation.
Default delay is 0.\n *\n options: AnimationOptions|null;\n}\n\n/**\n * Encapsulates an animation group.\n *
Instantiated and returned by the `{ @link animations/group group()}` function.\n *\n * @publicApi\n *\nexport
interface AnimationGroupMetadata extends AnimationMetadata {\n /**\n * One or more animation or style steps
that form this group.\n *\n steps: AnimationMetadata[];\n /**\n * An options object containing a delay and\n
* developer-defined parameters that provide styling defaults and\n * can be overridden on invocation. Default delay
is 0.\n *\n options: AnimationOptions|null;\n}\n\n/**\n * Encapsulates animation
query options.\n * Passed to the `query()` function.\n *\n * @publicApi\n *\nexport declare interface
AnimationQueryOptions extends AnimationOptions {\n /**\n * True if this query is optional, false if it is required.
Default is false.\n * A required query throws an error if no elements are retrieved when\n * the query is executed.
An optional query does not.\n *\n *\n optional?: boolean;\n /**\n * A maximum total number of results to
return from the query.\n * If negative, results are limited from the end of the query list towards the beginning.\n
*\n * By default, results are not limited.\n *\n *\n limit?: number;\n}\n\n/**\n * Encapsulates parameters for staggering the
start times of a set of animation steps.\n * Instantiated and returned by the `stagger()` function.\n *\n *
*\n * @publicApi\n *\nexport interface AnimationStaggerMetadata extends AnimationMetadata {\n /**\n * The
timing data for the steps.\n *\n timings: string|number;\n /**\n * One or more

```

animation steps.

`animation: AnimationMetadata|AnimationMetadata[];`

Creates a named animation trigger, containing a list of `state()` and `transition()` entries to be evaluated when the expression bound to the trigger changes.

`@param name` An identifying string.

`@param definitions` An animation definition object, containing an array of `state()` and `transition()` declarations.

`@return` An object that encapsulates the trigger data.

`@usageNotes` Define an animation trigger in the `animations` section of `@Component` metadata. In the template, reference the trigger by name and bind it to a trigger expression that evaluates to a defined animation state, using the following format:

```
[@triggerName]="expression"
```

Animation trigger bindings convert all values to strings, and then match the previous and current values against any linked transitions.

Booleans can be specified as `1` or `true` and `0` or `false`.

### Usage Example

The following example creates an animation trigger reference based on the provided name value. The provided animation value is expected to be an array consisting of state and transition declarations.

```
typescript
@Component({
  selector: 'my-component',
  templateUrl: 'my-component-tpl.html',
  animations: [
    trigger('myAnimationTrigger', [
      state(...),
      state(...),
      transition(...),
      transition(...)
    ])
  ]
})
class MyComponent {
  myStatusExp = 'something';
}
```

The template associated with this component makes use of the defined trigger by binding to an element within its template code.

```
html
<!-- somewhere inside of my-component-tpl.html -->
<div [@myAnimationTrigger]="myStatusExp">...</div>
```

### Using an inline function

The `transition` animation method also supports reading an inline function which can decide if its associated animation should be run.

```
typescript
// this method is run each time the `myAnimationTrigger` trigger value changes.
function myInlineMatcherFn(fromState: string, toState: string, element: any, params: {[key: string]: any}): boolean {
  // notice that `element` and `params` are also available here
  return toState === 'yes-please-animate';
}
@Component({
  selector: 'my-component',
  templateUrl: 'my-component-tpl.html',
  animations: [
    trigger('myAnimationTrigger', [
      transition(myInlineMatcherFn, // the animation sequence code
    ])
  ])
})
class MyComponent {
  myStatusExp = 'yes-please-animate';
}
```

### Disabling Animations

When true, the special animation control binding `@.disabled` binding prevents all animations from rendering. Place the `@.disabled` binding on an element to disable animations on the element itself, as well as any inner animation triggers within the element.

The following example shows how to use this feature:

```
typescript
@Component({
  selector: 'my-component',
  template: `
<div [@.disabled]="isDisabled">
  <div [@childAnimation]="exp"></div>
</div>`,
  animations: [
    trigger('childAnimation', [
      // ...
    ])
  ]
})
class MyComponent {
  isDisabled = true;
  exp = '...';
}
```

When `@.disabled` is true, it prevents the `@childAnimation` trigger from animating, along with any inner animations.

### Disable animations application-wide

When an area of the template is set to have animations disabled, all inner components have their animations disabled as well. This means that you can disable all animations for an app

by placing a host binding set on `@.disabled` on the topmost Angular component.

```
typescript
import {Component, HostBinding} from '@angular/core';
@Component({
  selector: 'app-component',
  templateUrl: 'app.component.html',
})
class AppComponent {
  @HostBinding('@.disabled')
  public animationsDisabled = true;
}
```

### Overriding disablement of inner animations

Despite inner animations being disabled, a parent animation can `query()` for inner elements located in disabled areas of the template and still animate them if needed. This is also the case for when a sub animation is queried by a parent and then later animated using `animateChild()`.

### Detecting when an animation is disabled

If a region of the DOM (or the entire application) has its animations disabled, the animation trigger callbacks still fire, but for zero seconds. When the callback fires, it provides an instance of an `AnimationEvent`. If animations are disabled, the `.disabled` flag on the event is true.

`@publicApi`

```
export function trigger(name: string, definitions: AnimationMetadata[]): AnimationTriggerMetadata {
  return {
    type: AnimationMetadataType.Trigger,
    name,
    definitions,
    options: {}
  };
}
```

Defines an animation step



that combines styling information with timing information.

`@param timings` Sets `AnimateTimings`` for the parent animation.

A string in the format `"duration [delay] [easing]"`.

- Duration and delay are expressed as a number and optional time unit, such as `"1s"` or `"10ms"` for one second and 10 milliseconds, respectively.
- The default unit is milliseconds.
- The easing value controls how the animation accelerates and decelerates during its runtime. Value is one of `"ease"`, `"ease-in"`, `"ease-out"`, `"ease-in-out"`, or a `"cubic-bezier()"` function call.
- If not supplied, no easing is applied.

For example, the string `"1s 100ms ease-out"` specifies a duration of 1000 milliseconds, and delay of 100 ms, and the `"ease-out"` easing style, which decelerates near the end of the duration.

`@param styles` Sets `AnimationStyles` for the parent animation.

A function call to either `style()` or `keyframes()` that returns a collection of CSS style entries to be applied to the parent animation.

- When null, uses the styles from the destination state.
- This is useful when describing an animation step that will complete an animation; see `"Animating to the final state"` in `transitions()`.

`@returns` An object that encapsulates the animation step.

`@usageNotes`

Call within an animation `sequence()`, `{@link animations/group group()}``, or `transition()` call to specify an animation step that applies given style data to the parent animation for a given amount of time.

### Syntax Examples

#### Timing examples

The following examples show various `timings`` specifications.

- `animate(500)`` : Duration is 500 milliseconds.
- `animate("1s")`` : Duration is 1000 milliseconds.
- `animate("100ms 0.5s")`` : Duration is 100 milliseconds, delay is 500 milliseconds.
- `animate("5s ease-in")`` : Duration is 5000 milliseconds, easing in.
- `animate("5s 10ms cubic-bezier(.17,.67,.88,.1)")`` : Duration is 5000 milliseconds, delay is 10 milliseconds, easing according to a bezier curve.

#### Style examples

The following example calls `style()` to set a single CSS style.

```

<<typescript
animate(500, style({ background: "red" }));

```

The following example calls `keyframes()` to set a CSS style to different values for successive keyframes.

```

<<typescript
animate(500, keyframes([
  style({ background: "blue" }),
  style({ background: "red" })
]));

```

`@publicApi`

```

export function animate(timings: string|number,
  styles: AnimationStyleMetadata|AnimationKeyframesSequenceMetadata|null
  = null): AnimationAnimateMetadata {
  return {type: AnimationMetadataType.Animate, styles,
    timings};
}

```

`@description` Defines a list of animation steps to be run in parallel.

`@param steps` An array of animation step objects.

- When steps are defined by `style()` or `animate()` function calls, each call within the group is executed instantly.
- To specify offset styles to be applied at a later time, define steps with `keyframes()`, or use `animate()` calls with a delay value.

For example:

```

<<typescript
group([
  animate("1s", style({ background: "black" })),
  animate("2s", style({ color: "white" }))]
);

```

`@param options` An options object containing a delay and developer-defined parameters that provide styling defaults and can be overridden on invocation.

`@return` An object that encapsulates the group data.

`@usageNotes`

Grouped animations are useful when a series of styles must be animated at different starting times and closed off at different ending times.

When called within a `sequence()` or a `transition()` call, does not continue to the next instruction until all of the inner animation steps have completed.

`@publicApi`

```

export function group(steps: AnimationMetadata[], options: AnimationOptions|null = null): AnimationGroupMetadata {
  return {type: AnimationMetadataType.Group, steps, options};
}

```

Defines a list of animation steps to be run sequentially, one by one.

`@param steps` An array of animation step objects.

- Steps defined by `style()` calls apply the styling data immediately.
- Steps defined by `animate()` calls apply the styling data over time as specified by the timing data.

```

<<typescript
sequence([
  style({ opacity: 0 }),
  animate("1s", style({ opacity: 1 }))]
);

```

`@param options`

An options object containing a delay and developer-defined parameters that provide styling defaults and can be overridden on invocation.

`@return` An object that encapsulates the sequence data.

`@usageNotes`

When you pass an array of steps to a `transition()` call, the steps run sequentially by default. Compare this to the `{@link animations/group group()}`` call, which runs animation steps in parallel.

When a sequence is used within a `{@link animations/group group()}`` or a `transition()` call, execution continues to the next

instruction only after each of the inner animation steps have completed.

```

@publicApi
export function sequence(steps: AnimationMetadata[], options: AnimationOptions | null = null): AnimationSequenceMetadata {
  return {type: AnimationMetadataType.Sequence, steps, options};
}

```

Declares a key/value object containing CSS properties/styles that can then be used for an animation

```

[ state` ](api/animations/state),

```

within an animation sequence, or as styling data for calls to `animate()` and `keyframes()`.

`@param tokens` A set of CSS styles or HTML styles associated with an animation state. The value can be any of the following:

- A key-value style pair associating a CSS property with a value.
- An array of key-value style pairs.
- An asterisk (\*), to use auto-styling, where styles are derived from the element being animated and applied to the animation when it starts.
- Auto-styling can be used to define a state that depends on layout or other environmental factors.

`@return` An object that encapsulates the style data.

`@usageNotes`

The following examples create animation styles that collect a set of CSS property values:

```

typescript
// string values for CSS properties
style({ background: "red", color: "blue" })
// numerical pixel values
style({ width: 100, height: 0 })

```

The following example uses auto-styling to allow an element to animate from a height of 0 up to its full height:

```

style({ height: 0 }), animate("1s", style({ height: "*" }))

```

`@publicApi`

```

export function style(tokens: {[key: string]: string | number} | Array<*[key: string]: string | number>): AnimationStyleMetadata {
  return {type: AnimationMetadataType.Style, styles: tokens, offset: null};
}

```

Declares an animation state within a trigger attached to an element.

`@param name` One or more names for the defined state in a comma-separated string. The following reserved state names can be supplied to define a style for specific use cases:

- `void`` You can associate styles with this name to be used when the element is detached from the application. For example, when an `ngIf`` evaluates to false, the state of the associated element is `void``.
- `void`` (asterisk) Indicates the default state. You can associate styles with this name to be used as the fallback when the state that is being animated is not declared within the trigger.

`@param styles` A set of CSS styles associated with this state, created using the `style()`` function. This set of styles persists on the element once the state has been reached.

`@param options` Parameters that can be passed to the state when it is invoked. 0 or more key-value pairs.

`@return` An object that encapsulates the new state data.

`@usageNotes`

Use the `trigger()`` function to register states to an animation trigger. Use the `transition()`` function to animate between states. When a state is active within a component, its associated styles persist on the element, even when the animation ends.

`@publicApi`

```

export function state(name: string, styles: AnimationStyleMetadata, options?: {params: {[name: string]: any}}): AnimationStateMetadata {
  return {type: AnimationMetadataType.State, name, styles, options};
}

```

Defines a set of animation styles, associating each style with an optional `offset`` value.

`@param steps` A set of animation styles with optional offset data. The optional `offset`` value for a style specifies a percentage of the total animation time at which that style is applied.

`@returns` An object that encapsulates the keyframes data.

`@usageNotes`

Use with the `animate()`` call. Instead of applying animations from the current state to the destination state, keyframes describe how each style entry is applied and at what point within the animation arc. Compare [CSS Keyframe Animations](https://www.w3schools.com/css/css3\_animations.asp).

### Usage

In the following example, the offset values describe when each `backgroundColor`` value is applied. The color is red at the start, and changes to blue when 20% of the total time has elapsed.

```

typescript
// the provided offset values
animate("5s", keyframes([
  style({ backgroundColor: "red", offset: 0 }),
  style({ backgroundColor: "blue", offset: 0.2 }),
  style({ backgroundColor: "orange", offset: 0.3 }),
  style({ backgroundColor: "black", offset: 1 })
]))

```

If there are no `offset`` values specified in the style entries, the offsets are calculated automatically.

```

typescript
animate("5s", keyframes([
  style({ backgroundColor: "red" }) // offset = 0
  style({ backgroundColor: "blue" }) // offset = 0.33
  style({ backgroundColor: "orange" }) // offset = 0.66
  style({ backgroundColor: "black" }) // offset = 1
]))

```

`@publicApi`

```

export function keyframes(steps:

```

AnimationStyleMetadata[]): AnimationKeyframesSequenceMetadata {  
 return {type: AnimationMetadataType.Keyframes, steps};  
 }  
 \* Declares an animation transition which is played when a certain specified condition is met.  
 \* @param stateChangeExpr A string with a specific format or a function that specifies when the animation transition should occur (see [State Change Expression](#state-change-expression)).  
 \* @param steps One or more animation objects that represent the animation's instructions.  
 \* @param options An options object that can be used to specify a delay for the animation or provide custom parameters for it.  
 \* @returns An object that encapsulates the transition data.  
 \* @usageNotes  
 ### State Change Expression  
 The State Change Expression instructs Angular when to run the transition's animations, it can either be  
 - a string with a specific syntax  
 - or a function that compares the previous and current state (value of the expression bound to the element's trigger) and returns `true` if the transition should occur or `false` otherwise  
 The string format can be:  
 - `fromState => toState`, which indicates that the transition's animations should occur then the expression bound to the trigger's element goes from `fromState` to `toState`  
 \_Example:\_  

```

<code>transition('open => closed', animate('.5s ease-out', style({ height: 0 })))
</code>
  - `fromState <=> toState`, which indicates that the transition's animations should occur then the expression bound to the trigger's element goes from `fromState` to `toState` or vice versa  

  _Example:_  


```

<code>transition('enabled <=> disabled', animate('1s cubic-bezier(0.8,0.3,0,1)'))
</code>
  - `:enter`/`:leave`, which indicates that the transition's animations should occur when the element enters or exists the DOM  

  _Example:_  


```

<code>transition(':enter', [style({ opacity: 0 }), animate('500ms', style({ opacity: 1 }))]
</code>
  - `:increment`/`:decrement`, which indicates that the transition's animations should occur when the numerical expression bound to the trigger's element has increased in value or decreased  

  _Example:_  


```

<code>transition(':increment', query('@counter', animateChild()))
</code>
  - a sequence of any of the above divided by commas, which indicates that transition's animations should occur whenever one of the state change expressions matches  

  _Example:_  


```

<code>transition(':increment, => enabled, :enter', animate('1s ease', keyframes([style({ transform: 'scale(1)', offset: 0}), style({ transform: 'scale(1.1)', offset: 0.7}), style({ transform: 'scale(1)', offset: 1 })]))
</code>
  Also note that in such context:  

  - `void` can be used to indicate the absence of the element  

  - asterisks can be used as wildcards that match any state  

  - (as a consequence of the above, `void => *` is equivalent to `:enter` and `* => void` is equivalent to `:leave`)  

  - `true` and `false` also match expression values of `1` and `0` respectively (but do not match _truthy_ and _falsy_ values)  

  <div class="alert is-helpful">  

  * Be careful about entering end leaving elements as their transitions present a common pitfall for developers.  

  * Note that when an element with a trigger enters the DOM its `:enter` transition always gets executed, but its `:leave` transition will not be executed if the element is removed alongside its parent (as it will be removed "without warning" before its transition has a chance to be executed, the only way that such transition can occur is if the element is exiting the DOM on its own).  

  ### Animating to a Final State  

  If the final step in a transition is a call to animate() that uses a timing value with no style data, that step is automatically considered the final animation arc for the element to reach the final state, in such case Angular automatically adds or removes CSS styles to ensure that the element is in the correct final state.  

  ### Usage Examples  

  - Transition animations applied based on the trigger's expression value  

  _HTML_  


```

<code><div [@myAnimationTrigger]="myStatusExp"> ... </div>
</code>
  _typescript_  


```

<code>trigger("myAnimationTrigger", [ ..., // states
transition("on => off, open => closed", animate(500)),
transition(" * <=> error", query('.indicator', animateChild()))
])
</code>
  - Transition animations applied based on custom logic dependent on the trigger's expression value and provided parameters  

  _HTML_  


```

<code><div [@myAnimationTrigger]="{ value: stepName, params: { target: currentTarget } }"
</code>
  
```


```


```


```


```


```


```


```

```

})>\n * ... \n * </div>\n * ```\n *\n * ```typescript\n * trigger('myAnimationTrigger', [\n * ..., //
states\n * transition(\n * (fromState, toState, _element, params) =>\n * ['firststep',
'laststep'].includes(fromState.toLowerCase()))\n * && toState === params?.['target'],\n * animate('1s')\n *
)\n * ])\n * ```\n *\n * @publicApi\n **/\nexport function transition(\n stateChangeExpr: string|\n
((fromState: string, toState: string, element?: any, params?: {[key: string]: any}) => boolean),\n steps:
AnimationMetadata|AnimationMetadata[],\n options: AnimationOptions|null = null):
AnimationTransitionMetadata {\n return {type: AnimationMetadataType.Transition, expr: stateChangeExpr,
animation: steps, options};\n}\n\n/**\n * Produces a reusable animation that can be invoked in another animation or
sequence,\n * by calling the `useAnimation()` function.\n *\n * @param steps One or more animation objects, as
returned
by the `animate()`\n * or `sequence()` function, that form a transformation from one state to another.\n * A
sequence is used by default when you pass an array.\n * @param options An options object that can contain a delay
value for the start of the\n * animation, and additional developer-defined parameters.\n * Provided values for
additional parameters are used as defaults,\n * and override values can be passed to the caller on invocation.\n *
@returns An object that encapsulates the animation data.\n *\n * @usageNotes\n * The following example defines a
reusable animation, providing some default parameter\n * values.\n *\n * ```typescript\n * var fadeAnimation =
animation([\n * style({ opacity: '{{ start }}' }),\n * animate('{{ time }}',\n * style({ opacity: '{{ end }}'))\n *
],\n * { params: { time: '1000ms', start: 0, end: 1 }});\n * ```\n *\n * The following invokes the defined animation
with a call to `useAnimation()`\n * passing in override parameter values.\n
*\n * ```js\n * useAnimation(fadeAnimation, {\n * params: {\n * time: '2s',\n * start: 1,\n * end: 0\n *
}\n * })\n * ```\n *\n * If any of the passed-in parameter values are missing from this call,\n * the default values are
used. If one or more parameter values are missing before a step is\n * animated, `useAnimation()` throws an error.\n
*\n * @publicApi\n **/\nexport function animation(\n steps: AnimationMetadata|AnimationMetadata[],\n
options: AnimationOptions|null = null): AnimationReferenceMetadata {\n return {type:
AnimationMetadataType.Reference, animation: steps, options};\n}\n\n/**\n * Executes a queried inner animation
element within an animation sequence.\n *\n * @param options An options object that can contain a delay value for
the start of the\n * animation, and additional override values for developer-defined parameters.\n * @return An
object that encapsulates the child animation data.\n *\n * @usageNotes\n * Each time an animation is triggered in
Angular, the parent animation\n * has priority and any child animations are blocked. In order\n * for a child
animation to run, the parent animation must query each of the elements\n * containing child animations, and run
them using this function.\n *\n * Note that this feature is designed to be used with `query()` and it will only work\n *
with animations that are assigned using the Angular animation library. CSS keyframes\n * and transitions are not
handled by this API.\n *\n * @publicApi\n **/\nexport function animateChild(options: AnimateChildOptions|null =
null):\n AnimationAnimateChildMetadata {\n return {type: AnimationMetadataType.AnimateChild,
options};\n}\n\n/**\n * Starts a reusable animation that is created using the `animation()` function.\n *\n * @param
animation The reusable animation to start.\n * @param options An options object that can contain a delay value for
the start of\n * the animation, and additional override values for developer-defined parameters.\n * @return
An object that contains the animation parameters.\n *\n * @publicApi\n **/\nexport function useAnimation(\n
animation: AnimationReferenceMetadata,\n options: AnimationOptions|null = null):
AnimationAnimateRefMetadata {\n return {type: AnimationMetadataType.AnimateRef, animation,
options};\n}\n\n/**\n * Finds one or more inner elements within the current element that is\n * being animated
within a sequence. Use with `animate()`.\n *\n * @param selector The element to query, or a set of elements that
contain Angular-specific\n * characteristics, specified with one or more of the following tokens.\n * -
`query(':enter()')` or `query(':leave()')` : Query for newly inserted/removed elements (not\n * all elements can be
queried via these tokens, see\n * [Entering and Leaving Elements](#entering-and-leaving-elements))\n * -
`query(':animating()')` : Query all currently animating elements.\n * - `query('@triggerName')` : Query elements
that contain an animation trigger.\n

```

\* - `query('@*')` : Query all elements that contain an animation triggers.

\* - `query(':self')` : Include the current element into the animation sequence.

\* `@param animation` One or more animation steps to apply to the queried element or elements.

\* An array is treated as an animation sequence.

\* `@param options` An options object. Use the 'limit' field to limit the total number of items to collect.

\* `@return` An object that encapsulates the query data.

\* `@usageNotes`

### Multiple Tokens

\* Tokens can be merged into a combined query selector string. For example:

```
typescript
query(':self, .record:enter, .record:leave, @subTrigger', [...])
```

\* The `query()` function collects multiple elements and works internally by using `element.querySelectorAll`. Use the `limit` field of an options object to limit the total number of items to be collected. For example:

```
js
query('div', [animate(...), animate(...)], { limit: 1 })
```

\* By default, throws an error when zero items are found. Set the `optional` flag to ignore this error. For example:

```
js
query('.some-element-that-may-not-be-there', [animate(...), animate(...)], { optional: true })
```

### Entering and Leaving Elements

\* Not all elements can be queried via the `:enter` and `:leave` tokens, the only ones that can are those that Angular assumes can enter/leave based on their own logic (if their insertion/removal is simply a consequence of that of their parent they should be queried via a different token in their parent's `:enter`/`:leave` transitions).

\* The only elements Angular assumes can enter/leave based on their own logic (thus the only ones that can be queried via the `:enter` and `:leave` tokens) are:

- Those inserted dynamically (via `ViewContainerRef`)
- Those that have a structural directive (which, under the hood, are a subset of the above ones)

\* `<div class="alert is-helpful">` Note that elements will be successfully queried via `:enter`/`:leave` even if their insertion/removal is not done manually via `ViewContainerRef` or caused by their structural directive (e.g. they enter/exit alongside their parent).

\* `</div>`

\* `<div class="alert is-important">` There is an exception to what previously mentioned, besides elements entering/leaving based on their own logic, elements with an animation trigger can always be queried via `:leave` when their parent is also leaving.

```
</div>
```

### Usage Example

\* The following example queries for inner elements and animates them individually using `animate()`.

```
typescript
@Component({
  selector: 'inner',
  template: `
    <div [@queryAnimation]="exp">
      <h1>Title</h1>
      <div class="content">
        Blah blah blah
      </div>
    </div>`,
  animations: [
    trigger('queryAnimation', [
      transition('* => goAnimate', [
        // hide the inner elements
        query('h1', style({ opacity: 0 })),
        query('.content', style({ opacity: 0 })),
        // animate the inner elements in, one by one
        query('h1', animate(1000, style({ opacity: 1 }))),
        query('.content', animate(1000, style({ opacity: 1 })))
      ])
    ])
  ],
  class: Cmp,
  exports: [goAnimate]
})
export function query(selector: string, animation: AnimationMetadata|AnimationMetadata[], options: AnimationQueryOptions|null = null): AnimationQueryMetadata {
  return { type: AnimationMetadataType.Query, selector, animation, options };
}
```

\* Use within an animation `query()` call to issue a timing gap after each queried item is animated.

\* `@param timings` A delay value.

\* `@param animation` One or more animation steps.

\* `@returns` An object that encapsulates the stagger data.

\* `@usageNotes` In the following example, a container element wraps a list of items stamped out by an `ngFor`. The container element contains an animation trigger that will later be set to query for each of the inner items. Each time items are added, the opacity fade-in animation runs, and each removed item is faded out. When either of these animations occur, the stagger effect is applied after each item's animation is started.

```
html
<!-- list.component.html -->
<button (click)="toggle()">Show / Hide Items</button>
<div [@listAnimation]="items.length">
  <div *ngFor="let item of items">
    {{ item }}
  </div>
</div>
```

\* Here is the component code:

```
typescript
import { trigger, transition, style, animate, query, stagger } from '@angular/animations';
@Component({
  templateUrl: 'list.component.html',
  animations: [
    trigger('listAnimation', [
      ...
    ])
  ],
  class: ListComponent,
  items = [],
  showItems() {
    this.items = [0,1,2,3,4];
  },
  hideItems() {
    this.items = [];
  },
  toggle() {
    this.items.length ?

```

```
this.hideItems() : this.showItems();\n *  }\n *  }\n *  ``\n *  Here is the animation trigger code:\n *  ``\n *  typescript\n *  trigger('listAnimation', [\n *    transition('* => *', [ // each time the binding value changes\n *      query(':leave', [\n *        stagger(100, [\n *          animate('0.5s', style({ opacity: 0 })))\n *        ])\n *      ]),\n *      query(':enter', [\n *        style({ opacity: 0 })),\n *        stagger(100, [\n *          animate('0.5s', style({ opacity: 1 })))\n *        ])\n *      ])\n *    ])\n *  ``\n *  @publicApi\n *  ^\n *  export function stagger(timings: string|number,\n *    animation: AnimationMetadata|AnimationMetadata[]):\n *    AnimationStaggerMetadata {
```

```
\n *   return {type: AnimationMetadataType.Stagger, timings, animation};\n * }\n * }", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-\n * style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n * export function\n * scheduleMicroTask(cb: () => any) {\n *   Promise.resolve().then(cb);\n * }\n * }", /**\n * @license\n * Copyright Google\n * LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found\n * in the LICENSE file at https://angular.io/license\n * ^\n * import {scheduleMicroTask} from './util';\n * }
```

Provides programmatic control of a reusable animation sequence, built using the

```
<code>[AnimationBuilder.build](api/animations/AnimationBuilder#build)</code>\n * method which returns an\n * `AnimationFactory`, whose\n * <code>[create](api/animations/AnimationFactory#create)</code> method\n * instantiates
```

```
\n * and\n * initializes this interface.\n * @see `AnimationBuilder`\n * @see `AnimationFactory`\n * @see\n * `animate()`\n * @publicApi\n * ^\n * export interface AnimationPlayer {\n *   /**\n *    * Provides a callback to invoke\n *    * when the animation finishes.\n *    * @param fn The callback function.\n *    * @see `finish()`\n *    * ^\n *    * onDone(fn: () =>\n *    * void): void;\n *    * /**\n *    * Provides a callback to invoke when the animation starts.\n *    * @param fn The callback\n *    * function.\n *    * @see `run()`\n *    * ^\n *    * onStart(fn: () => void): void;\n *    * /**\n *    * Provides a callback to invoke after the\n *    * animation is destroyed.\n *    * @param fn The callback function.\n *    * @see `destroy()`\n *    * @see\n *    * `beforeDestroy()`\n *    * ^\n *    * onDestroy(fn: () => void): void;\n *    * /**\n *    * Initializes the animation.\n *    * ^\n *    * init():\n *    * void;\n *    * /**\n *    * Reports whether the animation has started.\n *    * @returns True if the animation has started, false\n *    * otherwise.\n *    * ^\n *    * hasStarted(): boolean;\n *    * /**\n *    * Runs the animation, invoking the\n *    * `onStart()` callback.\n *    * ^\n *    * play(): void;\n *    * /**\n *    * Pauses the animation.\n *    * ^\n *    * pause(): void;\n *    * /**\n *    * Restarts the paused animation.\n *    * ^\n *    * restart(): void;\n *    * /**\n *    * Ends the animation, invoking the `onDone()`\n *    * callback.\n *    * ^\n *    * finish(): void;\n *    * /**\n *    * Destroys the animation, after invoking the `beforeDestroy()`\n *    * callback.\n *    * ^\n *    * destroy(): void;\n *    * /**\n *    * Resets the\n *    * animation to its initial state.\n *    * ^\n *    * reset(): void;\n *    * /**\n *    * Sets the position of the animation.\n *    * @param\n *    * position A 0-based offset into the duration, in milliseconds.\n *    * ^\n *    * setPosition(position: any /** TODO #9100 */):\n *    * void;\n *    * /**\n *    * Reports the current position of the animation.\n *    * @returns A 0-based offset into the duration, in\n *    * milliseconds.\n *    * ^\n *    * getPosition(): number;\n *    * /**\n *    * The parent of this player, if any.\n *    * ^\n *    * parentPlayer:\n *    * AnimationPlayer|null;\n *    * /**\n *    * The total run
```

```
\n * time of the animation, in milliseconds.\n * ^\n * readonly totalTime: number;\n * /**\n *    * Provides a callback to\n *    * invoke before the animation is destroyed.\n *    * ^\n *    * beforeDestroy?: () => any;\n *    * /**\n *    * @internal\n *    * Internal\n *    * ^\n *    * triggerCallback?: (phaseName: string) => void;\n *    * /**\n *    * @internal\n *    * Internal\n *    * ^\n *    * disabled?:\n *    * boolean;\n *    * }\n * }\n * /**\n *    * An empty programmatic controller for reusable animations.\n *    * Used internally when\n *    * animations are disabled, to avoid\n *    * checking for the null case when an animation player is expected.\n *    * @see\n *    * `animate()`\n *    * @see `AnimationPlayer`\n *    * @see `GroupPlayer`\n *    * @publicApi\n *    * ^\n *    * export class\n *    * NoopAnimationPlayer implements AnimationPlayer {\n *    *   private _onDoneFns: Function[] = [];\n *    *   private\n *    *   _onStartFns: Function[] = [];\n *    *   private _onDestroyFns: Function[] = [];\n *    *   private _originalOnDoneFns: Function[]\n *    *   = [];\n *    *   private _originalOnStartFns: Function[] = [];\n *    *   private _started = false;\n *    *   private _destroyed = false;\n *    *   private\n *    *   _finished = false;\n *    *   private _position = 0;\n *    *   public parentPlayer: AnimationPlayer|null = null;\n *    *   public\n *    *   readonly totalTime: number;\n *    *   constructor(duration: number = 0, delay: number = 0) {\n *    *     this.totalTime = duration\n *    *     + delay;\n *    *   }\n *    *   private _onFinish() {\n *    *     if (!this._finished) {\n *    *       this._finished = true;\n *    *     }\n *    *     this._onDoneFns.forEach(fn => fn());\n *    *     this._onDoneFns = [];\n *    *   }\n *    *   onStart(fn: () => void): void {\n *    *     this._originalOnStartFns.push(fn);\n *    *     this._onStartFns.push(fn);\n *    *   }\n *    *   onDone(fn: () => void): void {\n *    *     this._originalOnDoneFns.push(fn);\n *    *     this._onDoneFns.push(fn);\n *    *   }\n *    *   onDestroy(fn: () => void): void {\n *    *     this._originalOnDestroyFns.push(fn);\n *    *     this._onDestroyFns.push(fn);\n *    *   }\n *    *   disabled = false;\n *    * }\n * }\n * }
```

```

this._originalOnDoneFns.push(fn);\n this._onDoneFns.push(fn);\n }\n onDestroy(fn: () => void): void {\n
this._onDestroyFns.push(fn);\n }\n hasStarted(): boolean {\n return this._started;\n }\n init(): void {\n play():
void {\n if (!this.hasStarted()) {\n this._onStart();\n this.triggerMicrotask();\n }\n this._started = true;\n
}\n\n /** @internal *\n triggerMicrotask() {\n scheduleMicroTask()\n
=> this._onFinish();\n }\n\n private _onStart() {\n this._onStartFns.forEach(fn => fn());\n this._onStartFns =
[];\n }\n\n pause(): void {\n restart(): void {\n finish(): void {\n this._onFinish();\n }\n destroy(): void {\n
if (!this._destroyed) {\n this._destroyed = true;\n if (!this.hasStarted()) {\n this._onStart();\n }\n
this.finish();\n this._onDestroyFns.forEach(fn => fn());\n this._onDestroyFns = [];\n }\n }\n reset(): void
{\n this._started = false;\n this._finished = false;\n this._onStartFns = this._originalOnStartFns;\n
this._onDoneFns = this._originalOnDoneFns;\n }\n setPosition(position: number): void {\n this._position =
this.totalTime ? position * this.totalTime : 1;\n }\n getPosition(): number {\n return this.totalTime ? this._position
/ this.totalTime : 1;\n }\n\n /** @internal *\n triggerCallback(phaseName: string): void {\n const methods =
phaseName == 'start' ? this._onStartFns
: this._onDoneFns;\n methods.forEach(fn => fn());\n methods.length = 0;\n }\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {scheduleMicroTask} from
'./util';\nimport {AnimationPlayer} from './animation_player';\n\n/**\n * A programmatic controller for a group of
reusable animations.\n * Used internally to control animations.\n *\n * @see `AnimationPlayer`\n * @see `{@link
animations/group_group()}`\n *\n *\nexport class AnimationGroupPlayer implements AnimationPlayer {\n private
_onDoneFns: Function[] = [];\n private _onStartFns: Function[] = [];\n private _finished = false;\n private _started
= false;\n private _destroyed = false;\n private _onDestroyFns: Function[] = [];\n\n public parentPlayer:
AnimationPlayer|null = null;\n public totalTime: number = 0;\n public readonly players:
AnimationPlayer[];\n\n constructor(_players: AnimationPlayer[]) {\n this.players = _players;\n let doneCount =
0;\n let destroyCount = 0;\n let startCount = 0;\n const total = this.players.length;\n if (total == 0) {\n
scheduleMicroTask(() => this._onFinish());\n } else {\n this.players.forEach(player => {\n
player.onDone(() => {\n if (++doneCount == total) {\n this._onFinish();\n }\n });\n
player.onDestroy(() => {\n if (++destroyCount == total) {\n this._onDestroy();\n }\n });\n
player.onStart(() => {\n if (++startCount == total) {\n this._onStart();\n }\n });\n });\n
}\n\n this.totalTime = this.players.reduce((time, player) => Math.max(time, player.totalTime), 0);\n }\n\n private
_onFinish() {\n if (!this._finished) {\n this._finished = true;\n this._onDoneFns.forEach(fn => fn());\n
this._onDoneFns
= [];\n }\n }\n\n init(): void {\n this.players.forEach(player => player.init());\n }\n\n onStart(fn: () => void):
void {\n this._onStartFns.push(fn);\n }\n\n private _onStart() {\n if (!this.hasStarted()) {\n this._started =
true;\n this._onStartFns.forEach(fn => fn());\n this._onStartFns = [];\n }\n }\n\n onDone(fn: () => void):
void {\n this._onDoneFns.push(fn);\n }\n\n onDestroy(fn: () => void): void {\n this._onDestroyFns.push(fn);\n
}\n\n hasStarted() {\n return this._started;\n }\n\n play() {\n if (!this.parentPlayer) {\n this.init();\n }\n
this._onStart();\n this.players.forEach(player => player.play());\n }\n\n pause(): void {\n
this.players.forEach(player => player.pause());\n }\n\n restart(): void {\n this.players.forEach(player =>
player.restart());\n }\n\n finish(): void {\n this._onFinish();\n this.players.forEach(player => player.finish());\n
}\n\n destroy(): void {\n
this._onDestroy();\n }\n\n private _onDestroy() {\n if (!this._destroyed) {\n this._destroyed = true;\n
this._onFinish();\n this.players.forEach(player => player.destroy());\n this._onDestroyFns.forEach(fn =>
fn());\n this._onDestroyFns = [];\n }\n }\n\n reset(): void {\n this.players.forEach(player => player.reset());\n
this._destroyed = false;\n this._finished = false;\n this._started = false;\n }\n\n setPosition(p: number): void
{\n const timeAtPosition = p * this.totalTime;\n this.players.forEach(player => {\n const position =
player.totalTime ? Math.min(1, timeAtPosition / player.totalTime) : 1;\n player.setPosition(position);\n });\n
}\n\n getPosition(): number {\n const longestPlayer =\n this.players.reduce((longestSoFar:
AnimationPlayer|null, player: AnimationPlayer) => {\n const newPlayerIsLongest =\n longestSoFar

```

```

=== null || player.totalTime > longestSoFar.totalTime;\n
    return newPlayerIsLongest ? player : longestSoFar;\n    }, null);\n    return longestPlayer != null ?
longestPlayer.getPosition() : 0;\n    }\n\n    beforeDestroy(): void {\n    this.players.forEach(player => {\n    if
(player.beforeDestroy) {\n    player.beforeDestroy();\n    }\n    });\n    }\n\n    /** @internal *\ntriggerCallback(phaseName: string): void {\n    const methods = phaseName === 'start' ? this._onStartFns :
this._onDoneFns;\n    methods.forEach(fn => fn());\n    methods.length = 0;\n    }\n\n    /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\nexport { AnimationGroupPlayer as
AnimationGroupPlayer} from './players/animation_group_player';\n\nexport const PRE_STYLE = '!';\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that
can be\n * found in the LICENSE file at https://angular.io/license\n * \n\n/**\n * @module\n * @description\n *
Entry point for all animation APIs of the animation package.\n * \n\nexport { AnimationBuilder, AnimationFactory }
from './animation_builder';\n\nexport { AnimationEvent } from './animation_event';\n\nexport { animate, animateChild,
AnimateChildOptions, AnimateTimings, animation, AnimationAnimateChildMetadata,
AnimationAnimateMetadata, AnimationAnimateRefMetadata, AnimationGroupMetadata,
AnimationKeyframesSequenceMetadata, AnimationMetadata, AnimationMetadataType, AnimationOptions,
AnimationQueryMetadata, AnimationQueryOptions, AnimationReferenceMetadata, AnimationSequenceMetadata,
AnimationStaggerMetadata, AnimationStateMetadata, AnimationStyleMetadata, AnimationTransitionMetadata,
AnimationTriggerMetadata, AUTO_STYLE, group, keyframes, query, sequence, stagger, state, style, transition,
trigger, useAnimation, StyleData, StyleDataMap } from './animation_metadata';\n\nexport { AnimationPlayer,
NoopAnimationPlayer } from './players/animation_player';\n\nexport * from './private_export';\n\n/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\n/**\n * @module\n *
@description\n * Entry point for all public APIs of this package.\n * \n\nexport * from './src/animations';\n\n/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\n// This file is not used to
build this module. It is only used during editing\n// by the TypeScript language service and during build for
verification. `ngc` \n// replaces this file with production index.ts when it rewrites private symbol\n// names.\n\nexport
* from './public_api';\n\n/**\n * Generated bundle index. Do not edit.\n * \n\nexport
* from
'/index';\n\n"], "names": [], "mappings": ";;;;;;;;AAUA;;;;;;;;;AA6CG;MACmB,gBAAgB,CAAA
;AAQrC,CAAA;AAED;;;;;;;;;AAMG;MACmB,gBAAgB,CAAA;AAWrC;;ACpFD;;;;;;;;;AAMG;AAoKH;;;AAIG;AA
CI,MAAM,UAAU,GAAG,IAAI;AAyR9B;;;;;;;;;
;;;;;;;;;AAmJG;AACa,SAAA,OAAO,CAAC,IAAY,EAAE,WAAgC,EAAA;AACpE,IAAA,O
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/E,CAAC;AAED;;;;;;;;;AAyDG;SACa,OAAO,CACnB,OAAsB,EACTb,SACI,IAA
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EAAC,CAAC;AACxD,CAAC;AAED;;;;;;;;;

```



.....AAiJI;AACE,SAAU,UAAU,CACTB,eAC+F,EAC/F,KAA4C,EAC5C,UAAiC,IAAI,EAAA;  
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C,EAAA,yCAAE,SAAS,EAAE,OAAO,EAAC,CAAC;AACTe,CAAC;AAED;.....  
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,UAAcC,IAAI,EAAA;AAC5C,IAAA,OAAO,EAAC,IAAI,EAAA,EAAA,oCAA+B,QAAQ,EAAE,SAAS,EAAE,O  
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,OAAO,MAAW;IACIB,MAAM,GAAA;QACJ,IAAI,CAAC,SAAS,EAAE,CAAC;KACIB;IACD,OAAO,GAAA;A  
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AE,IAAI,EAAE,EAAE,CAAC,CAAC;AACvC,YAAA,IAAI,CAAC,aAAa,GAAG,EAAE,CAAC;AACzB,SAAA;K  
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Found

in path(s):

\* /opt/cola/permits/1784583507\_1693546602.9302073/0/animations-14-3-0-1-tgz/package/fesm2015/animations.mjs.map

No license file was found, but licenses were detected in source scan.

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```

```

function invalidDefinition(): Error {\n return new RuntimeError(\n
RuntimeErrorCode.INVALID_DEFINITION,\n ngDevMode && 'only state() and transition() definitions can sit
inside of a trigger()');\n}\n\n\nexport function invalidState(metadataName: string, missingSubs: string[]): Error {\n
return new RuntimeError(\n RuntimeErrorCode.INVALID_STATE,\n ngDevMode &&\n `state("${\n
metadataName})", ...) must define default values for all the following style substitutions: ${\n
missingSubs.join(', ')});\n}\n\n\nexport function invalidStyleValue(value: string): Error {\n return new
RuntimeError(\n RuntimeErrorCode.INVALID_STYLE_VALUE,\n ngDevMode && `The provided style
string value ${value} is not allowed.`);\n}\n\n\nexport function invalidProperty(prop: string): Error {\n return new
RuntimeError(\n RuntimeErrorCode.INVALID_PROPERTY,\n ngDevMode &&\n `The provided
animation property "${\n
prop}" is not a supported CSS property for animations`);\n}\n\n\nexport function invalidParallelAnimation(\n
prop: string, firstStart: number, firstEnd: number, secondStart: number,\n secondEnd: number): Error {\n return
new RuntimeError(\n RuntimeErrorCode.INVALID_PARALLEL_ANIMATION,\n ngDevMode &&\n
`The CSS property "${prop}" that exists between the times of "${firstStart}ms" and "${firstEnd}ms"
is also being animated in a parallel animation between the times of "${secondStart}ms" and
"${secondEnd}ms"`);\n}\n\n\nexport function invalidKeyframes(): Error {\n return new RuntimeError(\n
RuntimeErrorCode.INVALID_KEYFRAMES,\n ngDevMode && `keyframes() must be placed inside of a call to
animate()`);\n}\n\n\nexport function invalidOffset(): Error {\n return new RuntimeError(\n
RuntimeErrorCode.INVALID_OFFSET,\n ngDevMode && `Please ensure that all keyframe offsets are between
0 and 1`);\n}\n\n\nexport
function keyframeOffsetsOutOfOrder(): Error {\n return new RuntimeError(\n
RuntimeErrorCode.KEYFRAME_OFFSETS_OUT_OF_ORDER,\n ngDevMode && `Please ensure that all
keyframe offsets are in order`);\n}\n\n\nexport function keyframesMissingOffsets(): Error {\n return new
RuntimeError(\n RuntimeErrorCode.KEYFRAMES_MISSING_OFFSETS,\n ngDevMode && `Not all
style() steps within the declared keyframes() contain offsets`);\n}\n\n\nexport function invalidStagger(): Error {\n
return new RuntimeError(\n RuntimeErrorCode.INVALID_STAGGER,\n ngDevMode && `stagger() can
only be used inside of query()`);\n}\n\n\nexport function invalidQuery(selector: string): Error {\n return new
RuntimeError(\n RuntimeErrorCode.INVALID_QUERY,\n ngDevMode &&\n
`query("${selector}") returned zero elements. (Use query("${selector}", { optional: true })` if
you wish to allow this.`);\n}\n\n\nexport function invalidExpression(expr: string): Error
{\n return new RuntimeError(\n RuntimeErrorCode.INVALID_EXPRESSION,\n ngDevMode && `The
provided transition expression "${expr}" is not supported`);\n}\n\n\nexport function invalidTransitionAlias(alias:
string): Error {\n return new RuntimeError(\n RuntimeErrorCode.INVALID_TRANSITION_ALIAS,\n
ngDevMode && `The transition alias value "${alias}" is not supported`);\n}\n\n\nexport function
validationFailed(errors: Error[]): Error {\n return new RuntimeError(\n
RuntimeErrorCode.VALIDATION_FAILED,\n ngDevMode && `animation validation
failed:\n${errors.map(err => err.message).join("\n")}`);\n}\n\n\nexport function buildingFailed(errors: Error[]): Error
{\n return new RuntimeError(\n RuntimeErrorCode.BUILDING_FAILED,\n ngDevMode && `animation
building failed:\n${errors.map(err => err.message).join("\n")}`);\n}\n\n\nexport function triggerBuildFailed(name:
string, errors: Error[]): Error {\n return new RuntimeError(\n
RuntimeErrorCode.TRIGGER_BUILD_FAILED,\n
ngDevMode &&\n `The animation trigger "${name}" has failed to build due to the following errors:\n -
${\n errors.map(err => err.message).join("\n - ")}`);\n}\n\n\nexport function animationFailed(errors: Error[]):
Error {\n return new RuntimeError(\n RuntimeErrorCode.ANIMATION_FAILED,\n ngDevMode &&\n
`Unable to animate due to the following errors:${LINE_START}${\n errors.map(err =>
err.message).join(LINE_START)}`);\n}\n\n\nexport function registerFailed(errors: Error[]): Error {\n return new
RuntimeError(\n RuntimeErrorCode.REGISTRATION_FAILED,\n ngDevMode &&\n `Unable to build
the animation due to the following errors: ${\n errors.map(err => err.message).join("\n")}`);\n}\n\n\nexport

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function missingOrDestroyedAnimation(): Error {\n return new RuntimeError(\n
RuntimeErrorCode.MISSING_OR_DESTROYED_ANIMATION,\n ngDevMode && 'The requested animation
doesn\\t exist or has
already been destroyed');\n}\n\nexport function createAnimationFailed(errors: Error[]): Error {\n return new
RuntimeError(\n RuntimeErrorCode.CREATE_ANIMATION_FAILED,\n ngDevMode &&\n `Unable
to create the animation due to the following errors:${\n errors.map(err =>
err.message).join("\\n')');\n}\n\nexport function missingPlayer(id: string): Error {\n return new RuntimeError(\n
RuntimeErrorCode.MISSING_PLAYER,\n ngDevMode && `Unable to find the timeline player referenced by
${id}');\n}\n\nexport function missingTrigger(phase: string, name: string): Error {\n return new RuntimeError(\n
RuntimeErrorCode.MISSING_TRIGGER,\n ngDevMode &&\n `Unable to listen on the animation trigger
event \"${\n phase}\" because the animation trigger \"${name}\" doesn\\t exist!');\n}\n\nexport function
missingEvent(name: string): Error {\n return new RuntimeError(\n RuntimeErrorCode.MISSING_EVENT,\n
ngDevMode &&\n
`Unable to listen on the animation trigger \"${\n name}\" because the provided event is
undefined!');\n}\n\nexport function unsupportedTriggerEvent(phase: string, name: string): Error {\n return new
RuntimeError(\n RuntimeErrorCode.UNSUPPORTED_TRIGGER_EVENT,\n ngDevMode &&\n `The
provided animation trigger event \"${phase}\" for the animation trigger \"${\n name}\" is not
supported!');\n}\n\nexport function unregisteredTrigger(name: string): Error {\n return new RuntimeError(\n
RuntimeErrorCode.UNREGISTERED_TRIGGER,\n ngDevMode && `The provided animation trigger
\"${name}\" has not been registered!');\n}\n\nexport function triggerTransitionsFailed(errors: Error[]): Error {\n
return new RuntimeError(\n RuntimeErrorCode.TRIGGER_TRANSITIONS_FAILED,\n ngDevMode &&\n
`Unable to process animations due to the following failed trigger transitions\\n ${\n errors.map(err =>
err.message).join("\\n')');\n}\n\nexport
function triggerParsingFailed(name: string, errors: Error[]): Error {\n return new RuntimeError(\n
RuntimeErrorCode.TRIGGER_PARSING_FAILED,\n ngDevMode &&\n `Animation parsing for the
${name} trigger have failed:${LINE_START}${\n errors.map(err =>
err.message).join(LINE_START)}');\n}\n\nexport function transitionFailed(name: string, errors: Error[]): Error {\n
return new RuntimeError(\n RuntimeErrorCode.TRANSITION_FAILED,\n ngDevMode && `@${name} has
failed due to:\\n ${errors.map(err => err.message).join("\\n- ')}');\n}\n\n\"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n * Set of all animatable CSS properties\n */\n * @see
https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_animated_properties\n */\n\nexport const
ANIMATABLE_PROP_SET = new Set([\n '-moz-outline-radius',\n
'-moz-outline-radius-bottomleft',\n '-moz-outline-radius-bottomright',\n '-moz-outline-radius-topleft',\n '-moz-
outline-radius-topright',\n '-ms-grid-columns',\n '-ms-grid-rows',\n '-webkit-line-clamp',\n '-webkit-text-fill-
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'text-decoration-color',\n 'text-decoration-thickness',\n 'text-emphasis',\n 'text-emphasis-color',\n 'text-indent',\n 'text-shadow',\n 'text-underline-offset',\n 'top',\n 'transform',\n 'transform-origin',\n 'translate',\n 'vertical-align',\n 'visibility',\n 'width',\n 'word-spacing',\n 'z-index',\n 'zoom',\n '));\n"/>\n \* @license\n \* Copyright Google LLC  
All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in  
the LICENSE file at <https://angular.io/license>\n \*/\nimport { AnimationEvent, AnimationPlayer, AUTO\_STYLE, NoopAnimationPlayer, AnimationGroupPlayer, PRE\_STYLE as PRE\_STYLE, StyleDataMap } from '@angular/animations';\nimport { AnimationStyleNormalizer } from '../src/dsl/style\_normalization/animation\_style\_normalizer';\nimport { AnimationDriver } from '../src/render/animation\_driver';\nimport { animationFailed } from '../error\_helpers';\nimport { ANIMATABLE\_PROP\_SET } from './web\_animations/animatable\_props\_set';\n

We don't include ambient node types here since @angular/animations/browser is meant to target the browser so technically it should not depend on node types. `process` is just declared locally here as a result.\n\ndeclare const process: any;\n\nexport function isBrowser(): boolean {\n return (typeof window !== 'undefined' && typeof window.document !== 'undefined');\n}\n\nexport function isNode(): boolean {\n // Checking only for `process` isn't enough to identify whether or not we're in a Node environment, because Webpack by default will polyfill the `process`. While we can discern that Webpack polyfilled it by looking at `process.browser`, it's very Webpack-specific and might not be future-proof. Instead we look at the stringified version of `process` which is `[object process]` in Node and `[object Object]` when polyfilled.\n return typeof process !== 'undefined' && { }.toString.call(process) === '[object process]';\n}\n\nexport

function optimizeGroupPlayer(players: AnimationPlayer[]): AnimationPlayer {\n switch (players.length) {\n case 0:\n return new NoopAnimationPlayer();\n case 1:\n return players[0];\n default:\n return new AnimationGroupPlayer(players);\n }\n}\n\nexport function normalizeKeyframes(\n driver: AnimationDriver,\n normalizer: AnimationStyleNormalizer,\n element: any,\n keyframes: Array<StyleDataMap>,\n preStyles: StyleDataMap = new Map(),\n postStyles: StyleDataMap = new Map()): Array<StyleDataMap> {\n const errors: Error[] = [];\n const normalizedKeyframes: Array<StyleDataMap> = [];\n let previousOffset = -1;\n let previousKeyframe: StyleDataMap|null = null;\n keyframes.forEach(kf => {\n const offset = kf.get('offset') as number;\n const isSameOffset = offset === previousOffset;\n const normalizedKeyframe: StyleDataMap = (isSameOffset && previousKeyframe) || new Map();\n kf.forEach((val, prop) => {\n let normalizedProp = prop;\n

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    let normalizedValue = val;\n    if (prop !== 'offset') {\n        normalizedProp =
normalizer.normalizePropertyName(normalizedProp, errors);\n        switch (normalizedValue) {\n            case
PRE_STYLE:\n                normalizedValue = preStyles.get(prop)!;\n                break;\n\n            case AUTO_STYLE:\n                normalizedValue = postStyles.get(prop)!;\n                break;\n\n            default:\n                normalizedValue =\nnormalizer.normalizeStyleValue(prop, normalizedProp, normalizedValue, errors);\n                break;\n        }\n    }\n    normalizedKeyframe.set(normalizedProp, normalizedValue);\n    });\n    if (!isSameOffset) {\n        normalizedKeyframes.push(normalizedKeyframe);\n    }\n    previousKeyframe = normalizedKeyframe;\n    previousOffset = offset;\n    });\n    if (errors.length) {\n        throw animationFailed(errors);\n    }\n    return
normalizedKeyframes;\n}\n\nexport function listenOnPlayer(\n    player: AnimationPlayer, eventName: string,
event: AnimationEvent|undefined,\n    callback: (event: any) => any) {\n    switch (eventName) {\n        case 'start':\n            player.onStart(() => callback(event && copyAnimationEvent(event, 'start', player)));\n            break;\n        case 'done':\n            player.onDone(() => callback(event && copyAnimationEvent(event, 'done', player)));\n            break;\n        case
'destroy':\n            player.onDestroy(() => callback(event && copyAnimationEvent(event, 'destroy', player)));\n            break;\n    }\n}\n\nexport function copyAnimationEvent(\n    e: AnimationEvent, phaseName: string, player:
AnimationPlayer): AnimationEvent {\n    const totalTime = player.totalTime;\n    const disabled = (player as
any).disabled ? true : false;\n    const event = makeAnimationEvent(\n        e.element, e.triggerName, e.fromState,
e.toState, phaseName || e.phaseName,\n        totalTime === undefined ? e.totalTime : totalTime, disabled);\n    const
data = (e as any)['_data'];\n    if (data !== null) {\n        (event as any)['_data'] = data;\n    }\n    return event;\n}\n\nexport function makeAnimationEvent(\n    element: any, triggerName: string, fromState: string,
toState: string, phaseName: string = "",\n    totalTime: number = 0, disabled?: boolean): AnimationEvent {\n    return
{element, triggerName, fromState, toState, phaseName, totalTime, disabled: !!disabled};\n}\n\nexport function
getOrSetDefaultValue<T, V>(map: Map<T, V>, key: T, defaultValue: V) {\n    let value = map.get(key);\n    if
(!value) {\n        map.set(key, value = defaultValue);\n    }\n    return value;\n}\n\nexport function
parseTimelineCommand(command: string): [string, string] {\n    const separatorPos = command.indexOf(':');\n    const
id = command.substring(1, separatorPos);\n    const action = command.slice(separatorPos + 1);\n    return [id,
action];\n}\n\nlet _contains: (elm1: any, elm2: any) => boolean = (elm1: any, elm2: any) => false;\nlet _query:
(element: any, selector: string, multi: boolean) => any[] =\n    (element: any, selector: string, multi: boolean) => {\n
return [];\n    };\nlet _documentElement: unknown|null = null;\n\nexport function getParentElement(element: any):
unknown|null {\n    const parent = element.parentNode || element.host; // consider host to support shadow DOM\n    if
(parent === _documentElement) {\n        return null;\n    }\n    return parent;\n}\n\n// Define utility methods for browsers
and platform-server(domino) where Element\n// and utility methods exist.\nconst _isNode = isNode();\nif (_isNode
|| typeof Element !== 'undefined') {\n    if (!isBrowser()) {\n        _contains = (elm1, elm2) => elm1.contains(elm2);\n    }
else {\n        // Read the document element in an IIFE that's been marked pure to avoid a top-level property\n        // read
that may prevent tree-shaking.\n        _documentElement = /* @_PURE_ */ (() => document.documentElement());\n        _contains = (elm1, elm2) => {\n            while (elm2) {\n                if (elm2 === elm1) {\n                    return true;\n                }\n                elm2 = getParentElement(elm2);\n            }\n            return false;\n        };\n    }\n}\n\nlet _query = (element: any, selector: string, multi: boolean) => any[] => {\n    if (multi) {\n        return
Array.from(element.querySelectorAll(selector));\n    }\n    const elem = element.querySelector(selector);\n    return
elem ? [elem] : [];\n    };\n}\n\nfunction containsVendorPrefix(prop: string): boolean {\n    // Webkit is the only real
popular vendor prefix nowadays\n    // cc: http://shouldiprefix.com/\n    return prop.substring(1, 6) === 'ebkit'; // webkit
or Webkit\n}\n\nlet _CACHED_BODY: {style: any}|null = null;\nlet _IS_WEBKIT = false;\n\nexport function
validateStyleProperty(prop: string): boolean {\n    if (!_CACHED_BODY) {\n        _CACHED_BODY =
getBodyNode() || {};\n        _IS_WEBKIT = _CACHED_BODY!.style ? ('WebkitAppearance' in
_CACHED_BODY!.style) : false;\n    }\n    let result = true;\n    if (_CACHED_BODY!.style &&
!containsVendorPrefix(prop)) {\n        result = prop in _CACHED_BODY!.style;\n        if (!result && _IS_WEBKIT) {\n
const camelProp = 'Webkit' + prop.charAt(0).toUpperCase()

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+ prop.slice(1);\n    result = camelProp in _CACHED_BODY!.style;\n  }\n }\n\n return result;\n}\n\n\nexport
function validateWebAnimatableStyleProperty(prop: string): boolean {\n return
ANIMATABLE_PROP_SET.has(prop);\n}\n\n\nexport function getBodyNode(): any|null {\n if (typeof document !=
'undefined') {\n return document.body;\n }\n return null;\n}\n\n\nexport const containsElement =
_contains;\n\nexport const invokeQuery = _query;\n\n\nexport function hyphenatePropsKeys(original: StyleDataMap):
StyleDataMap {\n const newMap: StyleDataMap = new Map();\n original.forEach((val, prop) => {\n const
newProp = prop.replace(/([a-z])([A-Z])/g, '$1-$2');\n newMap.set(newProp, val);\n });\n return
newMap;\n}\n\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport { AnimateTimings, AnimationMetadata, AnimationMetadataType,
AnimationOptions, sequence, StyleData, StyleDataMap } from '@angular/animations';\nimport { Ast as
AnimationAst, AstVisitor as AnimationAstVisitor } from './dsl/animation_ast';\nimport { AnimationDslVisitor } from
 './dsl/animation_dsl_visitor';\nimport { invalidNodeType, invalidParamValue, invalidStyleParams,
invalidTimingValue, negativeDelayValue, negativeStepValue } from './error_helpers';\nimport { isNode } from
 './render/shared';\n\nexport const ONE_SECOND = 1000;\n\nexport const SUBSTITUTION_EXPR_START =
'{{';\n\nexport const SUBSTITUTION_EXPR_END = '}}';\n\nexport const ENTER_CLASSNAME = 'ng-
enter';\n\nexport const LEAVE_CLASSNAME = 'ng-leave';\n\nexport const NG_TRIGGER_CLASSNAME = 'ng-
trigger';\n\nexport const NG_TRIGGER_SELECTOR = 'ng-trigger';\n\nexport const
NG_ANIMATING_CLASSNAME = 'ng-animating';\n\nexport const NG_ANIMATING_SELECTOR = 'ng-
animating';\n\n\nexport function resolveTimingValue(value: string|number) {\n if (typeof value == 'number') return
value;\n\n const matches
= value.match(/^(?![\\d+])(m?s)/);\n if (!matches || matches.length < 2) return 0;\n\n return
_convertTimeValueToMS(parseFloat(matches[1]), matches[2]);\n}\n\n\nfunction _convertTimeValueToMS(value:
number, unit: string): number {\n switch (unit) {\n case 's':\n return value * ONE_SECOND;\n default: // ms
or something else\n return value;\n }\n}\n\n\nexport function resolveTiming(\n timings:
string|number|AnimateTimings, errors: Error[], allowNegativeValues?: boolean) {\n return
timings.hasOwnProperty('duration') ?\n <AnimateTimings>timings :\n parseTimeExpression(<string|number>timings, errors, allowNegativeValues);\n}\n\n\nfunction
parseTimeExpression(\n exp: string|number, errors: Error[], allowNegativeValues?: boolean): AnimateTimings
{\n const regex = /^(?![\\d+])(m?s)(?:\\s+(-?[\\d+])(m?s))?(?:\\s+([a-z]+(?:\\.(+?\\))?)?)?$/i;\n let duration:
number;\n let delay: number = 0;\n let easing: string = '';\n if (typeof exp === 'string')\n {\n const matches = exp.match(regex);\n if (matches === null) {\n errors.push(invalidTimingValue(exp));\n
return {duration: 0, delay: 0, easing: ''};\n }\n\n duration = _convertTimeValueToMS(parseFloat(matches[1]),
matches[2]);\n\n const delayMatch = matches[3];\n if (delayMatch != null) {\n delay =
_convertTimeValueToMS(parseFloat(delayMatch), matches[4]);\n }\n\n const easingVal = matches[5];\n if
(easingVal) {\n easing = easingVal;\n }\n }\n else {\n duration = exp;\n }\n\n if (!allowNegativeValues) {\n
let containsErrors = false;\n let startIndex = errors.length;\n if (duration < 0) {\n
errors.push(negativeStepValue());\n containsErrors = true;\n }\n if (delay < 0) {\n
errors.push(negativeDelayValue());\n containsErrors = true;\n }\n if (containsErrors) {\n
errors.splice(startIndex, 0, invalidTimingValue(exp));\n }\n }\n\n\n return {duration, delay, easing};\n}\n\n\nexport
function
copyObj(\n obj: {[key: string]: any}, destination: {[key: string]: any} = {}): {[key: string]: any} {\n
Object.keys(obj).forEach(prop => {\n destination[prop] = obj[prop];\n });\n return destination;\n}\n\n\nexport
function convertToMap(obj: StyleData): StyleDataMap {\n const styleMap: StyleDataMap = new Map();\n
Object.keys(obj).forEach(prop => {\n const val = obj[prop];\n styleMap.set(prop, val);\n });\n return
styleMap;\n}\n\n\nexport function normalizeKeyframes(keyframes: Array<StyleData>|\n
Array<StyleDataMap>): Array<StyleDataMap> {\n if (!keyframes.length) {\n return [];\n }\n if (keyframes[0]
instanceof Map) {\n return keyframes as Array<StyleDataMap>;\n }\n return keyframes.map(kf =>

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convertToMap(kf as StyleData));\n}\n\nexport function normalizeStyles(styles:
StyleDataMap|Array<StyleDataMap>): StyleDataMap {\n  const normalizedStyles: StyleDataMap = new Map();\n  if (Array.isArray(styles)) {\n    styles.forEach(data
=> copyStyles(data, normalizedStyles));\n  } else {\n    copyStyles(styles, normalizedStyles);\n  }\n  return
normalizedStyles;\n}\n\nexport function copyStyles(\n  styles: StyleDataMap, destination: StyleDataMap = new
Map(),\n  backfill?: StyleDataMap): StyleDataMap {\n  if (backfill) {\n    for (let [prop, val] of backfill) {\n
destination.set(prop, val);\n    }\n  }\n  for (let [prop, val] of styles) {\n    destination.set(prop, val);\n  }\n  return
destination;\n}\n\nfunction getStyleAttributeString(element: any, key: string, value: string) {\n  // Return the key-
value pair string to be added to the style attribute for the\n  // given CSS style key.\n  if (value) {\n    return key + ':'
+ value + ';\n  } else {\n    return '';\n  }\n}\n\nfunction writeStyleAttribute(element: any) {\n  // Read the style
property of the element and manually reflect it to the\n  // style attribute. This is needed because Domino on
platform-server doesn't\n  // understand
the full set of allowed CSS properties and doesn't reflect some\n  // of them automatically.\n  let styleAttrValue =
'';\n  for (let i = 0; i < element.style.length; i++) {\n    const key = element.style.item(i);\n    styleAttrValue +=
getStyleAttributeString(element, key, element.style.getPropertyValue(key));\n  }\n  for (const key in element.style)
{\n    // Skip internal Domino properties that don't need to be reflected.\n    if (!element.style.hasOwnProperty(key) ||
key.startsWith('_')) {\n      continue;\n    }\n    const dashKey = camelCaseToDashCase(key);\n    styleAttrValue +=
getStyleAttributeString(element, dashKey, element.style[key]);\n  }\n  element.setAttribute('style',
styleAttrValue);\n}\n\nexport function setStyles(element: any, styles: StyleDataMap, formerStyles?: StyleDataMap)
{\n  if (element['style']) {\n    styles.forEach((val, prop) => {\n      const camelProp =
dashCaseToCamelCase(prop);\n      if (formerStyles && !formerStyles.has(prop)) {\n        formerStyles.set(prop,
element.style[camelProp]);\n      }\n      element.style[camelProp] = val;\n    });\n    // On the server set the 'style'
attribute since it's not automatically reflected.\n    if (isNode()) {\n      writeStyleAttribute(element);\n    }\n  }\n}\n\nexport function eraseStyles(element: any, styles: StyleDataMap) {\n  if (element['style']) {\n
styles.forEach(, prop) => {\n    const camelProp = dashCaseToCamelCase(prop);\n    element.style[camelProp]
= '';\n  });\n  // On the server set the 'style' attribute since it's not automatically reflected.\n  if (isNode()) {\n
writeStyleAttribute(element);\n  }\n}\n}\n\nexport function normalizeAnimationEntry(steps:
AnimationMetadata|\n  AnimationMetadata[]): AnimationMetadata {\n  if
(Array.isArray(steps)) {\n    if (steps.length === 1) return steps[0];\n    return sequence(steps);\n  }\n  return steps as
AnimationMetadata;\n}\n\nexport function validateStyleParams(\n  value:
string|number|null|undefined, options: AnimationOptions, errors: Error[]) {\n  const params = options.params ||
{};\n  const matches = extractStyleParams(value);\n  if (matches.length) {\n    matches.forEach(varName => {\n
if (!params.hasOwnProperty(varName)) {\n      errors.push(invalidStyleParams(varName));\n    }\n  });\n}\n}\n\nconst PARAM_REGEX =\n  new
RegExp(`${SUBSTITUTION_EXPR_START}\\\\s*(.+?)\\\\s*${SUBSTITUTION_EXPR_END}`,'g');\n\nexport
function extractStyleParams(value: string|number|null|undefined): string[] {\n  let params: string[] = [];\n  if (typeof
value === 'string') {\n    let match: any;\n    while (match = PARAM_REGEX.exec(value)) {\n
params.push(match[1] as string);\n    }\n    PARAM_REGEX.lastIndex = 0;\n  }\n  return params;\n}\n\nexport
function interpolateParams(\n  value: string|number, params: {[name: string]: any}, errors: Error[]): string|number
{\n  const original = value.toString();\n  const str = original.replace(PARAM_REGEX,
(, varName) => {\n    let localVal = params[varName];\n    // this means that the value was never overridden by the
data passed in by the user\n    if (localVal === null) {\n      errors.push(invalidParamValue(varName));\n      localVal
= '';\n    }\n    return localVal.toString();\n  });\n  // we do this to assert that numeric values stay as they are\n
return str === original ? value : str;\n}\n\nexport function iteratorToArray(iterator: any): any[] {\n  const arr: any[] =
[];\n  let item = iterator.next();\n  while (!item.done) {\n    arr.push(item.value);\n    item = iterator.next();\n  }\n
return arr;\n}\n\nconst DASH_CASE_REGEX = /-+([a-z0-9])/g;\n\nexport function dashCaseToCamelCase(input:
string): string {\n  return input.replace(DASH_CASE_REGEX, (...m: any[]) => m[1].toUpperCase());\n}\n\nexport
function camelCaseToDashCase(input: string): string {\n  return input.replace(/([a-z])([A-Z])/g, '$1-

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$2').toLowerCase();\n}\n\nexport function allowPreviousPlayerStylesMerge(duration:
number, delay: number) {\n return duration === 0 || delay === 0;\n}\n\nexport function
balancePreviousStylesIntoKeyframes(\n element: any, keyframes: Array<StyleDataMap>, previousStyles:
StyleDataMap) {\n if (previousStyles.size && keyframes.length) {\n let startingKeyframe = keyframes[0];\n let
missingStyleProps: string[] = [];\n previousStyles.forEach((val, prop) => {\n if (!startingKeyframe.has(prop))
{\n missingStyleProps.push(prop);\n }\n startingKeyframe.set(prop, val);\n });\n\n if
(missingStyleProps.length) {\n for (let i = 1; i < keyframes.length; i++) {\n let kf = keyframes[i];\n
missingStyleProps.forEach(prop => kf.set(prop, computeStyle(element, prop)));\n }\n }\n }\n return
keyframes;\n}\n\nexport function visitDslNode(\n visitor: AnimationDslVisitor, node: AnimationMetadata,
context: any): any;\nexport function visitDslNode(\n visitor: AnimationAstVisitor, node:
AnimationAst<AnimationMetadataType>,
context: any): any;\nexport function visitDslNode(visitor: any, node: any, context: any): any {\n switch (node.type)
{\n case AnimationMetadataType.Trigger:\n return visitor.visitTrigger(node, context);\n case
AnimationMetadataType.State:\n return visitor.visitState(node, context);\n case
AnimationMetadataType.Transition:\n return visitor.visitTransition(node, context);\n case
AnimationMetadataType.Sequence:\n return visitor.visitSequence(node, context);\n case
AnimationMetadataType.Group:\n return visitor.visitGroup(node, context);\n case
AnimationMetadataType.Animate:\n return visitor.visitAnimate(node, context);\n case
AnimationMetadataType.Keyframes:\n return visitor.visitKeyframes(node, context);\n case
AnimationMetadataType.Style:\n return visitor.visitStyle(node, context);\n case
AnimationMetadataType.Reference:\n return visitor.visitReference(node, context);\n case
AnimationMetadataType.AnimateChild:\n
return visitor.visitAnimateChild(node, context);\n case AnimationMetadataType.AnimateRef:\n return
visitor.visitAnimateRef(node, context);\n case AnimationMetadataType.Query:\n return
visitor.visitQuery(node, context);\n case AnimationMetadataType.Stagger:\n return visitor.visitStagger(node,
context);\n default:\n throw invalidNodeType(node.type);\n }\n}\n\nexport function computeStyle(element:
any, prop: string): string {\n return (<any>window.getComputedStyle(element))[prop];\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { AnimationPlayer,
AUTO_STYLE, NoopAnimationPlayer, StyleDataMap } from '@angular/animations';\nimport { AnimationDriver,
allowPreviousPlayerStylesMerge as allowPreviousPlayerStylesMerge, containsElement as containsElement,
getParentElement as
getParentElement, invokeQuery as invokeQuery, normalizeKeyframes as normalizeKeyframes,
validateStyleProperty as validateStyleProperty, } from '@angular/animations/browser';\nimport
{ validateWebAnimatableStyleProperty } from '../src/render/shared';\nimport { camelCaseToDashCase } from
'../src/util';\n\n/**\n * @publicApi\n */\nexport class MockAnimationDriver implements AnimationDriver {\n
static log: AnimationPlayer[] = [];\n\n validateStyleProperty(prop: string): boolean {\n return
validateStyleProperty(prop);\n }\n\n validateAnimatableStyleProperty(prop: string): boolean {\n const cssProp =
camelCaseToDashCase(prop);\n return validateWebAnimatableStyleProperty(cssProp);\n }\n\n matchesElement(_element: any, _selector: string): boolean {\n return false;\n }\n\n containsElement(elm1: any,
elm2: any): boolean {\n return containsElement(elm1, elm2);\n }\n\n getParentElement(element: unknown):
unknown {\n return getParentElement(element);\n }\n\n query(element:
any, selector: string, multi: boolean): any[] {\n return invokeQuery(element, selector, multi);\n }\n\n
computeStyle(element: any, prop: string, defaultValue?: string): string {\n return defaultValue || "";\n }\n\n
animate(\n element: any, keyframes: Array<StyleDataMap>, duration: number, delay: number,\n easing:
string, previousPlayers: any[] = []): MockAnimationPlayer {\n const player =\n new
MockAnimationPlayer(element, keyframes, duration, delay, easing, previousPlayers);\n
MockAnimationDriver.log.push(<AnimationPlayer>player);\n return player;\n }\n}\n\n"/**\n * @publicApi\n

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*\nexport class MockAnimationPlayer extends NoopAnimationPlayer {\n private __finished = false;\n private
__started = false;\n public previousStyles: StyleDataMap = new Map();\n private _onInitFns: (() => any)[] = [];\n
public currentSnapshot: StyleDataMap = new Map();\n private _keyframes: Array<StyleDataMap> = [];\n\n
constructor(\n public element:
any, public keyframes: Array<StyleDataMap>, public duration: number,\n public delay: number, public easing:
string, public previousPlayers: any[]) {\n super(duration, delay);\n\n this._keyframes =
normalizeKeyframes(keyframes);\n\n if (allowPreviousPlayerStylesMerge(duration, delay)) {\n
previousPlayers.forEach(player => {\n if (player instanceof MockAnimationPlayer) {\n const styles =
player.currentSnapshot;\n styles.forEach((val, prop) => this.previousStyles.set(prop, val));\n }
});\n }\n }\n\n /* @internal */\n onInit(fn: () => any) {\n this._onInitFns.push(fn);\n }\n\n /* @internal */\n override
init() {\n super.init();\n this._onInitFns.forEach(fn => fn());\n this._onInitFns = [];\n }\n\n override reset() {\n
super.reset();\n this.__started = false;\n }\n\n override finish(): void {\n super.finish();\n this.__finished =
true;\n }\n\n override destroy(): void {\n super.destroy();\n\n this.__finished = true;\n }\n\n /* @internal */\n triggerMicrotask() {\n\n override play(): void {\n
super.play();\n this.__started = true;\n }\n\n override hasStarted() {\n return this.__started;\n }\n\n
beforeDestroy() {\n const captures: StyleDataMap = new Map();\n\n this.previousStyles.forEach((val, prop) =>
captures.set(prop, val));\n\n if (this.hasStarted()) {\n // when assembling the captured styles, it's important
that\n // we build the keyframe styles in the following order:\n // {other styles within keyframes, ...
previousStyles }\n\n this._keyframes.forEach(kf => {\n for (let [prop, val] of kf) {\n if (prop !== 'offset')
{\n captures.set(prop, this.__finished ? val : AUTO_STYLE);\n }\n }
});\n }\n\n this.currentSnapshot = captures;\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nexport {MockAnimationDriver,
MockAnimationPlayer} from './mock_animation_driver';\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n/**\n * @module\n * @description\n * Entry point for all public
APIs of this package.\n */\nexport * from './src/testing';\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n// This file is not used to build this module. It is only used during
editing\n// by the TypeScript language service and during build for verification. `ngc`\n// replaces this file with
production index.ts when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n"/**\n
* Generated bundle index. Do not edit.\n */\n\nexport * from
'./index';\n"],"names":["RuntimeError","normalizeKeyframes","PRE_STYLE","validateStyleProperty","containsEle
ment","getParentElement","invokeQuery","allowPreviousPlayerStylesMerge"],"mappings":":;::;::;::;AAAA;::;::;AA
MG;AAMH,MAAM,UAAU,GAAG,OAAO,CAAC;AAErB,SAAU,kBAaKB,CAAC,GAaKB,EAAA;AACnD,IAA
A,OAAO,IAAIA,aAAY,CAEnB,IAAA,8CAAA,SAAS,IAAI,CAAA,2BAAA,EAA8B,GAAG,CAAA,aAAA,CAAE
,CAAC,CAAC;AACrE,CAAC;SAEe,iBAaIB,GAAA;IAC/B,OAAO,IAAIA,aAAY,CAAA,IAAA,6CAEnB,SAAS,
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## Found

in path(s):

\* /opt/cola/permits/1784583507\_1693546602.9302073/0/animations-14-3-0-1-

tgz/package/fesm2015/browser/testing.mjs.map

No license file was found, but licenses were detected in source scan.

```
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```

<https://angular.io/license>

\* Represents a set of CSS styles for use in an animation style as a generic.

\* Represents a set of CSS styles for use in an animation style as a Map.

\* Represents animation-step timing parameters for an animation step.

\* @see `animate()`

\* @publicApi

\* declare type AnimateTimings = {

\* The full duration of an animation step. A number and optional time unit,

\* such as `"1s"` or `"10ms"` for one second and 10 milliseconds, respectively.

\* The default unit is milliseconds.

\* duration: number,

\* The delay in applying an animation step. A number and optional time unit.

\* The default unit is milliseconds.

\* delay: number,

\* An easing style that controls how an animations step accelerates and decelerates during its run time. An easing function such as `cubic-bezier`,

\* or one of the following constants:

\* - `ease-in`

\* - `ease-out`

\* - `ease-in-and-out`

\* easing: string | null;

\* @description Options that control animation styling and timing.

\* The following animation functions accept `AnimationOptions`

\* - `transition()`

\* - `sequence()`

\* - `{@link animations/group group()}`

\* - `query()`

\* - `animation()`

\* - `useAnimation()`

\* - `animateChild()`

\* Programmatic animations built using the `AnimationBuilder` service also make use of `AnimationOptions`.

\* @publicApi

\* declare interface AnimationOptions {

\* Sets a time-delay for initiating an animation action.

\* A number and optional time unit, such as `"1s"` or `"10ms"` for one second and 10 milliseconds, respectively. The default unit is milliseconds.

\* Default value is 0, meaning no delay.

\* delay?: number|string;

\* A set of developer-defined parameters that modify styling and timing when an animation action starts. An array of key-value pairs, where the provided value is used as a default.

\* params?: {[name: string]: any};

\* Adds duration options to control animation styling and timing for a child animation.

\* @see `animateChild()`

\* @publicApi

\* declare interface AnimateChildOptions extends AnimationOptions {

\* duration?: number|string;

\* @description Constants for the categories of parameters that can be defined for animations.

\* A corresponding function defines a set of parameters for each category, and collects them into a corresponding `AnimationMetadata` object.

\* @publicApi

\* declare const enum AnimationMetadataType {

\* Associates a named animation state with a set of CSS styles.

\* See `state()(api/animations/state)`

\* State = 0,

\* Data for a transition from one animation state to another.

\* See `transition()`

\* Transition = 1,

\* Contains a set of animation steps.

\* See `sequence()`

\* Sequence = 2,

\* Contains a set of animation steps.

\* See `{@link animations/group group()}`

\* Group = 3,

\* Contains an animation step.

\* See `animate()`

\* Animate = 4,

\* Contains a set of animation steps.

\* See `keyframes()`

\* Keyframes = 5,

\* Contains a set of CSS property-value pairs into a named style.

\* See `style()`

\* Style = 6,

\* Associates an animation with an entry trigger that can be attached to an element.

\* See `trigger()`

\* Trigger = 7,

\* Contains a re-usable animation.

\* See `animation()`

\* Reference = 8,

\* Contains data to use in executing child animations returned by a query.

\* See `animateChild()`

\* AnimateChild = 9,

\* Contains animation parameters for a re-usable animation.

\* See `useAnimation()`

\* AnimateRef = 10,

\* Contains child-animation query data.

\* See `query()`

\* Query = 11,

\* Contains data for staggering an animation sequence.

\* See `stagger()`

\* Stagger = 12

\* Specifies automatic styling.

\* @publicApi

\* declare const AUTO\_STYLE = '\*';

\* Base for animation data structures.

\* @publicApi

\* declare interface AnimationMetadata {

\* type: AnimationMetadataType;

\* Contains an animation trigger. Instantiated and returned by the `trigger()` function.

\* @publicApi

\* declare interface AnimationTriggerMetadata extends AnimationMetadata {

\* The trigger name, used to associate it with an element. Unique within the component.

\* name: string;

\* An animation definition object, containing an array of state and transition declarations.

\* definitions: AnimationMetadata[];

\* An options object containing a delay and developer-defined

parameters that provide styling defaults and\n \* can be overridden on invocation. Default delay is 0.\n \*/>\n options: {params?: {[name: string]: any}}|null;\n}\n\n/\*\*\n \* Encapsulates an animation state by associating a state name with a set of CSS styles.\n \* Instantiated and returned by the [state()](api/animations/state) function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationStateMetadata extends AnimationMetadata {\n /\*\*\n \* The state name, unique within the component.\n \*/\n name: string;\n /\*\*\n \* The CSS styles associated with this state.\n \*/\n styles: AnimationStyleMetadata;\n /\*\*\n \* An options object containing\n \* developer-defined parameters that provide styling defaults and\n \* can be overridden on invocation.\n \*/\n options?: {params: {[name: string]: any}};\n}\n\n/\*\*\n \* Encapsulates an animation transition. Instantiated and returned by the\n \* `transition()` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationTransitionMetadata extends AnimationMetadata {\n /\*\*\n \* An expression that describes a state change.\n \*/\n expr: string|\n ((fromState: string, toState: string, element?: any,\n params?: {[key: string]: any}) => boolean);\n /\*\*\n \* One or more animation objects to which this transition applies.\n \*/\n animation: AnimationMetadata|AnimationMetadata[];\n /\*\*\n \* An options object containing a delay and\n \* developer-defined parameters that provide styling defaults and\n \* can be overridden on invocation. Default delay is 0.\n \*/\n options: AnimationOptions|null;\n}\n\n/\*\*\n \* Encapsulates a reusable animation, which is a collection of individual animation steps.\n \* Instantiated and returned by the `animation()` function, and\n \* passed to the `useAnimation()` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationReferenceMetadata extends AnimationMetadata {\n /\*\*\n \* One or more animation step objects.\n \*/\n animation: AnimationMetadata|AnimationMetadata[];\n /\*\*\n \* An options object containing a delay and\n \* developer-defined parameters that provide styling defaults and\n \* can be overridden on invocation. Default delay is 0.\n \*/\n options: AnimationOptions|null;\n}\n\n/\*\*\n \* Encapsulates an animation query. Instantiated and returned by\n \* the `query()` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationQueryMetadata extends AnimationMetadata {\n /\*\*\n \* The CSS selector for this query.\n \*/\n selector: string;\n /\*\*\n \* One or more animation step objects.\n \*/\n animation: AnimationMetadata|AnimationMetadata[];\n /\*\*\n \* A query options object.\n \*/\n options: AnimationQueryOptions|null;\n}\n\n/\*\*\n \* Encapsulates a keyframes sequence. Instantiated and returned by\n \* the `keyframes()` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationKeyframesSequenceMetadata extends AnimationMetadata {\n /\*\*\n \* An array of animation styles.\n \*/\n steps: AnimationStyleMetadata[];\n}\n\n/\*\*\n \* Encapsulates an animation style. Instantiated and returned by\n \* the `style()` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationStyleMetadata extends AnimationMetadata {\n /\*\*\n \* A set of CSS style properties.\n \*/\n styles: '\*|{[key: string]: string | number}|Array<{[key: string]: string | number}|\*';\n /\*\*\n \* A percentage of the total animate time at which the style is to be applied.\n \*/\n offset: number|null;\n}\n\n/\*\*\n \* Encapsulates an animation step. Instantiated and returned by\n \* the `animate()` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationAnimateMetadata extends AnimationMetadata {\n /\*\*\n \* The timing data for the step.\n \*/\n timings: string|number|AnimateTimings;\n /\*\*\n \* A set of styles used in the step.\n \*/\n styles: AnimationStyleMetadata|AnimationKeyframesSequenceMetadata|null;\n}\n\n/\*\*\n \* Encapsulates a child animation, that can be run explicitly when the parent is run.\n \* Instantiated and returned by the `animateChild` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationAnimateChildMetadata extends AnimationMetadata {\n /\*\*\n \* An options object containing a delay and\n \* developer-defined parameters that provide styling defaults and\n \* can be overridden on invocation. Default delay is 0.\n \*/\n options: AnimationOptions|null;\n}\n\n/\*\*\n \* Encapsulates a reusable animation.\n \* Instantiated and returned by the `useAnimation()` function.\n \*\n \* @publicApi\n \*/\nexport interface AnimationAnimateRefMetadata extends AnimationMetadata {\n /\*\*\n \* An animation reference object.\n \*/\n animation: AnimationReferenceMetadata;\n /\*\*\n \* An options object containing a delay and\n \* developer-defined parameters that provide styling defaults and\n \* can be overridden on invocation. Default delay is 0.\n \*/\n options: AnimationOptions|null;\n}\n\n/\*\*\n \* Encapsulates an animation sequence.\n \* Instantiated and returned by the `sequence()` function.\n \*/\n

```

*\n * @publicApi\n */\nexport interface AnimationSequenceMetadata extends AnimationMetadata {\n /**\n *
An array of animation step objects.\n */\n steps: AnimationMetadata[];\n /**\n * An options object containing a
delay and\n * developer-defined parameters that provide styling defaults and\n * can be overridden on invocation.
Default delay is 0.\n */\n options: AnimationOptions|null;\n}\n\n/**\n * Encapsulates an animation group.\n *
Instantiated and returned by the `@link animations/group group()` function.\n */\n * @publicApi\n */\nexport
interface AnimationGroupMetadata extends AnimationMetadata {\n /**\n * One or more animation or style steps
that form this group.\n */\n steps: AnimationMetadata[];\n /**\n * An options object containing a delay and\n *
developer-defined parameters that provide styling defaults and\n * can be overridden on invocation. Default delay
is 0.\n */\n options: AnimationOptions|null;\n}\n\n/**\n * Encapsulates animation
query options.\n * Passed to the `query()` function.\n */\n * @publicApi\n */\nexport declare interface
AnimationQueryOptions extends AnimationOptions {\n /**\n * True if this query is optional, false if it is required.
Default is false.\n * A required query throws an error if no elements are retrieved when\n * the query is executed.
An optional query does not.\n */\n optional?: boolean;\n /**\n * A maximum total number of results to
return from the query.\n * If negative, results are limited from the end of the query list towards the beginning.\n *
By default, results are not limited.\n */\n limit?: number;\n}\n\n/**\n * Encapsulates parameters for staggering the
start times of a set of animation steps.\n * Instantiated and returned by the `stagger()` function.\n */\n *
@publicApi\n */\nexport interface AnimationStaggerMetadata extends AnimationMetadata {\n /**\n * The
timing data for the steps.\n */\n timings: string|number;\n /**\n * One or more
animation steps.\n */\n animation: AnimationMetadata|AnimationMetadata[];\n}\n\n/**\n * Creates a named
animation trigger, containing a list of [ `state()` ](api/animations/state)\n * and `transition()` entries to be evaluated
when the expression\n * bound to the trigger changes.\n */\n * @param name An identifying string.\n * @param
definitions An animation definition object, containing an array of\n * [ `state()` ](api/animations/state) and
`transition()` declarations.\n */\n * @return An object that encapsulates the trigger data.\n */\n * @usageNotes\n *
Define an animation trigger in the `animations` section of `@Component` metadata.\n * In the template, reference
the trigger by name and bind it to a trigger expression that\n * evaluates to a defined animation state, using the
following format:\n */\n * `[@triggerName]="expression"`\n * Animation trigger bindings convert all values to
strings, and then match the\n * previous and current values against any linked transitions.\n
* Booleans can be specified as `1` or `true` and `0` or `false`.\n */\n * ### Usage Example\n */\n * The following
example creates an animation trigger reference based on the provided\n * name value.\n * The provided animation
value is expected to be an array consisting of state and\n * transition declarations.\n */\n * ```typescript\n *
@Component({\n * selector: "my-component",\n * templateUrl: "my-component-tpl.html",\n * animations:\n *
trigger("myAnimationTrigger", [\n * state(...),\n * state(...),\n * transition(...),\n *
transition(...)\n * ])\n * })\n * class MyComponent {\n * myStatusExp = "something";\n * }\n * ```\n */\n
* The template associated with this component makes use of the defined trigger\n * by binding to an element within
its template code.\n */\n * ```html\n * <!-- somewhere inside of my-component-tpl.html -->\n * <div
[@myAnimationTrigger]="myStatusExp">...</div>\n * ```\n */\n * ### Using an inline function\n
* The `transition` animation method also supports reading an inline function which can decide\n * if its associated
animation should be run.\n */\n * ```typescript\n * // this method is run each time the `myAnimationTrigger` trigger
value changes.\n * function myInlineMatcherFn(fromState: string, toState: string, element: any, params: {[key:\n
string]: any}): boolean {\n * // notice that `element` and `params` are also available here\n * return toState ==
'yes-please-animate';\n * }\n * }\n * @Component({\n * selector: 'my-component',\n * templateUrl: 'my-
component-tpl.html',\n * animations: [\n * trigger('myAnimationTrigger', [\n *
transition(myInlineMatcherFn, [\n * // the animation sequence code\n * ]),\n * ])\n * ])\n * })\n * class
MyComponent {\n * myStatusExp = "yes-please-animate";\n * }\n * ```\n */\n * ### Disabling Animations\n *
When true, the special animation control binding `@.disabled` binding prevents\n * all animations from
rendering.\n * Place the `@.disabled` binding on an element to disable\n * animations on the element itself, as well
as any inner animation triggers\n * within the element.\n */\n * The following example shows how to use this
feature:\n */\n * ```typescript\n * @Component({\n * selector: 'my-component',\n * template: `
<div

```

```

[@.disabled]=\isDisabled\>\n * <div [@childAnimation]=\exp"></div>\n * </div>\n * `,\n *
animations: [\n * trigger("childAnimation", [\n * // ... \n * ])\n * ]\n * }\n * class MyComponent {\n *
isDisabled = true;\n * exp = '...';\n * }\n * ``\n * \n * When `@.disabled` is true, it prevents the `@childAnimation`
trigger from animating,\n * along with any inner animations.\n * \n * ### Disable animations application-wide\n *
When an area of the template is set to have animations disabled,\n * **all** inner components have their animations
disabled as well.\n * This means that you can disable all animations for an app\n
* by placing a host binding set on `@.disabled` on the topmost Angular component.\n * \n * ``typescript\n * import
{Component, HostBinding} from '@angular/core';\n * \n * @Component({\n * selector: 'app-component',\n *
templateUrl: 'app.component.html',\n * })\n * class AppComponent {\n * @HostBinding('@.disabled')\n * public
animationsDisabled = true;\n * }\n * ``\n * \n * ### Overriding disablement of inner animations\n * Despite inner
animations being disabled, a parent animation can `query()`\n * for inner elements located in disabled areas of the
template and still animate\n * them if needed. This is also the case for when a sub animation is\n * queried by a
parent and then later animated using `animateChild()`.\n * \n * ### Detecting when an animation is disabled\n * If a
region of the DOM (or the entire application) has its animations disabled, the animation\n * trigger callbacks still
fire, but for zero seconds. When the callback fires, it provides\n * an instance of an
`AnimationEvent`. If animations are disabled,\n * the `.disabled` flag on the event is true.\n * \n * @publicApi\n
*\n * export function trigger(name: string, definitions: AnimationMetadata[]): AnimationTriggerMetadata {\n * return
{type: AnimationMetadataType.Trigger, name, definitions, options: {}};\n * }\n * \n * \n * Defines an animation step
that combines styling information with timing information.\n * \n * @param timings Sets `AnimateTimings` for the
parent animation.\n * A string in the format `"duration [delay] [easing]"`.\n * - Duration and delay are expressed as
a number and optional time unit,\n * such as `"1s"` or `"10ms"` for one second and 10 milliseconds, respectively.\n *
The default unit is milliseconds.\n * - The easing value controls how the animation accelerates and decelerates\n *
during its runtime. Value is one of `ease`, `ease-in`, `ease-out`,\n * `ease-in-out`, or a `cubic-bezier()` function
call.\n * If not supplied, no easing is applied.\n * \n * For example, the string
`"1s 100ms ease-out"` specifies a duration of\n * 1000 milliseconds, and delay of 100 ms, and the `"ease-out"`
easing style,\n * which decelerates near the end of the duration.\n * @param styles Sets AnimationStyles for the
parent animation.\n * A function call to either `style()` or `keyframes()`\n * that returns a collection of CSS style
entries to be applied to the parent animation.\n * When null, uses the styles from the destination state.\n * This is
useful when describing an animation step that will complete an animation;\n * see `"Animating to the final state"` in
`transitions()`.\n * @returns An object that encapsulates the animation step.\n * \n * @usageNotes\n * Call within an
animation `sequence()`, `{ @link animations/group group()}`, or\n * `transition()` call to specify an animation step\n
* that applies given style data to the parent animation for a given amount of time.\n * \n * ### Syntax Examples\n *
**Timing examples**\n * \n * The following examples show various `timings`
specifications.\n * - `animate(500)` : Duration is 500 milliseconds.\n * - `animate("1s")` : Duration is 1000
milliseconds.\n * - `animate("100ms 0.5s")` : Duration is 100 milliseconds, delay is 500 milliseconds.\n * -
`animate("5s ease-in")` : Duration is 5000 milliseconds, easing in.\n * - `animate("5s 10ms cubic-
bezier(.17,.67,.88,.1)")` : Duration is 5000 milliseconds, delay is 10\n * milliseconds, easing according to a bezier
curve.\n * \n * **Style examples**\n * \n * The following example calls `style()` to set a single CSS style.\n *
``typescript\n * animate(500, style({ background: "red" }));\n * ``\n * \n * The following example calls `keyframes()`
to set a CSS style\n * to different values for successive keyframes.\n * ``typescript\n * animate(500, keyframes([\n *
style({ background: "blue" }),\n * style({ background: "red" })\n * ]));\n * ``\n * \n * @publicApi\n
*\n * export function animate(\n * timings: string|number,\n * styles:
AnimationStyleMetadata|AnimationKeyframesSequenceMetadata|null
= \n * null): AnimationAnimateMetadata {\n * return {type: AnimationMetadataType.Animate, styles,
timings};\n * }\n * \n * \n * @description Defines a list of animation steps to be run in parallel.\n * \n * @param steps
An array of animation step objects.\n * - When steps are defined by `style()` or `animate()`\n * function calls, each
call within the group is executed instantly.\n * - To specify offset styles to be applied at a later time, define steps
with\n * `keyframes()`, or use `animate()` calls with a delay value.\n * For example:\n * \n * ``typescript\n *

```

group([n \* animate("1s", style({ background: "black" })),n \* animate("2s", style({ color: "white" }))]n \* )n \* ``n \* n \* @param options An options object containing a delay andn \* developer-defined parameters that provide styling defaults andn \* can be overridden on invocation.n \* n \* @return An object that encapsulates the group data.n \* n \* @usageNotesn \* Grouped animations are useful when a series of styles must be n \* animated at different starting times and closed off at different ending times.n \* n \* When called within a `sequence()` or a n \* `transition()` call, does not continue to the nextn \* instruction until all of the inner animation steps have completed.n \* n \* @publicApi\n \* \nexport function group(n \* steps: AnimationMetadata[], options: AnimationOptions|null = null): AnimationGroupMetadata {n \* return {type: AnimationMetadataType.Group, steps, options};\n \* }\n \* \n/\*\*n \* Defines a list of animation steps to be run sequentially, one by one.n \* n \* @param steps An array of animation step objects.n \* n \* - Steps defined by `style()` calls apply the styling data immediately.n \* n \* - Steps defined by `animate()` calls apply the styling data over time n \* as specified by the timing data.n \* n \* ``typescriptn \* sequence([n \* style({ opacity: 0 }),n \* animate("1s", style({ opacity: 1 }))]n \* )n \* ``n \* n \* @param options An options object containing a delay andn \* developer-defined parameters that provide styling defaults andn \* can be overridden on invocation.n \* n \* @return An object that encapsulates the sequence data.n \* n \* @usageNotes\n \* n \* When you pass an array of steps to a n \* `transition()` call, the steps run sequentially by default.n \* Compare this to the `{@link animations/group group()}` call, which runs animation steps in n \* parallel.n \* n \* When a sequence is used within a `{@link animations/group group()}` or a `transition()` call, n \* execution continues to the next instruction only after each of the inner animation n \* steps have completed.n \* n \* @publicApi\n \* \nexport function sequence(n \* steps: AnimationMetadata[], options: AnimationOptions|null = null): AnimationSequenceMetadata {n \* return {type: AnimationMetadataType.Sequence, steps, options};\n \* }\n \* \n/\*\*n \* Declares a key/value object containing CSS properties/styles that n \* can then be used for an animation [ state`](api/animations/state), within an animation n \* `sequence`, or as styling data for calls to `animate()` and `keyframes()`.n \* n \* @param tokens A set of CSS styles or HTML styles associated with an animation state.n \* The value can be any of the following:n \* n \* - A key-value style pair associating a CSS property with a value.n \* n \* - An array of key-value style pairs.n \* n \* - An asterisk (\*), to use auto-styling, where styles are derived from the element n \* being animated and applied to the animation when it starts.n \* n \* Auto-styling can be used to define a state that depends on layout or other n \* environmental factors.n \* n \* @return An object that encapsulates the style data.n \* n \* @usageNotes\n \* n \* The following examples create animation styles that collect a set of n \* CSS property values:n \* n \* ``typescriptn \* // string values for CSS propertiesn \* style({ background: "red", color: "blue" })n \* n \* // numerical pixel valuesn \* style({ width: 100, height: 0 })n \* ``n \* n \* The following example uses auto-styling to allow an element to animate from n \* a height of 0 up to its full height:n \* n \* ``n \* style({ height: 0 }),n \* animate("1s", style({ height: "\*" }))]n \* ``n \* n \* @publicApi\n \* \nexport function style(tokens: '\*|'[[key: string]: string | number]|\n \* Array<'\*'|{[key: string]: string | number}>): AnimationStyleMetadata {n \* return {type: AnimationMetadataType.Style, styles: tokens, offset: null};\n \* }\n \* \n/\*\*n \* Declares an animation state within a trigger attached to an element.n \* n \* @param name One or more names for the defined state in a comma-separated string.n \* The following reserved state names can be supplied to define a style for specific use n \* cases:n \* n \* - `void` You can associate styles with this name to be used when n \* the element is detached from the application. For example, when an `ngIf` evaluates n \* to false, the state of the associated element is void.n \* n \* - `\*` (asterisk) Indicates the default state. You can associate styles with this name n \* to be used as the fallback when the state that is being animated is not declared n \* within the trigger.n \* n \* @param styles A set of CSS styles associated with this state, created using the n \* `style()` function.n \* This set of styles persists on the element once the state has been reached.n \* n \* @param options Parameters that can be passed to the state when it is invoked.n \* 0 or more key-value pairs.n \* n \* @return An object that encapsulates the new state data.n \* n \* @usageNotes\n \* n \* Use the `trigger()` function to register states to an animation trigger.n \* Use the `transition()` function to animate between states.n \* n \* When a state is active within a component, its associated styles persist on the element, n \* even when the animation



ends.

```

@publicApi
export function state(
  name: string,
  styles: AnimationStyleMetadata,
  options?: {
    params: {
      [name: string]: any
    }
  }): AnimationStateMetadata

```

{\n return {type: AnimationMetadataType.State, name, styles, options};\n}\n\n\*\*\n \* Defines a set of animation styles, associating each style with an optional `offset` value.\n \* \n \* @param steps A set of animation styles with optional offset data.\n \* The optional `offset` value for a style specifies a percentage of the total animation\n \* time at which that style is applied.\n \* @returns An object that encapsulates the keyframes data.\n \* \n \* @usageNotes\n \* Use with the `animate()` call. Instead of applying animations\n \* from the current state\n \* to the destination state, keyframes describe how each style entry is applied and at what point\n \* within the animation arc.\n \* Compare [CSS Keyframe Animations](https://www.w3schools.com/css/css3\_animations.asp).\n \* \n \* ### Usage\n \* In the following example, the offset values describe\n \* when each `backgroundColor` value is applied. The color is red at the start, and changes to\n \* blue when 20% of the total time has elapsed.\n

```

```typescript
// the provided offset values
animate("5s", keyframes([
  style({ backgroundColor: "red", offset: 0 }),
  style({ backgroundColor: "blue", offset: 0.2 }),
  style({ backgroundColor: "orange", offset: 0.3 }),
  style({ backgroundColor: "black", offset: 1 })
]))

```

If there are no `offset` values specified in the style entries, the offsets\n \* are calculated automatically.\n \* \n \* ```typescript\n \* animate("5s", keyframes([\n \* style({ backgroundColor: "red" }) // offset = 0\n \* style({ backgroundColor: "blue" }) // offset = 0.33\n \* style({ backgroundColor: "orange" }) // offset = 0.66\n \* style({ backgroundColor: "black" }) // offset = 1\n \* ]))\n \* \n \* @publicApi\n \* \n \* export function keyframes(
 steps: AnimationStyleMetadata[]): AnimationKeyframesSequenceMetadata {
 return {
 type: AnimationMetadataType.Keyframes,
 steps
 };
}

\*\*\n \* Declares an animation transition which is played when a certain specified condition is met.\n \* \n \* @param stateChangeExpr A string with a specific format or a function that specifies when the\n \* animation transition should occur (see [State Change Expression](#state-change-expression)).\n \* \n \* @param steps One or more animation objects that represent the animation's instructions.\n \* \n \* @param options An options object that can be used to specify a delay for the animation or provide\n \* custom parameters for it.\n \* \n \* @returns An object that encapsulates the transition data.\n \* \n \* @usageNotes\n \* \n \* ### State Change Expression\n \* The State Change Expression instructs Angular when to run the transition's animations, it can\n \* either be\n \* - a string with a specific syntax\n \* - or a function that compares the previous and current state (value of the expression bound to\n \* the element's trigger) and returns `true` if the transition should occur or `false` otherwise\n \* \n \* The string format can be:\n \* - `fromState => toState`, which indicates that the transition's animations should occur then the\n \* expression bound to the trigger's element goes from `fromState` to `toState`\n \* \n \* \_Example:\_\n \* ```typescript\n \* transition('open => closed', animate('.5s ease-out', style({ height: 0 })))\n \* \n \* - `fromState <=> toState`, which indicates that the transition's animations should occur then\n \* the expression bound to the trigger's element goes from `fromState` to `toState` or vice versa\n \* \n \* \_Example:\_\n \* ```typescript\n \* transition('enabled <=> disabled', animate('1s cubic-bezier(0.8,0.3,0,1)'))\n \* \n \* - `:enter`/:leave`, which indicates that the transition's animations should occur when the\n \* element enters or exists the DOM\n \* \n \* \_Example:\_\n \* ```typescript\n \* transition(':enter', [\n \* style({ opacity: 0 }),\n \* animate('500ms', style({ opacity: 1 }))]
 )\n \* \n \* - `:increment`/:decrement`, which indicates that the transition's animations should occur when\n \* the numerical expression bound to the trigger's element has increased in value or decreased\n \* \n \* \_Example:\_\n \* ```typescript\n \* transition(':increment', query('@counter', animateChild()))\n \* \n \* - a sequence of any of the above divided by commas, which indicates that transition's animations\n \* should occur whenever one of the state change expressions matches\n \* \n \* \_Example:\_\n \* ```typescript\n \* transition(':increment, => enabled, :enter', animate('1s ease', keyframes([\n \* style({ transform: 'scale(1)', offset: 0}),\n \* style({ transform: 'scale(1.1)', offset: 0.7}),\n \* style({ transform: 'scale(1)', offset: 1 })
 ]))\n \* \n \* \n \* Also note that in such context:\n \* - `void` can be used to indicate the absence of the element\n \* - asterisks can be used as wildcards that match

any state\n \* - (as a consequence of the above, `void => \*` is equivalent to `:enter` and `\* => void` is\n \* equivalent to `:leave`)\n \* - `true` and `false` also match expression values of `1` and `0` respectively (but do not match\n \* `_truthy_` and `_falsy_` values)\n \* `<div class=\"alert is-helpful\">`\n \* Be careful about entering end leaving elements as their transitions present a common\n \* pitfall for developers.\n \* Note that when an element with a trigger enters the DOM its `:enter` transition always\n \* gets executed, but its `:leave` transition will not be executed if the element is removed\n \* alongside its parent (as it will be removed `"without warning"` before its transition has\n \* a chance to be executed, the only way that such transition can occur is if the element\n \* is exiting the DOM on its own).\n \* `</div>`\n \* `### Animating to a Final State`\n \* If the final step in a transition is a call to `animate()` that uses a timing

value\n \* with no `style` data, that step is automatically considered the final animation arc,\n \* for the element to reach the final state, in such case Angular automatically adds or removes\n \* CSS styles to ensure that the element is in the correct final state.\n \* `### Usage Examples`\n \* - Transition animations applied based on\n \* the trigger's expression value\n \* `HTML`\n \* `<div [@myAnimationTrigger]="myStatusExp">` ...  
`</div>`\n \* `typescript`\n \* `trigger("myAnimationTrigger", [ ... , // states\n * transition("\n * => off, open => closed", animate(500)),\n * transition("\n * <=> error", query('.indicator', animateChild()))\n * ])\n *` \n \* - Transition animations applied based on custom logic dependent\n \* on the trigger's expression value and provided parameters\n \* `HTML`\n \* `<div [@myAnimationTrigger]="{ value:`

`stepName,`\n \* `params: { target: currentTarget } }\n * >`\n \* ...  
`</div>`\n \* `typescript`\n \* `trigger("myAnimationTrigger", [ ... , // states\n * transition(\n * (fromState, toState, _element, params) =>\n * ['firststep', 'laststep'].includes(fromState.toLowerCase())\n * && toState === params?.['target'],\n * animate('1s')\n * )\n * ])\n *` \n \* `@publicApi`\n \* `export function transition(\n * stateChangeExpr: string\n * ((fromState: string, toState: string, element?: any, params?: {[key: string]: any}) => boolean),\n * steps: AnimationMetadata|AnimationMetadata[],\n * options: AnimationOptions|null = null):`

`AnimationTransitionMetadata` {\n \* return {type: AnimationMetadataType.Transition, expr: stateChangeExpr, animation: steps, options};}\n \* `Produces a reusable animation that can be invoked in another animation or sequence,\n * by calling the useAnimation() function.\n * @param steps One or more animation objects, as returned`

by the `animate()`\n \* or `sequence()` function, that form a transformation from one state to another.\n \* A sequence is used by default when you pass an array.\n \* @param options An options object that can contain a delay value for the start of the\n \* animation, and additional developer-defined parameters.\n \* Provided values for additional parameters are used as defaults,\n \* and override values can be passed to the caller on invocation.\n \* @returns An object that encapsulates the animation data.\n \* `@usageNotes`\n \* The following example defines a reusable animation, providing some default parameter\n \* values.\n \* `typescript`\n \* `var fadeAnimation = animation([\n * style({ opacity: '{ start }' }),\n * animate('{ time }',\n * style({ opacity: '{ end }' })),\n * ],\n * { params: { time: '1000ms', start: 0, end: 1 } });\n *` \n \* The following invokes the defined animation with a call to `useAnimation()`,\n \* passing in override parameter values.\n \* `js`\n \* `useAnimation(fadeAnimation, {\n * params: {\n * time: '2s',\n * start: 1,\n * end: 0\n * } }\n * )\n *` \n \* If any of the passed-in parameter values are missing from this call,\n \* the default values are used. If one or more parameter values are missing before a step is\n \* animated, `useAnimation()` throws an error.\n \* `@publicApi`\n \* `export function animation(\n * steps: AnimationMetadata|AnimationMetadata[],\n * options: AnimationOptions|null = null): AnimationReferenceMetadata` {\n \* return {type:

`AnimationMetadataType.Reference, animation: steps, options};}\n * Executes a queried inner animation element within an animation sequence.\n * @param options An options object that can contain a delay value for the start of the\n * animation, and additional override values for developer-defined parameters.\n * @return An object that encapsulates the child animation data.\n * @usageNotes\n * Each time an animation is triggered in Angular, the parent animation\n * has priority and any child animations are blocked. In order\n * for a child animation to run, the parent animation must query each of the elements\n * containing child animations, and run`

`AnimationReferenceMetadata` {\n \* return {type: AnimationMetadataType.Reference, animation: steps, options};}\n \* `Executes a queried inner animation element within an animation sequence.\n * @param options An options object that can contain a delay value for the start of the\n * animation, and additional override values for developer-defined parameters.\n * @return An object that encapsulates the child animation data.\n * @usageNotes`\n \* Each time an animation is triggered in Angular, the parent animation\n \* has priority and any child animations are blocked. In order\n \* for a child animation to run, the parent animation must query each of the elements\n \* containing child animations, and run

`AnimationReferenceMetadata` {\n \* return {type: AnimationMetadataType.Reference, animation: steps, options};}\n \* `Executes a queried inner animation element within an animation sequence.\n * @param options An options object that can contain a delay value for the start of the\n * animation, and additional override values for developer-defined parameters.\n * @return An object that encapsulates the child animation data.\n * @usageNotes`\n \* Each time an animation is triggered in Angular, the parent animation\n \* has priority and any child animations are blocked. In order\n \* for a child animation to run, the parent animation must query each of the elements\n \* containing child animations, and run

them using this function. Note that this feature is designed to be used with `query()` and it will only work with animations that are assigned using the Angular animation library. CSS keyframes and transitions are not handled by this API.

```

@publicApi
export function animateChild(options: AnimationChildOptions|null = null): AnimationAnimateChildMetadata {
  return {type: AnimationMetadataType.AnimateChild, options};
}

```

Starts a reusable animation that is created using the `animation()` function.

```

@param animation The reusable animation to start.
@param options An options object that can contain a delay value for the start of the animation, and additional override values for developer-defined parameters.
@return An object that contains the animation parameters.
@publicApi
export function useAnimation(animation: AnimationReferenceMetadata, options: AnimationOptions|null = null): AnimationAnimateRefMetadata {
  return {type: AnimationMetadataType.AnimateRef, animation, options};
}

```

Finds one or more inner elements within the current element that is being animated within a sequence. Use with `animate()`.

```

@param selector The element to query, or a set of elements that contain Angular-specific characteristics, specified with one or more of the following tokens.
- `query(':enter')` or `query(':leave')` : Query for newly inserted/removed elements (not all elements can be queried via these tokens, see [Entering and Leaving Elements](#entering-and-leaving-elements))
- `query(':animating')` : Query all currently animating elements.
- `query('@triggerName')` : Query elements that contain an animation trigger.
- `query('@*)` : Query all elements that contain an animation triggers.
- `query(':self')` : Include the current element into the animation sequence.

```

One or more animation steps to apply to the queried element or elements. An array is treated as an animation sequence.

```

@param options An options object. Use the 'limit' field to limit the total number of items to collect.
@return An object that encapsulates the query data.
@usageNotes
### Multiple Tokens
Tokens can be merged into a combined query selector string. For example:
`typescript`
query(':self, .record:enter, .record:leave, @subTrigger', [...])
`js`
The `query()` function collects multiple elements and works internally by using `element.querySelector`. Use the `limit` field of an options object to limit the total number of items to be collected. For example:
`js`
query('div', [animate(...), animate(...)], { limit: 1 })
By default, throws an error when zero items are found. Set the `optional` flag to ignore this error. For example:
`js`
query('.some-element-that-may-not-be-there', [animate(...), animate(...)], { optional: true })

```

### Entering and Leaving Elements

Not all elements can be queried via the `:enter` and `:leave` tokens, the only ones that can are those that Angular assumes can enter/leave based on their own logic (if their insertion/removal is simply a consequence of that of their parent they should be queried via a different token in their parent's `:enter`/:`leave` transitions).

The only elements Angular assumes can enter/leave based on their own logic (thus the only ones that can be queried via the `:enter` and `:leave` tokens) are:

- Those inserted dynamically (via `ViewContainerRef`)
- Those that have a structural directive (which, under the hood, are a subset of the above ones)

```

<div class="alert is-helpful">

```

Note that elements will be successfully queried via `:enter`/:`leave` even if their insertion/removal is not done manually via `ViewContainerRef` or caused by their structural directive (e.g. they enter/exit alongside their parent).

```

</div>
<div class="alert is-important">

```

There is an exception to what previously mentioned, besides elements entering/leaving based on their own logic, elements with an animation trigger can always be queried via `:leave` when their parent is also leaving.

```

</div>

```

### Usage Example

The following example queries for inner elements and animates them individually using `animate()`.

```

`typescript`
@Component({
  selector: 'inner',
  template: `
    <div [@queryAnimation]=["exp"]>
      <h1>Title</h1>
      <div class="content">
        Blah blah blah
      </div>
    </div>
  `,
  animations: [
    trigger('queryAnimation', [
      transition('* => goAnimate', [
        // hide the inner elements
        query('h1', style({ opacity: 0 })),
        query('.content', style({ opacity: 0 })),
        // animate the inner elements in, one by one
        query('h1', animate(1000, style({ opacity: 1 }))),
        query('.content', animate(1000, style({ opacity: 1 }))),
      ]),
    ]),
  ]),
})
class Cmp {
  exp =

```

```

";\n * goAnimate() {\n *   this.exp = 'goAnimate';\n * } \n * }\n * ``\n * @publicApi\n * ^\nexport
function query(\n selector: string, animation: AnimationMetadata|AnimationMetadata[],\n options:
AnimationQueryOptions|null = null): AnimationQueryMetadata {\n return {type: AnimationMetadataType.Query,
selector, animation, options};\n}\n\n/**\n * Use within an animation `query()` call to issue a timing gap after\n *
each queried item is animated.\n * @param timings
A delay value.\n * @param animation One ore more animation steps.\n * @returns An object that encapsulates the
stagger data.\n * @usageNotes\n * In the following example, a container element wraps a list of items stamped
out\n * by an `ngFor`. The container element contains an animation trigger that will later be set\n * to query for each
of the inner items.\n * Each time items are added, the opacity fade-in animation runs,\n * and each removed item
is faded out.\n * When either of these animations occur, the stagger effect is\n * applied after each item's animation
is started.\n * ``html\n * <!-- list.component.html -->\n * <button (click)="toggle()">Show / Hide
Items</button>\n * <hr />\n * <div [@listAnimation]="items.length">\n * <div *ngFor="let item of items">\n *
  { { item }}\n * </div>\n * </div>\n * ``\n * Here is the component code:\n * ``typescript\n * import
{trigger, transition, style, animate, query, stagger} from '@angular/animations';\n
* @Component({\n *   templateUrl: 'list.component.html',\n *   animations: [\n *     trigger('listAnimation', [\n *
...,\n *   ])\n * ]\n * })\n * class ListComponent {\n *   items = [];\n *   showItems() {\n *     this.items =
[0,1,2,3,4];\n *   }\n *   hideItems() {\n *     this.items = [];\n *   }\n *   toggle() {\n *     this.items.length ?
this.hideItems() : this.showItems();\n *   }\n *   ``\n * Here is the animation trigger code:\n * ``typescript\n *
trigger('listAnimation', [\n *   transition('* => *', [ // each time the binding value changes\n *
query(':leave', [\n *   stagger(100, [\n *     animate('0.5s', style({ opacity: 0 })))\n *   ])\n * ],\n *
query(':enter', [\n *   style({ opacity: 0 })),\n *   stagger(100, [\n *     animate('0.5s', style({ opacity: 1 })))\n *
])\n * ])\n * ])\n * ])\n * @publicApi\n * ^\nexport function stagger(timings: string|number,
animation: AnimationMetadata|AnimationMetadata[]):\n
AnimationStaggerMetadata {\n return {type: AnimationMetadataType.Stagger, timings, animation};\n}\n\n",/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\nexport function
scheduleMicroTask(cb: () => any) {\n Promise.resolve().then(cb);\n}\n\n",/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n * ^\nimport { scheduleMicroTask } from './util';\n\n/**\n
* Provides programmatic control of a reusable animation sequence,\n * built using the
<code>[AnimationBuilder.build](api/animations/AnimationBuilder#build())</code>\n * method which returns an
`AnimationFactory`, whose\n * <code>[create](api/animations/AnimationFactory#create())</code> method
instantiates
and\n * initializes this interface.\n * @see `AnimationBuilder`\n * @see `AnimationFactory`\n * @see
`animate()`\n * @publicApi\n * ^\nexport interface AnimationPlayer {\n /**\n * Provides a callback to invoke
when the animation finishes.\n * @param fn The callback function.\n * @see `finish()`\n * ^\n onDone(fn: () =>
void): void;\n /**\n * Provides a callback to invoke when the animation starts.\n * @param fn The callback
function.\n * @see `run()`\n * ^\n onStart(fn: () => void): void;\n /**\n * Provides a callback to invoke after the
animation is destroyed.\n * @param fn The callback function.\n * @see `destroy()`\n * @see
`beforeDestroy()`\n * ^\n onDestroy(fn: () => void): void;\n /**\n * Initializes the animation.\n * ^\n init():
void;\n /**\n * Reports whether the animation has started.\n * @returns True if the animation has started, false
otherwise.\n * ^\n hasStarted(): boolean;\n /**\n * Runs the animation, invoking the
`onStart()` callback.\n * ^\n play(): void;\n /**\n * Pauses the animation.\n * ^\n pause(): void;\n /**\n
* Restarts the paused animation.\n * ^\n restart(): void;\n /**\n * Ends the animation, invoking the `onDone()`
callback.\n * ^\n finish(): void;\n /**\n * Destroys the animation, after invoking the `beforeDestroy()`
callback.\n * ^\n * Calls the `onDestroy()` callback when destruction is completed.\n * ^\n destroy(): void;\n /**\n
* Resets the animation to its initial state.\n * ^\n reset(): void;\n /**\n * Sets the position of the animation.\n *
@param
position A 0-based offset into the duration, in milliseconds.\n * ^\n setPosition(position: any /** TODO #9100 */):

```

```

void;
/**
 * Reports the current position of the animation.
 * @returns A 0-based offset into the duration, in
 milliseconds.
 */
getPosition(): number;
/**
 * The parent of this player, if any.
 */
parentPlayer:
AnimationPlayer|null;
/**
 * The total run
 time of the animation, in milliseconds.
 */
readonly totalTime: number;
/**
 * Provides a callback to
 invoke before the animation is destroyed.
 */
beforeDestroy?: () => any;
/**
 * @internal
 * Internal
 */
triggerCallback?: (phaseName: string) => void;
/**
 * @internal
 * Internal
 */
disabled?:
boolean;
}
}
/**
 * An empty programmatic controller for reusable animations.
 * Used internally when
 animations are disabled, to avoid
 * checking for the null case when an animation player is expected.
 */
@see `animate()`
 * @see `AnimationPlayer`
 * @see `GroupPlayer`
 * @publicApi
 */
export class
NoopAnimationPlayer implements AnimationPlayer {
  private _onDoneFns: Function[] = [];
  private
_onStartFns: Function[] = [];
  private _onDestroyFns: Function[] = [];
  private _originalOnDoneFns: Function[]
= [];
  private _originalOnStartFns: Function[] = [];
  private _started = false;
  private _destroyed = false;
  private _finished = false;
  private _position = 0;
  public parentPlayer: AnimationPlayer|null = null;
  public
readonly totalTime: number;
  constructor(duration: number = 0, delay: number = 0) {
    this.totalTime = duration
+ delay;
  }
  private _onFinish() {
    if (!this._finished) {
      this._finished = true;
      this._onDoneFns.forEach(fn => fn());
      this._onDoneFns = [];
    }
  }
  onStart(fn: () => void): void {
    this._originalOnStartFns.push(fn);
    this._onStartFns.push(fn);
  }
  onDone(fn: () => void): void {
    this._originalOnDoneFns.push(fn);
    this._onDoneFns.push(fn);
  }
  onDestroy(fn: () => void): void {
    this._onDestroyFns.push(fn);
  }
  hasStarted(): boolean {
    return this._started;
  }
  init(): void {}
  play():
void {
    if (!this.hasStarted()) {
      this._onStart();
      this.triggerMicrotask();
    }
    this._started = true;
  }
  /**
 * @internal
 */
triggerMicrotask() {
    scheduleMicroTask(()
=> this._onFinish());
  }
  private _onStart() {
    this._onStartFns.forEach(fn => fn());
    this._onStartFns =
[];
  }
  pause(): void {}
  restart(): void {}
  finish(): void {
    this._onFinish();
  }
  destroy(): void {
    if (!this._destroyed) {
      this._destroyed = true;
      if (!this.hasStarted()) {
        this._onStart();
      }
      this.finish();
      this._onDestroyFns.forEach(fn => fn());
      this._onDestroyFns = [];
    }
  }
  reset(): void
{
    this._started = false;
    this._finished = false;
    this._onStartFns = this._originalOnStartFns;
    this._onDoneFns = this._originalOnDoneFns;
  }
  setPosition(position: number): void {
    this._position =
this.totalTime ? position * this.totalTime : 1;
  }
  getPosition(): number {
    return this.totalTime ? this._position
/ this.totalTime : 1;
  }
  /**
 * @internal
 */
triggerCallback(phaseName: string): void {
    const methods =
phaseName == 'start' ? this._onStartFns
: this._onDoneFns;
    methods.forEach(fn => fn());
    methods.length = 0;
  }
}
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license
 that can be
 * found in the LICENSE file at https://angular.io/license
 */
import { scheduleMicroTask } from
'./util';
import { AnimationPlayer } from './animation_player';
/**
 * A programmatic controller for a group of
 reusable animations.
 * Used internally to control animations.
 */
@see `AnimationPlayer`
 * @see `{ @link
animations/group group()}`
 */
export class AnimationGroupPlayer implements AnimationPlayer {
  private
_onDoneFns: Function[] = [];
  private _onStartFns: Function[] = [];
  private _finished = false;
  private _started
= false;
  private _destroyed = false;
  private _onDestroyFns: Function[] = [];
  public parentPlayer:
AnimationPlayer|null = null;
  public totalTime: number = 0;
  public readonly players:
AnimationPlayer[];
  constructor(_players: AnimationPlayer[]) {
    this.players = _players;
    let doneCount =
0;
    let destroyCount = 0;
    let startCount = 0;
    const total = this.players.length;
    if (total == 0) {
      scheduleMicroTask(() => this._onFinish());
    } else {
      this.players.forEach(player => {
        player.onDone(() => {
          if (++doneCount == total) {
            this._onFinish();
          }
        });
        player.onDestroy(() => {
          if (++destroyCount == total) {
            this._onDestroy();
          }
        });
        player.onStart(() => {
          if (++startCount == total) {
            this._onStart();
          }
        });
      });
      this.totalTime = this.players.reduce((time, player) => Math.max(time, player.totalTime), 0);
    }
  }
  private
_onFinish() {
    if (!this._finished) {
      this._finished = true;
      this._onDoneFns.forEach(fn => fn());
      this._onDoneFns

```



\* from

./index';\n"],"names":[],"mappings":",,,,,;AAUA,,,,,;AA6CG;MACmB,gBAAgB,CAAA  
;AAQrC,CAAA;AAED,,,,;AAMG;MACmB,gBAAgB,CAAA;AAWrC;;ACpFD,,,,;AAMG;AAoKH,,,,;AAIG;AA  
CI,MAAM,UAAU,GAAG,IAAI;AAyR9B,,,,,;AAmJG;AACa,SAAA,OAAO,CAAC,IAAY,EAAE,WAAgC,EAAA;AACpE,IAAA,O  
AAO,EAAC,IAAI,EAA+B,CAAA,sCAAE,IAAI,EAAE,WAAW,EAAE,OAAO,EAAE,EAAE,EAAC,CAAC;AAC  
/E,CAAC;AAED,,,,,;AAyDG;SACa,OAAO,CACnB,OAAsB,EACtB,SACI,IAA  
I,EAAA;IACV,OAAO,EAAC,IAAI,EAA+B,CAAA,sCAAE,MAAM,EAAE,OAAO,EAAC,CAAC;AACHe,CAAC  
;AAED,,,,,;AAgCG;SACa,KAAK,CACjB,KAA0B,EAAE,UAAiC,IAAI,EAAA;IACnE,OAAO,E  
AAC,IAAI,EAA6B,CAAA,oCAAE,KAAK,EAAE,OAAO,EAAC,CAAC;AAC7D,CAAC;AAED,,,,,;AAgCI;SACY,QAAQ,CACpB,KAA0B,EAAE,UAAiC,IAAI,EAAA;IACnE,OAAO,EAAC,IAAI,EAAGC,CA  
AA,uCAAE,KAAK,EAAE,OAAO,EAAC,CAAC;AACHe,CAAC;AAED,,,,,;AAsCI;AAACE,  
SAAU,KAAK,CAAC,MAC2C,EAAA;AAC/D,IAAA,OAAO,EAAC,IAAI,EAA6B,CAAA,oCAAE,MAAM,EAAE  
,MAAM,EAAE,MAAM,EAAE,IAAI,EAAC,CAAC;AAC3E,CAAC;AAED,,,,,;AA4BI;SACY,KA  
AK,CACjB,IAAY,EAAE,MAA8B,EAC5C,OAAyC,EAAA;IAC3C,OAAO,EAAC,IAAI,EAAA,CAAA,oCAA+B,I  
AAI,EAAE,MAAM,EAAE,OAAO,EAAC,CAAC;AACpE,CAAC;AAED,,,,,;AA4CG;A  
ACG,SAAU,SAAS,CAAC,KAA+B,EAAA;AACvD,IAAA,OAAO,EAAC,IAAI,EAAA,CAAA,wCAAmC,KAAK,  
EAAC,CAAC;AACxD,CAAC;AAED,,,,,;AAiJI;AAACE,SAAU,UAAU,CACtB,eAC+F,EAC/F,KAA4C,EAC5C,UAAiC,IAAI,EAAA;  
AACvC,IAAA,OAAO,EAAC,IAAI,EAakC,CAAA,yCAAE,IAAI,EAAE,eAAe,EAAE,SAAS,EAAE,KAAK,EAA  
E,OAAO,EAAC,CAAC;AACpG,CAAC;AAED,,,,,;AA4CG;SACa,SAAS,CACrB,KAA4  
C,EAC5C,UAAiC,IAAI,EAAA;IACvC,OAAO,EAAC,IAAI,EAAA,CAAA,wCAAmC,SAAS,EAAE,KAAK,EAA  
E,OAAO,EAAC,CAAC;AAC5E,CAAC;AAED,,,,,;AAkBG;AACa,SAAA,YAAY,CAAC,OAAA,GAAoC,  
IAAI,EAAA;AAEnE,IAAA,OAAO,EAAC,IAAI,EAAA,CAAA,2CAAsC,OAAO,EAAC,CAAC;AAC7D,CAAC;A  
AED,,,,,;AASG;SACa,YAAY,CACxB,SAAqC,EACrC,UAAiC,IAAI,EAAA;IACvC,OAAO,EAAC,IAAI,EAak  
C,EAAA,yCAAE,SAAS,EAAE,OAAO,EAAC,CAAC;AACTe,CAAC;AAED,,,,,;AAuHG;AACG,SAAU,KAAK,CACjB,QAAgB,EAAE,SAAGD,EACIE  
,UAAsC,IAAI,EAAA;IAC5C,OAAO,EAAC,IAAI,EAAA,EAAA,oCAA+B,QAAQ,EAAE,SAAS,EAAE,OAAO,E  
AAC,CAAC;AAC3E,CAAC;AAED,,,,,;AA+EG;AACa,SAAA,  
OAAO,CAAC,OAAsB,EAAE,SAAGD,EAAA;IAE9F,OAAO,EAAC,IAAI,EAA+B,EAAA,sCAAE,OAAO,EAAE,  
SAAS,EAAC,CAAC;AACnE;;ACnzCA,,,,;AAMG;AACG,SAAU,iBAaIB,CAAC,EAAa,EAAA;IAC7C,OAAO,C  
AAC,OAAO,EAAE,CAAC,IAAI,CAAC,EAAE,CAAC,CAAC;AAC7B;;ACTA,,,,;AAMG;AAwGH,,,,;AAUG  
;MACU,mBAAmB,CAAA;AAy9B,IAAA,WAAA,CAAY,QAAmB,GAAA,CAAC,EAAE,KAAA,GAAgB,CAAC,  
EAAA;QAX3C,IAAU,CAAA,UAAA,GAAe,EAAE,CAAC;QAC5B,IAAW,CAAA,WAAA,GAAe,EAAE,CAAC;  
QAC7B,IAAa,CAAA,aAAA,GAAe,EAAE,CAAC;QAC/B,IAakB,CAAA,kBAAA,GAAe,EAAE,CAAC;QACpC,I  
AAmB,CAAA,mBAAA,GAAe,EAAE,CAAC;QACrC,IAAQ,CAAA,QAAA,GAAG,KAAK,CAAC;QACjB,IAAU,  
CAAA,UAAA,GAAG,KAAK,CAAC;QACnB,IAAS,CAAA,SAAA,GAAG,KAAK,CAAC;QACIB,IAAS,CAAA,S  
AAA,GAAG,CAAC,CAAC;QACf,IAAY,CAAA,YAAA,GAAY,IAAI,CAAC;AAG/C,QAAA,IAAI,CAAC,SAAS  
,GAAG,QAAQ,GAAG,KAAK,CAAC;KACnC;IACO,SAAS,GAAA;AACf,QAAA,IAAI,CAAC,IAAI,CAAC,SAA  
S,EAAE;AACnB,YAAA,IAAI,CAAC,SAAS,GAAG,IAAI,CAAC;AACtB,YAAA,IAAI,CAAC,UAAU,CAAC,OA  
AO,CAAC,EAAE,IAAI,EAAE,EAAE,CAAC,CAAC;AACpC,YAAA,IAAI,CAAC,UAAU,GAAG,EAAE,CAAC;  
AACtB,SAAA;KACF;AACD,IAAA,OAAO,CAAC,EAAc,EAAA;AACpB,QAAA,IAAI,CAAC,mBAAmB,CAAC,  
IAAI,CAAC,EAAE,CAAC,CAAC;AACIC,QAAA,IAAI,CAAC,WAAW,CAAC,IAAI,CAAC,EAAE,CAAC,CAA  
C;KAC3B;AACD,IAAA,MAAM,CAAC,EAAc,EAAA;AACnB,QAAA,IAAI,CAAC,kBAakB,CAAC,IAAI,CAA  
C,EAAE,CAAC,CAAC;AACjC,QAAA,IAAI,CAAC,UAAU,CAAC,IAAI,CAAC,EAAE,CAAC,CAAC;KACIB;A  
ACD,IAAA,SAAS,CAAC,EAAc,EAAA;AACtB,QAAA,IAAI,CAAC,aAAA,CAAC,IAAI,CAAC,EAAE,CAAC,C  
AAC;KAC7B;IACD,UAAU,GAAA;QACR,OAAO,IAAI,CAAC,QAAQ,CAAC;KACtB;AACD,IAAA,IAAI,MAA  
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\* /opt/cola/permits/1784583507\_1693546602.9302073/0/animations-14-3-0-1-  
tgz/package/fesm2020/animations.mjs.map  
No license file was found, but licenses were detected in source scan.

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0 are not allowed for this animation step.);\n\n\nexport function negativeDelayValue(): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.NEGATIVE_DELAY_VALUE,\n    ngDevMode && 'Delay values below
0 are not allowed for this animation step.);\n\n\nexport function invalidStyleParams(varName: string): Error {\n
return new RuntimeError(\n    RuntimeErrorCode.INVALID_STYLE_PARAMS,\n    ngDevMode &&\n
`Unable to resolve the
local animation param ${varName} in the given list of values`);\n\n\nexport function
invalidParamValue(varName: string): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.INVALID_PARAM_VALUE,\n    ngDevMode && `Please provide a value for the animation
param ${varName}`);\n\n\nexport function invalidNodeType(nodeType: string): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.INVALID_NODE_TYPE,\n    ngDevMode && `Unable to resolve
animation metadata node #${nodeType}`);\n\n\nexport function invalidCssUnitValue(userProvidedProperty:
string, value: string): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.INVALID_CSS_UNIT_VALUE,\n    ngDevMode && `Please provide a CSS unit value for
${userProvidedProperty}:${value}`);\n\n\nexport function invalidTrigger(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.INVALID_TRIGGER,\n    ngDevMode &&\n    `animation triggers cannot be prefixed
with an `@` sign (e.g. trigger(\`@foo\`, [...])));\n\n\nexport
function invalidDefinition(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.INVALID_DEFINITION,\n    ngDevMode && `only state() and transition() definitions can sit
inside of a trigger()`);\n\n\nexport function invalidState(metadataName: string, missingSubs: string[]): Error {\n
return new RuntimeError(\n    RuntimeErrorCode.INVALID_STATE,\n    ngDevMode &&\n    `state("${metadataName}
", ...) must define default values for all the following style substitutions: ${\n
missingSubs.join(', ')`);\n\n\nexport function invalidStyleValue(value: string): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.INVALID_STYLE_VALUE,\n    ngDevMode && `The provided style
string value ${value} is not allowed.`);\n\n\nexport function invalidProperty(prop: string): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.INVALID_PROPERTY,\n    ngDevMode &&\n    `The provided
animation property "${\n
prop}" is not a supported CSS property for animations`);\n\n\nexport function invalidParallelAnimation(\n
prop: string, firstStart: number, firstEnd: number, secondStart: number,\n  secondEnd: number): Error {\n  return
new RuntimeError(\n    RuntimeErrorCode.INVALID_PARALLEL_ANIMATION,\n    ngDevMode &&\n
`The CSS property "${prop}" that exists between the times of "${firstStart}ms" and "${\n
firstEnd}ms"
is also being animated in a parallel animation between the times of "${\n
secondStart}ms" and
"${secondEnd}ms"`);\n\n\nexport function invalidKeyframes(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.INVALID_KEYFRAMES,\n    ngDevMode && `keyframes() must be placed inside of a call to
animate()`);\n\n\nexport function invalidOffset(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.INVALID_OFFSET,\n    ngDevMode && `Please ensure that all keyframe offsets are between
0 and 1`);\n\n\nexport
function keyframeOffsetsOutOfOrder(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.KEYFRAME_OFFSETS_OUT_OF_ORDER,\n    ngDevMode && `Please ensure that all
keyframe offsets are in order`);\n\n\nexport function keyframesMissingOffsets(): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.KEYFRAMES_MISSING_OFFSETS,\n    ngDevMode && `Not all
style() steps within the declared keyframes() contain offsets`);\n\n\nexport function invalidStagger(): Error {\n
return new RuntimeError(\n    RuntimeErrorCode.INVALID_STAGGER,\n    ngDevMode && `stagger() can
only be used inside of query()`);\n\n\nexport function invalidQuery(selector: string): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.INVALID_QUERY,\n    ngDevMode &&\n
`query("${selector}") returned zero elements. (Use query("${\n
selector}", { optional: true }) if
you wish to allow this.`);\n\n\nexport function invalidExpression(expr: string): Error
{\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_EXPRESSION,\n    ngDevMode && `The
provided transition expression "${expr}" is not supported`);\n\n\nexport function invalidTransitionAlias(alias:

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string): Error {\n return new RuntimeError(\n   RuntimeErrorCode.INVALID_TRANSITION_ALIAS,\n   ngDevMode && `The transition alias value \"${alias}\" is not supported`);\n}\n\n\nexport function\nvalidationFailed(errors: Error[]): Error {\n return new RuntimeError(\n   RuntimeErrorCode.VALIDATION_FAILED,\n   ngDevMode && `animation validation\nfailed:\n${errors.map(err => err.message).join(\"\\n\")}`);\n}\n\n\nexport function buildingFailed(errors: Error[]): Error\n{\n return new RuntimeError(\n   RuntimeErrorCode.BUILDING_FAILED,\n   ngDevMode && `animation\nbuilding failed:\n${errors.map(err => err.message).join(\"\\n\")}`);\n}\n\n\nexport function triggerBuildFailed(name:\nstring, errors: Error[]): Error {\n return new RuntimeError(\n   RuntimeErrorCode.TRIGGER_BUILD_FAILED,\n   ngDevMode &&\n   `The animation trigger \"${name}\" has failed to build due to the following errors:\n\n -\n${\n   errors.map(err => err.message).join(\"\\n - \")`);\n}\n\n\nexport function animationFailed(errors: Error[]):\nError {\n return new RuntimeError(\n   RuntimeErrorCode.ANIMATION_FAILED,\n   ngDevMode &&\n   `Unable to animate due to the following errors:\n${LINE_START}${\n   errors.map(err =>\nerr.message).join(LINE_START)`);\n}\n\n\nexport function registerFailed(errors: Error[]): Error {\n return new\nRuntimeError(\n   RuntimeErrorCode.REGISTRATION_FAILED,\n   ngDevMode &&\n   `Unable to build\nthe animation due to the following errors: ${\n   errors.map(err => err.message).join(\"\\n\")`);\n}\n\n\nexport\nfunction missingOrDestroyedAnimation(): Error {\n return new RuntimeError(\n   RuntimeErrorCode.MISSING_OR_DESTROYED_ANIMATION,\n   ngDevMode && `The requested animation\ndoesn\\'t exist or has\nalready been destroyed`);\n}\n\n\nexport function createAnimationFailed(errors: Error[]): Error {\n return new\nRuntimeError(\n   RuntimeErrorCode.CREATE_ANIMATION_FAILED,\n   ngDevMode &&\n   `Unable\nto create the animation due to the following errors:\n${\n   errors.map(err =>\nerr.message).join(\"\\n\")`);\n}\n\n\nexport function missingPlayer(id: string): Error {\n return new RuntimeError(\n   RuntimeErrorCode.MISSING_PLAYER,\n   ngDevMode && `Unable to find the timeline player referenced by\n${id}`);\n}\n\n\nexport function missingTrigger(phase: string, name: string): Error {\n return new RuntimeError(\n   RuntimeErrorCode.MISSING_TRIGGER,\n   ngDevMode &&\n   `Unable to listen on the animation trigger\nevent \"${\n   phase}\" because the animation trigger \"${name}\" doesn\\'t exist!`);\n}\n\n\nexport function\nmissingEvent(name: string): Error {\n return new RuntimeError(\n   RuntimeErrorCode.MISSING_EVENT,\n   ngDevMode &&\n   `Unable to listen on the animation trigger \"${\n   name}\" because the provided event is\nundefined!`);\n}\n\n\nexport function unsupportedTriggerEvent(phase: string, name: string): Error {\n return new\nRuntimeError(\n   RuntimeErrorCode.UNSUPPORTED_TRIGGER_EVENT,\n   ngDevMode &&\n   `The\nprovided animation trigger event \"${phase}\" for the animation trigger \"${\n   name}\" is not\nsupported!`);\n}\n\n\nexport function unregisteredTrigger(name: string): Error {\n return new RuntimeError(\n   RuntimeErrorCode.UNREGISTERED_TRIGGER,\n   ngDevMode && `The provided animation trigger\n\"${name}\" has not been registered!`);\n}\n\n\nexport function triggerTransitionsFailed(errors: Error[]): Error {\n\nreturn new RuntimeError(\n   RuntimeErrorCode.TRIGGER_TRANSITIONS_FAILED,\n   ngDevMode &&\n   `Unable to process animations due to the following failed trigger transitions\n\n ${\n   errors.map(err =>\nerr.message).join(\"\\n\")`);\n}\n\n\nexport\nfunction triggerParsingFailed(name: string, errors: Error[]): Error {\n return new RuntimeError(\n   RuntimeErrorCode.TRIGGER_PARSING_FAILED,\n   ngDevMode &&\n   `Animation parsing for the\n${name} trigger have failed:\n${LINE_START}${\n   errors.map(err =>\nerr.message).join(LINE_START)`);\n}\n\n\nexport function transitionFailed(name: string, errors: Error[]): Error {\n\nreturn new RuntimeError(\n   RuntimeErrorCode.TRANSITION_FAILED,\n   ngDevMode && `@${name} has\nfailed due to:\n\n ${errors.map(err => err.message).join(\"\\n- \")`);\n}\n\n\n\",/**\n * @license\n * Copyright Google\nLLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found\nin the LICENSE file at https://angular.io/license\n * /\n * Set of all animatable CSS properties\n * @see\nhttps://developer.mozilla.org/en-US/docs/Web/CSS/CSS_animated_properties\n */\nexport const

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ANIMATABLE_PROP_SET = new Set([\n '-moz-outline-radius',\n
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color',\n '-webkit-text-stroke',\n '-webkit-text-stroke-color',\n 'accent-color',\n 'all',\n 'backdrop-filter',\n
'background',\n 'background-color',\n 'background-position',\n 'background-size',\n 'block-size',\n 'border',\n
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radius',\n 'border-top-right-radius',\n 'border-top-width',\n 'border-width',\n 'bottom',\n 'box-shadow',\n 'caret-
color',\n 'clip',\n 'clip-path',\n 'color',\n 'column-count',\n 'column-gap',\n 'column-rule',\n 'column-rule-color',\n
'column-rule-width',\n 'column-width',\n 'columns',\n 'filter',\n 'flex',\n 'flex-basis',\n 'flex-grow',\n 'flex-
shrink',\n 'font',\n 'font-size',\n 'font-size-adjust',\n 'font-stretch',\n 'font-variation-settings',\n 'font-weight',\n
'gap',\n 'grid-column-gap',\n 'grid-gap',\n 'grid-row-gap',\n 'grid-template-columns',\n 'grid-template-rows',\n
'height',\n 'inline-size',\n 'input-security',\n 'inset',\n 'inset-block',\n 'inset-block-end',\n 'inset-block-start',\n
'inset-inline',\n 'inset-inline-end',\n 'inset-inline-start',\n 'left',\n 'letter-spacing',\n 'line-clamp',\n 'line-height',\n
'margin',\n 'margin-block-end',\n 'margin-block-start',\n 'margin-bottom',\n 'margin-inline-end',\n 'margin-inline-
start',\n 'margin-left',\n 'margin-right',\n 'margin-top',\n 'mask',\n 'mask-border',\n 'mask-position',\n 'mask-
size',\n 'max-block-size',\n 'max-height',\n 'max-inline-size',\n 'max-lines',\n 'max-width',\n 'min-block-size',\n
'min-height',\n 'min-inline-size',\n 'min-width',\n 'object-position',\n 'offset',\n 'offset-anchor',\n 'offset-
distance',\n 'offset-path',\n 'offset-position',\n 'offset-rotate',\n 'opacity',\n 'order',\n 'outline',\n 'outline-color',\n
'outline-offset',\n 'outline-width',\n 'padding',\n 'padding-block-end',\n 'padding-block-start',\n 'padding-bottom',\n
'padding-inline-end',\n 'padding-inline-start',\n 'padding-left',\n 'padding-right',\n 'padding-top',\n 'perspective',\n
'perspective-origin',\n 'right',\n 'rotate',\n 'row-gap',\n 'scale',\n 'scroll-margin',\n 'scroll-margin-block',\n 'scroll-
margin-block-end',\n 'scroll-margin-block-start',\n 'scroll-margin-bottom',\n 'scroll-margin-inline',\n 'scroll-
margin-inline-end',\n 'scroll-margin-inline-start',\n 'scroll-margin-left',\n 'scroll-margin-right',\n 'scroll-margin-
top',\n 'scroll-padding',\n 'scroll-padding-block',\n 'scroll-padding-block-end',\n 'scroll-padding-block-start',\n
'scroll-padding-bottom',\n 'scroll-padding-inline',\n 'scroll-padding-inline-end',\n 'scroll-padding-inline-start',\n
'scroll-padding-left',\n 'scroll-padding-right',\n 'scroll-padding-top',\n 'scroll-snap-coordinate',\n 'scroll-snap-
destination',\n 'scrollbar-color',\n 'shape-image-threshold',\n 'shape-margin',\n 'shape-outside',\n 'tab-size',\n 'text-
decoration',\n
'text-decoration-color',\n 'text-decoration-thickness',\n 'text-emphasis',\n 'text-emphasis-color',\n 'text-indent',\n
'text-shadow',\n 'text-underline-offset',\n 'top',\n 'transform',\n 'transform-origin',\n 'translate',\n 'vertical-align',\n
'visibility',\n 'width',\n 'word-spacing',\n 'z-index',\n 'zoom',\n]);\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\nimport {AnimationEvent, AnimationPlayer, AUTO_STYLE,
NoopAnimationPlayer, AnimationGroupPlayer, PRE_STYLE as PRE_STYLE, StyleDataMap} from
'@angular/animations';\nimport {AnimationStyleNormalizer} from
'../src/dsl/style_normalization/animation_style_normalizer';\nimport {AnimationDriver} from
'../src/render/animation_driver';\nimport {animationFailed} from '../error_helpers';\nimport
{ANIMATABLE_PROP_SET} from './web_animations/animatable_props_set';\n\n//
We don't include ambient node types here since @angular/animations/browser\n// is meant to target the browser so
technically it should not depend on node\n// types. `process` is just declared locally here as a result.\ndeclare const
process: any;\n\nexport function isBrowser(): boolean {\n  return (typeof window !== 'undefined' && typeof

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window.document !== 'undefined');\n}\n\nexport function isNode(): boolean {\n // Checking only for `process` isn't
enough to identify whether or not we're in a Node\n // environment, because Webpack by default will polyfill the
`process`. While we can discern\n // that Webpack polyfilled it by looking at `process.browser`, it's very Webpack-
specific and\n // might not be future-proof. Instead we look at the stringified version of `process` which\n // is
`[object process]` in Node and `[object Object]` when polyfilled.\n return typeof process !== 'undefined' &&
{ }.toString.call(process) === '[object process]';\n}\n\nexport
function optimizeGroupPlayer(players: AnimationPlayer[]): AnimationPlayer {\n switch (players.length) {\n case
0:\n return new NoopAnimationPlayer();\n case 1:\n return players[0];\n default:\n return new
AnimationGroupPlayer(players);\n }\n}\n\nexport function normalizeKeyframes(\n driver: AnimationDriver,
normalizer: AnimationStyleNormalizer, element: any,\n keyframes: Array<StyleDataMap>, preStyles:
StyleDataMap = new Map(),\n postStyles: StyleDataMap = new Map()): Array<StyleDataMap> {\n const errors:
Error[] = [];\n const normalizedKeyframes: Array<StyleDataMap> = [];\n let previousOffset = -1;\n let
previousKeyframe: StyleDataMap|null = null;\n keyframes.forEach(kf => {\n const offset = kf.get('offset') as
number;\n const isSameOffset = offset === previousOffset;\n const normalizedKeyframe: StyleDataMap =
(isSameOffset && previousKeyframe) || new Map();\n kf.forEach((val, prop) => {\n let normalizedProp =
prop;\n
let normalizedValue = val;\n if (prop !== 'offset') {\n normalizedProp =
normalizer.normalizePropertyName(normalizedProp, errors);\n switch (normalizedValue) {\n case
PRE_STYLE:\n normalizedValue = preStyles.get(prop)!;\n break;\n case AUTO_STYLE:\n
normalizedValue = postStyles.get(prop)!;\n break;\n default:\n normalizedValue =\n
normalizer.normalizeStyleValue(prop, normalizedProp, normalizedValue, errors);\n break;\n }\n }\n
normalizedKeyframe.set(normalizedProp, normalizedValue);\n });\n if (!isSameOffset) {\n
normalizedKeyframes.push(normalizedKeyframe);\n } previousKeyframe = normalizedKeyframe;\n
previousOffset = offset;\n });\n if (errors.length) {\n throw animationFailed(errors);\n }\n\n return
normalizedKeyframes;\n}\n\nexport function listenOnPlayer(\n player: AnimationPlayer, eventName: string,
event: AnimationEvent|undefined,\n callback: (event: any) => any) {\n switch (eventName) {\n case 'start':\n
player.onStart() => callback(event && copyAnimationEvent(event, 'start', player));\n break;\n case 'done':\n
player.onDone() => callback(event && copyAnimationEvent(event, 'done', player));\n break;\n case
'destroy':\n player.onDestroy() => callback(event && copyAnimationEvent(event, 'destroy', player));\n
break;\n }\n}\n\nexport function copyAnimationEvent(\n e: AnimationEvent, phaseName: string, player:
AnimationPlayer): AnimationEvent {\n const totalTime = player.totalTime;\n const disabled = (player as
any).disabled ? true : false;\n const event = makeAnimationEvent(\n e.element, e.triggerName, e.fromState,
e.toState, phaseName || e.phaseName,\n totalTime === undefined ? e.totalTime : totalTime, disabled);\n const
data = (e as any)['_data'];\n if (data != null) {\n (event as any)['_data'] = data;\n }\n
return event;\n}\n\nexport function makeAnimationEvent(\n element: any, triggerName: string, fromState: string,
toState: string, phaseName: string = "",\n totalTime: number = 0, disabled?: boolean): AnimationEvent {\n return
{element, triggerName, fromState, toState, phaseName, totalTime, disabled: !!disabled};\n}\n\nexport function
getOrSetDefaultValue<T, V>(map: Map<T, V>, key: T, defaultValue: V) {\n let value = map.get(key);\n if
(!value) {\n map.set(key, value = defaultValue);\n }\n return value;\n}\n\nexport function
parseTimelineCommand(command: string): [string, string] {\n const separatorPos = command.indexOf(':');\n const
id = command.substring(1, separatorPos);\n const action = command.slice(separatorPos + 1);\n return [id,
action];\n}\n\nlet _contains: (elm1: any, elm2: any) => boolean = (elm1: any, elm2: any) => false;\nlet _query:
(element: any, selector: string, multi: boolean) => any[] =\n (element: any, selector: string, multi: boolean) => {\n
return [];\n }; \nlet _documentElement: unknown|null = null;\n\nexport function getParentElement(element: any):
unknown|null {\n const parent = element.parentNode || element.host; // consider host to support shadow DOM\n if
(parent === _documentElement) {\n return null;\n }\n return parent;\n}\n\n// Define utility methods for browsers
and platform-server(domino) where Element\n// and utility methods exist.\nconst _isNode = isNode();\nif (!_isNode

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|| typeof Element !== 'undefined') {\n  if (!isBrowser()) {\n    _contains = (elm1, elm2) => elm1.contains(elm2);\n  }
else {\n    // Read the document element in an IIFE that's been marked pure to avoid a top-level property\n    // read that may prevent tree-shaking.\n    _documentElement = /* #__PURE__*/ (() => document.documentElement());\n    _contains = (elm1, elm2) => {\n      while (elm2) {\n        if (elm2 === elm1) {\n          return true;\n        }\n        elm2 = getParentElement(elm2);\n      }\n      return false;\n    };\n  }\n  _query = (element: any, selector: string, multi: boolean): any[] => {\n    if (multi) {\n      return Array.from(element.querySelectorAll(selector));\n    }\n    const elem = element.querySelector(selector);\n    return elem ? [elem] : [];\n  };\n}\n\nfunction containsVendorPrefix(prop: string): boolean {\n  // Webkit is the only real popular vendor prefix nowadays\n  // cc: http://shouldiprefix.com/\n  return prop.substring(1, 6) === 'ebkit'; // webkit or Webkit\n}\n\nlet _CACHED_BODY: {style: any}|null = null;\nlet _IS_WEBKIT = false;\n\nexport function validateStyleProperty(prop: string): boolean {\n  if (!_CACHED_BODY) {\n    _CACHED_BODY = getBodyNode() || {};\n    _IS_WEBKIT = _CACHED_BODY!.style ? ('WebkitAppearance' in _CACHED_BODY!.style) : false;\n  }\n  let result = true;\n  if (_CACHED_BODY!.style && !containsVendorPrefix(prop)) {\n    result = prop in _CACHED_BODY!.style;\n    if (!result && _IS_WEBKIT) {\n      const camelProp = 'Webkit' + prop.charAt(0).toUpperCase() + prop.slice(1);\n      result = camelProp in _CACHED_BODY!.style;\n    }\n  }\n  return result;\n}\n\nexport function validateWebAnimatableStyleProperty(prop: string): boolean {\n  return ANIMATABLE_PROP_SET.has(prop);\n}\n\nexport function getBodyNode(): any|null {\n  if (typeof document !== 'undefined') {\n    return document.body;\n  }\n  return null;\n}\n\nexport const containsElement = _contains;\n\nexport const invokeQuery = _query;\n\nexport function hyphenatePropsKeys(original: StyleDataMap): StyleDataMap {\n  const newMap: StyleDataMap = new Map();\n  original.forEach((val, prop) => {\n    const newProp = prop.replace(/([a-z])([A-Z])/g, '$1-$2');\n    newMap.set(newProp, val);\n  });\n  return newMap;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { AnimateTimings, AnimationMetadata, AnimationMetadataType, AnimationOptions, sequence, StyleData, StyleDataMap } from '@angular/animations';\nimport { Ast as AnimationAst, AstVisitor as AnimationAstVisitor } from './dsl/animation_ast';\nimport { AnimationDslVisitor } from './dsl/animation_dsl_visitor';\nimport { InvalidNodeType, InvalidParamValue, InvalidStyleParams, InvalidTimingValue, negativeDelayValue, negativeStepValue } from './error_helpers';\nimport { isNode } from './render/shared';\n\nexport const ONE_SECOND = 1000;\n\nexport const SUBSTITUTION_EXPR_START = '{';\nexport const SUBSTITUTION_EXPR_END = '}';\nexport const ENTER_CLASSNAME = 'ng-enter';\nexport const LEAVE_CLASSNAME = 'ng-leave';\nexport const NG_TRIGGER_CLASSNAME = 'ng-trigger';\nexport const NG_TRIGGER_SELECTOR = '.ng-trigger';\nexport const NG_ANIMATING_CLASSNAME = 'ng-animating';\nexport const NG_ANIMATING_SELECTOR = '.ng-animating';\n\nexport function resolveTimingValue(value: string|number) {\n  if (typeof value === 'number') return value;\n  const matches = value.match(/^(?!(\\.|\\d+)(m?s)/);\n  if (!matches || matches.length < 2) return 0;\n  return _convertTimeValueToMS(parseFloat(matches[1]), matches[2]);\n}\n\nfunction _convertTimeValueToMS(value: number, unit: string): number {\n  switch (unit) {\n    case 's':\n      return value * ONE_SECOND;\n    default: // ms or something else\n      return value;\n  }\n}\n\nexport function resolveTiming(\n  timings: string|number|AnimateTimings, errors: Error[], allowNegativeValues?: boolean) {\n  return timings.hasOwnProperty('duration') ?\n    <AnimateTimings>timings :\n    parseTimeExpression(<string|number>timings, errors, allowNegativeValues);\n}\n\nfunction parseTimeExpression(\n  exp: string|number, errors: Error[], allowNegativeValues?: boolean): AnimateTimings {\n  const regex = /^(?!(\\.|\\d+)(m?s)(?:\\s+(-?(\\.|\\d+)(m?s))?(?:\\s+([-a-z]+(?(\\.|\\d+)?))?)?)?$/i;\n  let duration: number;\n  let delay: number = 0;\n  let easing: string = '';\n  if (typeof exp === 'string') {\n    const matches = exp.match(regex);\n    if (matches === null) {\n      errors.push(InvalidTimingValue(exp));\n      return { duration: 0, delay: 0, easing: ''};\n    }\n    duration = _convertTimeValueToMS(parseFloat(matches[1]),

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matches[2]);\n\n  const delayMatch = matches[3];\n  if (delayMatch != null) {\n    delay =
_convertTimeValueToMS(parseFloat(delayMatch), matches[4]);\n  }\n\n  const easingVal = matches[5];\n  if
(easingVal) {\n    easing = easingVal;\n  } else {\n    duration = exp;\n  }\n\n  if (!allowNegativeValues) {\n
let containsErrors = false;\n  let startIndex = errors.length;\n  if (duration < 0) {\n
errors.push(negativeStepValue());\n    containsErrors = true;\n  }\n  if (delay < 0) {\n
errors.push(negativeDelayValue());\n    containsErrors = true;\n  }\n  if (containsErrors) {\n
errors.splice(startIndex, 0, invalidTimingValue(exp));\n  }\n  }\n\n  return {duration, delay, easing};\n}\n\nexport
function
copyObj(\n  obj: {[key: string]: any}, destination: {[key: string]: any} = {}): {[key: string]: any} {\n
Object.keys(obj).forEach(prop => {\n  destination[prop] = obj[prop];\n });\n  return destination;\n}\n\nexport
function convertToMap(obj: StyleData): StyleDataMap {\n  const styleMap: StyleDataMap = new Map();\n
Object.keys(obj).forEach(prop => {\n  const val = obj[prop];\n  styleMap.set(prop, val);\n });\n  return
styleMap;\n}\n\nexport function normalizeKeyframes(keyframes: Array<StyleData>|\n
Array<StyleDataMap>): Array<StyleDataMap> {\n  if (!keyframes.length) {\n    return [];\n  }\n  if (keyframes[0]
instanceof Map) {\n    return keyframes as Array<StyleDataMap>;\n  }\n  return keyframes.map(kf =>
convertToMap(kf as StyleData));\n}\n\nexport function normalizeStyles(styles:
StyleDataMap|Array<StyleDataMap>): StyleDataMap {\n  const normalizedStyles: StyleDataMap = new Map();\n
if (Array.isArray(styles)) {\n  styles.forEach(data
=> copyStyles(data, normalizedStyles);\n  } else {\n  copyStyles(styles, normalizedStyles);\n  }\n  return
normalizedStyles;\n}\n\nexport function copyStyles(\n  styles: StyleDataMap, destination: StyleDataMap = new
Map(),\n  backfill?: StyleDataMap): StyleDataMap {\n  if (backfill) {\n    for (let [prop, val] of backfill) {\n
destination.set(prop, val);\n    }\n  }\n  for (let [prop, val] of styles) {\n  destination.set(prop, val);\n  }\n  return
destination;\n}\n\nfunction getStyleAttributeString(element: any, key: string, value: string) {\n  // Return the key-
value pair string to be added to the style attribute for the\n  // given CSS style key.\n  if (value) {\n    return key + ':'
+ value + ';\n  } else {\n    return '';\n  }\n}\n\nfunction writeStyleAttribute(element: any) {\n  // Read the style
property of the element and manually reflect it to the\n  // style attribute. This is needed because Domino on
platform-server doesn't\n  // understand
the full set of allowed CSS properties and doesn't reflect some\n  // of them automatically.\n  let styleAttrValue =
'';\n  for (let i = 0; i < element.style.length; i++) {\n    const key = element.style.item(i);\n    styleAttrValue +=
getStyleAttributeString(element, key, element.style.getPropertyValue(key));\n  }\n  for (const key in element.style)
{\n    // Skip internal Domino properties that don't need to be reflected.\n    if (!element.style.hasOwnProperty(key) ||
key.startsWith('_')) {\n      continue;\n    }\n    const dashKey = camelCaseToDashCase(key);\n    styleAttrValue +=
getStyleAttributeString(element, dashKey, element.style[key]);\n  }\n  element.setAttribute('style',
styleAttrValue);\n}\n\nexport function setStyles(element: any, styles: StyleDataMap, formerStyles?: StyleDataMap)
{\n  if (element['style']) {\n  styles.forEach((val, prop) => {\n    const camelProp =
dashCaseToCamelCase(prop);\n    if (formerStyles && !formerStyles.has(prop)) {\n      formerStyles.set(prop,
element.style[camelProp]);\n    }\n    element.style[camelProp] = val;\n  });\n  // On the server set the 'style'
attribute since it's not automatically reflected.\n  if (isNode()) {\n    writeStyleAttribute(element);\n  }\n  }\n}\n\nexport function eraseStyles(element: any, styles: StyleDataMap) {\n  if (element['style']) {\n
styles.forEach( (_, prop) => {\n    const camelProp = dashCaseToCamelCase(prop);\n    element.style[camelProp]
= '';\n  });\n  // On the server set the 'style' attribute since it's not automatically reflected.\n  if (isNode()) {\n
writeStyleAttribute(element);\n  }\n  }\n}\n\nexport function normalizeAnimationEntry(steps:
AnimationMetadata|\n  AnimationMetadata[]): AnimationMetadata {\n  if
(Array.isArray(steps)) {\n  if (steps.length == 1) return steps[0];\n  return sequence(steps);\n  }\n  return steps as
AnimationMetadata;\n}\n\nexport function validateStyleParams(\n  value:
string|number|null|undefined, options: AnimationOptions, errors: Error[]) {\n  const params = options.params ||
{};\n  const matches = extractStyleParams(value);\n  if (matches.length) {\n  matches.forEach(varName => {\n
if (!params.hasOwnProperty(varName)) {\n    errors.push(invalidStyleParams(varName));\n  }\n  });\n  }\n}

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}\n}\n\nconst PARAM_REGEX =\n  new
RegExp(`${SUBSTITUTION_EXPR_START}\\\\s*(.+?)\\\\s*${SUBSTITUTION_EXPR_END}`, 'g');\n\nexport
function extractStyleParams(value: string|number|null|undefined): string[] {\n  let params: string[] = [];\n  if (typeof
value === 'string') {\n    let match: any;\n    while (match = PARAM_REGEX.exec(value)) {\n
params.push(match[1] as string);\n    }\n    PARAM_REGEX.lastIndex = 0;\n  }\n  return params;\n}\n\n\nexport
function interpolateParams(\n  value: string|number, params: {[name: string]: any}, errors: Error[]): string|number
{\n  const original = value.toString();\n  const str = original.replace(PARAM_REGEX,
  (_, varName) => {\n    let localVal = params[varName];\n    // this means that the value was never overridden by the
data passed in by the user\n    if (localVal === null) {\n      errors.push(invalidParamValue(varName));\n      localVal
= '';\n    }\n    return localVal.toString();\n  });\n  // we do this to assert that numeric values stay as they are\n
return str === original ? value : str;\n}\n\n\nexport function iteratorToArray(iterator: any): any[] {\n  const arr: any[] =
[];\n  let item = iterator.next();\n  while (!item.done) {\n    arr.push(item.value);\n    item = iterator.next();\n  }\n
return arr;\n}\n\n\nconst DASH_CASE_REGEXP = /-+([a-z0-9])/g;\n\nexport function dashCaseToCamelCase(input:
string): string {\n  return input.replace(DASH_CASE_REGEXP, (...m: any[]) => m[1].toUpperCase());\n}\n\n\nexport
function camelCaseToDashCase(input: string): string {\n  return input.replace(/([a-z])([A-Z])/g, '$1-
$2').toLowerCase();\n}\n\n\nexport function allowPreviousPlayerStylesMerge(duration:
  number, delay: number) {\n  return duration === 0 || delay === 0;\n}\n\n\nexport function
balancePreviousStylesIntoKeyframes(\n  element: any, keyframes: Array<StyleDataMap>, previousStyles:
StyleDataMap) {\n  if (previousStyles.size && keyframes.length) {\n    let startingKeyframe = keyframes[0];\n    let
missingStyleProps: string[] = [];\n    previousStyles.forEach((val, prop) => {\n      if (!startingKeyframe.has(prop))
{\n        missingStyleProps.push(prop);\n      }\n      startingKeyframe.set(prop, val);\n    });\n\n    if
(missingStyleProps.length) {\n      for (let i = 1; i < keyframes.length; i++) {\n        let kf = keyframes[i];\n
missingStyleProps.forEach(prop => kf.set(prop, computeStyle(element, prop))); \n      }\n    }\n  }\n  return
keyframes;\n}\n\n\nexport function visitDslNode(\n  visitor: AnimationDslVisitor, node: AnimationMetadata,
context: any): any;\n\nexport function visitDslNode(\n  visitor: AnimationAstVisitor, node:
AnimationAst<AnimationMetadataType>,
context: any): any;\n\nexport function visitDslNode(visitor: any, node: any, context: any): any {\n  switch (node.type)
{\n    case AnimationMetadataType.Trigger:\n      return visitor.visitTrigger(node, context);\n    case
AnimationMetadataType.State:\n      return visitor.visitState(node, context);\n    case
AnimationMetadataType.Transition:\n      return visitor.visitTransition(node, context);\n    case
AnimationMetadataType.Sequence:\n      return visitor.visitSequence(node, context);\n    case
AnimationMetadataType.Group:\n      return visitor.visitGroup(node, context);\n    case
AnimationMetadataType.Animate:\n      return visitor.visitAnimate(node, context);\n    case
AnimationMetadataType.Keyframes:\n      return visitor.visitKeyframes(node, context);\n    case
AnimationMetadataType.Style:\n      return visitor.visitStyle(node, context);\n    case
AnimationMetadataType.Reference:\n      return visitor.visitReference(node, context);\n    case
AnimationMetadataType.AnimateChild:\n
      return visitor.visitAnimateChild(node, context);\n    case AnimationMetadataType.AnimateRef:\n      return
visitor.visitAnimateRef(node, context);\n    case AnimationMetadataType.Query:\n      return
visitor.visitQuery(node, context);\n    case AnimationMetadataType.Stagger:\n      return visitor.visitStagger(node,
context);\n    default:\n      throw invalidNodeType(node.type);\n  }\n}\n\n\nexport function computeStyle(element:
any, prop: string): string {\n  return (<any>window.getComputedStyle(element))[prop];\n}\n\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { AnimationPlayer,
AUTO_STYLE, NoopAnimationPlayer, StyleDataMap } from '@angular/animations';\nimport { AnimationDriver,
allowPreviousPlayerStylesMerge as allowPreviousPlayerStylesMerge, containsElement as containsElement,
getParentElement as

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getParentElement, invokeQuery as invokeQuery, normalizeKeyframes as normalizeKeyframes,
validateStyleProperty as validateStyleProperty,} from '@angular/animations/browser';\n\nimport
{ validateWebAnimatableStyleProperty } from './../src/render/shared';\n\nimport { camelCaseToDashCase } from
'./../src/util';\n\n/**\n * @publicApi\n */\nexport class MockAnimationDriver implements AnimationDriver {\n
static log: AnimationPlayer[] = [];\n\n validateStyleProperty(prop: string): boolean {\n return
validateStyleProperty(prop);\n }\n\n validateAnimatableStyleProperty(prop: string): boolean {\n const cssProp =
camelCaseToDashCase(prop);\n return validateWebAnimatableStyleProperty(cssProp);\n }\n\n
matchesElement(_element: any, _selector: string): boolean {\n return false;\n }\n\n containsElement(elm1: any,
elm2: any): boolean {\n return containsElement(elm1, elm2);\n }\n\n getParentElement(element: unknown):
unknown {\n return getParentElement(element);\n }\n\n query(element:
any, selector: string, multi: boolean): any[] {\n return invokeQuery(element, selector, multi);\n }\n\n
computeStyle(element: any, prop: string, defaultValue?: string): string {\n return defaultValue || '';\n }\n\n
animate(\n element: any, keyframes: Array<StyleDataMap>, duration: number, delay: number,\n easing:
string, previousPlayers: any[] = []): MockAnimationPlayer {\n const player =\n new
MockAnimationPlayer(element, keyframes, duration, delay, easing, previousPlayers);\n
MockAnimationDriver.log.push(<AnimationPlayer>player);\n return player;\n }\n\n}\n\n/**\n * @publicApi\n
*/\nexport class MockAnimationPlayer extends NoopAnimationPlayer {\n private __finished = false;\n private
__started = false;\n public previousStyles: StyleDataMap = new Map();\n private _onInitFns: (() => any)[] = [];\n
public currentSnapshot: StyleDataMap = new Map();\n private _keyframes: Array<StyleDataMap> = [];\n\n
constructor(\n public element:
any, public keyframes: Array<StyleDataMap>, public duration: number,\n public delay: number, public easing:
string, public previousPlayers: any[]) {\n super(duration, delay);\n\n this._keyframes =
normalizeKeyframes(keyframes);\n\n if (allowPreviousPlayerStylesMerge(duration, delay)) {\n
previousPlayers.forEach(player => {\n if (player instanceof MockAnimationPlayer) {\n const styles =
player.currentSnapshot;\n styles.forEach((val, prop) => this.previousStyles.set(prop, val));\n }\n });\n
}\n }\n\n /* @internal */\n onInit(fn: () => any) {\n this._onInitFns.push(fn);\n }\n\n /* @internal */\n
override init() {\n super.init();\n this._onInitFns.forEach(fn => fn());\n this._onInitFns = [];\n }\n\n
override reset() {\n super.reset();\n this.__started = false;\n }\n\n override finish(): void {\n
super.finish();\n this.__finished =
true;\n }\n\n override destroy(): void {\n super.destroy();\n
this.__finished = true;\n }\n\n /* @internal */\n triggerMicrotask() {\n }\n\n override play(): void {\n
super.play();\n this.__started = true;\n }\n\n override hasStarted() {\n return this.__started;\n }\n\n
beforeDestroy() {\n const captures: StyleDataMap = new Map();\n\n this.previousStyles.forEach((val, prop) =>
captures.set(prop, val));\n\n if (this.hasStarted()) {\n // when assembling the captured styles, it's important
that\n // we build the keyframe styles in the following order:\n // {other styles within keyframes, ...
previousStyles }\n\n this._keyframes.forEach(kf => {\n for (let [prop, val] of kf) {\n if (prop !== 'offset')
{\n captures.set(prop, this.__finished ? val : AUTO_STYLE);\n }\n }\n });\n }\n }\n\n
this.currentSnapshot = captures;\n }\n\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport { MockAnimationDriver,
MockAnimationPlayer } from './mock_animation_driver';\n\n", "/*\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n */\n\n/*\n * @module\n * @description\n * Entry point for all public
APIs of this package.\n */\n\nexport * from './src/testing';\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n // This file is not used to build this module. It is only used during
editing\n // by the TypeScript language service and during build for verification. `ngc` replaces this file with
production index.ts when it rewrites private symbol\n // names.\n\nexport * from './public_api';\n\n", "/*\n

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\* Generated bundle index. Do not edit.\n \*/\n\nexport \* from

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* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license\n */\nimport { RuntimeError as RuntimeError } from '@angular/core';\nimport { RuntimeErrorCode } from './errors';\nconst LINE_START = '\n - '\n\nexport function invalidTimingValue(exp: string|number): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_TIMING_VALUE,\n    ngDevMode && `The provided timing value \"${exp}\" is invalid.`);\n}\n\nexport function negativeStepValue(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.NEGATIVE_STEP_VALUE,\n    ngDevMode && `Duration values below 0 are not allowed for this animation step.`);\n}\n\nexport function negativeDelayValue(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.NEGATIVE_DELAY_VALUE,\n    ngDevMode && `Delay values below 0 are not allowed for this animation step.`);\n}\n\nexport function invalidStyleParams(varName: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_STYLE_PARAMS,\n    ngDevMode && `Unable to resolve the local animation param ${varName} in the given list of values`);\n}\n\nexport function invalidParamValue(varName: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_PARAM_VALUE,\n    ngDevMode && `Please provide a value for the animation param ${varName}`);\n}\n\nexport function invalidNodeType(nodeType: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_NODE_TYPE,\n    ngDevMode && `Unable to resolve animation metadata node #${nodeType}`);\n}\n\nexport function invalidCssUnitValue(userProvidedProperty: string, value: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_CSS_UNIT_VALUE,\n    ngDevMode && `Please provide a CSS unit value for ${userProvidedProperty}:${value}`);\n}\n\nexport function invalidTrigger(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_TRIGGER,\n    ngDevMode && `animation triggers cannot be prefixed with an `@` sign (e.g. trigger('@foo\\', [...]))`);\n}\n\nexport function invalidDefinition(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_DEFINITION,\n    ngDevMode && `only state() and transition() definitions can sit inside of a trigger`);\n}\n\nexport function invalidState(metadataName: string, missingSubs: string[]): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_STATE,\n    ngDevMode && `state("${\n      metadataName}\", ...) must define default values for all the following style substitutions: ${\n        missingSubs.join(', ')}`);\n}\n\nexport function invalidStyleValue(value: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_STYLE_VALUE,\n    ngDevMode && `The provided style string value ${value} is not allowed.`);\n}\n\nexport function invalidProperty(prop: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_PROPERTY,\n    ngDevMode && `The provided animation property \"${prop}\" is not a supported CSS property for animations`);\n}\n\nexport function invalidParallelAnimation(prop: string, firstStart: number, firstEnd: number, secondStart: number, secondEnd: number): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_PARALLEL_ANIMATION,\n    ngDevMode && `The CSS property \"${prop}\" that exists between the times of \"${firstStart}ms\"
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and ``${firstEnd}ms`` is also being animated in a parallel animation between the times of ``${secondStart}ms`` and ``${secondEnd}ms``);  
`export function invalidKeyframes(): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.INVALID_KEYFRAMES`,  
`ngDevMode` && `keyframes() must be placed inside of a call to animate()`);  
`export function invalidOffset(): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.INVALID_OFFSET`,  
`ngDevMode` && `Please ensure that all keyframe offsets are between 0 and 1`);  
`export function keyframeOffsetsOutOfOrder(): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.KEYFRAME_OFFSETS_OUT_OF_ORDER`,  
`ngDevMode` && `Please ensure that all keyframe offsets are in order`);  
`export function keyframesMissingOffsets(): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.KEYFRAMES_MISSING_OFFSETS`,  
`ngDevMode` && `Not all style() steps within the declared keyframes() contain offsets`);  
`export function invalidStagger(): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.INVALID_STAGGER`,  
`ngDevMode` && `stagger() can only be used inside of query()`);  
`export function invalidQuery(selector: string): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.INVALID_QUERY`,  
`ngDevMode` && `query("\${selector}") returned zero elements. (Use `query("\${selector}", { optional: true })` if you wish to allow this.)`);  
`export function invalidExpression(expr: string): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.INVALID_EXPRESSION`,  
`ngDevMode` && `The provided transition expression "\${expr}" is not supported`);  
`export function invalidTransitionAlias(alias: string): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.INVALID_TRANSITION_ALIAS`,  
`ngDevMode` && `The transition alias value "\${alias}" is not supported`);  
`validationFailed(errors: Error[]): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.VALIDATION_FAILED`,  
`ngDevMode` && `animation validation failed:\n\${errors.map(err => err.message).join("\n")}`);  
`buildingFailed(errors: Error[]): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.BUILDING_FAILED`,  
`ngDevMode` && `animation building failed:\n\${errors.map(err => err.message).join("\n")}`);  
`triggerBuildFailed(name: string, errors: Error[]): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.TRIGGER_BUILD_FAILED`,  
`ngDevMode` && `The animation trigger "\${name}" has failed to build due to the following errors:\n - \${errors.map(err => err.message).join("\n - ")}`);  
`animationFailed(errors: Error[]): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.ANIMATION_FAILED`,  
`ngDevMode` && `Unable to animate due to the following errors:\n\${LINE\_START}\${errors.map(err => err.message).join(LINE\_START)}`);  
`registerFailed(errors: Error[]): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.REGISTRATION_FAILED`,  
`ngDevMode` && `Unable to build the animation due to the following errors:\n\${errors.map(err => err.message).join("\n")}`);  
`missingOrDestroyedAnimation(): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.MISSING_OR_DESTROYED_ANIMATION`,  
`ngDevMode` && `The requested animation doesn't exist or has already been destroyed`);  
`createAnimationFailed(errors: Error[]): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.CREATE_ANIMATION_FAILED`,  
`ngDevMode` && `Unable to create the animation due to the following errors:\n\${errors.map(err => err.message).join("\n")}`);  
`missingPlayer(id: string): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.MISSING_PLAYER`,  
`ngDevMode` && `Unable to find the timeline player referenced by \${id}`);  
`missingTrigger(phase: string, name: string): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.MISSING_TRIGGER`,  
`ngDevMode` && `Unable to listen on the animation trigger event "\${phase}" because the animation trigger "\${name}" doesn't exist!`);  
`missingEvent(name: string): Error` {  
return new `RuntimeError`(  
`RuntimeErrorCode.MISSING_EVENT`,  
`ngDevMode` && `Unable to listen on the animation trigger "\${name}" because the provided event is undefined!`);  
`export function`

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unsupportedTriggerEvent(phase: string, name: string): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.UNSUPPORTED_TRIGGER_EVENT,\n    ngDevMode &&\n    `The provided animation
trigger event \"${phase}\" for the animation trigger \"${\n      name}\"
is not supported!`);\n}\n\nexport function unregisteredTrigger(name: string): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.UNREGISTERED_TRIGGER,\n    ngDevMode && `The provided animation trigger
\"${name}\" has not been registered!`);\n}\n\nexport function triggerTransitionsFailed(errors: Error[]): Error {\n
return new RuntimeError(\n  RuntimeErrorCode.TRIGGER_TRANSITIONS_FAILED,\n    ngDevMode &&\n    `Unable to process animations due to the following failed trigger transitions\n  ${\n    errors.map(err =>
err.message).join("\n")`);\n}\n\nexport function triggerParsingFailed(name: string, errors: Error[]): Error {\n  return
new RuntimeError(\n  RuntimeErrorCode.TRIGGER_PARSING_FAILED,\n    ngDevMode &&\n    `Animation parsing for the ${name} trigger have failed:${LINE_START}${\n    errors.map(err =>
err.message).join(LINE_START)`);\n}\n\nexport function transitionFailed(name: string, errors: Error[]): Error {\n
return
new RuntimeError(\n  RuntimeErrorCode.TRANSITION_FAILED,\n    ngDevMode && `@${name} has
failed due to:\n  ${errors.map(err => err.message).join("\n- ")`);\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n * Set of all animatable CSS properties\n * @see
https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_animated_properties\n */\nexport const
ANIMATABLE_PROP_SET = new Set([\n  '-moz-outline-radius',\n  '-moz-outline-radius-bottomleft',\n  '-moz-
outline-radius-bottomright',\n  '-moz-outline-radius-topleft',\n  '-moz-outline-radius-topright',\n  '-ms-grid-
columns',\n  '-ms-grid-rows',\n  '-webkit-line-clamp',\n  '-webkit-text-fill-color',\n  '-webkit-text-stroke',\n
'-webkit-text-stroke-color',\n  'accent-color',\n  'all',\n  'backdrop-filter',\n  'background',\n  'background-color',\n
'background-position',\n  'background-size',\n  'block-size',\n  'border',\n  'border-block-end',\n  'border-block-end-color',\n
'border-block-end-width',\n  'border-block-start',\n  'border-block-start-color',\n  'border-block-start-width',\n
'border-bottom',\n  'border-bottom-color',\n  'border-bottom-left-radius',\n  'border-bottom-right-radius',\n
'border-bottom-width',\n  'border-color',\n  'border-end-end-radius',\n  'border-end-start-radius',\n  'border-image-outset',\n
'border-image-slice',\n  'border-image-width',\n  'border-inline-end',\n  'border-inline-end-color',\n  'border-inline-end-width',\n
'border-inline-start',\n  'border-inline-start-color',\n  'border-inline-start-width',\n  'border-left',\n  'border-left-color',\n
'border-left-width',\n  'border-radius',\n  'border-right',\n  'border-right-color',\n  'border-right-width',\n
'border-start-end-radius',\n  'border-start-start-radius',\n  'border-top',\n  'border-top-color',\n  'border-top-left-radius',\n
'border-top-right-radius',\n  'border-top-width',\n  'border-width',\n  'bottom',\n  'box-shadow',\n  'caret-color',\n
'clip',\n  'clip-path',\n  'color',\n  'column-count',\n  'column-gap',\n  'column-rule',\n  'column-rule-color',\n
'column-rule-width',\n  'column-width',\n  'columns',\n  'filter',\n  'flex',\n  'flex-basis',\n  'flex-grow',\n  'flex-shrink',\n
'font',\n  'font-size',\n  'font-size-adjust',\n  'font-stretch',\n  'font-variation-settings',\n  'font-weight',\n
'gap',\n  'grid-column-gap',\n  'grid-gap',\n  'grid-row-gap',\n  'grid-template-columns',\n  'grid-template-rows',\n
'height',\n  'inline-size',\n  'input-security',\n  'inset',\n  'inset-block',\n  'inset-block-end',\n  'inset-block-start',\n
'inset-inline',\n  'inset-inline-end',\n  'inset-inline-start',\n  'left',\n  'letter-spacing',\n  'line-clamp',\n
'line-height',\n  'margin',\n  'margin-block-end',\n  'margin-block-start',\n  'margin-bottom',\n  'margin-inline-end',\n
'margin-inline-start',\n  'margin-left',\n  'margin-right',\n  'margin-top',\n  'mask',\n  'mask-border',\n  'mask-position',\n
'mask-size',\n  'max-block-size',\n  'max-height',\n  'max-inline-size',\n  'max-lines',\n  'max-width',\n  'min-block-size',\n
'min-height',\n  'min-inline-size',\n  'min-width',\n  'object-position',\n  'offset',\n  'offset-anchor',\n  'offset-distance',\n
'offset-path',\n  'offset-position',\n  'offset-rotate',\n  'opacity',\n  'order',\n  'outline',\n  'outline-color',\n
'outline-offset',\n  'outline-width',\n  'padding',\n  'padding-block-end',\n  'padding-block-start',\n  'padding-bottom',\n
'padding-inline-end',\n  'padding-inline-start',\n  'padding-left',\n  'padding-right',\n  'padding-top',\n  'perspective',\n
'perspective-origin',\n  'right',\n  'rotate',\n  'row-gap',\n  'scale',\n  'scroll-margin',\n  'scroll-margin-block',\n
'scroll-margin-block-end',\n  'scroll-margin-block-start',\n  'scroll-margin-bottom',\n  'scroll-margin-inline',\n
'scroll-margin-inline-end',\n  'scroll-

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margin-inline-start',\n
  'scroll-margin-left',\n 'scroll-margin-right',\n 'scroll-margin-top',\n 'scroll-padding',\n 'scroll-padding-block',\n
'scroll-padding-block-end',\n 'scroll-padding-block-start',\n 'scroll-padding-bottom',\n 'scroll-padding-inline',\n
'scroll-padding-inline-end',\n 'scroll-padding-inline-start',\n 'scroll-padding-left',\n 'scroll-padding-right',\n 'scroll-
padding-top',\n 'scroll-snap-coordinate',\n 'scroll-snap-destination',\n 'scrollbar-color',\n 'shape-image-threshold',\n
'shape-margin',\n 'shape-outside',\n 'tab-size',\n 'text-decoration',\n 'text-decoration-color',\n 'text-decoration-
thickness',\n 'text-emphasis',\n 'text-emphasis-color',\n 'text-indent',\n 'text-shadow',\n 'text-underline-offset',\n
'top',\n 'transform',\n 'transform-origin',\n 'translate',\n 'vertical-align',\n 'visibility',\n 'width',\n 'word-spacing',\n
'z-index',\n 'zoom',\n]);\n";\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { AnimationEvent, AnimationPlayer, AUTO_STYLE, NoopAnimationPlayer,
AnimationGroupPlayer, PRE_STYLE as PRE_STYLE, StyleDataMap } from '@angular/animations';\nimport
{ AnimationStyleNormalizer } from '../src/dsl/style_normalization/animation_style_normalizer';\nimport
{ AnimationDriver } from '../src/render/animation_driver';\nimport { animationFailed } from
'./error_helpers';\nimport { ANIMATABLE_PROP_SET } from './web_animations/animatable_props_set';\n\n//
We don't include ambient node types here since @angular/animations/browser\n// is meant to target the browser so
technically it should not depend on node\n// types. `process` is just declared locally here as a result.\ndeclare const
process: any;\n\nexport function isBrowser(): boolean {\n  return (typeof window !== 'undefined' && typeof
window.document !== 'undefined');\n}\n\nexport
function isNode(): boolean {\n  // Checking only for `process` isn't enough to identify whether or not we're in a
Node\n  // environment, because Webpack by default will polyfill the `process`. While we can discern\n  // that
Webpack polyfilled it by looking at `process.browser`, it's very Webpack-specific and\n  // might not be future-
proof. Instead we look at the stringified version of `process` which\n  // is `[object process]` in Node and `[object
Object]` when polyfilled.\n  return typeof process !== 'undefined' && {}.toString.call(process) === '[object
process]';\n}\n\nexport function optimizeGroupPlayer(players: AnimationPlayer[]): AnimationPlayer {\n  switch
(players.length) {\n    case 0:\n      return new NoopAnimationPlayer();\n    case 1:\n      return players[0];\n    default:\n      return new AnimationGroupPlayer(players);\n  }\n}\n\nexport function normalizeKeyframes(\n
driver: AnimationDriver, normalizer: AnimationStyleNormalizer, element: any,\n  keyframes:
Array<StyleDataMap>,\n  preStyles: StyleDataMap = new Map(),\n  postStyles: StyleDataMap = new Map()): Array<StyleDataMap> {\n
const errors: Error[] = [];\n  const normalizedKeyframes: Array<StyleDataMap> = [];\n  let previousOffset = -1;\n
let previousKeyframe: StyleDataMap|null = null;\n  keyframes.forEach(kf => {\n    const offset = kf.get('offset') as
number;\n    const isSameOffset = offset === previousOffset;\n    const normalizedKeyframe: StyleDataMap =
(isSameOffset && previousKeyframe) || new Map();\n    kf.forEach((val, prop) => {\n      let normalizedProp =
prop;\n      let normalizedValue = val;\n      if (prop !== 'offset') {\n        normalizedProp =
normalizer.normalizePropertyName(normalizedProp, errors);\n        switch (normalizedValue) {\n          case
PRE_STYLE:\n            normalizedValue = preStyles.get(prop)!;\n            break;\n          case AUTO_STYLE:\n
normalizedValue = postStyles.get(prop)!;\n            break;\n          default:\n            normalizedValue =\n              normalizer.normalizeStyleValue(prop, normalizedProp, normalizedValue,
errors);\n            break;\n        }\n      }\n      normalizedKeyframe.set(normalizedProp, normalizedValue);\n    });\n
if (!isSameOffset) {\n      normalizedKeyframes.push(normalizedKeyframe);\n    }\n    previousKeyframe =
normalizedKeyframe;\n    previousOffset = offset;\n  });\n  if (errors.length) {\n    throw animationFailed(errors);\n
}\n\n  return normalizedKeyframes;\n}\n\nexport function listenOnPlayer(\n  player: AnimationPlayer, eventName:
string, event: AnimationEvent|undefined,\n  callback: (event: any) => any) {\n  switch (eventName) {\n    case
'start':\n    player.onStart() => callback(event && copyAnimationEvent(event, 'start', player));\n    break;\n    case
'done':\n    player.onDone() => callback(event && copyAnimationEvent(event, 'done', player));\n    break;\n    case
'destroy':\n    player.onDestroy() => callback(event && copyAnimationEvent(event,

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'destroy', player));\n  break;\n }\n}\n\nexport function copyAnimationEvent(\n  e: AnimationEvent,
phaseName: string, player: AnimationPlayer): AnimationEvent {\n  const totalTime = player.totalTime;\n  const
disabled = (player as any).disabled ? true : false;\n  const event = makeAnimationEvent(\n    e.element,
e.triggerName, e.fromState, e.toState, phaseName || e.phaseName,\n    totalTime === undefined ? e.totalTime :
totalTime, disabled);\n  const data = (e as any)['_data'];\n  if (data != null) {\n    (event as any)['_data'] = data;\n  }\n  return event;\n}\n\nexport function makeAnimationEvent(\n  element: any, triggerName: string, fromState: string,
toState: string, phaseName: string = "",\n  totalTime: number = 0, disabled?: boolean): AnimationEvent {\n  return
{element, triggerName, fromState, toState, phaseName, totalTime, disabled: !!disabled};\n}\n\nexport function
getOrSetDefaultValue<T, V>(map: Map<T, V>, key: T, defaultValue: V) {\n
  let value = map.get(key);\n  if (!value) {\n    map.set(key, value = defaultValue);\n  }\n  return value;\n}\n\nexport
function parseTimelineCommand(command: string): [string, string] {\n  const separatorPos =
command.indexOf(':');\n  const id = command.substring(1, separatorPos);\n  const action =
command.slice(separatorPos + 1);\n  return [id, action];\n}\n\nlet _contains: (elm1: any, elm2: any) => boolean =
(elm1: any, elm2: any) => false;\nlet _query: (element: any, selector: string, multi: boolean) => any[] =\n(element: any, selector: string, multi: boolean) => {\n  return [];\n };
\nlet _documentElement: unknown|null =
null;\n\nexport function getParentElement(element: any): unknown|null {\n  const parent = element.parentNode ||
element.host; // consider host to support shadow DOM\n  if (parent === _documentElement) {\n    return null;\n
  }\n  return parent;\n}\n\n// Define utility methods for browsers and platform-server(domino) where Element\n// and
utility methods
  exist.\nconst _isNode = isNode();\nif (_isNode || typeof Element !== 'undefined') {\n  if (!isBrowser()) {\n
    _contains = (elm1, elm2) => elm1.contains(elm2);\n  } else {\n    // Read the document element in an IIFE that's
been marked pure to avoid a top-level property\n    // read that may prevent tree-shaking.\n    _documentElement =
/* @__PURE__ */ (() => document.documentElement)();\n    _contains = (elm1, elm2) => {\n      while (elm2) {\n
        if (elm2 === elm1) {\n          return true;\n        }\n        elm2 = getParentElement(elm2);\n      }\n      return false;\n
    };\n  }\n\n  _query = (element: any, selector: string, multi: boolean): any[] => {\n    if (multi) {\n      return
Array.from(element.querySelectorAll(selector));\n    }\n    const elem = element.querySelector(selector);\n    return
elem ? [elem] : [];\n  };\n}\n\nfunction containsVendorPrefix(prop: string): boolean {\n  // Webkit is the only real
popular vendor prefix nowadays\n  // cc: http://shouldiprefix.com/\n
  return prop.substring(1, 6) === 'ebkit'; // webkit or Webkit\n}\n\nlet _CACHED_BODY: {style: any}|null =
null;\nlet _IS_WEBKIT = false;\nexport function validateStyleProperty(prop: string): boolean {\n  if
(!_CACHED_BODY) {\n    _CACHED_BODY = getBodyNode() || {};\n    _IS_WEBKIT =
_CACHED_BODY!.style ? ('WebkitAppearance' in _CACHED_BODY!.style) : false;\n  }\n\n  let result = true;\n  if (_CACHED_BODY!.style && !containsVendorPrefix(prop)) {\n    result = prop in _CACHED_BODY!.style;\n
  }\n  if (!result && _IS_WEBKIT) {\n    const camelProp = 'Webkit' + prop.charAt(0).toUpperCase() + prop.slice(1);\n
    result = camelProp in _CACHED_BODY!.style;\n  }\n}\n\nreturn result;\n}\n\nexport function
validateWebAnimatableStyleProperty(prop: string): boolean {\n  return
ANIMATABLE_PROP_SET.has(prop);\n}\n\nexport function getBodyNode(): any|null {\n  if (typeof document !==
'undefined') {\n    return document.body;\n  }\n  return null;\n}\n\nexport const containsElement =
_contains;\n\nexport
const invokeQuery = _query;\n\nexport function hyphenatePropsKeys(original: StyleDataMap): StyleDataMap {\n
  const newMap: StyleDataMap = new Map();\n  original.forEach((val, prop) => {\n    const newProp =
prop.replace(/([a-z])([A-Z])/g, '$1-$2');\n    newMap.set(newProp, val);\n  });\n  return newMap;\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { AnimationPlayer,
NoopAnimationPlayer } from '@angular/animations';\nimport { Injectable } from '@angular/core';\nimport
{ containsElement, getParentElement, invokeQuery, validateStyleProperty } from './shared';\n\n/**\n * @publicApi\n */\n@Injectable()\nexport class NoopAnimationDriver implements AnimationDriver {\n
  validateStyleProperty(prop: string): boolean {\n    return validateStyleProperty(prop);\n  }\n}\n\n

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matchesElement(_element: any, _selector:
string): boolean {\n // This method is deprecated and no longer in use so we return false.\n return false;\n }\n\ncontainsElement(elm1: any, elm2: any): boolean {\n return containsElement(elm1, elm2);\n }\n\ngetParentElement(element: unknown): unknown {\n return getParentElement(element);\n }\n\nquery(element:
any, selector: string, multi: boolean): any[] {\n return invokeQuery(element, selector, multi);\n }\n\ncomputeStyle(element: any, prop: string, defaultValue?: string): string {\n return defaultValue || "";\n }\n\nanimate(\n element: any, keyframes: Array<Map<string, string|number>>, duration: number, delay: number,\n easing: string, previousPlayers: any[] = [],\n scrubberAccessRequested?: boolean): AnimationPlayer {\n return
new NoopAnimationPlayer(duration, delay);\n }\n}\n\n/**\n * @publicApi\n */\n\nexport abstract class
AnimationDriver {\n static NOOP: AnimationDriver = (/ * @__PURE__ */ new NoopAnimationDriver());\n\nabstract
validateStyleProperty(prop: string): boolean;\n\n abstract validateAnimatableStyleProperty?: (prop: string) =>
boolean;\n\n /**\n * @deprecated No longer in use. Will be removed.\n */\n abstract matchesElement(element:
any, selector: string): boolean;\n\n abstract containsElement(elm1: any, elm2: any): boolean;\n\n /**\n * Obtains
the parent element, if any. `null` is returned if the element does not have a parent.\n */\n abstract
getParentElement(element: unknown): unknown;\n\n abstract query(element: any, selector: string, multi: boolean):
any[];\n\n abstract computeStyle(element: any, prop: string, defaultValue?: string): string;\n\n abstract animate(\n
element: any, keyframes: Array<Map<string, string|number>>, duration: number, delay: number,\n easing?:
string|null, previousPlayers?: any[], scrubberAccessRequested?: boolean): any;\n}\n\n"/ * @license\n *
Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style
license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { AnimateTimings,
AnimationMetadata, AnimationMetadataType, AnimationOptions, sequence, StyleData, StyleDataMap } from
'@angular/animations';\n\nimport { Ast as AnimationAst, AstVisitor as AnimationAstVisitor } from
'./dsl/animation_ast';\n\nimport { AnimationDslVisitor } from './dsl/animation_dsl_visitor';\n\nimport { invalidNodeType,
invalidParamValue, invalidStyleParams, invalidTimingValue, negativeDelayValue, negativeStepValue } from
'./error_helpers';\n\nimport { isNode } from './render/shared';\n\nexport const ONE_SECOND = 1000;\n\nexport const
SUBSTITUTION_EXPR_START = '{';\n\nexport const SUBSTITUTION_EXPR_END = '}';\n\nexport const
ENTER_CLASSNAME = 'ng-enter';\n\nexport const LEAVE_CLASSNAME = 'ng-leave';\n\nexport const
NG_TRIGGER_CLASSNAME = 'ng-trigger';\n\nexport const NG_TRIGGER_SELECTOR = '.ng-trigger';\n\nexport
const NG_ANIMATING_CLASSNAME = 'ng-animating';\n\nexport const NG_ANIMATING_SELECTOR
= '.ng-animating';\n\nexport function resolveTimingValue(value: string|number) {\n if (typeof value == 'number')
return value;\n\n const matches = value.match(/^(?[\d]+)(m?s)/);\n if (!matches || matches.length < 2) return
0;\n\n return _convertTimeValueToMS(parseFloat(matches[1]), matches[2]);\n}\n\nfunction
_convertTimeValueToMS(value: number, unit: string): number {\n switch (unit) {\n case 's':\n return value *
ONE_SECOND;\n default: // ms or something else\n return value;\n }\n}\n\nexport function resolveTiming(\n
timings: string|number|AnimateTimings, errors: Error[], allowNegativeValues?: boolean) {\n return
timings.hasOwnProperty('duration') ?\n <AnimateTimings>timings :\n
parseTimeExpression(<string|number>timings, errors, allowNegativeValues);\n}\n\nfunction
parseTimeExpression(\n exp: string|number, errors: Error[], allowNegativeValues?: boolean): AnimateTimings
{\n const regex = /^(?[\d]+)(m?s)(?:\s+(?[\d]+)(m?s))?(?:\s+([a-z]+(?:(.+)?))?)?$/i;\n
let duration: number;\n let delay: number = 0;\n let easing: string = "";\n if (typeof exp === 'string') {\n const
matches = exp.match(regex);\n if (matches === null) {\n errors.push(invalidTimingValue(exp));\n return
{duration: 0, delay: 0, easing: ""};\n }\n\n duration = _convertTimeValueToMS(parseFloat(matches[1]),
matches[2]);\n\n const delayMatch = matches[3];\n if (delayMatch != null) {\n delay =
_convertTimeValueToMS(parseFloat(delayMatch), matches[4]);\n }\n\n const easingVal = matches[5];\n if
(easingVal) {\n easing = easingVal;\n }\n } else {\n duration = exp;\n }\n\n if (!allowNegativeValues) {\n
let containsErrors = false;\n let startIndex = errors.length;\n if (duration < 0) {\n
errors.push(negativeStepValue());\n containsErrors = true;\n }\n\n if (delay < 0) {\n

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errors.push(negativeDelayValue());\n  containsErrors = true;\n  }\n  if (containsErrors)
  {\n    errors.splice(startIndex, 0, invalidTimingValue(exp));\n  }\n  }\n  }\n  return {duration, delay,
easing};\n}\n\nexport function copyObj(\n  obj: {[key: string]: any}, destination: {[key: string]: any} = {}): {[key:
string]: any} {\n  Object.keys(obj).forEach(prop => {\n    destination[prop] = obj[prop];\n  });\n  return
destination;\n}\n\nexport function convertToMap(obj: StyleData): StyleDataMap {\n  const styleMap:
StyleDataMap = new Map();\n  Object.keys(obj).forEach(prop => {\n    const val = obj[prop];\n
styleMap.set(prop, val);\n  });\n  return styleMap;\n}\n\nexport function normalizeKeyframes(keyframes:
Array<StyleData>|\n  Array<StyleDataMap>): Array<StyleDataMap> {\n  if
(!keyframes.length) {\n    return [];\n  }\n  if (keyframes[0] instanceof Map) {\n    return keyframes as
Array<StyleDataMap>;\n  }\n  return keyframes.map(kf => convertToMap(kf as StyleData));\n}\n\nexport function
normalizeStyles(styles: StyleDataMap|Array<StyleDataMap>):
StyleDataMap {\n  const normalizedStyles: StyleDataMap = new Map();\n  if (Array.isArray(styles)) {\n
styles.forEach(data => copyStyles(data, normalizedStyles));\n  } else {\n    copyStyles(styles, normalizedStyles);\n
}\n  return normalizedStyles;\n}\n\nexport function copyStyles(\n  styles: StyleDataMap, destination:
StyleDataMap = new Map(),\n  backfill?: StyleDataMap): StyleDataMap {\n  if (backfill) {\n    for (let [prop, val]
of backfill) {\n      destination.set(prop, val);\n    }\n  }\n  for (let [prop, val] of styles) {\n    destination.set(prop,
val);\n  }\n  return destination;\n}\n\nfunction getStyleAttributeString(element: any, key: string, value: string) {\n //
Return the key-value pair string to be added to the style attribute for the\n // given CSS style key.\n  if (value) {\n
return key + ':' + value + ';\n  } else {\n    return '';\n  }\n}\n\nfunction writeStyleAttribute(element: any) {\n //
Read the style property
of the element and manually reflect it to the\n // style attribute. This is needed because Domino on platform-server
doesn't\n // understand the full set of allowed CSS properties and doesn't reflect some\n // of them automatically.\n
let styleAttrValue = '';\n  for (let i = 0; i < element.style.length; i++) {\n    const key = element.style.item(i);\n
styleAttrValue += getStyleAttributeString(element, key, element.style.getPropertyValue(key));\n  }\n  for (const key
in element.style) {\n    // Skip internal Domino properties that don't need to be reflected.\n    if
(!element.style.hasOwnProperty(key) || key.startsWith('_')) {\n      continue;\n    }\n    const dashKey =
camelCaseToDashCase(key);\n    styleAttrValue += getStyleAttributeString(element, dashKey,
element.style[key]);\n  }\n  element.setAttribute('style', styleAttrValue);\n}\n\nexport function setStyles(element:
any, styles: StyleDataMap, formerStyles?: StyleDataMap) {\n  if (element['style']) {\n    styles.forEach((val,
prop) => {\n      const camelProp = dashCaseToCamelCase(prop);\n      if (formerStyles &&
!formerStyles.has(prop)) {\n        formerStyles.set(prop, element.style[camelProp]);\n      }\n
element.style[camelProp] = val;\n    });\n    // On the server set the 'style' attribute since it's not automatically
reflected.\n    if (isNode()) {\n      writeStyleAttribute(element);\n    }\n  }\n}\n\nexport function
eraseStyles(element: any, styles: StyleDataMap) {\n  if (element['style']) {\n    styles.forEach( (_, prop) => {\n
const camelProp = dashCaseToCamelCase(prop);\n    element.style[camelProp] = '';\n  });\n  // On the server set
the 'style' attribute since it's not automatically reflected.\n  if (isNode()) {\n    writeStyleAttribute(element);\n
}\n  }\n}\n\nexport function normalizeAnimationEntry(steps: AnimationMetadata|\n  AnimationMetadata[]): AnimationMetadata {\n  if (Array.isArray(steps)) {\n    if (steps.length ==
1) return steps[0];\n    return sequence(steps);\n  }\n  return steps as AnimationMetadata;\n}\n\nexport function
validateStyleParams(\n  value: string|number|null|undefined, options: AnimationOptions, errors: Error[]) {\n  const
params = options.params || {};\n  const matches = extractStyleParams(value);\n  if (matches.length) {\n
matches.forEach(varName => {\n    if (!params.hasOwnProperty(varName)) {\n
errors.push(invalidStyleParams(varName));\n    }\n  });\n  }\n}\n\nconst PARAM_REGEX =\n  new
RegExp(`${SUBSTITUTION_EXPR_START}\\\\s*(.+?)\\\\s*${SUBSTITUTION_EXPR_END}`, 'g');\n\nexport
function extractStyleParams(value: string|number|null|undefined): string[] {\n  let params: string[] = [];\n  if (typeof
value === 'string') {\n    let match: any;\n    while (match = PARAM_REGEX.exec(value)) {\n
params.push(match[1] as string);\n    }\n    PARAM_REGEX.lastIndex = 0;\n  }\n  return params;\n}\n\nexport
function interpolateParams(\n  value: string|number, params:

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    {[name: string]: any}, errors: Error[]): string|number {\n  const original = value.toString();\n  const str =
original.replace(PARAM_REGEX, (_, varName) => {\n    let localVal = params[varName];\n    // this means that
the value was never overridden by the data passed in by the user\n    if (localVal == null) {\n
errors.push(invalidParamValue(varName));\n    localVal = "";\n    }\n    return localVal.toString();\n  });\n  // we
do this to assert that numeric values stay as they are\n  return str == original ? value : str;\n}\n\nexport function
iteratorToArray(iterator: any): any[] {\n  const arr: any[] = [];\n  let item = iterator.next();\n  while (!item.done) {\n
arr.push(item.value);\n  item = iterator.next();\n  }\n  return arr;\n}\n\nconst DASH_CASE_REGEX = /-+([a-z0-
9])/g;\nexport function dashCaseToCamelCase(input: string): string {\n  return
input.replace(DASH_CASE_REGEX, (...m: any[]) => m[1].toUpperCase());\n}\n\nexport function
camelCaseToDashCase(input:
string): string {\n  return input.replace(/([a-z])([A-Z])/g, '$1-$2').toLowerCase();\n}\n\nexport function
allowPreviousPlayerStylesMerge(duration: number, delay: number) {\n  return duration === 0 || delay ===
0;\n}\n\nexport function balancePreviousStylesIntoKeyframes(\n  element: any, keyframes:
Array<StyleDataMap>, previousStyles: StyleDataMap) {\n  if (previousStyles.size && keyframes.length) {\n    let
startingKeyframe = keyframes[0];\n    let missingStyleProps: string[] = [];\n    previousStyles.forEach((val, prop) =>
{\n      if (!startingKeyframe.has(prop)) {\n        missingStyleProps.push(prop);\n      }\n      startingKeyframe.set(prop, val);\n    });\n    if (missingStyleProps.length) {\n      for (let i = 1; i <
keyframes.length; i++) {\n        let kf = keyframes[i];\n        missingStyleProps.forEach(prop => kf.set(prop,
computeStyle(element, prop)));\n      }\n    }\n  }\n  return keyframes;\n}\n\nexport function visitDslNode(\n
visitor: AnimationDslVisitor,
node: AnimationMetadata, context: any): any;\nexport function visitDslNode(\n  visitor: AnimationAstVisitor,
node: AnimationAst<AnimationMetadataType>, context: any): any;\nexport function visitDslNode(visitor: any,
node: any, context: any): any {\n  switch (node.type) {\n    case AnimationMetadataType.Trigger:\n      return
visitor.visitTrigger(node, context);\n    case AnimationMetadataType.State:\n      return visitor.visitState(node,
context);\n    case AnimationMetadataType.Transition:\n      return visitor.visitTransition(node, context);\n    case
AnimationMetadataType.Sequence:\n      return visitor.visitSequence(node, context);\n    case
AnimationMetadataType.Group:\n      return visitor.visitGroup(node, context);\n    case
AnimationMetadataType.Animate:\n      return visitor.visitAnimate(node, context);\n    case
AnimationMetadataType.Keyframes:\n      return visitor.visitKeyframes(node, context);\n    case
AnimationMetadataType.Style:\n      return visitor.visitStyle(node,
context);\n    case AnimationMetadataType.Reference:\n      return visitor.visitReference(node, context);\n    case
AnimationMetadataType.AnimateChild:\n      return visitor.visitAnimateChild(node, context);\n    case
AnimationMetadataType.AnimateRef:\n      return visitor.visitAnimateRef(node, context);\n    case
AnimationMetadataType.Query:\n      return visitor.visitQuery(node, context);\n    case
AnimationMetadataType.Stagger:\n      return visitor.visitStagger(node, context);\n    default:\n      throw
invalidNodeType(node.type);\n  }\n}\n\nexport function computeStyle(element: any, prop: string): string {\n  return
(<any>window.getComputedStyle(element))[prop];\n}\n\n"/>**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
!!ngDevMode;\n\nfunction createListOfWarnings(warnings:
string[]): string {\n  const LINE_START = '\n - ';\n  return
`${LINE_START}${warnings.filter(Boolean).map(warning => warning).join(LINE_START)} `;\n}\n\nexport
function warnValidation(warnings: string[]): void {\n  NG_DEV_MODE && console.warn(`animation validation
warnings:${createListOfWarnings(warnings)} `);\n}\n\nexport function warnTriggerBuild(name: string, warnings:
string[]): void {\n  NG_DEV_MODE && console.warn(`The animation trigger \"${name}\" has built with the
following warnings:${createListOfWarnings(warnings)} `);\n}\n\nexport function warnRegister(warnings:
string[]): void {\n  NG_DEV_MODE && console.warn(`Animation built with the following
warnings:${createListOfWarnings(warnings)} `);\n}\n\nexport function triggerParsingWarnings(name: string,

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warnings: string[]): void {\n  NG_DEV_MODE &&\n    console.warn(`Animation parsing for the ${name} trigger
presents the following warnings:${\n    createListOfWarnings(warnings)}`);\n}\n\nexport
function pushUnrecognizedPropertiesWarning(warnings: string[], props: string[]): void {\n  if (props.length) {\n
warnings.push(`The following provided properties are not recognized: ${props.join(', ')}`);\n  }\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{invalidExpression, invalidTransitionAlias} from './error_helpers';\n\nexport const ANY_STATE = '*';\n\nexport
declare type TransitionMatcherFn =\n  (fromState: any, toState: any, element: any, params: {[key: string]: any})
=> boolean;\n\nexport function parseTransitionExpr(\n  transitionValue: string|\nTransitionMatcherFn, errors:
Error[]): TransitionMatcherFn[] {\n  const expressions: TransitionMatcherFn[] = [];\n  if (typeof transitionValue ==
'string') {\n    transitionValue.split(/\\s*/, \\s*/).forEach(\n      str => parseInnerTransitionStr(str, expressions,
errors);\n    }\n  } else {\n    expressions.push(<TransitionMatcherFn>transitionValue);\n  }\n  return
expressions;\n}\n\nfunction parseInnerTransitionStr(\n  eventStr: string, expressions: TransitionMatcherFn[],
errors: Error[]) {\n  if (eventStr[0] == ':') {\n    const result = parseAnimationAlias(eventStr, errors);\n    if (typeof
result == 'function') {\n      expressions.push(result);\n      return;\n    }\n    eventStr = result;\n  }\n\n  const match =
eventStr.match(/^(\\s*|[-\\w+)]\\s*(<?[->)]\\s*(\\s*|[-\\w+)]$/);\n  if (match == null || match.length < 4) {\n
errors.push(invalidExpression(eventStr));\n    return expressions;\n  }\n\n  const fromState = match[1];\n  const
separator = match[2];\n  const toState = match[3];\n  expressions.push(makeLambdaFromStates(fromState,
toState));\n\n  const isFullAnyStateExpr = fromState == ANY_STATE && toState == ANY_STATE;\n  if
(separator[0] == '<' && !isFullAnyStateExpr) {\n    expressions.push(makeLambdaFromStates(toState,
fromState));\n  }\n}\n\nfunction parseAnimationAlias(alias: string, errors: Error[]): string|\nTransitionMatcherFn {\n
switch (alias) {\n  case 'enter':\n    return 'void => *';\n  case 'leave':\n    return '* => void';\n  case
'increment':\n    return (fromState: any, toState: any): boolean => parseFloat(toState) > parseFloat(fromState);\n  case
'decrement':\n    return (fromState: any, toState: any): boolean => parseFloat(toState) < parseFloat(fromState);\n  default:\n
errors.push(invalidTransitionAlias(alias));\n    return '* => *';\n  }\n}\n\n// DO NOT REFACTOR ... keep the
follow set instantiations\n// with the values intact (closure compiler for some reason\n// removes follow-up lines that
add the values outside of\n// the constructor...)\nconst TRUE_BOOLEAN_VALUES = new Set<string>(['true',
'1']);\nconst FALSE_BOOLEAN_VALUES = new Set<string>(['false', '0']);\n\nfunction
makeLambdaFromStates(lhs: string, rhs: string): TransitionMatcherFn {\n  const LHS_MATCH_BOOLEAN
= TRUE_BOOLEAN_VALUES.has(lhs) || FALSE_BOOLEAN_VALUES.has(lhs);\n  const
RHS_MATCH_BOOLEAN = TRUE_BOOLEAN_VALUES.has(rhs) ||
FALSE_BOOLEAN_VALUES.has(rhs);\n\n  return (fromState: any, toState: any): boolean => {\n    let lhsMatch =
lhs == ANY_STATE || lhs == fromState;\n    let rhsMatch = rhs == ANY_STATE || rhs == toState;\n\n    if
(!lhsMatch && LHS_MATCH_BOOLEAN && typeof fromState === 'boolean') {\n      lhsMatch = fromState ?
TRUE_BOOLEAN_VALUES.has(lhs) : FALSE_BOOLEAN_VALUES.has(lhs);\n    }\n    if (!rhsMatch &&
RHS_MATCH_BOOLEAN && typeof toState === 'boolean') {\n      rhsMatch = toState ?
TRUE_BOOLEAN_VALUES.has(rhs) : FALSE_BOOLEAN_VALUES.has(rhs);\n    }\n\n    return lhsMatch &&
rhsMatch;\n  };\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {AnimateTimings, AnimationAnimateChildMetadata,
AnimationAnimateMetadata, AnimationAnimateRefMetadata, AnimationGroupMetadata,
AnimationKeyframesSequenceMetadata, AnimationMetadata, AnimationMetadataType, AnimationOptions,
AnimationQueryMetadata, AnimationQueryOptions, AnimationReferenceMetadata, AnimationSequenceMetadata,
AnimationStaggerMetadata, AnimationStateMetadata, AnimationStyleMetadata, AnimationTransitionMetadata,
AnimationTriggerMetadata, AUTO_STYLE, style, StyleDataMap} from '@angular/animations';\n\nimport
{invalidDefinition, invalidKeyframes, invalidOffset, invalidParallelAnimation, invalidProperty, invalidStagger,
invalidState, invalidStyleValue, invalidTrigger, keyframeOffsetsOutOfOrder, keyframesMissingOffsets} from

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'./error_helpers';\nimport { AnimationDriver } from './render/animation_driver';\nimport { getOrSetDefaultValue }
from './render/shared';\nimport { convertToMap, copyObj, extractStyleParams, iteratorToArray,
NG_ANIMATING_SELECTOR, NG_TRIGGER_SELECTOR, normalizeAnimationEntry, resolveTiming,
SUBSTITUTION_EXPR_START,
  validateStyleParams, visitDslNode } from './util';\nimport { pushUnrecognizedPropertiesWarning } from
'./warning_helpers';\n\nimport { AnimateAst, AnimateChildAst, AnimateRefAst, Ast, DynamicTimingAst,
GroupAst, KeyframesAst, QueryAst, ReferenceAst, SequenceAst, StaggerAst, StateAst, StyleAst, TimingAst,
TransitionAst, TriggerAst } from './animation_ast';\nimport { AnimationDslVisitor } from
'./animation_dsl_visitor';\nimport { parseTransitionExpr } from './animation_transition_expr';\n\nconst
SELF_TOKEN = 'self';\nconst SELF_TOKEN_REGEX = new RegExp(`\\s*${SELF_TOKEN}\\s*`, 'g');\n\n/*
 * [Validation]\n * The visitor code below will traverse the animation AST generated by the animation verb
functions\n * (the output is a tree of objects) and attempt to perform a series of validations on the data. The\n *
following corner-cases will be validated:\n * 1. Overlap of animations\n * Given that a CSS property cannot be
animated in more than one place at the same time, it's\n
 * important that this behavior is detected and validated. The way in which this occurs is that\n * each time a style
property is examined, a string-map containing the property will be updated with\n * the start and end times for when
the property is used within an animation step.\n * If there are two or more parallel animations that are currently
running (these are invoked by the\n * group()) on the same element then the validator will throw an error. Since the
start/end timing\n * values are collected for each property then if the current animation step is animating the same\n
 * property and its timing values fall anywhere into the window of time that the property is\n * currently being
animated within then this is what causes an error.\n * 2. Timing values\n * The validator will validate to see if a
timing value of `duration delay easing` or\n * `durationNumber` is valid or not.\n * (note that upon validation
the code below will replace the timing data with an object containing\n
 * {duration,delay,easing}).\n * 3. Offset Validation\n * Each of the style() calls are allowed to have an offset
value when placed inside of keyframes().\n * Offsets within keyframes() are considered valid when:\n * - No
offsets are used at all\n * - Each style() entry contains an offset value\n * - Each offset is between 0 and 1\n * -
Each offset is greater to or equal than the previous one\n * Otherwise an error will be thrown.\n */\n\nexport
function buildAnimationAst(\n  driver: AnimationDriver, metadata: AnimationMetadata|AnimationMetadata[],
errors: Error[],\n  warnings: string[]): Ast<AnimationMetadataType> {\n  return new
AnimationAstBuilderVisitor(driver).build(metadata, errors, warnings);\n}\n\nconst ROOT_SELECTOR =
";\n\nexport class AnimationAstBuilderVisitor implements AnimationDslVisitor {\n  constructor(private _driver:
AnimationDriver) {\n\n  build(metadata: AnimationMetadata|AnimationMetadata[], errors: Error[], warnings:
string[]):\n
    Ast<AnimationMetadataType> {\n    const context = new AnimationAstBuilderContext(errors);\n    this._resetContextStyleTimingState(context);\n    const ast =\n
<Ast<AnimationMetadataType>>visitDslNode(this, normalizeAnimationEntry(metadata), context);\n\n    if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n      if (context.unsupportedCSSPropertiesFound.size) {\n        pushUnrecognizedPropertiesWarning(\n          warnings,\n
[...context.unsupportedCSSPropertiesFound.keys()],\n          );\n        }\n      }\n\n      return ast;\n    }\n\n    private
_resetContextStyleTimingState(context: AnimationAstBuilderContext) {\n      context.currentQuerySelector =
ROOT_SELECTOR;\n      context.collectedStyles = new Map<string, Map<string, StyleTimeTuple>>();\n      context.collectedStyles.set(ROOT_SELECTOR, new Map());\n      context.currentTime = 0;\n    }\n\n    visitTrigger(metadata: AnimationTriggerMetadata, context: AnimationAstBuilderContext):\n      TriggerAst {\n      let
queryCount
= context.queryCount = 0;\n      let depCount = context.depCount = 0;\n      const states: StateAst[] = [];\n      const
transitions: TransitionAst[] = [];\n      if (metadata.name.charAt(0) === '@') {\n        context.errors.push(invalidTrigger());\n      }\n\n      metadata.definitions.forEach(def => {\n        this._resetContextStyleTimingState(context);\n        if (def.type === AnimationMetadataType.State) {\n          const

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stateDef = def as AnimationStateMetadata;\n    const name = stateDef.name;\n
name.toString().split(/\\s*,\\s*/).forEach(n => {\n    stateDef.name = n;\n
states.push(this.visitState(stateDef, context));\n    });\n    stateDef.name = name;\n    } else if (def.type ==
AnimationMetadataType.Transition) {\n    const transition = this.visitTransition(def as
AnimationTransitionMetadata, context);\n    queryCount += transition.queryCount;\n    depCount +=
transition.depCount;\n    transitions.push(transition);\n    } else {\n
context.errors.push(invalidDefinition());\n
    }\n    });\n\n    return {\n    type: AnimationMetadataType.Trigger,\n    name: metadata.name,\n    states,\n    transitions,\n    queryCount,\n    depCount,\n    options: null\n    };\n\n    visitState(metadata:
AnimationStateMetadata, context: AnimationAstBuilderContext): StateAst {\n    const styleAst =
this.visitStyle(metadata.styles, context);\n    const astParams = (metadata.options && metadata.options.params) ||
null;\n    if (styleAst.containsDynamicStyles) {\n    const missingSubs = new Set<string>();\n    const params =
astParams || {};\n    styleAst.styles.forEach(style => {\n    if (style instanceof Map) {\n    style.forEach(value
=> {\n    extractStyleParams(value).forEach(sub => {\n    if (!params.hasOwnProperty(sub)) {\n
missingSubs.add(sub);\n    });\n    });\n    });\n    });\n    if (missingSubs.size) {\n    const
missingSubsArr
= iteratorToArray(missingSubs.values());\n    context.errors.push(invalidState(metadata.name,
missingSubsArr));\n    }\n    });\n\n    return {\n    type: AnimationMetadataType.State,\n    name:
metadata.name,\n    style: styleAst,\n    options: astParams ? {params: astParams} : null\n    };\n\n    visitTransition(metadata: AnimationTransitionMetadata, context: AnimationAstBuilderContext):\n    TransitionAst
{\n    context.queryCount = 0;\n    context.depCount = 0;\n    const animation = visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context);\n    const matchers = parseTransitionExpr(metadata.expr,
context.errors);\n\n    return {\n    type: AnimationMetadataType.Transition,\n    matchers,\n    animation,\n    queryCount: context.queryCount,\n    depCount: context.depCount,\n    options:
normalizeAnimationOptions(metadata.options)\n    };\n    }\n\n    visitSequence(metadata:
AnimationSequenceMetadata, context: AnimationAstBuilderContext):\n
SequenceAst {\n    return {\n    type: AnimationMetadataType.Sequence,\n    steps: metadata.steps.map(s =>
visitDslNode(this, s, context)),\n    options: normalizeAnimationOptions(metadata.options)\n    };\n    }\n\n    visitGroup(metadata: AnimationGroupMetadata, context: AnimationAstBuilderContext): GroupAst {\n    const
currentTime = context.currentTime;\n    let furthestTime = 0;\n    const steps = metadata.steps.map(step => {\n
context.currentTime = currentTime;\n    const innerAst = visitDslNode(this, step, context);\n    furthestTime =
Math.max(furthestTime, context.currentTime);\n    return innerAst;\n    });\n\n    context.currentTime =
furthestTime;\n    return {\n    type: AnimationMetadataType.Group,\n    steps,\n    options:
normalizeAnimationOptions(metadata.options)\n    };\n    }\n\n    visitAnimate(metadata: AnimationAnimateMetadata,
context: AnimationAstBuilderContext):\n    AnimateAst {\n    const timingAst =
constructTimingAst(metadata.timings,
context.errors);\n    context.currentAnimateTimings = timingAst;\n    let styleAst: StyleAst|KeyframesAst;\n    let
styleMetadata: AnimationStyleMetadata|AnimationKeyframesSequenceMetadata =\n    metadata.styles ?
metadata.styles : style({});\n    if (styleMetadata.type == AnimationMetadataType.Keyframes) {\n    styleAst =
this.visitKeyframes(styleMetadata as AnimationKeyframesSequenceMetadata, context);\n    } else {\n    let
styleMetadata = metadata.styles as AnimationStyleMetadata;\n    let isEmpty = false;\n    if (!styleMetadata) {\n
isEmpty = true;\n    const newStyleData: {[prop: string]: string|number} = {};\n    if (timingAst.easing) {\n
newStyleData['easing'] = timingAst.easing;\n    }\n    styleMetadata = style(newStyleData);\n    }\n
context.currentTime += timingAst.duration + timingAst.delay;\n    const _styleAst = this.visitStyle(styleMetadata,
context);\n    _styleAst.isEmptyStep = isEmpty;\n    styleAst
= _styleAst;\n    }\n\n    context.currentAnimateTimings = null;\n    return {\n    type:
AnimationMetadataType.Animate,\n    timings: timingAst,\n    style: styleAst,\n    options: null\n    };\n\n    visitStyle(metadata: AnimationStyleMetadata, context: AnimationAstBuilderContext): StyleAst {\n    const ast =

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this._makeStyleAst(metadata, context);\n  this._validateStyleAst(ast, context);\n  return ast;\n }\n\n private\n _makeStyleAst(metadata: AnimationStyleMetadata, context: AnimationAstBuilderContext):\n  StyleAst {\n  const styles: Array<(StyleDataMap | string)> = [];\n  const metadataStyles = Array.isArray(metadata.styles) ?\n  metadata.styles : [metadata.styles];\n\n  for (let styleTuple of metadataStyles) {\n    if (typeof styleTuple ===\n  'string') {\n      if (styleTuple === AUTO_STYLE) {\n        styles.push(styleTuple);\n      } else {\n        context.errors.push(invalidStyleValue(styleTuple));\n      }\n    } else {\n      styles.push(convertToMap(styleTuple));\n    }\n  }\n\n  let containsDynamicStyles = false;\n  let collectedEasing: string|null = null;\n  styles.forEach(styleData => {\n    if (styleData instanceof Map) {\n      if (styleData.has('easing')) {\n        collectedEasing = styleData.get('easing') as string;\n        styleData.delete('easing');\n      }\n      if\n  (!containsDynamicStyles) {\n        for (let value of styleData.values()) {\n          if\n  (value!.toString().indexOf(SUBSTITUTION_EXPR_START) >= 0) {\n            containsDynamicStyles = true;\n            break;\n          }\n        }\n      }\n    }\n  });\n\n  return {\n    type: AnimationMetadataType.Style,\n    styles,\n    easing: collectedEasing,\n    offset: metadata.offset,\n    containsDynamicStyles,\n    options: null\n  };\n }\n\n private _validateStyleAst(ast: StyleAst, context: AnimationAstBuilderContext): void {\n  const timings\n  = context.currentAnimateTimings;\n\n  let endTime = context.currentTime;\n  let startTime = context.currentTime;\n  if (timings && startTime > 0) {\n    startTime -= timings.duration + timings.delay;\n  }\n\n  ast.styles.forEach(tuple => {\n    if (typeof tuple ===\n  'string') return;\n\n    tuple.forEach((value, prop) => {\n      if (typeof ngDevMode === 'undefined' || ngDevMode)\n  {\n        if (!this._driver.validateStyleProperty(prop)) {\n          tuple.delete(prop);\n          context.unsupportedCSSPropertiesFound.add(prop);\n          return;\n        }\n      }\n      // This is guaranteed\n  to have a defined Map at this querySelector location making it\n      // safe to add the assertion here. It is set as a\n  default empty map in prior methods.\n      const collectedStyles =\n  context.collectedStyles.get(context.currentQuerySelector!);\n      const collectedEntry =\n  collectedStyles.get(prop);\n      let updateCollectedStyle = true;\n      if (collectedEntry) {\n        if (startTime\n  != endTime && startTime >= collectedEntry.startTime &&\n          endTime <= collectedEntry.endTime) {\n          context.errors.push(invalidParallelAnimation(\n            prop, collectedEntry.startTime,\n            collectedEntry.endTime, startTime, endTime));\n          updateCollectedStyle = false;\n        }\n      }\n      // we\n  always choose the smaller start time value since we\n      // want to have a record of the entire animation window\n  where\n      // the style property is being animated in between\n      startTime = collectedEntry.startTime;\n    }\n\n    if (updateCollectedStyle) {\n      collectedStyles.set(prop, {startTime, endTime});\n    }\n\n    if\n  (context.options) {\n      validateStyleParams(value, context.options, context.errors);\n    }\n  });\n }\n\n visitKeyframes(metadata: AnimationKeyframesSequenceMetadata, context: AnimationAstBuilderContext):\n  KeyframesAst {\n  const ast: KeyframesAst = {\n    type:\n  AnimationMetadataType.Keyframes, styles: [], options: null};\n  if (!context.currentAnimateTimings) {\n    context.errors.push(invalidKeyframes());\n    return ast;\n  }\n\n  const MAX_KEYFRAME_OFFSET = 1;\n  let totalKeyframesWithOffsets = 0;\n  const offsets: number[] = [];\n  let offsetsOutOfOrder = false;\n  let\n  keyframesOutOfRange = false;\n  let previousOffset: number = 0;\n  const keyframes: StyleAst[] =\n  metadata.steps.map(styles => {\n    const style = this._makeStyleAst(styles, context);\n    let offsetVal:\n  number|null =\n    style.offset != null ? style.offset : consumeOffset(style.styles);\n    let offset: number = 0;\n    if (offsetVal != null) {\n      totalKeyframesWithOffsets++;\n      offset = style.offset = offsetVal;\n    }\n\n    keyframesOutOfRange = keyframesOutOfRange || offset < 0 || offset > 1;\n    offsetsOutOfOrder =\n  offsetsOutOfOrder || offset < previousOffset;\n    previousOffset = offset;\n    offsets.push(offset);\n\n    return style;\n  });\n\n  if (keyframesOutOfRange) {\n    context.errors.push(invalidOffset());\n  }\n\n  if\n  (offsetsOutOfOrder) {\n    context.errors.push(keyframeOffsetsOutOfOrder());\n  }\n\n  const length =\n  metadata.steps.length;\n  let generatedOffset = 0;\n  if (totalKeyframesWithOffsets > 0 &&\n  totalKeyframesWithOffsets < length) {\n    context.errors.push(keyframesMissingOffsets());\n  } else if\n  (totalKeyframesWithOffsets == 0) {\n    generatedOffset = MAX_KEYFRAME_OFFSET / (length - 1);\n  }\n\n  }

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const limit = length - 1;\n  const currentTime = context.currentTime;\n  const currentAnimateTimings =
context.currentAnimateTimings!;\n  const animateDuration = currentAnimateTimings.duration;\n
keyframes.forEach((kf, i) => {\n  const offset = generatedOffset > 0 ? (i == limit ? 1 : (generatedOffset * i)) :
offsets[i];\n  const durationUpToThisFrame = offset * animateDuration;\n  context.currentTime = currentTime
+ currentAnimateTimings.delay + durationUpToThisFrame;\n  currentAnimateTimings.duration =
durationUpToThisFrame;\n  this._validateStyleAst(kf, context);\n  kf.offset = offset;\n\n
ast.styles.push(kf);\n  });\n\n  return ast;\n }\n\n visitReference(metadata: AnimationReferenceMetadata,
context: AnimationAstBuilderContext):\n  ReferenceAst {\n  return {\n  type:
AnimationMetadataType.Reference,\n  animation: visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context),\n  options:
normalizeAnimationOptions(metadata.options)\n  };\n }\n\n visitAnimateChild(metadata:
AnimationAnimateChildMetadata, context: AnimationAstBuilderContext):\n  AnimateChildAst {\n
context.depCount++;\n  return {\n  type: AnimationMetadataType.AnimateChild,\n  options:
normalizeAnimationOptions(metadata.options)\n  };\n }\n\n visitAnimateRef(metadata:
AnimationAnimateRefMetadata, context: AnimationAstBuilderContext):\n  AnimateRefAst
{\n  return {\n  type: AnimationMetadataType.AnimateRef,\n  animation:
this.visitReference(metadata.animation, context),\n  options: normalizeAnimationOptions(metadata.options)\n
};\n }\n\n visitQuery(metadata: AnimationQueryMetadata, context: AnimationAstBuilderContext): QueryAst {\n
const parentSelector = context.currentQuerySelector!;\n  const options = (metadata.options || {}) as
AnimationQueryOptions;\n\n  context.queryCount++;\n  context.currentQuery = metadata;\n  const [selector,
includeSelf] = normalizeSelector(metadata.selector);\n  context.currentQuerySelector =\n
parentSelector.length ? (parentSelector + ' ' + selector) : selector;\n  getOrSetDefaultValue(context.collectedStyles,
context.currentQuerySelector, new Map());\n\n  const animation = visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context);\n  context.currentQuery = null;\n\n
context.currentQuerySelector = parentSelector;\n\n  return {\n  type:
AnimationMetadataType.Query,\n  selector,\n  limit: options.limit || 0,\n  optional: !!options.optional,\n
includeSelf,\n  animation,\n  originalSelector: metadata.selector,\n  options:
normalizeAnimationOptions(metadata.options)\n  };\n }\n\n visitStagger(metadata: AnimationStaggerMetadata,
context: AnimationAstBuilderContext):\n  StaggerAst {\n  if (!context.currentQuery) {\n
context.errors.push(invalidStagger());\n  }\n  const timings = metadata.timings === 'full' ?\n  {duration: 0,
delay: 0, easing: 'full'} :
resolveTiming(metadata.timings, context.errors, true);\n\n  return {\n  type:
AnimationMetadataType.Stagger,\n  animation: visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context),\n  timings,\n  options: null\n  };\n }\n\nfunction
normalizeSelector(selector: string): [string, boolean] {\n  const hasAmpersand = selector.split(/\\s*,\\s*/).find((token
=> token == SELF_TOKEN) ?
true : false);\n  if (hasAmpersand) {\n  selector = selector.replace(SELF_TOKEN_REGEX, "");\n  }\n\n  // Note: the
:enter and :leave aren't normalized here since those\n  // selectors are filled in at runtime during timeline building\n
selector = selector.replace(/@\\s*/g, NG_TRIGGER_SELECTOR)\n  .replace(/@\\s*w+/g, match =>
NG_TRIGGER_SELECTOR + ' ' + match.slice(1))\n  .replace(/:animating/g,
NG_ANIMATING_SELECTOR);\n\n  return [selector, hasAmpersand];\n }\n\nfunction normalizeParams(obj:
{[key: string]: any}|any): {[key: string]: any}|null {\n  return obj ? copyObj(obj) : null;\n }\n\nexport type
StyleTimeTuple = {\n  startTime: number; endTime: number;\n};\n\nexport class AnimationAstBuilderContext {\n
public queryCount: number = 0;\n  public depCount: number = 0;\n  public currentTransition:
AnimationTransitionMetadata|null = null;\n  public currentQuery: AnimationQueryMetadata|null = null;\n  public
currentQuerySelector: string|null = null;\n  public
currentAnimateTimings: TimingAst|null = null;\n  public currentTime: number = 0;\n  public collectedStyles = new
Map<string, Map<string, StyleTimeTuple>>();\n  public options: AnimationOptions|null = null;\n  public
unsupportedCSSPropertiesFound: Set<string> = new Set<string>();\n  constructor(public errors: Error[])

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    }
  }
  type OffsetStyles = string | StyleDataMap;
  function consumeOffset(styles:
  OffsetStyles | Array<OffsetStyles>): number | null {
    if (typeof styles === 'string') return null;
    let offset:
    number | null = null;
    if (Array.isArray(styles)) {
      styles.forEach(styleTuple => {
        if (styleTuple instanceof
        Map && styleTuple.has('offset')) {
          const obj = styleTuple as StyleDataMap;
          offset =
          parseFloat(obj.get('offset') as string);
          obj.delete('offset');
        }
      });
    } else if (styles instanceof Map &&
    styles.has('offset')) {
      const obj = styles;
      offset = parseFloat(obj.get('offset') as string);
      obj.delete('offset');
    }
    return offset;
  }
  function constructTimingAst(value: string | number | AnimateTimings,
  errors: Error[]) {
    if (value.hasOwnProperty('duration')) {
      return value as AnimateTimings;
    }
    if (typeof value === 'number') {
      const duration = resolveTiming(value, errors).duration;
      return makeTimingAst(duration, 0, "");
    }
    const strValue = value as string;
    const isDynamic = strValue.split(/\s+/).some(v => v.charAt(0) === '{' && v.charAt(1)
    === '}');
    if (isDynamic) {
      const ast = makeTimingAst(0, 0, "") as any;
      ast.dynamic = true;
      ast.strValue =
      strValue;
      return ast as DynamicTimingAst;
    }
    const timings = resolveTiming(strValue, errors);
    return
    makeTimingAst(timings.duration, timings.delay, timings.easing);
  }
  function
  normalizeAnimationOptions(options: AnimationOptions | null): AnimationOptions {
    if (options) {
      options =
      copyObj(options);
      if (options['params']) {
        options['params'] =
        normalizeParams(options['params']);
      }
    } else {
      options =
      {};
    }
    return options;
  }
  function makeTimingAst(duration: number, delay:
  number, easing: string | null): TimingAst {
    return {
      duration,
      delay,
      easing;
    };
  }
  /**
   * @license
   * Copyright
   * Google LLC All Rights Reserved.
   * Use of this source code is governed by an MIT-style license that can be
   * found in the LICENSE file at https://angular.io/license
   */
  import { StyleDataMap } from
  '@angular/animations';
  import { AnimationEngineInstruction, AnimationTransitionInstructionType } from
  './render/animation_engine_instruction';
  export interface AnimationTimelineInstruction extends
  AnimationEngineInstruction {
    element: any;
    keyframes: Array<StyleDataMap>;
    preStyleProps: string[];
    postStyleProps: string[];
    duration: number;
    delay: number;
    totalTime: number;
    easing: string | null;
    stretchStartingKeyframe?: boolean;
    subTimeline: boolean;
  }
  export function createTimelineInstruction(
  element: any, keyframes: Array<StyleDataMap>, preStyleProps: string[],
  postStyleProps: string[], duration:
  number, delay: number, easing: string | null = null,
  subTimeline: boolean = false): AnimationTimelineInstruction {
    return {
      type: AnimationTransitionInstructionType.TimelineAnimation,
      element,
      keyframes,
      preStyleProps,
      postStyleProps,
      duration,
      delay,
      totalTime: duration + delay,
      easing,
      subTimeline;
    };
  }
  /**
   * @license
   * Copyright
   * Google LLC All Rights Reserved.
   * Use of this source code is governed by an MIT-style license that can be
   * found in the LICENSE file at
   * https://angular.io/license
   */
  import { AnimationTimelineInstruction } from
  './animation_timeline_instruction';
  export class ElementInstructionMap {
    private _map = new Map<any,
    AnimationTimelineInstruction[]>();
    get(element: any): AnimationTimelineInstruction[] {
      return
      this._map.get(element) || [];
    }
    append(element:
    any, instructions: AnimationTimelineInstruction[]) {
      let existingInstructions = this._map.get(element);
      if
      (!existingInstructions) {
        this._map.set(element, existingInstructions = []);
      }
      existingInstructions.push(...instructions);
    }
    has(element: any): boolean {
      return this._map.has(element);
    }
    clear() {
      this._map.clear();
    }
  }
  /**
   * @license
   * Copyright
   * Google LLC All Rights
   * Reserved.
   * Use of this source code is governed by an MIT-style license that can be
   * found in the
   * LICENSE file at https://angular.io/license
   */
  import { AnimateChildOptions, AnimateTimings,
  AnimationMetadataType, AnimationOptions, AnimationQueryOptions, AUTO_STYLE, PRE_STYLE as
  PRE_STYLE, StyleDataMap } from '@angular/animations';
  import { invalidQuery } from
  './error_helpers';
  import { AnimationDriver } from './render/animation_driver';
  import { copyStyles,
  interpolateParams, iteratorToArray, resolveTiming, resolveTimingValue, visitDslNode }
  from './util';
  import { AnimateAst, AnimateChildAst, AnimateRefAst, Ast, AstVisitor, DynamicTimingAst,
  GroupAst, KeyframesAst, QueryAst, ReferenceAst, SequenceAst, StaggerAst, StateAst, StyleAst,
  TimingAst,
  TransitionAst, TriggerAst } from './animation_ast';
  import { AnimationTimelineInstruction,

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createTimelineInstruction} from './animation_timeline_instruction';\nimport {ElementInstructionMap} from
 './element_instruction_map';\n\nconst ONE_FRAME_IN_MILLISECONDS = 1;\nconst ENTER_TOKEN =
 'enter';\nconst ENTER_TOKEN_REGEX = new RegExp(ENTER_TOKEN, 'g');\nconst LEAVE_TOKEN =
 'leave';\nconst LEAVE_TOKEN_REGEX = new RegExp(LEAVE_TOKEN, 'g');\n\n/* The code within this file
 aims to generate web-animations-compatible keyframes from Angular's\n * animation DSL code.\n * The code
 below will be converted from:\n * \n * ``\n * sequence([\n *   style({ opacity: 0 } ),\n *   animate(1000, style({
 opacity: 0 } ))\n * ])\n * \n * To:\n * ``\n * keyframes = [{ opacity: 0, offset:
 0 }, { opacity: 1, offset: 1 }]\n * duration = 1000\n * delay = 0\n * easing = "\n * ``\n * \n * For this operation to
 cover the combination of animation verbs (style, animate, group, etc...) a\n * combination of AST traversal and
 merge-sort-like algorithms are used.\n * \n * [AST Traversal]\n * Each of the animation verbs, when executed, will
 return an string-map object representing what\n * type of action it is (style, animate, group, etc...) and the data
 associated with it. This means\n * that when functional composition mix of these functions is evaluated (like in the
 example above)\n * then it will end up producing a tree of objects representing the animation itself.\n * \n * When
 this animation object tree is processed by the visitor code below it will visit each of the\n * verb statements within
 the visitor. And during each visit it will build the context of the\n * animation keyframes by interacting with the
 `TimelineBuilder`.\n * \n * [TimelineBuilder]\n * This class is responsible
 for tracking the styles and building a series of keyframe objects for a\n * timeline between a start and end time. The
 builder starts off with an initial timeline and each\n * time the AST comes across a `group()`, `keyframes()` or a
 combination of the two within a\n * `sequence()` then it will generate a sub timeline for each step as well as a new
 one after\n * they are complete.\n * \n * As the AST is traversed, the timing state on each of the timelines will be
 incremented. If a sub\n * timeline was created (based on one of the cases above) then the parent timeline will
 attempt to\n * merge the styles used within the sub timelines into itself (only with group() this will happen).\n * This
 happens with a merge operation (much like how the merge works in mergeSort) and it will only\n * copy the most
 recently used styles from the sub timelines into the parent timeline. This ensures\n * that if the styles are used later
 on in another phase of the animation then they will be the most\n
 * up-to-date values.\n * \n * [How Missing Styles Are Updated]\n * Each timeline has a `backFill` property which is
 responsible for filling in new styles into\n * already processed keyframes if a new style shows up later within the
 animation sequence.\n * \n * ``\n * sequence([\n *   style({ width: 0 } ),\n *   animate(1000, style({ width: 100 }
)),\n *   animate(1000, style({ width: 200 })),\n *   animate(1000, style({ width: 300 })),\n *   animate(1000, style({
 width: 400, height: 400 }))] // notice how `height` doesn't exist anywhere\n * else\n * ])\n * \n * What is
 happening here is that the `height` value is added later in the sequence, but is missing\n * from all previous
 animation steps. Therefore when a keyframe is created it would also be missing\n * from all previous keyframes up
 until where it is first used. For the timeline keyframe generation\n * to properly fill in the style it will place the
 previous value (the value from the parent\n * timeline) or a default value
 of `` into the backFill map. The `copyStyles` method in util.ts\n * handles propagating that backfill map to the
 styles object.\n * \n * When a sub-timeline is created it will have its own backFill property. This is done so that\n
 * styles present within the sub-timeline do not accidentally seep into the previous/future timeline\n * keyframes\n * \n
 * [Validation]\n * The code in this file is not responsible for validation. That functionality happens with within\n
 * the `AnimationValidatorVisitor` code.\n */\nexport function buildAnimationTimelines(\n  driver:
 AnimationDriver, rootElement: any, ast: Ast<AnimationMetadataType>,\n  enterClassName: string,
 leaveClassName: string, startingStyles: StyleDataMap = new Map(),\n  finalStyles: StyleDataMap = new Map(),
 options: AnimationOptions,\n  subInstructions?: ElementInstructionMap, errors: Error[] = []):
 AnimationTimelineInstruction[] {\n  return new AnimationTimelineBuilderVisitor().buildKeyframes(\n    driver,
 rootElement,\n    ast, enterClassName, leaveClassName, startingStyles, finalStyles,\n    options, subInstructions,
 errors);\n}\n\nexport class AnimationTimelineBuilderVisitor implements AstVisitor {\n  buildKeyframes(\n    driver: AnimationDriver, rootElement: any, ast: Ast<AnimationMetadataType>,\n    enterClassName: string,
 leaveClassName: string, startingStyles: StyleDataMap,\n    finalStyles: StyleDataMap, options:

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AnimationOptions,\n  subInstructions?: ElementInstructionMap,\n  errors: Error[] = []):
AnimationTimelineInstruction[] {\n  subInstructions = subInstructions || new ElementInstructionMap();\n  const
context = new AnimationTimelineContext(\n    driver, rootElement, subInstructions, enterClassName,
leaveClassName, errors, []);\n  context.options = options;\n  const delay = options.delay ?
resolveTimingValue(options.delay) : 0;\n  context.currentTimeline.delayNextStep(delay);\n
context.currentTimeline.setStyles([startingStyles], null, context.errors, options);\n\n
  visitDslNode(this, ast, context);\n  // this checks to see if an actual animation happened\n  const timelines =
context.timelines.filter(timeline => timeline.containsAnimation());\n  // note: we just want to apply the final
styles for the rootElement, so we do not\n  // just apply the styles to the last timeline but the last timeline
which\n  // element is the root one (basically `*-styles are replaced with the actual\n  // state style values
only for the root element)\n  if (timelines.length && finalStyles.size) {\n    let lastRootTimeline:
TimelineBuilder|undefined;\n    for (let i = timelines.length - 1; i >= 0; i--) {\n      const timeline = timelines[i];\n
      if (timeline.element === rootElement) {\n        lastRootTimeline = timeline;\n        break;\n      }\n    }\n    if (lastRootTimeline && !lastRootTimeline.allowOnlyTimelineStyles()) {\n
lastRootTimeline.setStyles([finalStyles], null, context.errors,
options);\n    }\n    return timelines.length ?\n      timelines.map(timeline => timeline.buildKeyframes()) :\n      [createTimelineInstruction(rootElement, [], [], [], 0, delay, "", false)];\n  }\n  visitTrigger(ast: TriggerAst,
context: AnimationTimelineContext): any {\n    // these values are not visited in this AST\n  }\n  visitState(ast:
StateAst, context: AnimationTimelineContext): any {\n    // these values are not visited in this AST\n  }\n  visitTransition(ast: TransitionAst, context: AnimationTimelineContext): any {\n    // these values are not visited in
this AST\n  }\n  visitAnimateChild(ast: AnimateChildAst, context: AnimationTimelineContext): any {\n    const
elementInstructions = context.subInstructions.get(context.element);\n    if (elementInstructions) {\n      const
innerContext = context.createSubContext(ast.options);\n      const startTime =
context.currentTimeline.currentTime;\n      const endTime = this._visitSubInstructions(\n        elementInstructions,
innerContext, innerContext.options as AnimateChildOptions);\n      if (startTime != endTime) {\n        // we do this
on the upper context because we created a sub context for\n        // the sub child animations\n        context.transformIntoNewTimeline(endTime);\n      }\n      context.previousNode = ast;\n    }\n  }\n  visitAnimateRef(ast: AnimateRefAst, context: AnimationTimelineContext): any {\n    const innerContext =
context.createSubContext(ast.options);\n    innerContext.transformIntoNewTimeline();\n    this._applyAnimationRefDelays([ast.options, ast.animation.options], context, innerContext);\n    this.visitReference(ast.animation, innerContext);\n    context.transformIntoNewTimeline(innerContext.currentTimeline.currentTime);\n    context.previousNode = ast;\n  }\n  private _applyAnimationRefDelays(\n    animationsRefsOptions: (AnimationOptions|null)[], context:
AnimationTimelineContext,\n    innerContext: AnimationTimelineContext) {\n    for (const animationRefOptions
of animationsRefsOptions) {\n      const animationDelay = animationRefOptions?.delay;\n      if (animationDelay)
{\n        const animationDelayValue = typeof animationDelay === 'number' ?\n          animationDelay :\n          resolveTimingValue(interpolateParams(\n            animationDelay, animationRefOptions?.params ?? {},
context.errors));\n        innerContext.delayNextStep(animationDelayValue);\n      }\n    }\n  }\n  private
_visitSubInstructions(\n    instructions: AnimationTimelineInstruction[], context: AnimationTimelineContext,\n    options: AnimateChildOptions): number {\n    const startTime = context.currentTimeline.currentTime;\n    let
furthestTime = startTime;\n    // this is a special-case for when a user wants to skip a sub\n    // animation from
being fired entirely.\n    const duration = options.duration != null ? resolveTimingValue(options.duration) : null;\n    const delay = options.delay != null ? resolveTimingValue(options.delay)
:\n    : null;\n    if (duration !== 0) {\n      instructions.forEach(instruction => {\n        const instructionTimings =\n        context.appendInstructionToTimeline(instruction, duration, delay);\n        furthestTime =\n        Math.max(furthestTime, instructionTimings.duration + instructionTimings.delay);\n      });\n    }\n    return
furthestTime;\n  }\n  visitReference(ast: ReferenceAst, context: AnimationTimelineContext) {\n    context.updateOptions(ast.options, true);\n    visitDslNode(this, ast.animation, context);\n    context.previousNode =

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ast;\n }\n\n visitSequence(ast: SequenceAst, context: AnimationTimelineContext) {\n  const subContextCount =
context.subContextCount;\n  let ctx = context;\n  const options = ast.options;\n\n  if (options &&
(options.params || options.delay)) {\n    ctx = context.createSubContext(options);\n    ctx.transformIntoNewTimeline();\n\n    if (options.delay != null) {\n      if (ctx.previousNode.type ==
AnimationMetadataType.Style)
        {\n          ctx.currentTimeline.snapshotCurrentStyles();\n          ctx.previousNode =
DEFAULT_NOOP_PREVIOUS_NODE;\n        }\n\n        const delay = resolveTimingValue(options.delay);\n        ctx.delayNextStep(delay);\n      }\n    }\n\n    if (ast.steps.length) {\n      ast.steps.forEach(s => visitDslNode(this, s,
ctx));\n\n      // this is here just in case the inner steps only contain or end with a style() call\n      ctx.currentTimeline.applyStylesToKeyframe();\n\n      // this means that some animation function within the
sequence\n      // ended up creating a sub timeline (which means the current\n      // timeline cannot overlap with the
contents of the sequence)\n      if (ctx.subContextCount > subContextCount) {\n        ctx.transformIntoNewTimeline();\n      }\n    }\n\n    context.previousNode = ast;\n  }\n\n  visitGroup(ast: GroupAst,
context: AnimationTimelineContext) {\n    const innerTimelines: TimelineBuilder[] = [];\n    let furthestTime =
context.currentTimeline.currentTime;\n\n    const delay = ast.options && ast.options.delay ? resolveTimingValue(ast.options.delay) : 0;\n    ast.steps.forEach(s => {\n      const innerContext = context.createSubContext(ast.options);\n      if (delay) {\n        innerContext.delayNextStep(delay);\n      }\n      visitDslNode(this, s, innerContext);\n      furthestTime =
Math.max(furthestTime, innerContext.currentTimeline.currentTime);\n      innerTimelines.push(innerContext.currentTimeline);\n    });\n\n    // this operation is run after the AST loop because
otherwise\n    // if the parent timeline's collected styles were updated then\n    // it would pass in invalid data into the
new-to-be forked items\n    innerTimelines.forEach(\n      timeline =>
context.currentTimeline.mergeTimelineCollectedStyles(timeline));\n    context.transformIntoNewTimeline(furthestTime);\n    context.previousNode = ast;\n  }\n\n  private
_visitTiming(ast: TimingAst, context: AnimationTimelineContext): AnimateTimings
{\n    if ((ast as DynamicTimingAst).dynamic) {\n      const strValue = (ast as DynamicTimingAst).strValue;\n      const timingValue =\n        context.params ? interpolateParams(strValue, context.params, context.errors) :
strValue;\n      return resolveTiming(timingValue, context.errors);\n    } else {\n      return {duration: ast.duration,
delay: ast.delay, easing: ast.easing};\n    }\n  }\n\n  visitAnimate(ast: AnimateAst, context:
AnimationTimelineContext) {\n    const timings = context.currentAnimateTimings = this._visitTiming(ast.timings,
context);\n    const timeline = context.currentTimeline;\n    if (timings.delay) {\n      context.incrementTime(timings.delay);\n      timeline.snapshotCurrentStyles();\n    }\n\n    const style = ast.style;\n    if (style.type == AnimationMetadataType.Keyframes) {\n      this.visitKeyframes(style, context);\n    } else {\n      context.incrementTime(timings.duration);\n      this.visitStyle(style as StyleAst, context);\n      timeline.applyStylesToKeyframe();\n    }\n\n    context.currentAnimateTimings = null;\n    context.previousNode = ast;\n  }\n\n  visitStyle(ast: StyleAst,
context: AnimationTimelineContext) {\n    const timeline = context.currentTimeline;\n    const timings =
context.currentAnimateTimings!;\n\n    // this is a special case for when a style() call\n    // directly follows an
animate() call (but not inside of an animate() call)\n    if (!timings && timeline.hasCurrentStyleProperties()) {\n      timeline.forwardFrame();\n    }\n\n    const easing = (timings && timings.easing) || ast.easing;\n    if
(ast.isEmptyStep) {\n      timeline.applyEmptyStep(easing);\n    } else {\n      timeline.setStyles(ast.styles, easing,
context.errors, context.options);\n    }\n\n    context.previousNode = ast;\n  }\n\n  visitKeyframes(ast: KeyframesAst,
context: AnimationTimelineContext) {\n    const currentAnimateTimings = context.currentAnimateTimings!;\n    const startTime = (context.currentTimeline!).duration;\n    const
duration = currentAnimateTimings.duration;\n    const innerContext = context.createSubContext();\n    const
innerTimeline = innerContext.currentTimeline;\n    innerTimeline.easing = currentAnimateTimings.easing;\n\n    ast.styles.forEach(step => {\n      const offset: number = step.offset || 0;\n      innerTimeline.forwardTime(offset *
duration);\n      innerTimeline.setStyles(step.styles, step.easing, context.errors, context.options);\n    });\n  }\n\n  visitDslNode(this, ast, context);\n}

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innerTimeline.applyStylesToKeyframe();\n  });\n\n  // this will ensure that the parent timeline gets all the styles
from\n  // the child even if the new timeline below is not used\n
context.currentTimeline.mergeTimelineCollectedStyles(innerTimeline);\n\n  // we do this because the window
between this timeline and the sub timeline\n  // should ensure that the styles within are exactly the same as they
were before\n  context.transformIntoNewTimeline(startTime + duration);\n  context.previousNode = ast;\n  }\n\n  visitQuery(ast:
QueryAst, context: AnimationTimelineContext) {\n  // in the event that the first step before this is a style step we
need\n  // to ensure the styles are applied before the children are animated\n  const startTime =
context.currentTimeline.currentTime;\n  const options = (ast.options || {}) as AnimationQueryOptions;\n  const
delay = options.delay ? resolveTimingValue(options.delay) : 0;\n\n  if (delay &&\n
(context.previousNode.type === AnimationMetadataType.Style ||\n    (startTime == 0 &&
context.currentTimeline.hasCurrentStyleProperties())) {\n  context.currentTimeline.snapshotCurrentStyles();\n
context.previousNode = DEFAULT_NOOP_PREVIOUS_NODE;\n  }\n\n  let furthestTime = startTime;\n
const elms = context.invokeQuery(\n    ast.selector, ast.originalSelector, ast.limit, ast.includeSelf,\n
options.optional ? true : false, context.errors);\n\n  context.currentQueryTotal = elms.length;\n  let
sameElementTimeline: TimelineBuilder\n
= null;\n  elms.forEach((element, i) => {\n  context.currentQueryIndex = i;\n  const innerContext =
context.createSubContext(ast.options, element);\n  if (delay) {\n    innerContext.delayNextStep(delay);\n
}\n\n  if (element === context.element) {\n    sameElementTimeline = innerContext.currentTimeline;\n
}\n\n  visitDslNode(this, ast.animation, innerContext);\n\n  // this is here just incase the inner steps only contain
or end\n  // with a style() call (which is here to signal that this is a preparatory\n  // call to style an element
before it is animated again)\n  innerContext.currentTimeline.applyStylesToKeyframe();\n\n  const endTime =
innerContext.currentTimeline.currentTime;\n  furthestTime = Math.max(furthestTime, endTime);\n  });\n\n
context.currentQueryIndex = 0;\n  context.currentQueryTotal = 0;\n
context.transformIntoNewTimeline(furthestTime);\n\n  if (sameElementTimeline) {\n
context.currentTimeline.mergeTimelineCollectedStyles(sameElementTimeline);\n
  context.currentTimeline.snapshotCurrentStyles();\n  }\n\n  context.previousNode = ast;\n  }\n\n
visitStagger(ast: StaggerAst, context: AnimationTimelineContext) {\n  const parentContext =
context.parentContext!;\n  const tl = context.currentTimeline;\n  const timings = ast.timings;\n  const duration =
Math.abs(timings.duration);\n  const maxTime = duration * (context.currentQueryTotal - 1);\n  let delay =
duration * context.currentQueryIndex;\n\n  let staggerTransformer = timings.duration < 0 ? 'reverse' :
timings.easing;\n  switch (staggerTransformer) {\n  case 'reverse':\n    delay = maxTime - delay;\n
break;\n  case 'full':\n    delay = parentContext.currentStaggerTime;\n    break;\n  }\n\n  const timeline =
context.currentTimeline;\n  if (delay) {\n    timeline.delayNextStep(delay);\n  }\n\n  const startingTime =
timeline.currentTime;\n  visitDslNode(this,
ast.animation, context);\n  context.previousNode = ast;\n\n  // time = duration + delay\n  // the reason why this
computation is so complex is because\n  // the inner timeline may either have a delay value or a stretched\n  //
keyframe depending on if a subtimeline is not used or is used.\n  parentContext.currentStaggerTime =\n
(tl.currentTime - startingTime) + (tl.startTime - parentContext.currentTimeline.startTime);\n  }\n\n\n
export declare
type StyleAtTime = {\n  time: number; value: string | number;\n};\n\nconst DEFAULT_NOOP_PREVIOUS_NODE
= <Ast<AnimationMetadataType>>{};\n\nexport class AnimationTimelineContext {\n  public parentContext:
AnimationTimelineContext | null = null;\n  public currentTimeline: TimelineBuilder;\n  public
currentAnimateTimings: AnimateTimings | null = null;\n  public previousNode: Ast<AnimationMetadataType> =
DEFAULT_NOOP_PREVIOUS_NODE;\n  public subContextCount = 0;\n  public options: AnimationOptions =
{};\n  public currentQueryIndex: number
= 0;\n  public currentQueryTotal: number = 0;\n  public currentStaggerTime: number = 0;\n\n  constructor(\n
private _driver: AnimationDriver, public element: any,\n  public subInstructions: ElementInstructionMap, private
_enterClassName: string,\n  private _leaveClassName: string, public errors: Error[], public timelines:

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TimelineBuilder[],\n  initialTimeline?: TimelineBuilder) {\n  this.currentTimeline = initialTimeline || new
TimelineBuilder(this._driver, element, 0);\n  timelines.push(this.currentTimeline);\n  }\n\n  get params() {\n
return this.options.params;\n  }\n\n  updateOptions(options: AnimationOptions|null, skipIfExists?: boolean) {\n  if
(!options) return;\n\n  const newOptions = options as any;\n  let optionsToUpdate = this.options;\n\n  // NOTE:
this will get patched up when other animation methods support duration overrides\n  if (newOptions.duration !=
null) {\n    (optionsToUpdate as any).duration = resolveTimingValue(newOptions.duration);\n
  }\n\n  if (newOptions.delay != null) {\n    optionsToUpdate.delay = resolveTimingValue(newOptions.delay);\n
  }\n\n  const newParams = newOptions.params;\n  if (newParams) {\n    let paramsToUpdate: {[name: string]:
any} = optionsToUpdate.params!;\n    if (!paramsToUpdate) {\n      paramsToUpdate = this.options.params =
{};\n    }\n\n    Object.keys(newParams).forEach(name => {\n      if (!skipIfExists ||
!paramsToUpdate.hasOwnProperty(name)) {\n        paramsToUpdate[name] =
interpolateParams(newParams[name], paramsToUpdate, this.errors);\n      }\n    });\n  }\n\n  private
_copyOptions() {\n    const options: AnimationOptions = {};\n    if (this.options) {\n      const oldParams =
this.options.params;\n      if (oldParams) {\n        const params: {[name: string]: any} = options['params'] =
{};\n        Object.keys(oldParams).forEach(name => {\n          params[name] = oldParams[name];\n        });\n      }\n    }\n
return options;\n  }\n\n  createSubContext(options: AnimationOptions|null = null, element?: any, newTime?: number):\n
AnimationTimelineContext {\n    const target = element || this.element;\n    const context = new
AnimationTimelineContext(\n      this._driver, target, this.subInstructions, this._enterClassName,\n      this._leaveClassName,\n      this.errors, this.timelines, this.currentTimeline.fork(target, newTime || 0);\n
context.previousNode = this.previousNode;\n    context.currentAnimateTimings = this.currentAnimateTimings;\n
context.options = this._copyOptions();\n    context.updateOptions(options);\n\n    context.currentQueryIndex =
this.currentQueryIndex;\n    context.currentQueryTotal = this.currentQueryTotal;\n    context.parentContext = this;\n
this.subContextCount++;\n    return context;\n  }\n\n  transformIntoNewTimeline(newTime?: number) {\n
this.previousNode = DEFAULT_NOOP_PREVIOUS_NODE;\n  this.currentTimeline =
this.currentTimeline.fork(this.element, newTime);\n
this.timelines.push(this.currentTimeline);\n  return this.currentTimeline;\n  }\n\n  appendInstructionToTimeline(\n
instruction: AnimationTimelineInstruction, duration: number|null,\n  delay:
number|null): AnimateTimings {\n    const updatedTimings: AnimateTimings = {\n      duration: duration != null ?
duration : instruction.duration,\n      delay: this.currentTimeline.currentTime + (delay != null ? delay : 0) +
instruction.delay,\n      easing: "\n  "};\n    const builder = new SubTimelineBuilder(\n      this._driver,\n      instruction.element, instruction.keyframes, instruction.preStyleProps,\n      instruction.postStyleProps,\n      updatedTimings, instruction.stretchStartingKeyframe);\n    this.timelines.push(builder);\n    return
updatedTimings;\n  }\n\n  incrementTime(time: number) {\n
this.currentTimeline.forwardTime(this.currentTimeline.duration + time);\n  }\n\n  delayNextStep(delay: number) {\n
// negative delays are not yet supported\n  if (delay > 0) {\n
this.currentTimeline.delayNextStep(delay);\n  }\n\n  invokeQuery(\n    selector: string, originalSelector:
string, limit: number, includeSelf: boolean,\n    optional: boolean, errors: Error[]): any[] {\n    let results: any[] =
[];\n    if (includeSelf) {\n      results.push(this.element);\n    }\n    if (selector.length > 0) { // only if :self is used
then the selector can be empty\n      selector = selector.replace(ENTER_TOKEN_REGEX, '.' +
this._enterClassName);\n      selector = selector.replace(LEAVE_TOKEN_REGEX, '.' + this._leaveClassName);\n
const multi = limit != 1;\n      let elements = this._driver.query(this.element, selector, multi);\n      if (limit !== 0) {\n
elements = limit < 0 ? elements.slice(elements.length + limit, elements.length) :
elements.slice(0, limit);\n      }\n      results.push(...elements);\n    }\n\n    if (!optional && results.length == 0) {\n
errors.push(invalidQuery(originalSelector));\n    }\n
return results;\n  }\n}\n\nexport class TimelineBuilder {\n  public duration: number = 0;\n  //
TODO(issue/24571): remove '!'\n  public easing!: string|null;\n  private _previousKeyframe: StyleDataMap = new
Map();\n  private _currentKeyframe: StyleDataMap = new Map();\n  private _keyframes = new Map<number,

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StyleDataMap>());\n private _styleSummary = new Map<string, StyleAtTime>();\n private _localTimelineStyles:
StyleDataMap = new Map();\n private _globalTimelineStyles: StyleDataMap;\n private _pendingStyles:
StyleDataMap = new Map();\n private _backFill: StyleDataMap = new Map();\n private
_currentEmptyStepKeyframe: StyleDataMap|null = null;\n\n constructor(\n private _driver: AnimationDriver,
public element: any, public startTime: number,\n private _elementTimelineStylesLookup?: Map<any,
StyleDataMap>) {\n if (!this._elementTimelineStylesLookup) {\n this._elementTimelineStylesLookup = new
Map<any, StyleDataMap>();\n }\n\n this._globalTimelineStyles
= this._elementTimelineStylesLookup.get(element)!;\n if (!this._globalTimelineStyles) {\n
this._globalTimelineStyles = this._localTimelineStyles;\n this._elementTimelineStylesLookup.set(element,
this._localTimelineStyles);\n }\n\n this._loadKeyframe();\n }\n\n containsAnimation(): boolean {\n switch
(this._keyframes.size) {\n case 0:\n return false;\n case 1:\n return this.hasCurrentStyleProperties();\n
default:\n return true;\n }\n }\n\n hasCurrentStyleProperties(): boolean {\n return
this._currentKeyframe.size > 0;\n }\n\n get currentTime() {\n return this.startTime + this.duration;\n }\n\n
delayNextStep(delay: number) {\n // in the event that a style() step is placed right before a stagger()\n // and that
style() step is the very first style() value in the animation\n // then we need to make a copy of the keyframe [0,
copy, 1] so that the delay\n // properly applies the style() values
to work with the stagger...\n const hasPreStyleStep = this._keyframes.size === 1 &&
this._pendingStyles.size;\n\n if (this.duration || hasPreStyleStep) {\n this.forwardTime(this.currentTime +
delay);\n if (hasPreStyleStep) {\n this.snapshotCurrentStyles();\n }\n } else {\n this.startTime +=
delay;\n }\n }\n\n fork(element: any, currentTime?: number): TimelineBuilder {\n
this.applyStylesToKeyframe();\n return new TimelineBuilder(\n this._driver, element, currentTime ||
this.currentTime, this._elementTimelineStylesLookup);\n }\n\n private _loadKeyframe() {\n if
(this._currentKeyframe) {\n this._previousKeyframe = this._currentKeyframe;\n }\n this._currentKeyframe =
this._keyframes.get(this.duration)!;\n if (!this._currentKeyframe) {\n this._currentKeyframe = new Map();\n
this._keyframes.set(this.duration, this._currentKeyframe);\n }\n }\n\n forwardFrame() {\n this.duration +=
ONE_FRAME_IN_MILLISECONDS;\n
this._loadKeyframe();\n }\n\n forwardTime(time: number) {\n this.applyStylesToKeyframe();\n this.duration
= time;\n this._loadKeyframe();\n }\n\n private _updateStyle(prop: string, value: string|number) {\n
this._localTimelineStyles.set(prop, value);\n this._globalTimelineStyles.set(prop, value);\n
this._styleSummary.set(prop, {time: this.currentTime, value});\n }\n\n allowOnlyTimelineStyles() {\n return
this._currentEmptyStepKeyframe !== this._currentKeyframe;\n }\n\n applyEmptyStep(easing: string|null) {\n if
(easing) {\n this._previousKeyframe.set('easing', easing);\n }\n\n // special case for animate(duration):\n //
all missing styles are filled with a `*` value then\n // if any destination styles are filled in later on the same\n //
keyframe then they will override the overridden styles\n // We use `_globalTimelineStyles` here because there
may be\n // styles in previous keyframes that are not present in this timeline\n
for (let [prop, value] of this._globalTimelineStyles) {\n this._backFill.set(prop, value || AUTO_STYLE);\n
this._currentKeyframe.set(prop, AUTO_STYLE);\n }\n\n this._currentEmptyStepKeyframe =
this._currentKeyframe;\n }\n\n setStyles(\n input: Array<(StyleDataMap | string)>, easing: string|null, errors:
Error[],\n options?: AnimationOptions) {\n if (easing) {\n this._previousKeyframe.set('easing', easing);\n
}\n\n const params = (options && options.params) || {};\n const styles = flattenStyles(input,
this._globalTimelineStyles);\n for (let [prop, value] of styles) {\n const val = interpolateParams(value, params,
errors);\n this._pendingStyles.set(prop, val);\n if (!this._localTimelineStyles.has(prop)) {\n
this._backFill.set(prop, this._globalTimelineStyles.get(prop) ?? AUTO_STYLE);\n }\n
this._updateStyle(prop, val);\n }\n }\n\n applyStylesToKeyframe() {\n if (this._pendingStyles.size === 0)
return;\n\n this._pendingStyles.forEach((val, prop) => {\n this._currentKeyframe.set(prop, val);\n });\n
this._pendingStyles.clear();\n\n this._localTimelineStyles.forEach((val, prop) => {\n if
(!this._currentKeyframe.has(prop)) {\n this._currentKeyframe.set(prop, val);\n }\n });\n }\n\n
snapshotCurrentStyles() {\n for (let [prop, val] of this._localTimelineStyles) {\n this._pendingStyles.set(prop,

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val);\n  this._updateStyle(prop, val);\n  }\n }\n\n getFinalKeyframe() {\n  return
this._keyframes.get(this.duration);\n  }\n\n get properties() {\n  const properties: string[] = [];\n  for (let prop in
this._currentKeyframe) {\n    properties.push(prop);\n  }\n  return properties;\n  }\n\n
mergeTimelineCollectedStyles(timeline: TimelineBuilder) {\n  timeline._styleSummary.forEach((details1, prop)
=> {\n    const details0 = this._styleSummary.get(prop);\n    if (!details0 || details1.time > details0.time) {\n
      this._updateStyle(prop, details1.value);\n    }\n  });\n  }\n\n buildKeyframes(): AnimationTimelineInstruction
{\n  this.applyStylesToKeyframe();\n  const preStyleProps = new Set<string>();\n  const postStyleProps = new
Set<string>();\n  const isEmpty = this._keyframes.size === 1 && this.duration === 0;\n\n  let finalKeyframes:
Array<StyleDataMap> = [];\n  this._keyframes.forEach((keyframe, time) => {\n    const finalKeyframe =
copyStyles(keyframe, new Map(), this._backFill);\n    finalKeyframe.forEach((value, prop) => {\n      if (value
=== PRE_STYLE) {\n        preStyleProps.add(prop);\n      } else if (value === AUTO_STYLE) {\n
        postStyleProps.add(prop);\n      }\n    });\n    if (!isEmpty) {\n      finalKeyframe.set('offset', time /
this.duration);\n    }\n    finalKeyframes.push(finalKeyframe);\n  });\n\n  const preProps: string[] =
preStyleProps.size ? iteratorToArray(preStyleProps.values()) : [];\n  const postProps: string[]
= postStyleProps.size ? iteratorToArray(postStyleProps.values()) : [];\n\n  // special case for a 0-second animation
(which is designed just to place styles onscreen)\n  if (isEmpty) {\n    const kf0 = finalKeyframes[0];\n    const
kf1 = new Map(kf0);\n    kf0.set('offset', 0);\n    kf1.set('offset', 1);\n    finalKeyframes = [kf0, kf1];\n  }\n\n
return createTimelineInstruction(\n    this.element, finalKeyframes, preProps, postProps, this.duration,\n    this.startTime,\n    this.easing, false);\n  })\n}\n\nclass SubTimelineBuilder extends TimelineBuilder {\n  public
timings: AnimateTimings;\n\n  constructor(\n    driver: AnimationDriver, element: any, public keyframes:
Array<StyleDataMap>,\n    public preStyleProps: string[], public postStyleProps: string[], timings:
AnimateTimings,\n    private _stretchStartingKeyframe: boolean = false) {\n    super(driver, element,\n    timings.delay);\n    this.timings = { duration: timings.duration, delay: timings.delay, easing:
timings.easing };\n  }\n\n  override containsAnimation(): boolean {\n    return this.keyframes.length > 1;\n  }\n\n
  override buildKeyframes(): AnimationTimelineInstruction {\n    let keyframes = this.keyframes;\n    let {delay,\n    duration, easing} = this.timings;\n    if (this._stretchStartingKeyframe && delay) {\n      const newKeyframes:
Array<StyleDataMap> = [];\n      const totalTime = duration + delay;\n      const startingGap = delay / totalTime;\n\n      // the original starting keyframe now starts once the delay is done\n      const newFirstKeyframe =
copyStyles(keyframes[0]);\n      newFirstKeyframe.set('offset', 0);\n      newKeyframes.push(newFirstKeyframe);\n\n      const oldFirstKeyframe = copyStyles(keyframes[0]);\n      oldFirstKeyframe.set('offset', roundOffset(startingGap));\n      newKeyframes.push(oldFirstKeyframe);\n\n      /*\n      When the keyframe is stretched then it means that the delay before the animation\n      starts is gone. Instead the
first keyframe
is placed at the start of the animation\n      and it is then copied to where it starts when the original delay is over.
This basically\n      means nothing animates during that delay, but the styles are still rendered. For this\n      to
work the original offset values that exist in the original keyframes must be \"warped\"\n      so that they can take the
new keyframe + delay into account.\n      delay=1000, duration=1000, keyframes = 0 .5 1\n      turns into\n      delay=0, duration=2000, keyframes = 0 .33 .66 1\n      */\n      // offsets between 1 ... n -1 are all warped by the
keyframe stretch\n      const limit = keyframes.length - 1;\n      for (let i = 1; i <= limit; i++) {\n        let kf =
copyStyles(keyframes[i]);\n        const oldOffset = kf.get('offset') as number;\n        const timeAtKeyframe = delay +
oldOffset * duration;\n        kf.set('offset', roundOffset(timeAtKeyframe / totalTime));\n      }\n      newKeyframes.push(kf);\n    }\n\n    //
the new starting keyframe should be added at the start\n    duration = totalTime;\n    delay = 0;\n    easing =
\";\n\n    keyframes = newKeyframes;\n  }\n\n  return createTimelineInstruction(\n    this.element, keyframes,\n    this.preStyleProps, this.postStyleProps, duration, delay, easing,\n    true);\n  })\n}\n\nfunction roundOffset(offset:
number, decimalPoints = 3): number {\n  const mult = Math.pow(10, decimalPoints - 1);\n  return Math.round(offset
* mult) / mult;\n}\n\nfunction flattenStyles(input: Array<(StyleDataMap | string)>, allStyles: StyleDataMap) {\n
const styles: StyleDataMap = new Map();\n  let allProperties: string[]\n}

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input.forEach(token => {\n  if (token === '*') {\n    allProperties = allProperties || allStyles.keys();\n    for (let
prop of allProperties) {\n      styles.set(prop, AUTO_STYLE);\n    } else {\n      copyStyles(token as
StyleDataMap, styles);\n    }\n  });\n  return styles;\n}\n", "/**\n
* @license\n* Copyright Google LLC All Rights Reserved.\n* \n* Use of this source code is governed by an
MIT-style license that can be\n* found in the LICENSE file at https://angular.io/license\n*/\nimport
{AnimationMetadata, AnimationMetadataType, AnimationOptions, StyleDataMap} from
'@angular/animations';\nimport {buildingFailed, validationFailed} from './error_helpers';\nimport
{AnimationDriver} from './render/animation_driver';\nimport {ENTER_CLASSNAME, LEAVE_CLASSNAME,
normalizeStyles} from './util';\nimport {warnValidation} from './warning_helpers';\nimport {Ast} from
'./animation_ast';\nimport {buildAnimationAst} from './animation_ast_builder';\nimport {buildAnimationTimelines}
from './animation_timeline_builder';\nimport {AnimationTimelineInstruction} from
'./animation_timeline_instruction';\nimport {ElementInstructionMap} from './element_instruction_map';\n\nexport
class Animation {\n  private _animationAst: Ast<AnimationMetadataType>;\n  constructor(private _driver:
AnimationDriver, input: AnimationMetadata|AnimationMetadata[]) {\n    const errors: Error[] = [];\n    const
warnings: string[] = [];\n    const ast = buildAnimationAst(_driver, input, errors, warnings);\n    if (errors.length) {\n
      throw validationFailed(errors);\n    }\n    if (warnings.length) {\n      warnValidation(warnings);\n    }\n
this._animationAst = ast;\n  }\n  buildTimelines(\n    element: any, startingStyles:
StyleDataMap|Array<StyleDataMap>,\n    destinationStyles: StyleDataMap|Array<StyleDataMap>, options:
AnimationOptions,\n    subInstructions?: ElementInstructionMap): AnimationTimelineInstruction[] {\n    const
start = Array.isArray(startingStyles) ? normalizeStyles(startingStyles) :\n    <StyleDataMap>startingStyles;\n    const dest = Array.isArray(destinationStyles) ?
normalizeStyles(destinationStyles) :\n    <StyleDataMap>destinationStyles;\n    const errors: any = [];\n    subInstructions = subInstructions || new ElementInstructionMap();\n    const result =
buildAnimationTimelines(\n      this._driver, element, this._animationAst, ENTER_CLASSNAME,
LEAVE_CLASSNAME, start, dest,\n      options, subInstructions, errors);\n    if (errors.length) {\n      throw
buildingFailed(errors);\n    }\n    return result;\n  }\n}\n", "/**\n* @license\n* Copyright Google LLC All Rights
Reserved.\n* \n* Use of this source code is governed by an MIT-style license that can be\n* found in the
LICENSE file at https://angular.io/license\n*/\n\n/**\n * @publicApi\n */\n\nexport abstract class
AnimationStyleNormalizer {\n  abstract normalizePropertyName(propertyName: string, errors: Error[]): string;\n
  abstract normalizeStyleValue(\n    userProvidedProperty: string, normalizedProperty: string, value:
string|number,\n    errors: Error[]): string;\n}\n\n/**\n * @publicApi\n */\n\nexport class
NoopAnimationStyleNormalizer {\n  normalizePropertyName(propertyName:
string, errors: Error[]): string {\n    return propertyName;\n  }\n  normalizeStyleValue(\n
userProvidedProperty: string, normalizedProperty: string, value: string|number,\n  errors: Error[]): string {\n
return <any>value;\n  }\n}\n", "/**\n* @license\n* Copyright Google LLC All Rights Reserved.\n* \n* Use of this
source code is governed by an MIT-style license that can be\n* found in the LICENSE file at
https://angular.io/license\n*/\nimport {invalidCssUnitValue} from './error_helpers';\nimport
{dashCaseToCamelCase} from './util';\nimport {AnimationStyleNormalizer} from
'./animation_style_normalizer';\n\nconst DIMENSIONAL_PROP_SET = new Set([\n  'width',\n  'height',\n
'minWidth',\n  'minHeight',\n  'maxWidth',\n  'maxHeight',\n  'left',\n  'top',\n  'bottom',\n  'right',\n
'fontSize',\n  'outlineWidth',\n  'outlineOffset',\n  'paddingTop',\n  'paddingLeft',\n  'paddingBottom',\n
'paddingRight',\n  'marginTop',\n  'marginLeft',\n  'marginBottom',\n
'marginRight',\n  'borderRadius',\n  'borderWidth',\n  'borderTopWidth',\n  'borderLeftWidth',\n
'borderRightWidth',\n  'borderBottomWidth',\n  'textIndent',\n  'perspective"\n]);\n\nexport class
WebAnimationsStyleNormalizer extends AnimationStyleNormalizer {\n  override
normalizePropertyName(propertyName: string, errors: Error[]): string {\n    return
dashCaseToCamelCase(propertyName);\n  }\n  override normalizeStyleValue(\n    userProvidedProperty: string,
normalizedProperty: string, value: string|number,\n    errors: Error[]): string {\n    let unit: string = "";\n    const

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strVal = value.toString().trim();\n\n  if (DIMENSIONAL_PROP_SET.has(normalizedProperty) && value !== 0
&& value !== '0') {\n    if (typeof value === 'number') {\n      unit = 'px';\n    } else {\n      const
valAndSuffixMatch = value.match(/^[+-]?[\\d\\.]+([a-z]*)$/);\n      if (valAndSuffixMatch &&
valAndSuffixMatch[1].length == 0) {\n        errors.push(invalidCssUnitValue(userProvidedProperty,
value));\n      }\n    }\n  }\n  return strVal + unit;\n }\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {StyleDataMap} from '@angular/animations';\n\nimport
{AnimationEngineInstruction, AnimationTransitionInstructionType} from
'./render/animation_engine_instruction';\n\nimport {AnimationTimelineInstruction} from
'./animation_timeline_instruction';\n\nexport interface AnimationTransitionInstruction extends
AnimationEngineInstruction {\n  element: any;\n  triggerName: string;\n  isRemovalTransition: boolean;\n
fromState: string;\n  fromStyles: StyleDataMap;\n  toState: string;\n  toStyles: StyleDataMap;\n  timelines:
AnimationTimelineInstruction[];\n  queriedElements: any[];\n  preStyleProps: Map<any, Set<string>>;\n
postStyleProps: Map<any, Set<string>>;\n  totalTime: number;\n
errors?: Error[];\n}\n\nexport function createTransitionInstruction(\n  element: any, triggerName: string,
fromState: string, toState: string,\n  isRemovalTransition: boolean, fromStyles: StyleDataMap, toStyles:
StyleDataMap,\n  timelines: AnimationTimelineInstruction[], queriedElements: any[],\n  preStyleProps:
Map<any, Set<string>>, postStyleProps: Map<any, Set<string>>, totalTime: number,\n  errors?: Error[]):
AnimationTransitionInstruction {\n  return {\n    type: AnimationTransitionInstructionType.TransitionAnimation,\n
element,\n    triggerName,\n    isRemovalTransition,\n    fromState,\n    fromStyles,\n    toState,\n    toStyles,\n
timelines,\n    queriedElements,\n    preStyleProps,\n    postStyleProps,\n    totalTime,\n    errors\n  };\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{AnimationOptions, StyleDataMap} from '@angular/animations';\n\nimport {AnimationDriver} from
'./render/animation_driver';\n\nimport {getOrSetDefaultValue} from './render/shared';\n\nimport {copyObj,
interpolateParams, iteratorToArray} from './util';\n\nimport {StyleAst, TransitionAst} from
'./animation_ast';\n\nimport {buildAnimationTimelines} from './animation_timeline_builder';\n\nimport
{AnimationTimelineInstruction} from './animation_timeline_instruction';\n\nimport {TransitionMatcherFn} from
'./animation_transition_expr';\n\nimport {AnimationTransitionInstruction, createTransitionInstruction} from
'./animation_transition_instruction';\n\nimport {ElementInstructionMap} from './element_instruction_map';\n\nimport
{AnimationStyleNormalizer} from './style_normalization/animation_style_normalizer';\n\nconst EMPTY_OBJECT
= {};\n\nexport class AnimationTransitionFactory {\n  constructor(\n    private _triggerName: string, public ast:
TransitionAst,\n    private _stateStyles: Map<string, AnimationStateStyles>)\n  {\n  }\n\n  match(currentState: any, nextState: any, element: any, params: {[key: string]: any}): boolean {\n    return
oneOrMoreTransitionsMatch(this.ast.matchers, currentState, nextState, element, params);\n  }\n\n  buildStyles(stateName: string|boolean|undefined, params: {[key: string]: any}, errors: Error[]): StyleDataMap
{\n    let styler = this._stateStyles.get('*');\n    if (stateName !== undefined) {\n      styler =
this._stateStyles.get(stateName?.toString()) || styler;\n    }\n    return styler ? styler.buildStyles(params, errors) : new
Map();\n  }\n\n  build(\n    driver: AnimationDriver, element: any, currentState: any, nextState: any,\n    enterClassName: string, leaveClassName: string, currentOptions?: AnimationOptions,\n    nextOptions?:
AnimationOptions, subInstructions?: ElementInstructionMap,\n    skipAstBuild?: boolean):
AnimationTransitionInstruction {\n    const errors: Error[] = [];\n    const transitionAnimationParams =
this.ast.options
&& this.ast.options.params || EMPTY_OBJECT;\n    const currentAnimationParams = currentOptions &&
currentOptions.params || EMPTY_OBJECT;\n    const currentStateStyles = this.buildStyles(currentState,
currentAnimationParams, errors);\n    const nextAnimationParams = nextOptions && nextOptions.params ||
EMPTY_OBJECT;\n    const nextStateStyles = this.buildStyles(nextState, nextAnimationParams, errors);\n    const
queriedElements = new Set<any>();\n    const preStyleMap = new Map<any, Set<string>>();\n    const

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postStyleMap = new Map<any, Set<string>>();\n  const isRemoval = nextState === 'void';\n\n  const
animationOptions: AnimationOptions = {\n    params: applyParamDefaults(nextAnimationParams,
transitionAnimationParams),\n    delay: this.ast.options?.delay,\n  };\n\n  const timelines = skipAstBuild ?\n[] :\n  buildAnimationTimelines(\n    driver, element, this.ast.animation, enterClassName, leaveClassName,
currentStateStyles,\n    nextStateStyles,
animationOptions, subInstructions, errors);\n\n  let totalTime = 0;\n  timelines.forEach(tl => {\n    totalTime =
Math.max(tl.duration + tl.delay, totalTime);\n  });\n\n  if (errors.length) {\n    return
createTransitionInstruction(\n    element, this._triggerName, currentState, nextState, isRemoval,
currentStateStyles,\n    nextStateStyles, [], [], preStyleMap, postStyleMap, totalTime, errors);\n  }\n\n  timelines.forEach(tl => {\n    const elm = tl.element;\n    const preProps = getOrSetDefaultValue(preStyleMap,
elm, new Set<string>());\n    tl.preStyleProps.forEach(prop => preProps.add(prop));\n\n    const postProps =
getOrSetDefaultValue(postStyleMap, elm, new Set<string>());\n    tl.postStyleProps.forEach(prop =>
postProps.add(prop));\n\n    if (elm !== element) {\n      queriedElements.add(elm);\n    }\n\n    if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n      checkNonAnimatableInTimelines(timelines, this._triggerName,
driver);\n    }\n\n    const queriedElementsList = iteratorToArray(queriedElements.values());\n    return
createTransitionInstruction(\n    element, this._triggerName, currentState, nextState, isRemoval,
currentStateStyles,\n    nextStateStyles, timelines, queriedElementsList, preStyleMap, postStyleMap,
totalTime);\n  })\n}\n\n/**\n * Checks inside a set of timelines if they try to animate a css property which is not
considered\n * animatable, in that case it prints a warning on the console.\n * Besides that the function doesn't have
any other effect.\n * Note: this check is done here after the timelines are built instead of doing on a lower level
so\n * that we can make sure that the warning appears only once per instruction (we can aggregate here\n * all the
issues instead of finding them separately).\n *\n * @param timelines The built timelines for the current
instruction.\n * @param triggerName The name of the trigger for the current instruction.\n * @param driver
Animation driver used to perform the check.\n *\n */\nfunction checkNonAnimatableInTimelines(\n  timelines:
AnimationTimelineInstruction[], triggerName: string, driver: AnimationDriver): void {\n  if
(!driver.validateAnimatableStyleProperty) {\n    return;\n  }\n\n  const invalidNonAnimatableProps = new
Set<string>();\n\n  timelines.forEach(({keyframes}) => {\n    const nonAnimatablePropsInitialValues = new
Map<string, string|number>();\n    keyframes.forEach(keyframe => {\n      for (const [prop, value] of
keyframe.entries()) {\n        if (!driver.validateAnimatableStyleProperty!(prop)) {\n          if
(nonAnimatablePropsInitialValues.has(prop) && !invalidNonAnimatableProps.has(prop)) {\n            const
propInitialValue = nonAnimatablePropsInitialValues.get(prop);\n            if (propInitialValue !== value) {\n
invalidNonAnimatableProps.add(prop);\n          }\n        } else {\n          nonAnimatablePropsInitialValues.set(prop, value);\n        }\n      }\n    });\n  });\n\n  if (invalidNonAnimatableProps.size > 0) {\n    console.warn(\n      `Warning: The
animation trigger "${triggerName}" is attempting to animate the following` +\n      ' not animatable properties: ' +
Array.from(invalidNonAnimatableProps).join(', ') + '\n' +\n      '(to check the list of all animatable properties visit
https://developer.mozilla.org/en-US/docs/Web/CSS/CSS\_animated\_properties);\n    }\n\n  }\n\n  function
oneOrMoreTransitionsMatch(\n    matchFns: TransitionMatcherFn[], currentState: any, nextState: any, element:
any,\n    params: {[key: string]: any}): boolean {\n    return matchFns.some(fn => fn(currentState, nextState, element,
params));\n  }\n\n  function applyParamDefaults(userParams: Record<string, any>, defaults: Record<string, any>) {\n
const result: Record<string, any> = copyObj(defaults);\n\n    for (const key in userParams) {\n      if
(userParams.hasOwnProperty(key) && userParams[key] != null) {\n        result[key] = userParams[key];\n      }\n    }\n\n    return result;\n  }\n\n  export class AnimationStateStyles {\n    constructor(\n      private styles: StyleAst,
private defaultParams: {[key: string]: any},\n      private normalizer: AnimationStyleNormalizer) {\n    }\n\n    buildStyles(params: {[key: string]: any}, errors: Error[]): StyleDataMap {\n      const finalStyles: StyleDataMap =
new Map();\n      const combinedParams = copyObj(this.defaultParams);\n      Object.keys(params).forEach(key => {\n
const value = params[key];\n        if (value !== null) {\n          combinedParams[key] = value;\n        }\n      });\n\n      this.styles.styles.forEach(value => {\n        if (typeof value !== 'string') {\n          value.forEach((val, prop) => {\n

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if (val) {\n      val = interpolateParams(val, combinedParams, errors);\n      }\n      const normalizedProp =
this.normalizer.normalizePropertyName(prop, errors);\n      val = this.normalizer.normalizeStyleValue(prop,
normalizedProp, val, errors);\n      finalStyles.set(normalizedProp,
val);\n    });\n  });\n  return finalStyles;\n }\n}\n", "/*\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nimport { AnimationMetadataType, StyleDataMap } from
'@angular/animations';\nimport { SequenceAst, TransitionAst, TriggerAst } from './animation_ast';\nimport
{ AnimationStateStyles, AnimationTransitionFactory } from './animation_transition_factory';\nimport
{ AnimationStyleNormalizer } from './style_normalization/animation_style_normalizer';\n\n\nexport function
buildTrigger(\n  name: string, ast: TriggerAst, normalizer: AnimationStyleNormalizer): AnimationTrigger {\n
return new AnimationTrigger(name, ast, normalizer);\n}\n\nexport class AnimationTrigger {\n  public
transitionFactories: AnimationTransitionFactory[] = [];\n  public fallbackTransition: AnimationTransitionFactory;\n
public
states = new Map<string, AnimationStateStyles>();\n\n  constructor(\n    public name: string, public ast:
TriggerAst, private _normalizer: AnimationStyleNormalizer) {\n    ast.states.forEach(ast => {\n      const
defaultParams = (ast.options && ast.options.params) || {};\n      this.states.set(ast.name, new
AnimationStateStyles(ast.style, defaultParams, _normalizer);\n    });\n\n    balanceProperties(this.states, 'true', '1');\n
balanceProperties(this.states, 'false', '0');\n\n    ast.transitions.forEach(ast => {\n
this.transitionFactories.push(new AnimationTransitionFactory(name, ast, this.states);\n    });\n\n    this.fallbackTransition = createFallbackTransition(name, this.states, this._normalizer);\n  }\n\n  get
containsQueries() {\n    return this.ast.queryCount > 0;\n  }\n\n  matchTransition(currentState: any, nextState: any,
element: any, params: {[key: string]: any}): AnimationTransitionFactory|null {\n    const entry =\nthis.transitionFactories.find(f
=> f.match(currentState, nextState, element, params));\n    return entry || null;\n  }\n\n  matchStyles(currentState:
any, params: {[key: string]: any}, errors: Error[]): StyleDataMap {\n    return
this.fallbackTransition.buildStyles(currentState, params, errors);\n  }\n}\n\nfunction createFallbackTransition(\n
triggerName: string, states: Map<string, AnimationStateStyles>,\n  normalizer: AnimationStyleNormalizer):
AnimationTransitionFactory {\n  const matchers = [(fromState: any, toState: any) => true];\n  const animation:
SequenceAst = { type: AnimationMetadataType.Sequence, steps: [], options: null};\n  const transition: TransitionAst
= {\n    type: AnimationMetadataType.Transition,\n    animation,\n    matchers,\n    options: null,\n    queryCount:
0,\n    depCount: 0\n  };\n  return new AnimationTransitionFactory(triggerName, transition, states);\n}\n\nfunction
balanceProperties(\n  stateMap: Map<string, AnimationStateStyles>, key1: string, key2: string) {\n  if
(stateMap.has(key1))\n    {\n      if (!stateMap.has(key2)) {\n        stateMap.set(key2, stateMap.get(key1)!);\n      }\n    } else if
(stateMap.has(key2)) {\n      stateMap.set(key1, stateMap.get(key2)!);\n    }\n  }\n}\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\nimport { AnimationMetadata,
AnimationMetadataType, AnimationOptions, AnimationPlayer, AUTO_STYLE, StyleDataMap } from
'@angular/animations';\nimport { Ast } from './dsl/animation_ast';\nimport { buildAnimationAst } from
'./dsl/animation_ast_builder';\nimport { buildAnimationTimelines } from './dsl/animation_timeline_builder';\nimport
{ AnimationTimelineInstruction } from './dsl/animation_timeline_instruction';\nimport { ElementInstructionMap }
from './dsl/element_instruction_map';\nimport { AnimationStyleNormalizer } from
'./dsl/style_normalization/animation_style_normalizer';\nimport { createAnimationFailed,
missingOrDestroyedAnimation, missingPlayer, registerFailed } from './error_helpers';\nimport
{ ENTER_CLASSNAME, LEAVE_CLASSNAME } from './util';\nimport { warnRegister } from
'./warning_helpers';\nimport { AnimationDriver } from './animation_driver';\nimport { getOrSetDefaultValue,
listenOnPlayer, makeAnimationEvent, normalizeKeyframes, optimizeGroupPlayer } from './shared';\n\nconst
EMPTY_INSTRUCTION_MAP = new ElementInstructionMap();\n\nexport class TimelineAnimationEngine {\n

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'./dsl/style_normalization/animation_style_normalizer';\nimport { missingEvent, missingTrigger, transitionFailed,
triggerTransitionsFailed, unregisteredTrigger, unsupportedTriggerEvent } from './error_helpers';\nimport { copyObj,
ENTER_CLASSNAME, eraseStyles, LEAVE_CLASSNAME, NG_ANIMATING_CLASSNAME,
NG_ANIMATING_SELECTOR, NG_TRIGGER_CLASSNAME, NG_TRIGGER_SELECTOR, setStyles } from
'./util';\n\nimport { AnimationDriver } from './animation_driver';\nimport { getOrSetDefaultValue, listenOnPlayer,
makeAnimationEvent, normalizeKeyframes, optimizeGroupPlayer } from './shared';\n\nconst
QUEUED_CLASSNAME = 'ng-animate-queued';\nconst QUEUED_SELECTOR = '.ng-animate-queued';\nconst
DISABLED_CLASSNAME = 'ng-animate-disabled';\nconst DISABLED_SELECTOR = '.ng-animate-
disabled';\nconst STAR_CLASSNAME = 'ng-star-inserted';\nconst STAR_SELECTOR = '.ng-star-
inserted';\n\nconst EMPTY_PLAYER_ARRAY: TransitionAnimationPlayer[] = [];\nconst
NULL_REMOVAL_STATE: ElementAnimationState = {\n  namespaceId: '',\n  setForRemoval: false,\n  setForMove: false,\n  hasAnimation: false,\n  removedBeforeQueried: false\n};\nconst
NULL_REMOVED_QUERIED_STATE: ElementAnimationState = {\n  namespaceId: '',\n  setForMove: false,\n  setForRemoval: false,\n  hasAnimation: false,\n  removedBeforeQueried: true\n};\n\ninterface
TriggerListener {\n  name: string;\n  phase: string;\n  callback: (event: any) => any;\n}\n\nexport interface
QueueInstruction {\n  element: any;\n  triggerName: string;\n  fromState: StateValue;\n  toState: StateValue;\n  transition: AnimationTransitionFactory;\n  player: TransitionAnimationPlayer;\n  isFallbackTransition:
boolean;\n}\n\nexport const REMOVAL_FLAG = '__ng_removed';\n\nexport interface ElementAnimationState {\n  setForRemoval: boolean;\n  setForMove: boolean;\n  hasAnimation: boolean;\n  namespaceId: string;\n  removedBeforeQueried: boolean;\n  previousTriggersValues?: Map<string, string>;\n}\n\nexport class StateValue
{\n  public value: string;\n  public options: AnimationOptions;\n\n  get params(): {[key: string]: any} {\n    return
this.options.params as {[key: string]: any};\n  }\n\n  constructor(input: any, public namespaceId: string = '') {\n
const isObj = input && input.hasOwnProperty('value');\n    const value = isObj ? input['value'] : input;\n
    this.value = normalizeTriggerValue(value);\n    if (isObj) {\n      const options = copyObj(input as any);\n
delete options['value'];\n      this.options = options as AnimationOptions;\n    } else {\n      this.options = {};\n    }\n  }\n  if (!this.options.params) {\n    this.options.params = {};\n  }\n  }\n\n  absorbOptions(options: AnimationOptions)
{\n    const newParams = options.params;\n    if (newParams) {\n      const oldParams = this.options.params!;\n
Object.keys(newParams).forEach(prop => {\n      if (oldParams[prop] == null) {\n        oldParams[prop] =
newParams[prop];\n      }\n    });\n  }\n}\n\nexport const VOID_VALUE = 'void';\nexport const
DEFAULT_STATE_VALUE = new StateValue(VOID_VALUE);\n\nexport class AnimationTransitionNamespace
{\n  public players: TransitionAnimationPlayer[] = [];\n  private _triggers = new Map<string,
AnimationTrigger>();\n  private _queue: QueueInstruction[] = [];\n  private _elementListeners = new Map<any,
TriggerListener[]>();\n  private _hostClassName: string;\n\n  constructor(\n    public id: string, public
hostElement: any, private _engine: TransitionAnimationEngine) {\n    this._hostClassName = 'ng-tns-' + id;\n
addClass(hostElement, this._hostClassName);\n  }\n\n  listen(element: any, name: string, phase: string, callback:
(event: any) => boolean): () => any {\n    if (!this._triggers.has(name)) {\n      throw missingTrigger(phase, name);\n    }\n\n    if (phase == null || phase.length == 0) {\n      throw missingEvent(name);\n    }\n\n    if
(!isTriggerEventValid(phase)) {\n      throw unsupportedTriggerEvent(phase, name);\n    }\n\n    const listeners =
getOrSetDefaultValue(this._elementListeners, element, []);\n    const data = { name, phase, callback};\n
listeners.push(data);\n\n    const triggersWithStates =\n      getOrSetDefaultValue(this._engine.statesByElement,
element, new Map<string, StateValue>());\n    if (!triggersWithStates.has(name)) {\n      addClass(element,
NG_TRIGGER_CLASSNAME);\n      addClass(element, NG_TRIGGER_CLASSNAME + '-' + name);\n
triggersWithStates.set(name, DEFAULT_STATE_VALUE);\n    }\n\n    return () => {\n      // the event listener is
removed AFTER the flush has occurred such\n      // that leave animations callbacks can fire (otherwise if the node\n
// is removed in between then the listeners would be deregistered)\n      this._engine.afterFlush() => {\n        const
index = listeners.indexOf(data);\n        if (index >= 0) {\n          listeners.splice(index, 1);\n        }\n\n        if
(!this._triggers.has(name)) {\n          triggersWithStates.delete(name);\n        }\n      }\n    }; \n  }\n\n  register(name:
string, ast: AnimationTrigger): boolean {\n    if (this._triggers.has(name)) {\n      // throw\n      return false;\n    } else

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{\n  this._triggers.set(name, ast);\n  return true;\n  }\n }\n\n private _getTrigger(name: string) {\n  const
trigger = this._triggers.get(name);\n
  if (!trigger) {\n    throw unregisteredTrigger(name);\n  }\n  return trigger;\n }\n\n trigger(element: any,
triggerName: string, value: any, defaultToFallback: boolean = true):\n  TransitionAnimationPlayer|undefined {\n
const trigger = this._getTrigger(triggerName);\n  const player = new TransitionAnimationPlayer(this.id,
triggerName, element);\n\n  let triggersWithStates = this._engine.statesByElement.get(element);\n  if
(!triggersWithStates) {\n    addClass(element, NG_TRIGGER_CLASSNAME);\n    addClass(element,
NG_TRIGGER_CLASSNAME + '-' + triggerName);\n    this._engine.statesByElement.set(element,
triggersWithStates = new Map<string, StateValue>());\n  }\n\n  let fromState =
triggersWithStates.get(triggerName);\n  const toState = new StateValue(value, this.id);\n  const isObj = value &&
value.hasOwnProperty('value');\n  if (!isObj && fromState) {\n    toState.absorbOptions(fromState.options);\n
}\n\n  triggersWithStates.set(triggerName,
toState);\n\n  if (!fromState) {\n    fromState = DEFAULT_STATE_VALUE;\n  }\n\n  const isRemoval =
toState.value === VOID_VALUE;\n\n  // normally this isn't reached by here, however, if an object expression\n
// is passed in then it may be a new object each time. Comparing the value\n  // is important since that will stay the
same despite there being a new object.\n  // The removal arc here is special cased because the same element is
triggered\n  // twice in the event that it contains animations on the outer/inner portions\n  // of the host container\n
if (!isRemoval && fromState.value === toState.value) {\n    // this means that despite the value not changing,
some inner params\n    // have changed which means that the animation final styles need to be applied\n    if
(!objEquals(fromState.params, toState.params)) {\n      const errors: Error[] = [];\n      const fromStyles =
trigger.matchStyles(fromState.value, fromState.params, errors);\n
      const toStyles = trigger.matchStyles(toState.value, toState.params, errors);\n      if (errors.length) {\n
this._engine.reportError(errors);\n      } else {\n        this._engine.afterFlush() => {\n          eraseStyles(element,
fromStyles);\n          setStyles(element, toStyles);\n        });\n      }\n      return;\n    }\n\n    const
playersOnElement: TransitionAnimationPlayer[] =\n      getOrElseDefault(this._engine.playersByElement,
element, []);\n    playersOnElement.forEach(player => {\n      // only remove the player if it is queued on the
EXACT same trigger/namespace\n      // we only also deal with queued players here because if the animation has\n
// started then we want to keep the player alive until the flush happens\n      // (which is where the previousPlayers
are passed into the new player)\n      if (player.namespaceId == this.id && player.triggerName == triggerName &&
player.queued) {\n        player.destroy();\n      }\n
    });\n\n    let transition =\n      trigger.matchTransition(fromState.value, toState.value, element, toState.params);\n
    let isFallbackTransition = false;\n    if (!transition) {\n      if (!defaultToFallback) return;\n      transition =
trigger.fallbackTransition;\n      isFallbackTransition = true;\n    }\n\n    this._engine.totalQueuedPlayers++;\n
this._queue.push(\n      element, triggerName, transition, fromState, toState, player, isFallbackTransition);\n
if (!isFallbackTransition) {\n      addClass(element, QUEUED_CLASSNAME);\n      player.onStart() => {\n        removeClass(element, QUEUED_CLASSNAME);\n      });\n    }\n\n    player.onDone() => {\n      let index =
this.players.indexOf(player);\n      if (index >= 0) {\n        this.players.splice(index, 1);\n      }\n\n      const players =
this._engine.playersByElement.get(element);\n      if (players) {\n        let index = players.indexOf(player);\n        if
(index >= 0) {\n          players.splice(index,
1);\n        }\n      }\n    });\n\n    this.players.push(player);\n    playersOnElement.push(player);\n\n    return player;\n
}\n\n deregister(name: string) {\n  this._triggers.delete(name);\n
this._engine.statesByElement.forEach(stateMap => stateMap.delete(name));\n
this._elementListeners.forEach((listeners, element) => {\n  this._elementListeners.set(element,
listeners.filter(entry => {\n    return entry.name != name;\n  }));\n }));\n }\n\n clearElementCache(element:
any) {\n  this._engine.statesByElement.delete(element);\n  this._elementListeners.delete(element);\n  const
elementPlayers = this._engine.playersByElement.get(element);\n  if (elementPlayers) {\n
elementPlayers.forEach(player => player.destroy());\n  this._engine.playersByElement.delete(element);\n  }\n
}\n\n private _signalRemovalForInnerTriggers(rootElement: any, context: any) {\n  const elements =

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this._engine.driver.query(rootElement, NG_TRIGGER_SELECTOR, true);\n\n
  // emulate a leave animation for all inner nodes within this node.\n  // If there are no animations found for any of
the nodes then clear the cache\n  // for the element.\n  elements.forEach(elm => {\n    // this means that an inner
remove() operation has already kicked off\n    // the animation on this element...\n    if (elm[REMOVAL_FLAG])
return;\n\n    const namespaces = this._engine.fetchNamespacesByElement(elm);\n    if (namespaces.size) {\n
namespaces.forEach(ns => ns.triggerLeaveAnimation(elm, context, false, true));\n    } else {\n
this.clearElementCache(elm);\n    }\n  });\n\n  // If the child elements were removed along with the parent, their
animations might not\n  // have completed. Clear all the elements from the cache so we don't end up with a memory
leak.\n  this._engine.afterFlushAnimationsDone(\n    () => elements.forEach(elm =>
this.clearElementCache(elm));\n  });\n\n  triggerLeaveAnimation(\n    element: any, context:
any, destroyAfterComplete?: boolean,\n    defaultToFallback?: boolean): boolean {\n    const triggerStates =
this._engine.statesByElement.get(element);\n    const previousTriggersValues = new Map<string, string>();\n    if
(triggerStates) {\n    const players: TransitionAnimationPlayer[] = [];\n    triggerStates.forEach((state,
triggerName) => {\n    previousTriggersValues.set(triggerName, state.value);\n    // this check is here in the
event that an element is removed\n    // twice (both on the host level and the component level)\n    if
(this._triggers.has(triggerName)) {\n    const player = this.trigger(element, triggerName, VOID_VALUE,
defaultToFallback);\n    if (player) {\n    players.push(player);\n    }\n    });\n\n    if
(players.length) {\n    this._engine.markElementAsRemoved(this.id, element, true, context,
previousTriggersValues);\n    if (destroyAfterComplete) {\n    optimizeGroupPlayer(players).onDone(()
=> this._engine.processLeaveNode(element));\n    }\n    return true;\n    }\n    }\n    return false;\n  });\n\n  prepareLeaveAnimationListeners(element: any) {\n    const listeners = this._elementListeners.get(element);\n
const elementStates = this._engine.statesByElement.get(element);\n    // if this statement fails then it means that
the element was picked up\n    // by an earlier flush (or there are no listeners at all to track the leave).\n    if (listeners
&& elementStates) {\n    const visitedTriggers = new Set<string>();\n    listeners.forEach(listener => {\n
const triggerName = listener.name;\n    if (visitedTriggers.has(triggerName)) return;\n
visitedTriggers.add(triggerName);\n    const trigger = this._triggers.get(triggerName)!;\n    const transition =
trigger.fallbackTransition;\n    const fromState = elementStates.get(triggerName) ||
DEFAULT_STATE_VALUE;\n    const toState = new StateValue(VOID_VALUE);\n
const player = new TransitionAnimationPlayer(this.id, triggerName, element);\n\n
this._engine.totalQueuedPlayers++;\n    this._queue.push({\n    element,\n    triggerName,\n
transition,\n    fromState,\n    toState,\n    player,\n    isFallbackTransition: true\n    });\n  });\n\n
}\n\n  removeNode(element: any, context: any): void {\n    const engine = this._engine;\n    if
(element.childElementCount) {\n    this._signalRemovalForInnerTriggers(element, context);\n    }\n\n    // this
means that a * => VOID animation was detected and kicked off\n    if (this.triggerLeaveAnimation(element, context,
true)) return;\n\n    // find the player that is animating and make sure that the\n    // removal is delayed until that
player has completed\n    let containsPotentialParentTransition = false;\n    if (engine.totalAnimations) {\n    const
currentPlayers =\n    engine.players.length ? engine.playersByQueriedElement.get(element)
:\n    [];\n\n    // when this `if` statement` does not continue forward it means that\n    // a previous animation query has
selected the current element and\n    // is animating it. In this situation want to continue forwards and\n    // allow
the element to be queued up for animation later.\n    if (currentPlayers && currentPlayers.length) {\n
containsPotentialParentTransition = true;\n    } else {\n    let parent = element;\n    while (parent =
parent.parentNode) {\n    const triggers = engine.statesByElement.get(parent);\n    if (triggers) {\n
containsPotentialParentTransition = true;\n    break;\n    }\n    }\n    }\n\n    // at this stage we know
that the element will either get removed\n    // during flush or will be picked up by a parent query. Either way\n    //
we need to fire the listeners for this element when it DOES get\n    // removed (once the query parent animation is
done or
after flush)\n    this.prepareLeaveAnimationListeners(element);\n\n    // whether or not a parent has an animation we
need to delay the deferral of the leave\n    // operation until we have more information (which we do after flush()) has

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been called)\n  if (containsPotentialParentTransition) {\n    engine.markElementAsRemoved(this.id, element,\n    false, context);\n  } else {\n    const removalFlag = element[REMOVAL_FLAG];\n    if (!removalFlag ||\n    removalFlag === NULL_REMOVAL_STATE) {\n      // we do this after the flush has occurred such\n      // that\n      the callbacks can be fired\n      engine.afterFlush(() => this.clearElementCache(element));\n    }\n    engine.destroyInnerAnimations(element);\n    engine._onRemovalComplete(element, context);\n  }\n}\n\ninsertNode(element: any, parent: any): void {\n  addClass(element, this._hostClassName);\n}\n\n drainQueuedTransitions(microtaskId: number): QueueInstruction[] {\n  const instructions: QueueInstruction[]\n  = [];\n  this._queue.forEach(entry => {\n    const player = entry.player;\n    if (player.destroyed) return;\n    const element = entry.element;\n    const listeners = this._elementListeners.get(element);\n    if (listeners) {\n      listeners.forEach((listener: TriggerListener) => {\n        if (listener.name == entry.triggerName) {\n          const\n          baseEvent = makeAnimationEvent(\n            element, entry.triggerName, entry.fromState.value,\n            entry.toState.value);\n          (baseEvent as any)['_data'] = microtaskId;\n          listenOnPlayer(entry.player,\n            listener.phase, baseEvent, listener.callback);\n        }\n      });\n    }\n    if (player.markedForDestroy) {\n      this._engine.afterFlush(() => {\n        // now we can destroy the element properly since the event listeners have\n        // been bound to the player\n        player.destroy();\n      });\n    } else {\n      instructions.push(entry);\n    }\n  });\n}\n\n  this._queue = [];\n  return instructions.sort((a, b) => {\n    // if depCount == 0 them move to front\n    //\n    // otherwise if a contains b then move back\n    const d0 = a.transition.ast.depCount;\n    const d1 =\n    b.transition.ast.depCount;\n    if (d0 == 0 || d1 == 0) {\n      return d0 - d1;\n    }\n    return\n    this._engine.driver.containsElement(a.element, b.element) ? 1 : -1;\n  });\n}\n\n destroy(context: any) {\n  this.players.forEach(p => p.destroy());\n  this._signalRemovalForInnerTriggers(this.hostElement, context);\n}\n\n elementContainsData(element: any): boolean {\n  let containsData = false;\n  if\n  (this._elementListeners.has(element)) containsData = true;\n  containsData =\n  (this._queue.find(entry =>\n  entry.element === element) ? true : false) || containsData;\n  return containsData;\n}\n\n\nexport interface\n  QueuedTransition {\n  element: any;\n  instruction: AnimationTransitionInstruction;\n  player:\n  TransitionAnimationPlayer;\n}\n\n\nexport\n  class TransitionAnimationEngine {\n  public players: TransitionAnimationPlayer[] = [];\n  public newHostElements\n  = new Map<any, AnimationTransitionNamespace>();\n  public playersByElement = new Map<any,\n  TransitionAnimationPlayer[]>();\n  public playersByQueriedElement = new Map<any,\n  TransitionAnimationPlayer[]>();\n  public statesByElement = new Map<any, Map<string, StateValue>>();\n  public\n  disabledNodes = new Set<any>();\n  public totalAnimations = 0;\n  public totalQueuedPlayers = 0;\n  private\n  _namespaceLookup: {[id: string]: AnimationTransitionNamespace} = {};\n  private _namespaceList:\n  AnimationTransitionNamespace[] = [];\n  private _flushFns: (() => any)[] = [];\n  private _whenQuietFns: (() =>\n  any)[] = [];\n  public namespacesByHostElement = new Map<any, AnimationTransitionNamespace>();\n  public\n  collectedEnterElements: any[] = [];\n  public collectedLeaveElements: any[] = [];\n  // this method is designed to\n  be overridden by the code that uses this engine\n\n  public onRemovalComplete = (element: any, context: any) => {};\n  /** @internal */\n  _onRemovalComplete(element: any, context: any) {\n    this.onRemovalComplete(element, context);\n  }\n\n  constructor(\n    public bodyNode: any, public driver: AnimationDriver,\n    private _normalizer:\n    AnimationStyleNormalizer) {\n    get queuedPlayers(): TransitionAnimationPlayer[] {\n      const players:\n      TransitionAnimationPlayer[] = [];\n      this._namespaceList.forEach(ns => {\n        ns.players.forEach(player => {\n          if (player.queued) {\n            players.push(player);\n          }\n        });\n      });\n      return players;\n    }\n\n    createNamespace(namespaceId: string, hostElement: any) {\n      const ns = new\n      AnimationTransitionNamespace(namespaceId, hostElement, this);\n      if (this.bodyNode &&\n      this.driver.containsElement(this.bodyNode, hostElement)) {\n        this._balanceNamespaceList(ns, hostElement);\n      } else {\n        // defer this later until flush during when the host element\n        has\n        // been inserted so that we know exactly where to place it in\n        // the namespace list\n        this.newHostElements.set(hostElement, ns);\n        // given that this host element is a part of the animation code, it\n
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    // may or may not be inserted by a parent node that is of an // animation renderer type. If this happens then
we can still have // access to this item when we query for :enter nodes. If the parent // is a renderer then
the set data-structure will normalize the entry // this.collectEnterElement(hostElement); // } // return
this._namespaceLookup[namespaceId] = ns; // } // private _balanceNamespaceList(ns:
AnimationTransitionNamespace, hostElement: any) { // const namespaceList = this._namespaceList; // const
namespacesByHostElement = this.namespacesByHostElement; // const limit = namespaceList.length - 1; // if
(limit >= 0) { // let found = false; // // Find the closest ancestor with an existing namespace so
we can then insert `ns` after it, // // establishing a top-down ordering of namespaces in `this._namespaceList`. //
let ancestor = this.driver.getParentElement(hostElement); // while (ancestor) { // const ancestorNs =
namespacesByHostElement.get(ancestor); // if (ancestorNs) { // // An animation namespace has been
registered for this ancestor, so we insert `ns` // // right after it to establish top-down ordering of animation
namespaces. // const index = namespaceList.indexOf(ancestorNs); // namespaceList.splice(index + 1, 0,
ns); // found = true; // break; // } // ancestor = this.driver.getParentElement(ancestor); // } //
if (!found) { // // No namespace exists that is an ancestor of `ns`, so `ns` is inserted at the front to // // ensure
that any existing descendants are ordered after `ns`, retaining the desired // // top-down ordering. //
namespaceList.unshift(ns); //
} // } else { // namespaceList.push(ns); // } // namespacesByHostElement.set(hostElement, ns); //
return ns; // } // register(namespaceId: string, hostElement: any) { // let ns =
this._namespaceLookup[namespaceId]; // if (!ns) { // ns = this.createNamespace(namespaceId, hostElement); //
} // return ns; // } // registerTrigger(namespaceId: string, name: string, trigger: AnimationTrigger) { // let ns =
this._namespaceLookup[namespaceId]; // if (ns && ns.register(name, trigger)) { // this.totalAnimations++; //
} // } // destroy(namespaceId: string, context: any) { // if (!namespaceId) return; // const ns =
this._fetchNamespace(namespaceId); // this.afterFlush() => { //
this.namespacesByHostElement.delete(ns.hostElement); // delete this._namespaceLookup[namespaceId]; //
const index = this._namespaceList.indexOf(ns); // if (index >= 0) { // this._namespaceList.splice(index, 1); //
} // }); // this.afterFlushAnimationsDone()
=> ns.destroy(context); // } // private _fetchNamespace(id: string) { // return this._namespaceLookup[id]; //
} // fetchNamespacesByElement(element: any): Set<AnimationTransitionNamespace> { // // normally there
should only be one namespace per element, however // // if @triggers are placed on both the component element
and then // // its host element (within the component code) then there will be // // two namespaces returned. We
use a set here to simply deduplicate // // the namespaces in case (for the reason described above) there are multiple
triggers // const namespaces = new Set<AnimationTransitionNamespace>(); // const elementStates =
this.statesByElement.get(element); // if (elementStates) { // for (let stateValue of elementStates.values()) { //
if (stateValue.namespaceId) { // const ns = this._fetchNamespace(stateValue.namespaceId); // if (ns) { //
namespaces.add(ns); // } // } //
} // } // return namespaces; // } // trigger(namespaceId: string, element: any, name: string, value: any):
boolean { // if (isElementNode(element)) { // const ns = this._fetchNamespace(namespaceId); // if (ns) { //
ns.trigger(element, name, value); // return true; // } // } // return false; // } // insertNode(namespaceId:
string, element: any, parent: any, insertBefore: boolean): void { // if (!isElementNode(element)) return; // //
special case for when an element is removed and reinserted (move operation) // // when this occurs we do not want
to use the element for deletion later // const details = element[REMOVAL_FLAG] as ElementAnimationState; //
if (details && details.setForRemoval) { // details.setForRemoval = false; // details.setForMove = true; //
const index = this.collectedLeaveElements.indexOf(element); // if (index >= 0) { //
this.collectedLeaveElements.splice(index, 1); // } // } // // in the
event that the namespaceId is blank then the caller // // code does not contain any animation code in it, but it is //
just being called so that the node is marked as being inserted // if (namespaceId) { // const ns =
this._fetchNamespace(namespaceId); // // This if-statement is a workaround for router issue #21947. // // The
router sometimes hits a race condition where while a route // // is being instantiated a new navigation arrives,

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triggering leave\n    // animation of DOM that has not been fully initialized, until this\n    // is resolved, we need to
handle the scenario when DOM is not in a\n    // consistent state during the animation.\n    if (ns) {\n
ns.insertNode(element, parent);\n    }\n    }\n    // only *directives and host elements are inserted before\n    if
(insertBefore) {\n    this.collectEnterElement(element);\n    }\n    }\n    collectEnterElement(element: any) {\n
this.collectedEnterElements.push(element);\n    }\n\n
markElementAsDisabled(element: any, value: boolean) {\n    if (value) {\n    if (!this.disabledNodes.has(element))
{\n    this.disabledNodes.add(element);\n    addClass(element, DISABLED_CLASSNAME);\n    }\n    } else
if (this.disabledNodes.has(element)) {\n    this.disabledNodes.delete(element);\n    removeClass(element,
DISABLED_CLASSNAME);\n    }\n    }\n\n
removeNode(namespaceId: string, element: any, isHostElement:
boolean, context: any): void {\n    if (isElementNode(element)) {\n    const ns = namespaceId ?
this._fetchNamespace(namespaceId) : null;\n    if (ns) {\n    ns.removeNode(element, context);\n    } else {\n
this.markElementAsRemoved(namespaceId, element, false, context);\n    }\n\n
if (isHostElement) {\n    const
hostNS = this.namespacesByHostElement.get(element);\n    if (hostNS && hostNS.id !== namespaceId) {\n
hostNS.removeNode(element, context);\n    }\n    }\n    } else {\n    this._onRemovalComplete(element,
context);\n    }\n    }\n\n
markElementAsRemoved(\n    namespaceId: string, element: any, hasAnimation?:
boolean, context?: any,\n    previousTriggersValues?: Map<string, string>) {\n
this.collectedLeaveElements.push(element);\n    element[REMOVAL_FLAG] = {\n    namespaceId,\n
setForRemoval: context,\n    hasAnimation,\n    removedBeforeQueried: false,\n    previousTriggersValues\n
};\n    }\n\n
listen(\n    namespaceId: string, element: any, name: string, phase: string,\n    callback: (event: any) =>
boolean): () => any {\n    if (isElementNode(element)) {\n    return
this._fetchNamespace(namespaceId).listen(element, name, phase, callback);\n    }\n    return () => {};\n    }\n\n
private _buildInstruction(\n    entry: QueueInstruction, subTimelines: ElementInstructionMap, enterClassName:
string,\n    leaveClassName: string, skipBuildAst?: boolean) {\n    return entry.transition.build(\n    this.driver,
entry.element, entry.fromState.value, entry.toState.value,
enterClassName,\n    leaveClassName, entry.fromState.options, entry.toState.options, subTimelines,
skipBuildAst);\n    }\n\n
destroyInnerAnimations(containerElement: any) {\n    let elements =
this.driver.query(containerElement, NG_TRIGGER_SELECTOR, true);\n    elements.forEach(element =>
this.destroyActiveAnimationsForElement(element));\n\n
if (this.playersByQueriedElement.size == 0) return;\n\n
elements = this.driver.query(containerElement, NG_ANIMATING_SELECTOR, true);\n
elements.forEach(element => this.finishActiveQueriedAnimationOnElement(element));\n    }\n\n
destroyActiveAnimationsForElement(element: any) {\n    const players = this.playersByElement.get(element);\n    if
(players) {\n    players.forEach(player => {\n    // special case for when an element is set for destruction, but
hasn't started.\n    // in this situation we want to delay the destruction until the flush occurs\n    // so that any
event listeners attached to the player
are triggered.\n    if (player.queued) {\n    player.markedForDestroy = true;\n    } else {\n
player.destroy();\n    }\n    });\n    }\n\n
finishActiveQueriedAnimationOnElement(element: any) {\n    const
players = this.playersByQueriedElement.get(element);\n    if (players) {\n    players.forEach(player =>
player.finish());\n    }\n    }\n\n
whenRenderingDone(): Promise<any> {\n    return new Promise<void>(resolve =>
{\n    if (this.players.length) {\n    return optimizeGroupPlayer(this.players).onDone(() => resolve());\n    } else
{\n    resolve();\n    }\n    });\n    }\n\n
processLeaveNode(element: any) {\n    const details =
element[REMOVAL_FLAG] as ElementAnimationState;\n    if (details && details.setForRemoval) {\n    // this
will prevent it from removing it twice\n    element[REMOVAL_FLAG] = NULL_REMOVAL_STATE;\n    if
(details.namespaceId) {\n    this.destroyInnerAnimations(element);\n    const ns =
this._fetchNamespace(details.namespaceId);\n
if (ns) {\n    ns.clearElementCache(element);\n    }\n    }\n    this._onRemovalComplete(element,
details.setForRemoval);\n    }\n\n
if (element.classList?.contains(DISABLED_CLASSNAME)) {\n
this.markElementAsDisabled(element, false);\n    }\n\n
this.driver.query(element, DISABLED_SELECTOR,
true).forEach(node => {\n    this.markElementAsDisabled(node, false);\n    });\n    }\n\n
flush(microtaskId: number

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= -1) {\n  let players: AnimationPlayer[] = [];\n  if (this.newHostElements.size) {\n
this.newHostElements.forEach((ns, element) => this._balanceNamespaceList(ns, element));\n
this.newHostElements.clear();\n  }\n  if (this.totalAnimations && this.collectedEnterElements.length) {\n  for
(let i = 0; i < this.collectedEnterElements.length; i++) {\n    const elm = this.collectedEnterElements[i];\n
addClass(elm, STAR_CLASSNAME);\n  }\n  }\n  if (this._namespaceList.length &&\n
(this.totalQueuedPlayers || this.collectedLeaveElements.length)) {\n    const cleanupFns: Function[] = [];\n    try
{\n    players = this._flushAnimations(cleanupFns, microtaskId);\n    } finally {\n    for (let i = 0; i <
cleanupFns.length; i++) {\n    cleanupFns[i]();\n    }\n  } else {\n    for (let i = 0; i <
this.collectedLeaveElements.length; i++) {\n    const element = this.collectedLeaveElements[i];\n
this.processLeaveNode(element);\n  }\n  }\n  this.totalQueuedPlayers = 0;\n
this.collectedEnterElements.length = 0;\n  this.collectedLeaveElements.length = 0;\n  this._flushFns.forEach(fn
=> fn());\n  this._flushFns = [];\n  if (this._whenQuietFns.length) {\n    // we move these over to a variable so
that\n    // if any new callbacks are registered in another\n    // flush they do not populate the existing set\n
const quietFns = this._whenQuietFns;\n    this._whenQuietFns = [];\n    if (players.length)
{\n    optimizeGroupPlayer(players).onDone(() => {\n    quietFns.forEach(fn => fn());\n    });\n    } else
{\n    quietFns.forEach(fn => fn());\n    }\n  }\n  }\n  reportError(errors: Error[]) {\n  throw
triggerTransitionsFailed(errors);\n  }\n  private _flushAnimations(cleanupFns: Function[], microtaskId:
number):\n  TransitionAnimationPlayer[] {\n  const subTimelines = new ElementInstructionMap();\n  const
skippedPlayers: TransitionAnimationPlayer[] = [];\n  const skippedPlayersMap = new Map<any,
AnimationPlayer[]>();\n  const queuedInstructions: QueuedTransition[] = [];\n  const queriedElements = new
Map<any, TransitionAnimationPlayer[]>();\n  const allPreStyleElements = new Map<any, Set<string>>();\n
const allPostStyleElements = new Map<any, Set<string>>();\n  const disabledElementsSet = new Set<any>();\n
this.disabledNodes.forEach(node => {\n  disabledElementsSet.add(node);\n  const nodesThatAreDisabled =
this.driver.query(node,
QUEUED_SELECTOR, true);\n  for (let i = 0; i < nodesThatAreDisabled.length; i++) {\n
disabledElementsSet.add(nodesThatAreDisabled[i]);\n  }\n  });\n  const bodyNode = this.bodyNode;\n
const allTriggerElements = Array.from(this.statesByElement.keys());\n  const enterNodeMap =
buildRootMap(allTriggerElements, this.collectedEnterElements);\n  // this must occur before the instructions are
built below such that\n  // the :enter queries match the elements (since the timeline queries\n  // are fired during
instruction building).\n  const enterNodeMapIds = new Map<any, string>();\n  let i = 0;\n
enterNodeMap.forEach((nodes, root) => {\n  const className = ENTER_CLASSNAME + i++;\n
enterNodeMapIds.set(root, className);\n  nodes.forEach(node => addClass(node, className));\n  });\n  }\n
const allLeaveNodes: any[] = [];\n  const mergedLeaveNodes = new Set<any>();\n  const
leaveNodesWithoutAnimations = new Set<any>();\n
for (let i = 0; i < this.collectedLeaveElements.length; i++) {\n  const element =
this.collectedLeaveElements[i];\n  const details = element[REMOVAL_FLAG] as ElementAnimationState;\n
if (details && details.setForRemoval) {\n  allLeaveNodes.push(element);\n
mergedLeaveNodes.add(element);\n  if (details.hasAnimation) {\n  this.driver.query(element,
STAR_SELECTOR, true).forEach(elm => mergedLeaveNodes.add(elm));\n  } else {\n
leaveNodesWithoutAnimations.add(element);\n  }\n  }\n  }\n  const leaveNodeMapIds = new Map<any,
string>();\n  const leaveNodeMap = buildRootMap(allTriggerElements, Array.from(mergedLeaveNodes));\n
leaveNodeMap.forEach((nodes, root) => {\n  const className = LEAVE_CLASSNAME + i++;\n
leaveNodeMapIds.set(root, className);\n  nodes.forEach(node => addClass(node, className));\n  });\n  }\n
cleanupFns.push(() => {\n  enterNodeMap.forEach((nodes, root) => {\n  const
className = enterNodeMapIds.get(root);\n  nodes.forEach(node => removeClass(node, className));\n
});\n  leaveNodeMap.forEach((nodes, root) => {\n  const className = leaveNodeMapIds.get(root);\n
nodes.forEach(node => removeClass(node, className));\n  });\n  allLeaveNodes.forEach(element => {\n
this.processLeaveNode(element);\n  });\n  });\n  const allPlayers: TransitionAnimationPlayer[] = [];\n  const

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erroneousTransitions: AnimationTransitionInstruction[] = [];
for (let i = this._namespaceList.length - 1; i >= 0; i--) {
  const ns = this._namespaceList[i];
  ns.drainQueuedTransitions(microtaskId).forEach(entry => {
    const player = entry.player;
    const element = entry.element;
    allPlayers.push(player);
    if (this.collectedEnterElements.length) {
      const details = element[REMOVAL_FLAG] as ElementAnimationState;
      // animations for move operations (elements being removed and reinserted,
      // e.g. when the order of an *ngFor list changes) are currently not supported
      if (details && details.setForMove) {
        if (details.previousTriggersValues && details.previousTriggersValues.has(entry.triggerName)) {
          const previousValue = details.previousTriggersValues.get(entry.triggerName) as string;
          // we need to restore the previous trigger value since the element has
          // only been moved and hasn't actually left the DOM
          const triggersWithStates = this.statesByElement.get(entry.element);
          if (triggersWithStates && triggersWithStates.has(entry.triggerName)) {
            const state = triggersWithStates.get(entry.triggerName)!;
            state.value = previousValue;
            triggersWithStates.set(entry.triggerName, state);
          }
        }
        player.destroy();
        return;
      }
      const nodeIsOrphaned = !bodyNode || !this.driver.containsElement(bodyNode, element);
      const leaveClassName = leaveNodeMapIds.get(element)!;
      const enterClassName = enterNodeMapIds.get(element)!;
      const instruction = this._buildInstruction(entry, subTimelines, enterClassName, leaveClassName, nodeIsOrphaned);
      if (instruction.errors && instruction.errors.length) {
        erroneousTransitions.push(instruction);
        return;
      }
      // even though the element may not be in the DOM, it may still
      // be added at a later point (due to the mechanics of content
      // projection and/or dynamic component insertion) therefore it's
      // important to still style the element.
      if (nodeIsOrphaned) {
        player.onStart(() => eraseStyles(element, instruction.fromStyles));
        player.onDestroy(() => setStyles(element, instruction.toStyles));
        skippedPlayers.push(player);
        return;
      }
      // if an unmatched transition is queued and ready to go
      // then it SHOULD NOT render an animation and cancel the
      // previously running animations.
      if (entry.isFallbackTransition) {
        player.onStart(() => eraseStyles(element, instruction.fromStyles));
        player.onDestroy(() => setStyles(element, instruction.toStyles));
        skippedPlayers.push(player);
        return;
      }
      // this means that if a parent animation uses this animation as a sub-trigger
      // then it will instruct the timeline builder not to add a player delay, but
      // instead stretch the first keyframe gap until the animation starts. This is
      // important in order to prevent extra initialization styles from being
      // required by the user for the animation.
      const timelines: AnimationTimelineInstruction[] = [];
      instruction.timelines.forEach(tl => {
        tl.stretchStartingKeyframe = true;
        if (!this.disabledNodes.has(tl.element)) {
          timelines.push(tl);
        }
      });
      instruction.timelines = timelines;
      subTimelines.append(element, instruction.timelines);
      const tuple = {instruction, player, element};
      queuedInstructions.push(tuple);
      instruction.queriedElements.forEach(element => getOrSetDefaultValue(queriedElements, element, []).push(player));
      instruction.preStyleProps.forEach((stringMap, element) => {
        if (stringMap.size) {
          let setVal: Set<string> = allPreStyleElements.get(element)!;
          if (!setVal) {
            allPreStyleElements.set(element, setVal = new Set<string>());
          }
          stringMap.forEach( (_, prop) => setVal.add(prop));
        }
      });
      instruction.postStyleProps.forEach((stringMap, element) => {
        let setVal: Set<string> = allPostStyleElements.get(element)!;
        if (!setVal) {
          allPostStyleElements.set(element, setVal = new Set<string>());
        }
        stringMap.forEach( (_, prop) => setVal.add(prop));
      });
      if (erroneousTransitions.length) {
        const errors: Error[] = [];
        erroneousTransitions.forEach(instruction => {
          errors.push(transitionFailed(instruction.triggerName, instruction.errors!));
        });
        allPlayers.forEach(player => player.destroy());
        this.reportError(errors);
      }
      const allPreviousPlayersMap = new Map<any, TransitionAnimationPlayer[]>();
      // this map tells us which element in the DOM tree is contained by
      // which animation. Further down this map will get populated once
      // the players are built and in doing so we can use it to

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efficiently\n // figure out if a sub player is skipped due to a parent player having priority.\n  const
animationElementMap = new Map<any, any>();\n
  queuedInstructions.forEach(entry => {\n    const element = entry.element;\n    if (subTimelines.has(element))
{\n    animationElementMap.set(element, element);\n    this._beforeAnimationBuild(\n
entry.player.namespaceId, entry.instruction, allPreviousPlayersMap);\n    }\n  });\n\n
skippedPlayers.forEach(player => {\n    const element = player.element;\n    const previousPlayers =\n
this._getPreviousPlayers(element, false, player.namespaceId, player.triggerName, null);\n
previousPlayers.forEach(prevPlayer => {\n    getOrSetDefaultValue(allPreviousPlayersMap, element,
[], prevPlayer);\n    prevPlayer.destroy();\n    });\n  });\n\n // this is a special case for nodes that will be
removed either by\n // having their own leave animations or by being queried in a container\n // that will be
removed once a parent animation is complete. The idea\n // here is that * styles must be identical to ! styles
because of\n
  // backwards compatibility (* is also filled in by default in many places).\n // Otherwise * styles will return an
empty value or "auto" since the element\n // passed to getComputedStyle will not be visible (since * ===
destination)\n  const replaceNodes = allLeaveNodes.filter(node => {\n    return replacePostStylesAsPre(node,
allPreStyleElements, allPostStyleElements);\n  });\n\n // POST STAGE: fill the * styles\n  const postStylesMap
= new Map<any, StyleDataMap>();\n  const allLeaveQueriedNodes = cloakAndComputeStyles(\n
postStylesMap, this.driver, leaveNodesWithoutAnimations, allPostStyleElements, AUTO_STYLE);\n\n
allLeaveQueriedNodes.forEach(node => {\n    if (replacePostStylesAsPre(node, allPreStyleElements,
allPostStyleElements)) {\n    replaceNodes.push(node);\n    }\n  });\n\n // PRE STAGE: fill the ! styles\n
const preStylesMap = new Map<any, StyleDataMap>();\n  enterNodeMap.forEach((nodes, root) => {\n
cloakAndComputeStyles(\n
    preStylesMap, this.driver, new Set(nodes), allPreStyleElements, PRE_STYLE);\n  });\n\n
replaceNodes.forEach(node => {\n    const post = postStylesMap.get(node);\n    const pre =
preStylesMap.get(node);\n    postStylesMap.set(\n    node, \n    new Map([...Array.from(post?.entries() ??
[]), ...Array.from(pre?.entries() ?? [])]);\n  });\n\n  const rootPlayers: TransitionAnimationPlayer[] = [];\n  const
subPlayers: TransitionAnimationPlayer[] = [];\n  const NO_PARENT_ANIMATION_ELEMENT_DETECTED =
{};\n  queuedInstructions.forEach(entry => {\n    const {element, player, instruction} = entry;\n    // this means
that it was never consumed by a parent animation which\n // means that it is independent and therefore should be
set for animation\n    if (subTimelines.has(element)) {\n    if (disabledElementsSet.has(element)) {\n
player.onDestroy(() => setStyles(element, instruction.toStyles));\n    player.disabled = true;\n
    player.overrideTotalTime(instruction.totalTime);\n    skippedPlayers.push(player);\n    return;\n
  }\n\n // this will flow up the DOM and query the map to figure out\n // if a parent animation has priority
over it. In the situation\n // that a parent is detected then it will cancel the loop. If\n // nothing is detected, or
it takes a few hops to find a parent,\n // then it will fill in the missing nodes and signal them as having\n // a
detected parent (or a NO_PARENT value via a special constant).\n    let parentWithAnimation: any =
NO_PARENT_ANIMATION_ELEMENT_DETECTED;\n    if (animationElementMap.size > 1) {\n    let
elm = element;\n    const parentsToAdd: any[] = [];\n    while (elm = elm.parentNode) {\n    const
detectedParent = animationElementMap.get(elm);\n    if (detectedParent) {\n    parentWithAnimation =
detectedParent;\n    break;\n
    }\n    parentsToAdd.push(elm);\n    }\n    parentsToAdd.forEach(parent =>
animationElementMap.set(parent, parentWithAnimation));\n    }\n\n    const innerPlayer =
this._buildAnimation(\n    player.namespaceId, instruction, allPreviousPlayersMap, skippedPlayersMap,
preStylesMap, \n    postStylesMap);\n    player.setRealPlayer(innerPlayer);\n    if
(parentWithAnimation === NO_PARENT_ANIMATION_ELEMENT_DETECTED) {\n
rootPlayers.push(player);\n    } else {\n    const parentPlayers =
this.playersByElement.get(parentWithAnimation);\n    if (parentPlayers && parentPlayers.length) {\n
player.parentPlayer = optimizeGroupPlayer(parentPlayers);\n    }\n    skippedPlayers.push(player);\n    }\n
  });\n

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    } else {\n      eraseStyles(element, instruction.fromStyles);\n      player.onDestroy(() => setStyles(element,\ninstruction.toStyles));\n      // there still might be a ancestor player animating\n      this\n      // element therefore we will still add it as a sub player\n      // even if its animation may be disabled\n      subPlayers.push(player);\n      if (disabledElementsSet.has(element)) {\n        skippedPlayers.push(player);\n      }\n    });\n    // find all of the sub players' corresponding inner animation players\n    subPlayers.forEach(player => {\n      // even if no players are found for a sub animation it\n      // will still complete itself after the next tick since it's Noop\n      const playersForElement = skippedPlayersMap.get(player.element);\n      if (playersForElement && playersForElement.length) {\n        const innerPlayer =\noptimizeGroupPlayer(playersForElement);\n        player.setRealPlayer(innerPlayer);\n      }\n    });\n    // the reason why we don't actually play the animation is\n    // because all that a skipped player is designed to do is to\n    // fire the start/done transition callback events\n    skippedPlayers.forEach(player\n=> {\n      if (player.parentPlayer) {\n        player.syncPlayerEvents(player.parentPlayer);\n      } else {\n        player.destroy();\n      }\n    });\n    // run through all of the queued removals and see if they\n    // were picked up by a query. If not then perform the removal\n    // operation right away unless a parent animation is ongoing.\n    for (let i = 0; i < allLeaveNodes.length; i++) {\n      const element = allLeaveNodes[i];\n      const details =\nelement[REMOVAL_FLAG] as ElementAnimationState;\n      removeClass(element, LEAVE_CLASSNAME);\n      // this means the element has a removal animation that is being\n      // taken care of and therefore the inner elements will hang around\n      // until that animation is over (or the parent queried animation)\n      if (details && details.hasAnimation) continue;\n      let players: TransitionAnimationPlayer[] = [];\n      // if this element is queried or if it contains queried children\n      // then we want for the element not to be removed from the page\n      // until the queried animations have finished\n      if (queriedElements.size) {\n        let queriedPlayerResults = queriedElements.get(element);\n        if (queriedPlayerResults && queriedPlayerResults.length) {\n          players.push(...queriedPlayerResults);\n        }\n        let queriedInnerElements = this.driver.query(element, NG_ANIMATING_SELECTOR, true);\n        for (let j = 0; j < queriedInnerElements.length; j++) {\n          let queriedPlayers =\nqueriedElements.get(queriedInnerElements[j]);\n          if (queriedPlayers && queriedPlayers.length) {\n            players.push(...queriedPlayers);\n          }\n        }\n        const activePlayers = players.filter(p => !p.destroyed);\n        if (activePlayers.length) {\n          removeNodesAfterAnimationDone(this, element, activePlayers);\n        } else {\n          this.processLeaveNode(element);\n        }\n      }\n      // this is required so the cleanup method doesn't remove them\n      allLeaveNodes.length = 0;\n      rootPlayers.forEach(player => {\n        this.players.push(player);\n        player.onDone(() => {\n          player.destroy();\n          const index = this.players.indexOf(player);\n          this.players.splice(index, 1);\n        });\n        player.play();\n      });\n      return rootPlayers;\n    }\n    elementContainsData(namespaceId: string, element: any) {\n      let containsData = false;\n      const details = element[REMOVAL_FLAG] as ElementAnimationState;\n      if (details && details.setForRemoval) containsData = true;\n      if (this.playersByElement.has(element)) containsData = true;\n      if (this.playersByQueriedElement.has(element)) containsData = true;\n      if (this.statesByElement.has(element)) containsData = true;\n      return this._fetchNamespace(namespaceId).elementContainsData(element) || containsData;\n    }\n    afterFlush(callback: () => any) {\n      this._flushFns.push(callback);\n    }\n    afterFlushAnimationsDone(callback: () => any) {\n      this._whenQuietFns.push(callback);\n    }\n    private _getPreviousPlayers(\n      element: string,\n      isQueriedElement: boolean,\n      namespaceId?: string,\n      triggerName?: string,\n      toStateValue?: any):\nTransitionAnimationPlayer[] {\n      let players: TransitionAnimationPlayer[] = [];\n      if (isQueriedElement) {\n        const queriedElementPlayers = this.playersByQueriedElement.get(element);\n        if (queriedElementPlayers) {\n          players = queriedElementPlayers;\n        }\n      } else {\n        const elementPlayers = this.playersByElement.get(element);\n        if (elementPlayers) {\n          const isRemovalAnimation = !toStateValue || toStateValue == VOID_VALUE;\n          elementPlayers.forEach(player => {\n            if (player.queued) return;\n            if (!isRemovalAnimation && player.triggerName != triggerName) return;\n            players.push(player);\n          });\n        }\n      }\n    }\n  }\n}

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    }\n  }\n  if (namespaceId || triggerName) {\n    players = players.filter(player => {\n      if (namespaceId && namespaceId !== player.namespaceId) return false;\n      if (triggerName && triggerName !== player.triggerName) return false;\n      return true;\n    });\n  }\n  return players;\n }\n\n private\n  _beforeAnimationBuild(\n    namespaceId: string, instruction: AnimationTransitionInstruction,\n    allPreviousPlayersMap: Map<any, TransitionAnimationPlayer[]>) {\n    const triggerName =\n      instruction.triggerName;\n    const rootElement = instruction.element;\n    // when a removal animation occurs,\n    ALL previous players are collected\n    // and destroyed (even if they are outside of the current namespace)\n    const\n      targetNameSpaceId: string|undefined =\n        instruction.isRemovalTransition ? undefined : namespaceId;\n    const\n      targetTriggerName: string|undefined =\n        instruction.isRemovalTransition ? undefined : triggerName;\n    for\n      (const timelineInstruction of instruction.timelines) {\n        const element = timelineInstruction.element;\n        const isQueriedElement = element !== rootElement;\n        const players =\n          getOrElseDefault(allPreviousPlayersMap, element, []);\n        const previousPlayers =\n          this._getPreviousPlayers(\n            element, isQueriedElement, targetNameSpaceId, targetTriggerName,\n            instruction.toState);\n        previousPlayers.forEach(player => {\n          const realPlayer = (player as\n            TransitionAnimationPlayer).getRealPlayer() as any;\n          if (realPlayer.beforeDestroy) {\n            realPlayer.beforeDestroy();\n          }\n          player.destroy();\n          players.push(player);\n        });\n      }\n    // this\n    needs to be done so that the PRE/POST styles can be\n    // computed properly without interfering with the previous\n    animation\n    eraseStyles(rootElement, instruction.fromStyles);\n  }\n\n private _buildAnimation(\n    namespaceId: string, instruction: AnimationTransitionInstruction,\n    allPreviousPlayersMap: Map<any,\n    TransitionAnimationPlayer[]>,\n    skippedPlayersMap: Map<any, AnimationPlayer[]>,\n    preStylesMap: Map<any, StyleDataMap>,\n    postStylesMap: Map<any, StyleDataMap>): AnimationPlayer {\n    const triggerName = instruction.triggerName;\n    const rootElement = instruction.element;\n    // we first run this\n    so that the previous animation player\n    // data can be passed into the successive animation players\n    const\n      allQueriedPlayers: TransitionAnimationPlayer[] = [];\n    const allConsumedElements = new Set<any>();\n    const\n      allSubElements = new Set<any>();\n    const allNewPlayers = instruction.timelines.map(timelineInstruction => {\n      const element = timelineInstruction.element;\n      allConsumedElements.add(element);\n      // FIXME (matsko):\n      make sure to-be-removed animations are removed properly\n      const details = element[REMOVAL_FLAG];\n      if (details && details.removedBeforeQueried)\n        return new NoopAnimationPlayer(timelineInstruction.duration,\n          timelineInstruction.delay);\n      const isQueriedElement = element !== rootElement;\n      const previousPlayers =\n        flattenGroupPlayers((allPreviousPlayersMap.get(element) ||\n        EMPTY_PLAYER_ARRAY)\n          .map(p => p.getRealPlayer()))\n          .filter(p => {\n            // the `element` is not apart of the AnimationPlayer definition, but\n            // Mock/WebAnimations\n            // use the element within their implementation. This will be added in Angular5 to\n            // AnimationPlayer\n            const pp = p as any;\n            return pp.element ? pp.element === element : false;\n          });\n      const\n        preStyles = preStylesMap.get(element);\n      const postStyles = postStylesMap.get(element);\n      const\n        keyframes = normalizeKeyframes(\n          this.driver, this._normalizer, element, timelineInstruction.keyframes,\n          preStyles,\n          postStyles);\n      const player = this._buildPlayer(timelineInstruction, keyframes,\n        previousPlayers);\n      // this means that\n      this particular player belongs to a sub trigger. It is\n      // important that we match this player up with the\n      corresponding (@trigger.listener)\n      if (timelineInstruction.subTimeline && skippedPlayersMap) {\n        allSubElements.add(element);\n      }\n      if (isQueriedElement) {\n        const wrappedPlayer = new\n          TransitionAnimationPlayer(namespaceId, triggerName, element);\n        wrappedPlayer.setRealPlayer(player);\n        allQueriedPlayers.push(wrappedPlayer);\n      }\n      return player;\n    });\n    allQueriedPlayers.forEach(player\n      => {\n        getOrElseDefault(this.playersByQueriedElement, player.element, []).push(player);\n        player.onDone(() => deleteOrUnsetInMap(this.playersByQueriedElement, player.element, player));\n      });\n    allConsumedElements.forEach(element => addClass(element, NG_ANIMATING_CLASSNAME));\n    const\n      player = optimizeGroupPlayer(allNewPlayers);\n    player.onDestroy(() => {\n      allConsumedElements.forEach(element =>

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removeClass(element, NG_ANIMATING_CLASSNAME));\n    setStyles(rootElement, instruction.toStyles);\n});\n\n // this basically makes all of the callbacks for sub element animations\n // be dependent on the upper\n players for when they finish\n allSubElements.forEach(element => {\n  getOrSetDefaultValue(skippedPlayersMap, element, []).push(player);\n });\n\n return player;\n }\n\n private\n _buildPlayer(\n   instruction: AnimationTimelineInstruction, keyframes: Array<StyleDataMap>,\n   previousPlayers: AnimationPlayer[]): AnimationPlayer {\n   if (keyframes.length > 0) {\n     return\n       this.driver.animate(\n         instruction.element, keyframes, instruction.duration, instruction.delay,\n         instruction.easing, previousPlayers);\n   }\n\n   // special case for when an empty transition|definition is provided\n   // ... there is no point in rendering an empty animation\n   return new NoopAnimationPlayer(instruction.duration,\n     instruction.delay);\n }\n}\n\nexport class TransitionAnimationPlayer implements AnimationPlayer {\n  private _player:\n  AnimationPlayer = new NoopAnimationPlayer();\n  private _containsRealPlayer = false;\n\n  private\n  _queuedCallbacks = new Map<string, ((event: any) => any)[]>();\n  public readonly destroyed = false;\n  //\n  TODO(issue/24571): remove '!'.\n  public parentPlayer!: AnimationPlayer;\n  public markedForDestroy: boolean\n  = false;\n  public disabled = false;\n\n  readonly queued: boolean = true;\n  public readonly totalTime: number =\n  0;\n\n  constructor(public namespaceId: string, public triggerName: string, public element: any) {\n\n  setRealPlayer(player: AnimationPlayer) {\n    if (this._containsRealPlayer) return;\n\n    this._player = player;\n    this._queuedCallbacks.forEach((callbacks, phase) => {\n      callbacks.forEach(callback => listenOnPlayer(player,\n        phase, undefined, callback));\n    });\n\n    this._queuedCallbacks.clear();\n    this._containsRealPlayer = true;\n    this.overrideTotalTime(player.totalTime);\n\n    (this as {queued: boolean}).queued = false;\n  }\n\n  getRealPlayer() {\n    return this._player;\n  }\n\n  overrideTotalTime(totalTime: number) {\n    (this as any).totalTime = totalTime;\n  }\n\n  syncPlayerEvents(player:\n  AnimationPlayer) {\n    const p = this._player as any;\n    if (p.triggerCallback) {\n      player.onStart(() =>\n      p.triggerCallback!('start'));\n    }\n\n    player.onDone(() => this.finish());\n    player.onDestroy(() => this.destroy());\n  }\n\n  private _queueEvent(name: string, callback: (event: any) => any): void {\n\n  getOrSetDefaultValue(this._queuedCallbacks, name, []).push(callback);\n }\n\n  onDone(fn: () => void): void {\n  if (this.queued) {\n    this._queueEvent('done', fn);\n  }\n\n  this._player.onDone(fn);\n }\n\n  onStart(fn: () =>\n  void): void {\n  if (this.queued) {\n    this._queueEvent('start', fn);\n  }\n\n  this._player.onStart(fn);\n }\n\n  onDestroy(fn: () => void): void {\n  if (this.queued) {\n\n    this._queueEvent('destroy', fn);\n  }\n\n  this._player.onDestroy(fn);\n }\n\n  init(): void {\n\n  this._player.init();\n }\n\n  hasStarted(): boolean {\n    return this.queued ? false : this._player.hasStarted();\n  }\n\n  play(): void {\n    !this.queued && this._player.play();\n  }\n\n  pause(): void {\n    !this.queued &&\n    this._player.pause();\n  }\n\n  restart(): void {\n    !this.queued && this._player.restart();\n  }\n\n  finish(): void {\n    this._player.finish();\n  }\n\n  destroy(): void {\n    (this as {destroyed: boolean}).destroyed = true;\n    this._player.destroy();\n  }\n\n  reset(): void {\n    !this.queued && this._player.reset();\n  }\n\n  setPosition(p: any):\n  void {\n  if (!this.queued) {\n    this._player.setPosition(p);\n  }\n\n  }\n\n  getPosition(): number {\n    return\n    this.queued ? 0 : this._player.getPosition();\n  }\n\n  /** @internal */\n  triggerCallback(phaseName: string): void\n  {\n    const p = this._player as any;\n    if (p.triggerCallback)\n    {\n      p.triggerCallback(phaseName);\n    }\n  }\n\n  function deleteOrUnsetInMap<T, V>(map: Map<T, V[]>,\n  key: T, value: V) {\n    let currentValues = map.get(key);\n    if (currentValues) {\n      if (currentValues.length)\n      {\n        const index = currentValues.indexOf(value);\n        currentValues.splice(index, 1);\n      }\n\n      if (currentValues.length\n      == 0) {\n        map.delete(key);\n      }\n    }\n\n    return currentValues;\n  }\n\n  function normalizeTriggerValue(value: any):\n  any {\n  // we use `!= null` here because it's the most simple\n  // way to test against a \"falsy\" value without\n  mixing\n  // in empty strings or a zero value. DO NOT OPTIMIZE.\n  return value != null ? value :\n  null;\n }\n\n  function isElementNode(node: any) {\n    return node && node['nodeType'] === 1;\n  }\n\n  function\n  isTriggerEventValid(eventName: string): boolean {\n    return eventName == 'start' || eventName ==\n    'done';\n  }\n\n  function cloakElement(element: any, value?: string) {\n    const oldValue = element.style.display;\n
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    element.style.display = value != null ? value : 'none';\n    return oldValue;\n}\n\nfunction
cloakAndComputeStyles(\n  valuesMap: Map<any, StyleDataMap>, driver: AnimationDriver, elements:
Set<any>,\n  elementPropsMap: Map<any, Set<string>>, defaultStyle: string): any[] {\n  const cloakVals: string[]
= [];\n  elements.forEach(element => cloakVals.push(cloakElement(element)));\n\n  const failedElements: any[] =
[];\n\n  elementPropsMap.forEach((props: Set<string>, element: any) => {\n    const styles: StyleDataMap = new
Map();\n    props.forEach(prop => {\n      const value = driver.computeStyle(element, prop, defaultStyle);\n
styles.set(prop, value);\n\n      // there is no easy way to detect this because a sub element could be removed\n      //
by a parent animation element being detached.\n      if (!value || value.length == 0) {\n
element[REMOVAL_FLAG] = NULL_REMOVED_QUERIED_STATE;\n      failedElements.push(element);\n
}\n    });\n    valuesMap.set(element,
styles);\n  });\n\n  // we use a index variable here since Set.forEach(a, i) does not return\n  // an index value for the
closure (but instead just the value)\n  let i = 0;\n  elements.forEach(element => cloakElement(element,
cloakVals[i++]));\n\n  return failedElements;\n}\n\n/*\nSince the Angular renderer code will return a collection of
inserted\nnodes in all areas of a DOM tree, it's up to this algorithm to figure\nout which nodes are roots for each
animation @trigger.\n\nBy placing each inserted node into a Set and traversing upwards, it\nis possible to find the
@trigger elements and well any direct *star\ninsertion nodes, if a @trigger root is found then the enter element\nis
placed into the Map[@trigger] spot.\n*/\nfunction buildRootMap(roots: any[], nodes: any[]): Map<any, any[]> {\n
const rootMap = new Map<any, any[]>();\n  roots.forEach(root => rootMap.set(root, []));\n  if (nodes.length == 0)
return rootMap;\n\n  const NULL_NODE = 1;\n  const nodeSet = new Set(nodes);\n
const localRootMap = new Map<any, any>();\n\n  function getRoot(node: any): any {\n    if (!node) return
NULL_NODE;\n\n    let root = localRootMap.get(node);\n    if (root) return root;\n\n    const parent =
node.parentNode;\n    if (rootMap.has(parent)) { // ngIf inside @trigger\n      root = parent;\n    } else if
(nodeSet.has(parent)) { // ngIf inside ngIf\n      root = NULL_NODE;\n    } else { // recurse upwards\n      root =
getRoot(parent);\n    }\n\n    localRootMap.set(node, root);\n    return root;\n  }\n\n  nodes.forEach(node => {\n
const root = getRoot(node);\n    if (root !== NULL_NODE) {\n      rootMap.get(root)!.push(node);\n    }\n  });\n\n
return rootMap;\n}\n\nfunction addClass(element: any, className: string) {\n
element.classList?.add(className);\n}\n\nfunction removeClass(element: any, className: string) {\n
element.classList?.remove(className);\n}\n\nfunction removeNodesAfterAnimationDone(\n  engine:
TransitionAnimationEngine, element: any, players: AnimationPlayer[])
{\n  optimizeGroupPlayer(players).onDone() => engine.processLeaveNode(element));\n}\n\nfunction
flattenGroupPlayers(players: AnimationPlayer[]): AnimationPlayer[] {\n  const finalPlayers: AnimationPlayer[] =
[];\n  _flattenGroupPlayersRecur(players, finalPlayers);\n  return finalPlayers;\n}\n\nfunction
_flattenGroupPlayersRecur(players: AnimationPlayer[], finalPlayers: AnimationPlayer[]) {\n  for (let i = 0; i <
players.length; i++) {\n    const player = players[i];\n    if (player instanceof AnimationGroupPlayer) {\n
_flattenGroupPlayersRecur(player.players, finalPlayers);\n    } else {\n      finalPlayers.push(player);\n    }\n
}\n}\n\nfunction objEquals(a: {[key: string]: any}, b: {[key: string]: any}): boolean {\n  const k1 = Object.keys(a);\n
const k2 = Object.keys(b);\n  if (k1.length != k2.length) return false;\n  for (let i = 0; i < k1.length; i++) {\n
const prop = k1[i];\n    if (!b.hasOwnProperty(prop) || a[prop] !== b[prop]) return false;\n  }\n  return
true;\n}\n\nfunction replacePostStylesAsPre(\n  element: any, allPreStyleElements: Map<any, Set<string>>,\n
allPostStyleElements: Map<any, Set<string>>): boolean {\n  const postEntry =
allPostStyleElements.get(element);\n  if (!postEntry) return false;\n\n  let preEntry =
allPreStyleElements.get(element);\n  if (preEntry) {\n    postEntry.forEach(data => preEntry!.add(data));\n  } else
{\n    allPreStyleElements.set(element, postEntry);\n  }\n\n  allPostStyleElements.delete(element);\n  return
true;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport { AnimationMetadata, AnimationPlayer, AnimationTriggerMetadata } from
'@angular/animations';\nimport { TriggerAst } from './dsl/animation_ast';\nimport { buildAnimationAst } from
'./dsl/animation_ast_builder';\nimport { AnimationTrigger, buildTrigger } from './dsl/animation_trigger';\nimport

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{AnimationStyleNormalizer} from './dsl/style_normalization/animation_style_normalizer';\nimport
{triggerBuildFailed} from './error_helpers';\nimport {warnTriggerBuild} from './warning_helpers';\nimport
{AnimationDriver} from './animation_driver';\nimport {parseTimelineCommand} from './shared';\nimport
{TimelineAnimationEngine} from './timeline_animation_engine';\nimport {TransitionAnimationEngine} from
 './transition_animation_engine';\n\nexport class AnimationEngine {\n  private _transitionEngine:
TransitionAnimationEngine;\n  private _timelineEngine: TimelineAnimationEngine;\n\n  private _triggerCache:
{[key: string]: AnimationTrigger} = {};\n\n  // this method is designed to be overridden by the code that uses this
engine\n  public onRemovalComplete = (element: any, context: any) => {};\n\n  constructor(\n    private
bodyNode: any, private _driver: AnimationDriver,\n    private _normalizer: AnimationStyleNormalizer) {\n
this._transitionEngine
= new TransitionAnimationEngine(bodyNode, _driver, _normalizer);\n  this._timelineEngine = new
TimelineAnimationEngine(bodyNode, _driver, _normalizer);\n\n  this._transitionEngine.onRemovalComplete =
(element: any, context: any) =>\n    this.onRemovalComplete(element, context);\n  }\n\n  registerTrigger(\n
componentId: string, namespaceId: string, hostElement: any, name: string,\n  metadata:
AnimationTriggerMetadata): void {\n    const cacheKey = componentId + '-' + name;\n    let trigger =
this._triggerCache[cacheKey];\n    if (!trigger) {\n      const errors: Error[] = [];\n      const warnings: string[] = [];\n
      const ast = buildAnimationAst(\n        this._driver, metadata as AnimationMetadata, errors, warnings) as
TriggerAst;\n      if (errors.length) {\n        throw triggerBuildFailed(name, errors);\n      }\n      if (warnings.length)
{\n        warnTriggerBuild(name, warnings);\n      }\n      trigger = buildTrigger(name, ast, this._normalizer);\n
      this._triggerCache[cacheKey] = trigger;\n    }\n    this._transitionEngine.registerTrigger(namespaceId, name,
trigger);\n  }\n\n  register(namespaceId: string, hostElement: any) {\n    this._transitionEngine.register(namespaceId,
hostElement);\n  }\n\n  destroy(namespaceId: string, context: any) {\n    this._transitionEngine.destroy(namespaceId,
context);\n  }\n\n  onInsert(namespaceId: string, element: any, parent: any, insertBefore: boolean): void {\n
this._transitionEngine.insertNode(namespaceId, element, parent, insertBefore);\n  }\n\n  onRemove(namespaceId:
string, element: any, context: any, isHostElement?: boolean): void {\n
this._transitionEngine.removeNode(namespaceId, element, isHostElement || false, context);\n  }\n\n  disableAnimations(element: any, disable: boolean) {\n
this._transitionEngine.markElementAsDisabled(element, disable);\n  }\n\n  process(namespaceId: string, element: any, property: string, value: any) {\n
if (property.charAt(0) == '@') {\n
    const [id, action] = parseTimelineCommand(property);\n    const args = value as any[];\n
this._timelineEngine.command(id, element, action, args);\n  } else {\n
this._transitionEngine.trigger(namespaceId, element, property, value);\n  }\n  }\n\n  listen(\n    namespaceId:
string, element: any, eventName: string, eventPhase: string,\n    callback: (event: any) => any): () => any {\n
// @@listen\n    if (eventName.charAt(0) == '@') {\n      const [id, action] = parseTimelineCommand(eventName);\n
return this._timelineEngine.listen(id, element, action, callback);\n    }\n    return
this._transitionEngine.listen(namespaceId, element, eventName, eventPhase, callback);\n  }\n\n  flush(microtaskId:
number = -1): void {\n    this._transitionEngine.flush(microtaskId);\n  }\n\n  get players(): AnimationPlayer[] {\n
return (this._transitionEngine.players as AnimationPlayer[])\n    .concat(this._timelineEngine.players as
AnimationPlayer[]);\n  }\n\n  whenRenderingDone():
Promise<any> {\n    return this._transitionEngine.whenRenderingDone();\n  }\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {StyleDataMap} from
'@angular/animations';\nimport {eraseStyles, setStyles} from './util';\n\n/**\n * Returns an instance of
`SpecialCasedStyles` if and when any special (non animateable) styles are\n * detected.\n * In CSS there exist
properties that cannot be animated within a keyframe animation\n * (whether it be via CSS keyframes or web-
animations) and the animation implementation\n * will ignore them. This function is designed to detect those special
cased styles and\n * return a container that will be executed at the start and end of the animation.\n * @returns
an instance of `SpecialCasedStyles` if any special styles are detected otherwise `null`\n */\nexport

```

```

function packageNonAnimatableStyles(\n  element: any, styles: StyleDataMap|Array<StyleDataMap>):
SpecialCasedStyles|null {\n  let startStyles: StyleDataMap|null = null;\n  let endStyles: StyleDataMap|null = null;\n
if (Array.isArray(styles) && styles.length) {\n    startStyles = filterNonAnimatableStyles(styles[0]);\n    if
(styles.length > 1) {\n      endStyles = filterNonAnimatableStyles(styles[styles.length - 1]);\n    }\n  } else if (styles
instanceof Map) {\n    startStyles = filterNonAnimatableStyles(styles);\n  }\n  return (startStyles || endStyles) ?
new SpecialCasedStyles(element, startStyles, endStyles) : null;\n}\n\n/**\n * Designed to
be executed during a keyframe-based animation to apply any special-cased styles.\n * When started (when the
`start()` method is run) then the provided `startStyles`\n * will be applied. When finished (when the `finish()`
method is called) the\n * `endStyles` will be applied as well any any starting
styles. Finally when\n * `destroy()` is called then all styles will be removed.\n */\nexport class SpecialCasedStyles
{\n  static initialStylesByElement = (/* @__PURE__ */ new WeakMap<any, StyleDataMap>());\n  private _state
= SpecialCasedStylesState.Pending;\n  private _initialStyles!: StyleDataMap;\n\n  constructor(\n    private
_element: any, private _startStyles: StyleDataMap|null, private _endStyles: StyleDataMap|null) {\n    let
initialStyles = SpecialCasedStyles.initialStylesByElement.get(_element);\n    if (!initialStyles) {\n
SpecialCasedStyles.initialStylesByElement.set(_element, initialStyles = new Map());\n    }\n    this._initialStyles =
initialStyles;\n  }\n\n  start() {\n    if (this._state < SpecialCasedStylesState.Started) {\n      if (this._startStyles) {\n
setStyles(this._element, this._startStyles, this._initialStyles);\n      }\n      this._state =
SpecialCasedStylesState.Started;\n    }\n  }\n\n  finish() {\n    this.start();\n
if (this._state < SpecialCasedStylesState.Finished) {\n      setStyles(this._element, this._initialStyles);\n      if
(this._endStyles) {\n        setStyles(this._element, this._endStyles);\n        this._endStyles = null;\n      }\n
this._state = SpecialCasedStylesState.Started;\n    }\n  }\n\n  destroy() {\n    this.finish();\n    if (this._state <
SpecialCasedStylesState.Destroyed) {\n      SpecialCasedStyles.initialStylesByElement.delete(this._element);\n      if
(this._startStyles) {\n        eraseStyles(this._element, this._startStyles);\n        this._endStyles = null;\n      }\n      if
(this._endStyles) {\n        eraseStyles(this._element, this._endStyles);\n        this._endStyles = null;\n      }\n
setStyles(this._element, this._initialStyles);\n      this._state = SpecialCasedStylesState.Destroyed;\n    }\n  }\n}\n\n/**\n * An enum of states reflective of what the status of `SpecialCasedStyles` is.\n * Depending on
how `SpecialCasedStyles` is interacted with,
the start and end\n * styles may not be applied in the same way. This enum ensures that if and when\n * the ending
styles are applied then the starting styles are applied. It is\n * also used to reflect what the current status of the
special cased styles are\n * which helps prevent the starting/ending styles not be applied twice. It is\n * also used to
cleanup the styles once `SpecialCasedStyles` is destroyed.\n */\nconst enum SpecialCasedStylesState {\n  Pending =
0,\n  Started = 1,\n  Finished = 2,\n  Destroyed = 3,\n}\n\nfunction filterNonAnimatableStyles(styles:
StyleDataMap): StyleDataMap|null {\n  let result: StyleDataMap|null = null;\n  styles.forEach((val, prop) => {\n    if
(isNonAnimatableStyle(prop)) {\n      result = result || new Map();\n      result.set(prop, val);\n    }\n  });\n  return
result;\n}\n\nfunction isNonAnimatableStyle(prop: string) {\n  return prop === 'display' || prop ===
'position';\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { AnimationPlayer, StyleDataMap } from '@angular/animations';\nimport
{ computeStyle } from '../util';\nimport { SpecialCasedStyles } from './special_cased_styles';\nimport
{ DOMAnimation } from './dom_animation';\n\nexport class WebAnimationsPlayer implements AnimationPlayer {\n  private
_onDoneFns: Function[] = [];\n  private _onStartFns: Function[] = [];\n  private _onDestroyFns: Function[] =
[];\n  private _duration: number;\n  private _delay: number;\n  private _initialized = false;\n  private _finished =
false;\n  private _started = false;\n  private _destroyed = false;\n  private _finalKeyframe?: StyleDataMap;\n\n  // the
following original fns are persistent copies of the _onStartFns and _onDoneFns\n // and are used to reset the fns to
their original values upon reset()\n // (since the _onStartFns and _onDoneFns get deleted
after they are called)\n  private _originalOnDoneFns: Function[] = [];\n  private _originalOnStartFns: Function[] =
[];\n\n  // TODO(issue/24571): remove '!'.\n  public readonly domPlayer!: DOMAnimation;\n  public time = 0;\n  public
parentPlayer: AnimationPlayer|null = null;\n  public currentSnapshot: StyleDataMap = new Map();\n}

```

```

constructor(\n  public element: any, public keyframes: Array<StyleDataMap>,\n  public options: {[key: string]:\n  string|number},\n  private _specialStyles?: SpecialCasedStyles|null) {\n  this._duration =\n  <number>options['duration'];\n  this._delay = <number>options['delay'] || 0;\n  this.time = this._duration +\n  this._delay;\n  }\n\n  private _onFinish() {\n  if (!this._finished) {\n  this._finished = true;\n  this._onDoneFns.forEach(fn => fn());\n  this._onDoneFns = [];\n  }\n  }\n\n  init(): void {\n  this._buildPlayer();\n  this._preparePlayerBeforeStart();\n  }\n\n  private _buildPlayer(): void {\n  if\n  (this._initialized)\n  return;\n  this._initialized = true;\n\n  const keyframes = this.keyframes;\n  (this as {domPlayer:\n  DOMAnimation}).domPlayer =\n  this._triggerWebAnimation(this.element, keyframes, this.options);\n  this._finalKeyframe = keyframes.length ? keyframes[keyframes.length - 1] : new Map();\n  this.domPlayer.addEventListener('finish', () => this._onFinish());\n  }\n\n  private _preparePlayerBeforeStart() {\n  // this is required so that the player doesn't start to animate right away\n  if (this._delay) {\n  this._resetDomPlayerState();\n  } else {\n  this.domPlayer.pause();\n  }\n  }\n\n  private\n  _convertKeyframesToObject(keyframes: Array<StyleDataMap>): any[] {\n  const kfs: any[] = [];\n  keyframes.forEach(frame => {\n  kfs.push(Object.fromEntries(frame));\n  });\n  return kfs;\n  }\n\n  /**\n  @internal *\n  _triggerWebAnimation(element: any, keyframes: Array<StyleDataMap>, options: any):\n  DOMAnimation {\n  // jscompiler doesn't seem\n  to know animate is a native property because it's not fully\n  // supported yet across common browsers (we polyfill\n  it for Edge/Safari) [CL #143630929]\n  return element['animate'](this._convertKeyframesToObject(keyframes),\n  options) as DOMAnimation;\n  }\n\n  onStart(fn: () => void): void {\n  this._originalOnStartFns.push(fn);\n  this._onStartFns.push(fn);\n  }\n\n  onDone(fn: () => void): void {\n  this._originalOnDoneFns.push(fn);\n  this._onDoneFns.push(fn);\n  }\n\n  onDestroy(fn: () => void): void {\n  this._onDestroyFns.push(fn);\n  }\n\n  play(): void {\n  this._buildPlayer();\n  if (!this.hasStarted()) {\n  this._onStartFns.forEach(fn => fn());\n  this._onStartFns = [];\n  this._started = true;\n  if (this._specialStyles) {\n  this._specialStyles.start();\n  }\n  }\n  this.domPlayer.play();\n  }\n\n  pause(): void {\n  this.init();\n  this.domPlayer.pause();\n  }\n\n  finish(): void {\n  this.init();\n  if (this._specialStyles)\n  {\n  this._specialStyles.finish();\n  }\n  this._onFinish();\n  this.domPlayer.finish();\n  }\n\n  reset(): void {\n  this._resetDomPlayerState();\n  this._destroyed = false;\n  this._finished = false;\n  this._started = false;\n  this._onStartFns = this._originalOnStartFns;\n  this._onDoneFns = this._originalOnDoneFns;\n  }\n\n  private\n  _resetDomPlayerState() {\n  if (this.domPlayer) {\n  this.domPlayer.cancel();\n  }\n  }\n\n  restart(): void {\n  this.reset();\n  this.play();\n  }\n\n  hasStarted(): boolean {\n  return this._started;\n  }\n\n  destroy(): void {\n  if\n  (!this._destroyed) {\n  this._destroyed = true;\n  this._resetDomPlayerState();\n  this._onFinish();\n  if\n  (this._specialStyles) {\n  this._specialStyles.destroy();\n  }\n  this._onDestroyFns.forEach(fn => fn());\n  this._onDestroyFns = [];\n  }\n  }\n\n  setPosition(p: number): void {\n  if (this.domPlayer === undefined) {\n  this.init();\n  }\n  this.domPlayer.currentTime = p * this.time;\n  }\n\n  getPosition(): number {\n  return\n  this.domPlayer.currentTime / this.time;\n  }\n\n  get totalTime(): number {\n  return this._delay + this._duration;\n  }\n\n  beforeDestroy() {\n  const styles: StyleDataMap = new Map();\n  if (this.hasStarted())\n  // note: this\n  code is invoked only when the `play` function was called prior to this\n  // (thus `hasStarted` returns true), this\n  implies that the code that initializes\n  // `_finalKeyframe` has also been executed and the non-null assertion can\n  be safely used here\n  const finalKeyframe = this._finalKeyframe!;\n  finalKeyframe.forEach((val, prop) => {\n  if (prop !== 'offset') {\n  styles.set(prop, this._finished ? val : computeStyle(this.element, prop));\n  }\n  });\n  }\n  this.currentSnapshot = styles;\n  }\n\n  /** @internal *\n  triggerCallback(phaseName: string): void\n  {\n  const methods = phaseName\n  === 'start' ? this._onStartFns : this._onDoneFns;\n  methods.forEach(fn => fn());\n  methods.length = 0;\n  }\n  }\n  }"/**\n  *\n  @license\n  * Copyright Google LLC All Rights Reserved.\n  *\n  * Use of this source code is\n  governed by an MIT-style license that can be\n  * found in the LICENSE file at https://angular.io/license\n  *\n  */\n  import { AnimationPlayer, StyleDataMap } from '@angular/animations';\n  }

```

```

{allowPreviousPlayerStylesMerge, balancePreviousStylesIntoKeyframes, camelCaseToDashCase, copyStyles,
normalizeKeyframes} from './../util';\nimport {AnimationDriver} from './animation_driver';\nimport
{containsElement, getParentElement, invokeQuery, validateStyleProperty, validateWebAnimatableStyleProperty}
from './shared';\nimport {packageNonAnimatableStyles} from './special_cased_styles';\nimport
{WebAnimationsPlayer} from './web_animations_player';\n\nexport class WebAnimationsDriver implements
AnimationDriver {\n  validateStyleProperty(prop: string): boolean {\n    // Perform
actual validation in dev mode only, in prod mode this check is a noop.\n    if (typeof ngDevMode === 'undefined' ||
ngDevMode) {\n      return validateStyleProperty(prop);\n    }\n    return true;\n  }\n\n  validateAnimatableStyleProperty(prop: string): boolean {\n    // Perform actual validation in dev mode only, in prod
mode this check is a noop.\n    if (typeof ngDevMode === 'undefined' || ngDevMode) {\n      const cssProp =
camelCaseToDashCase(prop);\n      return validateWebAnimatableStyleProperty(cssProp);\n    }\n    return true;\n  }\n\n  matchesElement(_element: any, _selector: string): boolean {\n    // This method is deprecated and no longer in
use so we return false.\n    return false;\n  }\n\n  containsElement(elm1: any, elm2: any): boolean {\n    return
containsElement(elm1, elm2);\n  }\n\n  getParentElement(element: unknown): unknown {\n    return
getParentElement(element);\n  }\n\n  query(element: any, selector: string, multi: boolean): any[] {\n    return
invokeQuery(element,
selector, multi);\n  }\n\n  computeStyle(element: any, prop: string, defaultValue?: string): string {\n    return
(window.getComputedStyle(element) as any)[prop] as string;\n  }\n\n  animate(\n    element: any, keyframes:
Array<Map<string, string|number>>, duration: number, delay: number,\n    easing: string, previousPlayers:
AnimationPlayer[] = []): AnimationPlayer {\n    const fill = delay == 0 ? 'both' : 'forwards';\n    const playerOptions:
{[key: string]: string|number} = {duration, delay, fill};\n    // we check for this to avoid having a null|undefined
value be present\n    // for the easing (which results in an error for certain browsers #9752)\n    if (easing) {\n
playerOptions['easing'] = easing;\n    }\n\n    const previousStyles: StyleDataMap = new Map();\n    const
previousWebAnimationPlayers = <WebAnimationsPlayer[]>previousPlayers.filter(\n      player => player
instanceof WebAnimationsPlayer);\n    if (allowPreviousPlayerStylesMerge(duration, delay))\n      {\n        previousWebAnimationPlayers.forEach(player => {\n          player.currentSnapshot.forEach((val, prop) =>
previousStyles.set(prop, val));\n        });\n      }\n\n    let _keyframes = normalizeKeyframes(keyframes).map(styles =>
copyStyles(styles));\n    _keyframes = balancePreviousStylesIntoKeyframes(element, _keyframes,
previousStyles);\n    const specialStyles = packageNonAnimatableStyles(element, _keyframes);\n    return new
WebAnimationsPlayer(element, _keyframes, playerOptions, specialStyles);\n  }\n}\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport {Animation as Animation} from
'./dsl/animation';\nexport {AnimationStyleNormalizer as AnimationStyleNormalizer,
NoopAnimationStyleNormalizer as NoopAnimationStyleNormalizer} from
'./dsl/style_normalization/animation_style_normalizer';\nexport {WebAnimationsStyleNormalizer
as WebAnimationsStyleNormalizer} from './dsl/style_normalization/web_animations_style_normalizer';\nexport
{NoopAnimationDriver as NoopAnimationDriver} from './render/animation_driver';\nexport {AnimationEngine as
AnimationEngine} from './render/animation_engine_next';\nexport {containsElement as containsElement,
getParentElement as getParentElement, invokeQuery as invokeQuery, validateStyleProperty as
validateStyleProperty} from './render/shared';\nexport {WebAnimationsDriver as WebAnimationsDriver} from
'./render/web_animations/web_animations_driver';\nexport {WebAnimationsPlayer as WebAnimationsPlayer} from
'./render/web_animations/web_animations_player';\nexport {allowPreviousPlayerStylesMerge as
allowPreviousPlayerStylesMerge, normalizeKeyframes as normalizeKeyframes} from './util';\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file
at https://angular.io/license\n */\n\n * @module\n * @description\n * Entry point for all animation APIs of the
animation browser package.\n */\n\nexport {AnimationDriver} from './render/animation_driver';\nexport * from
'./private_export';\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source

```

```
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n * @module\n * @description\n * Entry point for all public APIs of this package.\n *\n * from\n './src/browser';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source\n code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n // This file is not used to build this module. It is only used during editing\n // by the TypeScript language\n service and during build for verification. `ngc` replaces this file with production index.ts\n\n when it rewrites private symbol\n // names.\n\n * from './public_api';\n", "/*\n * Generated bundle index. Do\n not edit.\n *\n * from\n './index';\n"], "names": ["RuntimeError", "normalizeKeyframes", "PRE_STYLE", "AnimationGroupPlayer"], "mapping\n s": ";;;;;;;;;AAAA;;;;;;;;;AAMG;AAMH,MAAM,UAAU,GAAG,OAAO,CAAC;AAErB,SAAU,kBAaKB,CAAC,GA\n AkB,EAAA;IACnD,OAAO,IAAIA,aAAY,CAEnB,IAAA,8CAAA,SAAS,IAAI,CAA8B,2BAAA,EAAA,GAAG,C\n AAe,aAAA,CAAA,CAAC,CAAC;AACrE,CAAC;SAEe,iBAaIB,GAAA;AAC/B,IAAA,OAAO,IAAIA,aAAY,CA\n AA,IAAA,6CAEnB,SAAS,IAAI,kEAAkE,CAAC,CAAC;AACvF,CAAC;SAEe,kBAaKB,GAAA;AAChC,IAAA,O\n AAO,IAAIA,aAAY,CAAA,IAAA,8CAEnB,SAAS,IAAI,+DAA+D,CAAC,CAAC;AACpF,CAAC;AAEK,SAAU,k\n BAaKB,CAAC,OAAe,EAAA;IACbD,OAAO,IAAIA,aAAY,CAAA,IAAA,8CAEnB,SAAS;QAAC,CAA+C,4CAA\n A,EAAA,OAAO,CAA8B,4BAAA,CAAA,CAAC,CAAC;AAChG,CAAC;AAEK,SAAU,iBAaIB,CAAC,OAAe,E\n AAA;IAC/C,OAAO,IAAIA,aAAY,CAEnB,IAAA,6CAAA,SAAS,IAAI,CAaKD,+CAAA,EAAA,OAAO,CAAE,C\n AAA,CAAC,CAAC;AAChF,CAAC;AAEK,SAAU,eAAe,CAAC,QAAgB,EAAA;IAC9C,OAAO,IAAIA,aAAY,C\n AEnB,IAAA,2CAAA,SAAS,IAAI,CAA8C,2CAAA,EAAA,QAAQ,CAAE,CAAA,CAAC,CAAC;AAC7E,CAAC;\n AAEE,SAAA,mBAaMB,CAAC,oBAA4B,EAAE,KAAa,EAAA;IAC7E,OAAO,IAAIA,aAAY,CAAA,IAAA,gDAE\n nB,SAAS,IAAI,CAAuC,oCAAA,EAAA,oBAAoB,CAAI,CAAA,EAAA,KAAK,CAAE,CAAA,CAAC,CAAC;AA\n C3F,CAAC;SAEe,cAAc,GAAA;IAC5B,OAAO,IAAIA,aAAY,CAAA,IAAA,yCAEnB,SAAS;AAAC,QAAA,wFA\n AwF,CAAC,CAAC;AACpG,CAAC;SAEe,iBAaIB,GAAA;AAC/B,IAAA,OAAO,IAAIA,aAAY,CAAA,IAAA,4C\n AEnB,SAAS,IAAI,yEAAyE,CAAC,CAAC;AAC9F,CAAC;AAEE,SAAA,YAAy,CAAC,YAAoB,EAAE,WAAqB,\n EAAA;IACtE,OAAO,IAAIA,aAAY,CAAA,IAAA,uCAEnB,SAAS;QAAC,CACI,OAAA,EAAA,YAAy,CACZ,8E\n AAA,EAAA,WAAW,CAAC,IAAI,CAAC,IAAI,CAAC,CAAE,CAAA,CAAC,CAAC;AACxC,CAAC;AAEK,SAA\n U,iBAaIB,CAAC,KAAa,EAAA;IAC7C,OAAO,IAAIA,aAAY,CAEnB,IAAA,6CAAA,SAAS,IAAI,CAAmC,gCA\n AA,EAAA,KAAK,CAaKB,gBAAA,CAAA,CAAC,CAAC;AAC/E,CAAC;AAEK,SAAU,eAAe,CAAC,IAAY,EA\n AA;IAC1C,OAAO,IAAIA,aAAY,CAAA,IAAA,0CAEnB,SAAS;QAAC,CACI,iCAAA,EAAA,IAAI,CAaKD,gDA\n AA,CAAA,CAAC,CAAC;AACtE,CAAC;AAEK,SAAU,wBAaWB,CACpC,IAAY,EAAE,UAAKB,EAAE,QAAgB\n ,EAAE,WAAmB,EACvE,SAaIB,EAAA;IACnB,OAAO,IAAIA,aAAY,CAAA,IAAA,oDAEnB,SAAS;QAAC,CA\n AqB,kBAAA,EAAA,IAAI,CAAuC,oCAAA,EAAA,UAAU,CACtE,SAAA,EAAA,QAAQ,CACR,yEAAA,EAAA,\n WAAW,CAAY,SAAA,EAAA,SAAS,CAAK,GAAA,CAAA,CAAC,CAAC;AACrD,CAAC;SAEe,gBAAgB,GAA\n A;AAC9B,IAAA,OAAO,IAAIA,aAAY,CAAA,IAAA,2CAEnB,SAAS,IAAI,CAAA,wDAAA,CAA0D,CAAC,CA\n AC;AAC/E,CAAC;SAEe,aAAa,GAAA;AAC3B,IAAA,OAAO,IAAIA,aAAY,CAAA,IAAA,wCAEnB,SAAS,IAAI,\n CAAA,2DAAA,CAA6D,CAAC,CAAC;AACIF,CAAC;SAEe,yBAAYB,GAAA;AACvC,IAAA,OAAO,IAAIA,aA\n AY,CAAA,IAAA,uDAEnB,SAAS,IAAI,CAAA,oDAAA,CAAsD,CAAC,CAAC;AAC3E,CAAC;SAEe,uBAAuB,\n GAAA;AACrC,IAAA,OAAO,IAAIA,aAAY,CAAA,IAAA,mDAEnB,SAAS,IAAI,CAAA,qEAAA,CAAuE,CAAC,\n CAAC;AAC5F,CAAC;SAEe,cAAc,GAAA;AAC5B,IAAA,OAAO,IAAIA,aAAY,CAAA,IAAA,yCAEnB,SAAS,I\n AAI,CAAA,4CAAA,CAA8C,CAAC,CAAC;AACnE,CAAC;AAEK,SAAU,YAAy,CAAC,QAAgB,EAAA;IAC3C,\n OAAO,IAAIA,aAAY,CAAA,IAAA,uCAEnB,SAAS;AAAC,QAAA,CAAA,SAAA,EAAy,QAAQ,CAAA,2CAAA,\n EAChB,QAAQ,CAAA,oDAAA,CAAsD,CAAC,CAAC;AAC9E,CAAC;AAEK,SAAU,iBAaIB,CAAC,IAAY,EA\n A;IAC5C,OAAO,IAAIA,aAAY,CAEnB,IAAA,4CAAA,SAAS,IAAI,CAAuC,oCAAA,EAAA,IAAI,CAAOB,kBAA\n A,CAAA,CAAC,CAAC;AACpF,CAAC;AAEK,SAAU,sBAAsB,CAAC,KAAa,EAAA;IACID,OAAO,IAAIA,aAA\n Y,CAEnB,IAAA,kDAAA,SAAS,IAAI,CAA+B,4BAAA,EAAA,KAAK,CAAOB,kBAAA,CAAA,CAAC,CAAC;A\n AC7E,CAAC;AAEK,SAAU,gBAAgB,CAAC,MAAe,EAAA;IAC9C,OAAO,IAAIA,aAAY,CAAA,IAAA,2CAEnB\n ,SAAS,IAAI,iCAAiC,MAAM,CAAC,GAAG,CAAC,GAAG,IAAI,GAAG,CAAC,OAAO,CAAC,CAAC,IAAI,CA\n AC,IAAI,CAAC,CAAE,CAAA,CAAC,CAAC;AACjG,CAAC;AAEK,SAAU,cAAc,CAAC,MAAe,EAAA;IAC5C,
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* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license\n *\nimport {RuntimeError as RuntimeError} from '@angular/core';\nimport {RuntimeErrorCode} from './errors';\nconst LINE_START = \n\nexport function invalidTimingValue(exp: string|number): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_TIMING_VALUE,\n    ngDevMode && `The provided timing value \"${exp}\" is invalid.`);\n}\n\nexport function negativeStepValue(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.NEGATIVE_STEP_VALUE,\n    ngDevMode && 'Duration values below 0 are not allowed for this animation step.);\n}\n\nexport function negativeDelayValue(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.NEGATIVE_DELAY_VALUE,\n    ngDevMode && 'Delay values below 0 are not allowed for this animation step.);\n}\n\nexport function invalidStyleParams(varName: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_STYLE_PARAMS,\n    ngDevMode && `Unable to resolve the local animation param ${varName} in the given list of values`);\n}\n\nexport function invalidParamValue(varName: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_PARAM_VALUE,\n    ngDevMode && `Please provide a value for the animation param ${varName}`);\n}\n\nexport function invalidNodeType(nodeType: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_NODE_TYPE,\n    ngDevMode && `Unable to resolve animation metadata node #${nodeType}`);\n}\n\nexport function invalidCssUnitValue(userProvidedProperty: string, value: string): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_CSS_UNIT_VALUE,\n    ngDevMode && `Please provide a CSS unit value for ${userProvidedProperty}:${value}`);\n}\n\nexport function invalidTrigger(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_TRIGGER,\n    ngDevMode && `animation triggers cannot be prefixed with an `@` sign (e.g. trigger('@foo', [...])));\n}\n\nexport function invalidDefinition(): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_DEFINITION,\n    ngDevMode && `only state() and transition() definitions can sit inside of a trigger()`);\n}\n\nexport function invalidState(metadataName: string, missingSubs: string[]): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.INVALID_STATE,\n    ngDevMode && `state("${\n      metadataName}\", ...) must define default values for all the following style substitutions: ${\n        missingSubs.join(', ')});\n}\n\nexport function invalidStyleValue(value: string): Error {\n  return new
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RuntimeError(\n    RuntimeErrorCode.INVALID_STYLE_VALUE,\n    ngDevMode && `The provided style
string value ${value} is not allowed.`);}\n\n\nexport function invalidProperty(prop: string): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.INVALID_PROPERTY,\n    ngDevMode &&\n    `The provided
animation property \"${\n        prop}\" is not a supported CSS property for animations`);}\n\n\nexport function
invalidParallelAnimation(\n    prop: string, firstStart: number, firstEnd: number, secondStart: number,\n    secondEnd: number): Error {\n    return new RuntimeError(\n
RuntimeErrorCode.INVALID_PARALLEL_ANIMATION,\n    ngDevMode &&\n    `The CSS property
\"${prop}\" that exists between the times of \"${firstStart}ms\"
and \"${\n        firstEnd}ms\" is also being animated in a parallel animation between the times of \"${\n
secondStart}ms\" and \"${secondEnd}ms\"`);}\n\n\nexport function invalidKeyframes(): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.INVALID_KEYFRAMES,\n    ngDevMode && `keyframes() must be
placed inside of a call to animate()`);}\n\n\nexport function invalidOffset(): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.INVALID_OFFSET,\n    ngDevMode && `Please ensure that all keyframe offsets are between
0 and 1`);}\n\n\nexport function keyframeOffsetsOutOfOrder(): Error {\n    return new RuntimeError(\n
RuntimeErrorCode.KEYFRAME_OFFSETS_OUT_OF_ORDER,\n    ngDevMode && `Please ensure that all
keyframe offsets are in order`);}\n\n\nexport function keyframesMissingOffsets(): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.KEYFRAMES_MISSING_OFFSETS,\n    ngDevMode && `Not all
style() steps within the declared keyframes()
contain offsets`);}\n\n\nexport function invalidStagger(): Error {\n    return new RuntimeError(\n
RuntimeErrorCode.INVALID_STAGGER,\n    ngDevMode && `stagger() can only be used inside of
query()`);}\n\n\nexport function invalidQuery(selector: string): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.INVALID_QUERY,\n    ngDevMode &&\n    `\\`query(\"${selector}\")\\` returned zero
elements. (Use \\`query(\"${\n        selector}\", { optional: true })\\` if you wish to allow this.)`);}\n\n\nexport
function invalidExpression(expr: string): Error {\n    return new RuntimeError(\n
RuntimeErrorCode.INVALID_EXPRESSION,\n    ngDevMode && `The provided transition expression
\"${expr}\" is not supported`);}\n\n\nexport function invalidTransitionAlias(alias: string): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.INVALID_TRANSITION_ALIAS,\n    ngDevMode && `The transition
alias value \"${alias}\" is not supported`);}\n\n\nexport function
validationFailed(errors: Error[]): Error {\n    return new RuntimeError(\n
RuntimeErrorCode.VALIDATION_FAILED,\n    ngDevMode && `animation validation
failed:\\n${errors.map(err => err.message).join(\"\\n\")}`);}\n\n\nexport function buildingFailed(errors: Error[]): Error
{\n    return new RuntimeError(\n    RuntimeErrorCode.BUILDING_FAILED,\n    ngDevMode && `animation
building failed:\\n${errors.map(err => err.message).join(\"\\n\")}`);}\n\n\nexport function triggerBuildFailed(name:
string, errors: Error[]): Error {\n    return new RuntimeError(\n
RuntimeErrorCode.TRIGGER_BUILD_FAILED,\n    ngDevMode &&\n    `The animation trigger \"${name}\"
has failed to build due to the following errors:\\n - ${\n        errors.map(err => err.message).join(\"\\n -
\")`);}\n\n\nexport function animationFailed(errors: Error[]): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.ANIMATION_FAILED,\n    ngDevMode &&\n    `Unable to animate due to the following
errors:${\n        LINE_START}${\n            errors.map(err => err.message).join(LINE_START)`);}\n\n\nexport function registerFailed(errors:
Error[]): Error {\n    return new RuntimeError(\n    RuntimeErrorCode.REGISTRATION_FAILED,\n    ngDevMode &&\n    `Unable to build the animation due to the following errors: ${\n        errors.map(err =>
err.message).join(\"\\n\")`);}\n\n\nexport function missingOrDestroyedAnimation(): Error {\n    return new
RuntimeError(\n    RuntimeErrorCode.MISSING_OR_DESTROYED_ANIMATION,\n    ngDevMode && `The
requested animation doesn't exist or has already been destroyed`);}\n\n\nexport function
createAnimationFailed(errors: Error[]): Error {\n    return new RuntimeError(\n
RuntimeErrorCode.CREATE_ANIMATION_FAILED,\n    ngDevMode &&\n    `Unable to create the
animation due to the following errors:${\n        errors.map(err => err.message).join(\"\\n\")`);}\n\n\nexport

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function missingPlayer(id: string): Error {\n  return new RuntimeError(\n
  RuntimeErrorCode.MISSING_PLAYER,\n    ngDevMode && `Unable to find the timeline player referenced
by ${id}`);\n}\n\nexport function missingTrigger(phase: string, name: string): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.MISSING_TRIGGER,\n    ngDevMode &&\n    `Unable to listen on
the animation trigger event "${\n      phase}" because the animation trigger "${name}" doesn't
exist!`);\n}\n\nexport function missingEvent(name: string): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.MISSING_EVENT,\n    ngDevMode &&\n    `Unable to listen on the animation trigger
"${\n      name}" because the provided event is undefined!`);\n}\n\nexport function
unsupportedTriggerEvent(phase: string, name: string): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.UNSUPPORTED_TRIGGER_EVENT,\n    ngDevMode &&\n    `The provided animation
trigger event "${phase}" for the animation trigger "${\n      name}"
is not supported!`);\n}\n\nexport function unregisteredTrigger(name: string): Error {\n  return new
RuntimeError(\n    RuntimeErrorCode.UNREGISTERED_TRIGGER,\n    ngDevMode && `The provided animation
trigger "${name}" has not been registered!`);\n}\n\nexport function triggerTransitionsFailed(errors:
Error[]): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.TRIGGER_TRANSITIONS_FAILED,\n    ngDevMode &&\n    `Unable to process animations due to the following failed trigger
transitions\n  ${\n      errors.map(err =>
err.message).join("\n")`);\n}\n\nexport function triggerParsingFailed(name: string, errors:
Error[]): Error {\n  return new RuntimeError(\n    RuntimeErrorCode.TRIGGER_PARSING_FAILED,\n    ngDevMode &&\n    `Animation parsing for the ${name} trigger have failed:${LINE_START}${\n      errors.map(err =>
err.message).join(LINE_START)`);\n}\n\nexport function transitionFailed(name: string, errors:
Error[]): Error {\n  return
new RuntimeError(\n    RuntimeErrorCode.TRANSITION_FAILED,\n    ngDevMode && `@${name} has
failed due to:\n  ${errors.map(err => err.message).join("\n - ")`);\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n * Set of all animatable CSS properties\n * @see
https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_animated_properties\n */\nexport const
ANIMATABLE_PROP_SET = new Set([\n  '-moz-outline-radius',\n  '-moz-outline-radius-bottomleft',\n  '-moz-
outline-radius-bottomright',\n  '-moz-outline-radius-topleft',\n  '-moz-outline-radius-topright',\n  '-ms-grid-
columns',\n  '-ms-grid-rows',\n  '-webkit-line-clamp',\n  '-webkit-text-fill-color',\n  '-webkit-text-stroke',\n  '-webkit-
text-stroke-color',\n  'accent-color',\n  'all',\n  'backdrop-filter',\n  'background',\n  'background-color',\n
'background-position',\n  'background-size',\n  'block-size',\n  'border',\n  'border-block-end',\n  'border-block-end-color',\n  'border-block-end-width',\n  'border-block-start',\n  'border-block-start-color',\n  'border-block-start-width',\n  'border-bottom',\n  'border-bottom-color',\n  'border-bottom-left-radius',\n  'border-bottom-right-radius',\n  'border-bottom-width',\n  'border-color',\n  'border-end-end-radius',\n  'border-end-start-radius',\n  'border-image-outset',\n  'border-image-slice',\n  'border-image-width',\n  'border-inline-end',\n  'border-inline-end-color',\n  'border-inline-end-width',\n  'border-inline-start',\n  'border-inline-start-color',\n  'border-inline-start-width',\n  'border-left',\n  'border-left-color',\n  'border-left-width',\n  'border-radius',\n  'border-right',\n  'border-right-color',\n  'border-right-width',\n  'border-start-end-radius',\n  'border-start-start-radius',\n  'border-top',\n  'border-top-color',\n  'border-top-left-radius',\n  'border-top-right-radius',\n  'border-top-width',\n  'border-width',\n  'bottom',\n  'box-shadow',\n  'caret-color',\n  'clip',\n  'clip-path',\n  'color',\n  'column-count',\n  'column-gap',\n  'column-rule',\n  'column-rule-color',\n  'column-rule-width',\n  'column-width',\n  'columns',\n  'filter',\n  'flex',\n  'flex-basis',\n  'flex-grow',\n  'flex-shrink',\n  'font',\n  'font-size',\n  'font-size-adjust',\n  'font-stretch',\n  'font-variation-settings',\n  'font-weight',\n  'gap',\n  'grid-column-gap',\n  'grid-gap',\n  'grid-row-gap',\n  'grid-template-columns',\n  'grid-template-rows',\n  'height',\n  'inline-size',\n  'input-security',\n  'inset',\n  'inset-block',\n  'inset-block-end',\n  'inset-block-start',\n  'inset-inline',\n  'inset-inline-end',\n  'inset-inline-start',\n  'left',\n  'letter-spacing',\n  'line-clamp',\n  'line-height',\n  'margin',\n  'margin-block-end',\n  'margin-block-start',\n  'margin-bottom',\n  'margin-inline-end',\n  'margin-inline-start',\n  'margin-left',\n

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'margin-right',\n 'margin-top',\n 'mask',\n 'mask-border',\n 'mask-position',\n 'mask-size',\n 'max-block-size',\n 'max-height',\n 'max-inline-size',\n 'max-lines',\n 'max-width',\n 'min-block-size',\n 'min-height',\n 'min-inline-size',\n 'min-width',\n 'object-position',\n 'offset',\n 'offset-anchor',\n 'offset-distance',\n 'offset-path',\n 'offset-position',\n 'offset-rotate',\n 'opacity',\n 'order',\n 'outline',\n 'outline-color',\n 'outline-offset',\n 'outline-width',\n 'padding',\n 'padding-block-end',\n 'padding-block-start',\n 'padding-bottom',\n 'padding-inline-end',\n 'padding-inline-start',\n 'padding-left',\n 'padding-right',\n 'padding-top',\n 'perspective',\n 'perspective-origin',\n 'right',\n 'rotate',\n 'row-gap',\n 'scale',\n 'scroll-margin',\n 'scroll-margin-block',\n 'scroll-margin-block-end',\n 'scroll-margin-block-start',\n 'scroll-margin-bottom',\n 'scroll-margin-inline',\n 'scroll-margin-inline-end',\n 'scroll-margin-inline-start',\n

'scroll-margin-left',\n 'scroll-margin-right',\n 'scroll-margin-top',\n 'scroll-padding',\n 'scroll-padding-block',\n 'scroll-padding-block-end',\n 'scroll-padding-block-start',\n 'scroll-padding-bottom',\n 'scroll-padding-inline',\n 'scroll-padding-inline-end',\n 'scroll-padding-inline-start',\n 'scroll-padding-left',\n 'scroll-padding-right',\n 'scroll-padding-top',\n 'scroll-snap-coordinate',\n 'scroll-snap-destination',\n 'scrollbar-color',\n 'shape-image-threshold',\n 'shape-margin',\n 'shape-outside',\n 'tab-size',\n 'text-decoration',\n 'text-decoration-color',\n 'text-decoration-thickness',\n 'text-emphasis',\n 'text-emphasis-color',\n 'text-indent',\n 'text-shadow',\n 'text-underline-offset',\n 'top',\n 'transform',\n 'transform-origin',\n 'translate',\n 'vertical-align',\n 'visibility',\n 'width',\n 'word-spacing',\n 'z-index',\n 'zoom',\n);\n";\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*/\n \*

Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at\n <https://angular.io/license>\n \*/\nimport { AnimationEvent, AnimationPlayer, AUTO\_STYLE, NoopAnimationPlayer,

AnimationGroupPlayer, PRE\_STYLE as PRE\_STYLE, StyleDataMap } from '@angular/animations';\nimport { AnimationStyleNormalizer } from '../src/dsl/style\_normalization/animation\_style\_normalizer';\nimport { AnimationDriver } from '../src/render/animation\_driver';\nimport { animationFailed } from

../error\_helpers';\nimport { ANIMATABLE\_PROP\_SET } from './web\_animations/animatable\_props\_set';\n\n// We don't include ambient node types here since @angular/animations/browser\n// is meant to target the browser so technically it should not depend on node\n// types. `process` is just declared locally here as a result.\ndeclare const process: any;\nexport function isBrowser(): boolean {\n return (typeof window !== 'undefined' && typeof window.document !== 'undefined');\n}\nexport

function isNode(): boolean {\n // Checking only for `process` isn't enough to identify whether or not we're in a\n // Node\n // environment, because Webpack by default will polyfill the `process`. While we can discern\n // that Webpack polyfilled it by looking at `process.browser`, it's very Webpack-specific and\n // might not be future-proof. Instead we look at the stringified version of `process` which\n // is `[object process]` in Node and `[object Object]` when polyfilled.\n return typeof process !== 'undefined' && {}.toString.call(process) === '[object process]';\n}\nexport function optimizeGroupPlayer(players: AnimationPlayer[]): AnimationPlayer {\n switch (players.length) {\n case 0:\n return new NoopAnimationPlayer();\n case 1:\n return players[0];\n default:\n return new AnimationGroupPlayer(players);\n }\n}\nexport function normalizeKeyframes(\n driver: AnimationDriver, normalizer: AnimationStyleNormalizer, element: any,\n keyframes:

Array<StyleDataMap>,

preStyles: StyleDataMap = new Map(),\n postStyles: StyleDataMap = new Map()): Array<StyleDataMap> {\n const errors: Error[] = [];\n const normalizedKeyframes: Array<StyleDataMap> = [];\n let previousOffset = -1;\n let previousKeyframe: StyleDataMap|null = null;\n keyframes.forEach(kf => {\n const offset = kf.get('offset') as number;\n const isSameOffset = offset === previousOffset;\n const normalizedKeyframe: StyleDataMap = (isSameOffset && previousKeyframe) || new Map();\n kf.forEach((val, prop) => {\n let normalizedProp = prop;\n let normalizedValue = val;\n if (prop !== 'offset') {\n normalizedProp = normalizer.normalizePropertyName(normalizedProp, errors);\n switch (normalizedValue) {\n case PRE\_STYLE:\n normalizedValue = preStyles.get(prop)!;\n break;\n case AUTO\_STYLE:\n normalizedValue = postStyles.get(prop)!;\n break;\n default:\n normalizedValue =\n normalizer.normalizeStyleValue(prop, normalizedProp, normalizedValue, errors);\n break;\n }\n }\n normalizedKeyframe.set(normalizedProp, normalizedValue);\n });\n

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if (!isSameOffset) {\n  normalizedKeyframes.push(normalizedKeyframe);\n } \n previousKeyframe =
normalizedKeyframe;\n previousOffset = offset;\n });\n if (errors.length) {\n  throw animationFailed(errors);\n
}\n\n return normalizedKeyframes;\n}\n\nexport function listenOnPlayer(\n  player: AnimationPlayer, eventName:
string, event: AnimationEvent|undefined,\n  callback: (event: any) => any) {\n  switch (eventName) {\n  case
'start':\n    player.onStart(() => callback(event && copyAnimationEvent(event, 'start', player)));\n    break;\n
case 'done':\n    player.onDone(() => callback(event && copyAnimationEvent(event, 'done', player)));\n
break;\n  case 'destroy':\n    player.onDestroy(() => callback(event && copyAnimationEvent(event,
'destroy', player)));\n    break;\n  }\n}\n\nexport function copyAnimationEvent(\n  e: AnimationEvent,
phaseName: string, player: AnimationPlayer): AnimationEvent {\n  const totalTime = player.totalTime;\n  const
disabled = (player as any).disabled ? true : false;\n  const event = makeAnimationEvent(\n    e.element,
e.triggerName, e.fromState, e.toState, phaseName || e.phaseName,\n    totalTime === undefined ? e.totalTime :
totalTime, disabled);\n  const data = (e as any)['_data'];\n  if (data != null) {\n    (event as any)['_data'] = data;\n  }\n
return event;\n}\n\nexport function makeAnimationEvent(\n  element: any, triggerName: string, fromState: string,
toState: string, phaseName: string = "",\n  totalTime: number = 0, disabled?: boolean): AnimationEvent {\n  return
{element, triggerName, fromState, toState, phaseName, totalTime, disabled: !!disabled};\n}\n\nexport function
getOrSetDefaultValue<T, V>(\n  map: Map<T, V>, key: T, defaultValue: V) {\n
  let value = map.get(key);\n  if (!value) {\n    map.set(key, value = defaultValue);\n  }\n  return value;\n}\n\nexport
function parseTimelineCommand(command: string): [string, string] {\n  const separatorPos =
command.indexOf(':');\n  const id = command.substring(1, separatorPos);\n  const action =
command.slice(separatorPos + 1);\n  return [id, action];\n}\n\nlet _contains: (elm1: any, elm2: any) => boolean =
(elm1: any, elm2: any) => false;\nlet _query: (element: any, selector: string, multi: boolean) => any[] =\n(element: any, selector: string, multi: boolean) => {\n  return [];\n};\nlet _documentElement: unknown|null =
null;\n\nexport function getParentElement(element: any): unknown|null {\n  const parent = element.parentNode ||
element.host; // consider host to support shadow DOM\n  if (parent === _documentElement) {\n    return null;\n
}\n  return parent;\n}\n\n// Define utility methods for browsers and platform-server(domino) where Element\n// and
utility methods\n\nconst _isNode = isNode();\nif (_isNode || typeof Element !== 'undefined') {\n  if (!isBrowser()) {\n
  _contains = (elm1, elm2) => elm1.contains(elm2);\n  } else {\n    // Read the document element in an IIFE that's
been marked pure to avoid a top-level property\n    // read that may prevent tree-shaking.\n    _documentElement =
/* @__PURE__ */ ((() => document.documentElement));\n    _contains = (elm1, elm2) => {\n      while (elm2) {\n
        if (elm2 === elm1) {\n          return true;\n        }\n        elm2 = getParentElement(elm2);\n      }\n      return false;\n
    };\n    _query = (element: any, selector: string, multi: boolean): any[] => {\n      if (multi) {\n        return
Array.from(element.querySelectorAll(selector));\n      }\n      const elem = element.querySelector(selector);\n      return
elem ? [elem] : [];\n    };\n  }\n}\n\nfunction containsVendorPrefix(prop: string): boolean {\n  // Webkit is the only real
popular vendor prefix nowadays\n  // cc: http://shouldiprefix.com/\n  return prop.substring(1, 6) === 'ebkit'; // webkit or Webkit\n}\n\nlet _CACHED_BODY: {style: any}|null =
null;\nlet _IS_WEBKIT = false;\n\nexport function validateStyleProperty(prop: string): boolean {\n  if
(!_CACHED_BODY) {\n    _CACHED_BODY = getBodyNode() || {};\n    _IS_WEBKIT =
_CACHED_BODY!.style ? ('WebkitAppearance' in _CACHED_BODY!.style) : false;\n  }\n  let result = true;\n  if (_CACHED_BODY!.style && !containsVendorPrefix(prop)) {\n    result = prop in _CACHED_BODY!.style;\n
  }\n  if (!result && _IS_WEBKIT) {\n    const camelProp = 'Webkit' + prop.charAt(0).toUpperCase() + prop.slice(1);\n    result = camelProp in _CACHED_BODY!.style;\n  }\n  return result;\n}\n\nexport function
validateWebAnimatableStyleProperty(prop: string): boolean {\n  return
ANIMATABLE_PROP_SET.has(prop);\n}\n\nexport function getBodyNode(): any|null {\n  if (typeof document !==
'undefined') {\n    return document.body;\n  }\n  return null;\n}\n\nexport const containsElement =
_contains;\n\nexport
const invokeQuery = _query;\n\nexport function hyphenatePropsKeys(original: StyleDataMap): StyleDataMap {\n
  const newMap: StyleDataMap = new Map();\n  original.forEach((val, prop) => {\n    const newProp =

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prop.replace(/([a-z])([A-Z])/g, '$1-$2');\n  newMap.set(newProp, val);\n });\n return newMap;\n}\n\n", "/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { AnimationPlayer,
NoopAnimationPlayer } from '@angular/animations';\nimport { Injectable } from '@angular/core';\nimport
{ containsElement, getParentElement, invokeQuery, validateStyleProperty } from './shared';\n\n/**\n * @publicApi\n */\n@Injectable()\nexport class NoopAnimationDriver implements AnimationDriver {\n
validateStyleProperty(prop: string): boolean {\n  return validateStyleProperty(prop);\n }\n\nmatchesElement(_element: any, _selector:
string): boolean {\n  // This method is deprecated and no longer in use so we return false.\n  return false;\n }\n\ncontainsElement(elm1: any, elm2: any): boolean {\n  return containsElement(elm1, elm2);\n }\n\ngetParentElement(element: unknown): unknown {\n  return getParentElement(element);\n }\n\nquery(element:
any, selector: string, multi: boolean): any[] {\n  return invokeQuery(element, selector, multi);\n }\n\ncomputeStyle(element: any, prop: string, defaultValue?: string): string {\n  return defaultValue || '';\n }\n\nanimate(\n  element: any, keyframes: Array<Map<string, string|number>>, duration: number, delay: number,\n  easing: string, previousPlayers: any[] = [],\n  scrubberAccessRequested?: boolean): AnimationPlayer {\n  return
new NoopAnimationPlayer(duration, delay);\n }\n}\n\n/**\n * @publicApi\n */\nexport abstract class
AnimationDriver {\n  static NOOP: AnimationDriver = (/* #__PURE__ */ new NoopAnimationDriver());\n\n  abstract
validateStyleProperty(prop: string): boolean;\n\n  abstract validateAnimatableStyleProperty?: (prop: string) =>
boolean;\n\n  /**\n   * @deprecated No longer in use. Will be removed.\n   */\n  abstract matchesElement(element:
any, selector: string): boolean;\n\n  abstract containsElement(elm1: any, elm2: any): boolean;\n\n  /**\n   * Obtains
the parent element, if any. `null` is returned if the element does not have a parent.\n   */\n  abstract
getParentElement(element: unknown): unknown;\n\n  abstract query(element: any, selector: string, multi: boolean):
any[];\n\n  abstract computeStyle(element: any, prop: string, defaultValue?: string): string;\n\n  abstract animate(\n
  element: any, keyframes: Array<Map<string, string|number>>, duration: number, delay: number,\n  easing?:
string|null, previousPlayers?: any[], scrubberAccessRequested?: boolean): any;\n}\n\n", "/*\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style
license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { AnimateTimings,
AnimationMetadata, AnimationMetadataType, AnimationOptions, sequence, StyleData, StyleDataMap } from
'@angular/animations';\nimport { Ast as AnimationAst, AstVisitor as AnimationAstVisitor } from
'./dsl/animation_ast';\nimport { AnimationDslVisitor } from './dsl/animation_dsl_visitor';\nimport { invalidNodeType,
invalidParamValue, invalidStyleParams, invalidTimingValue, negativeDelayValue, negativeStepValue } from
'./error_helpers';\nimport { isNode } from './render/shared';\n\nexport const ONE_SECOND = 1000;\n\nexport const
SUBSTITUTION_EXPR_START = '{{';\n\nexport const SUBSTITUTION_EXPR_END = '}}';\n\nexport const
ENTER_CLASSNAME = 'ng-enter';\n\nexport const LEAVE_CLASSNAME = 'ng-leave';\n\nexport const
NG_TRIGGER_CLASSNAME = 'ng-trigger';\n\nexport const NG_TRIGGER_SELECTOR = 'ng-trigger';\n\nexport
const NG_ANIMATING_CLASSNAME = 'ng-animating';\n\nexport const NG_ANIMATING_SELECTOR
= 'ng-animating';\n\nexport function resolveTimingValue(value: string|number) {\n  if (typeof value == 'number')
return value;\n\n  const matches = value.match(/^(?=[\.\d+](m?s));\n  if (!matches || matches.length < 2) return
0;\n\n  return _convertTimeValueToMS(parseFloat(matches[1]), matches[2]);\n}\n\nfunction
_convertTimeValueToMS(value: number, unit: string): number {\n  switch (unit) {\n    case 's':\n      return value *
ONE_SECOND;\n    default: // ms or something else\n      return value;\n  }\n}\n\nexport function resolveTiming(\n
timings: string|number|AnimateTimings, errors: Error[], allowNegativeValues?: boolean) {\n  return
timings.hasOwnProperty('duration') ?\n    <AnimateTimings>timings :\n  parseTimeExpression(<string|number>timings, errors, allowNegativeValues);\n}\n\nfunction
parseTimeExpression(\n  exp: string|number, errors: Error[], allowNegativeValues?: boolean): AnimateTimings
{\n  const regex = /^(?=[\.\d+](m?s))(?:\s+(-?[.\d+](m?s))?(?:\s+([-a-z](?:(.+\?))\?))?)?$/i;\n

```

```

let duration: number;\n let delay: number = 0;\n let easing: string = ";\n if (typeof exp === 'string') {\n  const
matches = exp.match(regex);\n  if (matches === null) {\n    errors.push(invalidTimingValue(exp));\n    return
{duration: 0, delay: 0, easing: "};\n  }\n  duration = _convertTimeValueToMS(parseFloat(matches[1]),
matches[2]);\n  const delayMatch = matches[3];\n  if (delayMatch !== null) {\n    delay =
_convertTimeValueToMS(parseFloat(delayMatch), matches[4]);\n  }\n  const easingVal = matches[5];\n  if
(easingVal) {\n    easing = easingVal;\n  }\n } else {\n  duration = exp;\n }\n if (!allowNegativeValues) {\n
let containsErrors = false;\n let startIndex = errors.length;\n if (duration < 0) {\n
errors.push(negativeStepValue());\n  containsErrors = true;\n }\n if (delay < 0) {\n
errors.push(negativeDelayValue());\n  containsErrors = true;\n }\n if (containsErrors)
{\n  errors.splice(startIndex, 0, invalidTimingValue(exp));\n }\n }\n return {duration, delay,
easing};\n}\n\nexport function copyObj(\n  obj: {[key: string]: any}, destination: {[key: string]: any} = {}): {[key:
string]: any} {\n  Object.keys(obj).forEach(prop => {\n    destination[prop] = obj[prop];\n  });\n  return
destination;\n}\n\nexport function convertToMap(obj: StyleData): StyleDataMap {\n  const styleMap:
StyleDataMap = new Map();\n  Object.keys(obj).forEach(prop => {\n    const val = obj[prop];\n
styleMap.set(prop, val);\n  });\n  return styleMap;\n}\n\nexport function normalizeKeyframes(keyframes:
Array<StyleData>|\n  Array<StyleDataMap>): Array<StyleDataMap> {\n  if
(!keyframes.length) {\n    return [];\n  }\n  if (keyframes[0] instanceof Map) {\n    return keyframes as
Array<StyleDataMap>;\n  }\n  return keyframes.map(kf => convertToMap(kf as StyleData));\n}\n\nexport function
normalizeStyles(styles: StyleDataMap|Array<StyleDataMap>):
StyleDataMap {\n  const normalizedStyles: StyleDataMap = new Map();\n  if (Array.isArray(styles)) {\n
styles.forEach(data => copyStyles(data, normalizedStyles));\n  } else {\n    copyStyles(styles, normalizedStyles);\n
}\n  return normalizedStyles;\n}\n\nexport function copyStyles(\n  styles: StyleDataMap, destination:
StyleDataMap = new Map(),\n  backfill?: StyleDataMap): StyleDataMap {\n  if (backfill) {\n    for (let [prop, val]
of backfill) {\n    destination.set(prop, val);\n    }\n  }\n  for (let [prop, val] of styles) {\n    destination.set(prop,
val);\n  }\n  return destination;\n}\n\nfunction getStyleAttributeString(element: any, key: string, value: string) {\n //
Return the key-value pair string to be added to the style attribute for the\n // given CSS style key.\n if (value) {\n
return key + ':' + value + ';\n } else {\n  return ";\n }\n}\n\nfunction writeStyleAttribute(element: any) {\n //
Read the style property
of the element and manually reflect it to the\n // style attribute. This is needed because Domino on platform-server
doesn't\n // understand the full set of allowed CSS properties and doesn't reflect some\n // of them automatically.\n
let styleAttrValue = ";\n for (let i = 0; i < element.style.length; i++) {\n  const key = element.style.item(i);\n
styleAttrValue += getStyleAttributeString(element, key, element.style.getPropertyValue(key));\n }\n for (const key
in element.style) {\n  // Skip internal Domino properties that don't need to be reflected.\n  if
(!element.style.hasOwnProperty(key) || key.startsWith('_')) {\n    continue;\n  }\n  const dashKey =
camelCaseToDashCase(key);\n  styleAttrValue += getStyleAttributeString(element, dashKey,
element.style[key]);\n }\n  element.setAttribute('style', styleAttrValue);\n}\n\nexport function setStyles(element:
any, styles: StyleDataMap, formerStyles?: StyleDataMap) {\n  if (element['style']) {\n    styles.forEach((val,
prop) => {\n    const camelProp = dashCaseToCamelCase(prop);\n    if (formerStyles &&
!formerStyles.has(prop)) {\n    formerStyles.set(prop, element.style[camelProp]);\n    }\n
element.style[camelProp] = val;\n  });\n  // On the server set the 'style' attribute since it's not automatically
reflected.\n  if (isNode()) {\n    writeStyleAttribute(element);\n  }\n }\n}\n\nexport function
eraseStyles(element: any, styles: StyleDataMap) {\n  if (element['style']) {\n    styles.forEach( (_, prop) => {\n
const camelProp = dashCaseToCamelCase(prop);\n    element.style[camelProp] = ";\n  });\n  // On the server set
the 'style' attribute since it's not automatically reflected.\n  if (isNode()) {\n    writeStyleAttribute(element);\n
}\n }\n}\n\nexport function normalizeAnimationEntry(steps: AnimationMetadata|\n  AnimationMetadata[]): AnimationMetadata {\n  if (Array.isArray(steps)) {\n  if (steps.length ==
1) return steps[0];\n  return sequence(steps);\n }\n  return steps as AnimationMetadata;\n}\n\nexport function
validateStyleParams(\n  value: string|number|null|undefined, options: AnimationOptions, errors: Error[]) {\n  const

```

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params = options.params || {};
const matches = extractStyleParams(value);
if (matches.length) {
  matches.forEach((varName => {
    if (!params.hasOwnProperty(varName)) {
      errors.push(invalidStyleParams(varName));
    }
  }));
  const PARAM_REGEX = new
  RegExp(`${SUBSTITUTION_EXPR_START}\\\\s*(.+?)\\\\s*${SUBSTITUTION_EXPR_END}`, 'g');
  export
  function extractStyleParams(value: string|number|null|undefined): string[] {
    let params: string[] = [];
    if (typeof
    value === 'string') {
      let match: any;
      while (match = PARAM_REGEX.exec(value)) {
        params.push(match[1] as string);
      }
      PARAM_REGEX.lastIndex = 0;
    }
    return params;
  }
  export
  function interpolateParams(
    value: string|number, params:
    {[name: string]: any}, errors: Error[]): string|number {
    const original = value.toString();
    const str =
    original.replace(PARAM_REGEX, (_, varName) => {
      let localVal = params[varName];
      // this means that
      the value was never overridden by the data passed in by the user
      if (localVal == null) {
        errors.push(invalidParamValue(varName));
        localVal = "";
      }
      return localVal.toString();
    });
    // we
    do this to assert that numeric values stay as they are
    return str == original ? value : str;
  }
  export function
  iteratorToArray(iterator: any): any[] {
    const arr: any[] = [];
    let item = iterator.next();
    while (!item.done) {
      arr.push(item.value);
      item = iterator.next();
    }
    return arr;
  }
  const DASH_CASE_REGEXP = /-+([a-z0-9])/g;
  export function
  dashCaseToCamelCase(input: string): string {
    return
    input.replace(DASH_CASE_REGEXP, (...m: any[]) => m[1].toUpperCase());
  }
  export function
  camelCaseToDashCase(input:
  string): string {
    return input.replace(/([a-z])([A-Z])/g, '$1-$2').toLowerCase();
  }
  export function
  allowPreviousPlayerStylesMerge(duration: number, delay: number) {
    return duration === 0 || delay ===
    0;
  }
  export function
  balancePreviousStylesIntoKeyframes(
    element: any, keyframes:
    Array<StyleDataMap>, previousStyles: StyleDataMap) {
    if (previousStyles.size && keyframes.length) {
      let
      startingKeyframe = keyframes[0];
      let missingStyleProps: string[] = [];
      previousStyles.forEach((val, prop) =>
      {
        if (!startingKeyframe.has(prop)) {
          missingStyleProps.push(prop);
        }
      });
      startingKeyframe.set(prop, val);
      if (missingStyleProps.length) {
        for (let i = 1; i <
        keyframes.length; i++) {
          let kf = keyframes[i];
          missingStyleProps.forEach(prop => kf.set(prop,
          computeStyle(element, prop)));
        }
      }
      return keyframes;
    }
  }
  export function
  visitDslNode(
    visitor: AnimationDslVisitor,
    node: AnimationMetadata, context: any): any;
  export function
  visitDslNode(
    visitor: AnimationAstVisitor,
    node: AnimationAst<AnimationMetadataType>, context: any): any;
  export function
  visitDslNode(
    visitor: any,
    node: any, context: any): any {
    switch (node.type) {
      case AnimationMetadataType.Trigger:
        return
        visitor.visitTrigger(node, context);
      case AnimationMetadataType.State:
        return
        visitor.visitState(node, context);
      case AnimationMetadataType.Transition:
        return
        visitor.visitTransition(node, context);
      case
      AnimationMetadataType.Sequence:
        return
        visitor.visitSequence(node, context);
      case
      AnimationMetadataType.Group:
        return
        visitor.visitGroup(node, context);
      case
      AnimationMetadataType.Animate:
        return
        visitor.visitAnimate(node, context);
      case
      AnimationMetadataType.Keyframes:
        return
        visitor.visitKeyframes(node, context);
      case
      AnimationMetadataType.Style:
        return
        visitor.visitStyle(node, context);
      case
      AnimationMetadataType.Reference:
        return
        visitor.visitReference(node, context);
      case
      AnimationMetadataType.AnimateChild:
        return
        visitor.visitAnimateChild(node, context);
      case
      AnimationMetadataType.AnimateRef:
        return
        visitor.visitAnimateRef(node, context);
      case
      AnimationMetadataType.Query:
        return
        visitor.visitQuery(node, context);
      case
      AnimationMetadataType.Stagger:
        return
        visitor.visitStagger(node, context);
      default:
        throw
        invalidNodeType(node.type);
    }
  }
  export function
  computeStyle(element: any, prop: string): string {
    return
    (<any>window.getComputedStyle(element))[prop];
  }
  /**
  * @license
  * Copyright Google LLC All Rights
  Reserved.
  * Use of this source code is governed by an MIT-style license that can be
  found in the
  LICENSE file at https://angular.io/license
  */
  const NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
  !!ngDevMode;
  function
  createListOfWarnings(warnings:

```

```

string[]): string {\n const LINE_START = '\n - ';\n return
`${LINE_START}`${warnings.filter(Boolean).map(warning => warning).join(LINE_START)}';\n}\n\nexport
function warnValidation(warnings: string[]): void {\n NG_DEV_MODE && console.warn(`animation validation
warnings:${createListOfWarnings(warnings)}`);\n}\n\nexport function warnTriggerBuild(name: string, warnings:
string[]): void {\n NG_DEV_MODE &&\n console.warn(`The animation trigger \"${name}\" has built with the
following warnings:${\n createListOfWarnings(warnings)}`);\n}\n\nexport function warnRegister(warnings:
string[]): void {\n NG_DEV_MODE &&\n console.warn(`Animation built with the following
warnings:${createListOfWarnings(warnings)}`);\n}\n\nexport function triggerParsingWarnings(name: string,
warnings: string[]): void {\n NG_DEV_MODE &&\n console.warn(`Animation parsing for the ${name} trigger
presents the following warnings:${\n createListOfWarnings(warnings)}`);\n}\n\nexport
function pushUnrecognizedPropertiesWarning(warnings: string[], props: string[]): void {\n if (props.length) {\n
warnings.push(`The following provided properties are not recognized: ${props.join(', ')}`);\n }\n}\n\n/*
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{invalidExpression, invalidTransitionAlias} from './error_helpers';\n\nexport const ANY_STATE = '*';\n\nexport
declare type TransitionMatcherFn =\n (fromState: any, toState: any, element: any, params: {[key: string]: any})
=> boolean;\n\nexport function parseTransitionExpr(\n transitionValue: string | TransitionMatcherFn, errors:
Error[]): TransitionMatcherFn[] {\n const expressions: TransitionMatcherFn[] = [];\n if (typeof transitionValue ==
'string') {\n transitionValue.split(/\\s*|\\s*/).forEach(\n str => parseInnerTransitionStr(str, expressions,
errors));\n }\n } else {\n expressions.push(<TransitionMatcherFn>transitionValue);\n }\n return
expressions;\n}\n\nfunction parseInnerTransitionStr(\n eventStr: string, expressions: TransitionMatcherFn[],
errors: Error[]) {\n if (eventStr[0] == ':') {\n const result = parseAnimationAlias(eventStr, errors);\n if (typeof
result == 'function') {\n expressions.push(result);\n return;\n }\n eventStr = result;\n }\n\n const match =
eventStr.match(/^(\\s*|\\s*)(<?[->|\\s*(\\s*|\\s*)\\s*|\\s*)$/);\n if (match == null || match.length < 4) {\n
errors.push(invalidExpression(eventStr));\n return expressions;\n }\n\n const fromState = match[1];\n const
separator = match[2];\n const toState = match[3];\n expressions.push(makeLambdaFromStates(fromState,
toState));\n\n const isFullAnyStateExpr = fromState == ANY_STATE && toState == ANY_STATE;\n if
(separator[0] == '<' && !isFullAnyStateExpr) {\n expressions.push(makeLambdaFromStates(toState,
fromState));\n }\n}\n\nfunction parseAnimationAlias(alias: string, errors: Error[]): string | TransitionMatcherFn {\n
switch (alias) {\n case 'enter':\n return 'void => *';\n case 'leave':\n return '* => void';\n case 'increment':\n
return (fromState: any, toState: any): boolean => parseFloat(toState) > parseFloat(fromState);\n case 'decrement':\n
return (fromState: any, toState: any): boolean => parseFloat(toState) < parseFloat(fromState);\n default:\n
errors.push(invalidTransitionAlias(alias));\n return '* => *';\n }\n}\n\n// DO NOT REFACTOR ... keep the
follow set instantiations\n// with the values intact (closure compiler for some reason\n// removes follow-up lines that
add the values outside of\n// the constructor...)\nconst TRUE_BOOLEAN_VALUES = new Set<string>(['true',
'1']);\nconst FALSE_BOOLEAN_VALUES = new Set<string>(['false', '0']);\n\nfunction
makeLambdaFromStates(lhs: string, rhs: string): TransitionMatcherFn {\n const LHS_MATCH_BOOLEAN
= TRUE_BOOLEAN_VALUES.has(lhs) || FALSE_BOOLEAN_VALUES.has(lhs);\n const
RHS_MATCH_BOOLEAN = TRUE_BOOLEAN_VALUES.has(rhs) ||
FALSE_BOOLEAN_VALUES.has(rhs);\n\n return (fromState: any, toState: any): boolean => {\n let lhsMatch =
lhs == ANY_STATE || lhs == fromState;\n let rhsMatch = rhs == ANY_STATE || rhs == toState;\n\n if
(!lhsMatch && LHS_MATCH_BOOLEAN && typeof fromState === 'boolean') {\n lhsMatch = fromState ?
TRUE_BOOLEAN_VALUES.has(lhs) : FALSE_BOOLEAN_VALUES.has(lhs);\n }\n\n if (!rhsMatch &&
RHS_MATCH_BOOLEAN && typeof toState === 'boolean') {\n rhsMatch = toState ?
TRUE_BOOLEAN_VALUES.has(rhs) : FALSE_BOOLEAN_VALUES.has(rhs);\n }\n\n return lhsMatch &&
rhsMatch;\n };}\n\n/*
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n

```

```

*\nimport { AnimateTimings, AnimationAnimateChildMetadata,
AnimationAnimateMetadata, AnimationAnimateRefMetadata, AnimationGroupMetadata,
AnimationKeyframesSequenceMetadata, AnimationMetadata, AnimationMetadataType, AnimationOptions,
AnimationQueryMetadata, AnimationQueryOptions, AnimationReferenceMetadata, AnimationSequenceMetadata,
AnimationStaggerMetadata, AnimationStateMetadata, AnimationStyleMetadata, AnimationTransitionMetadata,
AnimationTriggerMetadata, AUTO_STYLE, style, StyleDataMap } from '@angular/animations';\n\nimport
{invalidDefinition, invalidKeyframes, invalidOffset, invalidParallelAnimation, invalidProperty, invalidStagger,
invalidState, invalidStyleValue, invalidTrigger, keyframeOffsetsOutOfOrder, keyframesMissingOffsets} from
'./error_helpers';\nimport { AnimationDriver } from './render/animation_driver';\nimport { getOrSetDefaultValue }
from './render/shared';\nimport { convertToMap, copyObj, extractStyleParams, iteratorToArray,
NG_ANIMATING_SELECTOR, NG_TRIGGER_SELECTOR, normalizeAnimationEntry, resolveTiming,
SUBSTITUTION_EXPR_START,
validateStyleParams, visitDslNode } from './util';\nimport { pushUnrecognizedPropertiesWarning } from
'./warning_helpers';\n\nimport { AnimateAst, AnimateChildAst, AnimateRefAst, Ast, DynamicTimingAst,
GroupAst, KeyframesAst, QueryAst, ReferenceAst, SequenceAst, StaggerAst, StateAst, StyleAst, TimingAst,
TransitionAst, TriggerAst } from './animation_ast';\nimport { AnimationDslVisitor } from
'./animation_dsl_visitor';\nimport { parseTransitionExpr } from './animation_transition_expr';\n\nconst
SELF_TOKEN = 'self';\nconst SELF_TOKEN_REGEX = new RegExp(`\\s*${SELF_TOKEN}\\s*`, 'g');\n\n/*
 * [Validation]\n * The visitor code below will traverse the animation AST generated by the animation verb
functions\n * (the output is a tree of objects) and attempt to perform a series of validations on the data. The\n *
following corner-cases will be validated:\n * 1. Overlap of animations\n * Given that a CSS property cannot be
animated in more than one place at the same time, it's\n
 * important that this behavior is detected and validated. The way in which this occurs is that\n * each time a style
property is examined, a string-map containing the property will be updated with\n * the start and end times for when
the property is used within an animation step.\n * If there are two or more parallel animations that are currently
running (these are invoked by the\n * group()) on the same element then the validator will throw an error. Since the
start/end timing\n * values are collected for each property then if the current animation step is animating the same\n
 * property and its timing values fall anywhere into the window of time that the property is\n * currently being
animated within then this is what causes an error.\n * 2. Timing values\n * The validator will validate to see if a
timing value of `duration delay easing` or\n * `durationNumber` is valid or not.\n * (note that upon validation
the code below will replace the timing data with an object containing\n
 * {duration,delay,easing}).\n * 3. Offset Validation\n * Each of the style() calls are allowed to have an offset
value when placed inside of keyframes().\n * Offsets within keyframes() are considered valid when:\n * - No
offsets are used at all\n * - Each style() entry contains an offset value\n * - Each offset is between 0 and 1\n * -
Each offset is greater to or equal than the previous one\n * Otherwise an error will be thrown.\n */\n\nexport
function buildAnimationAst(\n  driver: AnimationDriver, metadata: AnimationMetadata|AnimationMetadata[],
errors: Error[],\n  warnings: string[]): Ast<AnimationMetadataType> {\n  return new
AnimationAstBuilderVisitor(driver).build(metadata, errors, warnings);\n}\n\nconst ROOT_SELECTOR =
";\n\nexport class AnimationAstBuilderVisitor implements AnimationDslVisitor {\n  constructor(private _driver:
AnimationDriver) {\n\n  build(metadata: AnimationMetadata|AnimationMetadata[], errors: Error[], warnings:
string[]):\n
    Ast<AnimationMetadataType> {\n    const context = new AnimationAstBuilderContext(errors);\n    this._resetContextStyleTimingState(context);\n    const ast =\n
<Ast<AnimationMetadataType>>visitDslNode(this, normalizeAnimationEntry(metadata), context);\n\n    if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n      if (context.unsupportedCSSPropertiesFound.size) {\n        pushUnrecognizedPropertiesWarning(\n          warnings,\n
[...context.unsupportedCSSPropertiesFound.keys()],\n          );\n      }\n    }\n\n    return ast;\n  }\n\n  private
_resetContextStyleTimingState(context: AnimationAstBuilderContext) {\n    context.currentQuerySelector =

```



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ROOT_SELECTOR;\n  context.collectedStyles = new Map<string, Map<string, StyleTimeTuple>>();\n
context.collectedStyles.set(ROOT_SELECTOR, new Map());\n  context.currentTime = 0;\n }\n\n
visitTrigger(metadata: AnimationTriggerMetadata, context: AnimationAstBuilderContext):\n  TriggerAst {\n  let
queryCount
= context.queryCount = 0;\n  let depCount = context.depCount = 0;\n  const states: StateAst[] = [];\n  const
transitions: TransitionAst[] = [];\n  if (metadata.name.charAt(0) == '@') {\n
context.errors.push(invalidTrigger());\n  }\n\n  metadata.definitions.forEach(def => {\n
this._resetContextStyleTimingState(context);\n  if (def.type == AnimationMetadataType.State) {\n  const
stateDef = def as AnimationStateMetadata;\n  const name = stateDef.name;\n
name.toString().split(/\\s*,\\s*/).forEach(n => {\n  stateDef.name = n;\n
states.push(this.visitState(stateDef, context));\n  });\n  stateDef.name = name;\n  } else if (def.type ==
AnimationMetadataType.Transition) {\n  const transition = this.visitTransition(def as
AnimationTransitionMetadata, context);\n  queryCount += transition.queryCount;\n  depCount +=
transition.depCount;\n  transitions.push(transition);\n  } else {\n
context.errors.push(invalidDefinition());\n
}\n });\n\n  return {\n  type: AnimationMetadataType.Trigger,\n  name: metadata.name,\n  states,\n
transitions,\n  queryCount,\n  depCount,\n  options: null\n }; }\n\n
visitState(metadata:
AnimationStateMetadata, context: AnimationAstBuilderContext): StateAst {\n  const styleAst =
this.visitStyle(metadata.styles, context);\n  const astParams = (metadata.options && metadata.options.params) ||
null;\n  if (styleAst.containsDynamicStyles) {\n  const missingSubs = new Set<string>();\n  const params =
astParams || {};\n  styleAst.styles.forEach(style => {\n  if (style instanceof Map) {\n  style.forEach(value
=> {\n  extractStyleParams(value).forEach(sub => {\n  if (!params.hasOwnProperty(sub)) {\n
missingSubs.add(sub);\n  }\n  });\n  });\n  });\n  });\n  if (missingSubs.size) {\n  const
missingSubsArr
= iteratorToArray(missingSubs.values());\n  context.errors.push(invalidState(metadata.name,
missingSubsArr));\n  }\n }\n\n  return {\n  type: AnimationMetadataType.State,\n  name:
metadata.name,\n  style: styleAst,\n  options: astParams ? {params: astParams} : null\n }; }\n\n
visitTransition(metadata: AnimationTransitionMetadata, context: AnimationAstBuilderContext):\n  TransitionAst
{\n  context.queryCount = 0;\n  context.depCount = 0;\n  const animation = visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context);\n  const matchers = parseTransitionExpr(metadata.expr,
context.errors);\n\n  return {\n  type: AnimationMetadataType.Transition,\n  matchers,\n  animation,\n
queryCount: context.queryCount,\n  depCount: context.depCount,\n  options:
normalizeAnimationOptions(metadata.options)\n }; }\n\n
visitSequence(metadata:
AnimationSequenceMetadata, context: AnimationAstBuilderContext):\n
SequenceAst {\n  return {\n  type: AnimationMetadataType.Sequence,\n  steps: metadata.steps.map(s =>
visitDslNode(this, s, context)),\n  options: normalizeAnimationOptions(metadata.options)\n }; }\n\n
visitGroup(metadata: AnimationGroupMetadata, context: AnimationAstBuilderContext): GroupAst {\n  const
currentTime = context.currentTime;\n  let furthestTime = 0;\n  const steps = metadata.steps.map(step => {\n
context.currentTime = currentTime;\n  const innerAst = visitDslNode(this, step, context);\n  furthestTime =
Math.max(furthestTime, context.currentTime);\n  return innerAst;\n });\n\n  context.currentTime =
furthestTime;\n  return {\n  type: AnimationMetadataType.Group,\n  steps,\n  options:
normalizeAnimationOptions(metadata.options)\n }; }\n\n
visitAnimate(metadata: AnimationAnimateMetadata,
context: AnimationAstBuilderContext):\n  AnimateAst {\n  const timingAst =
constructTimingAst(metadata.timings,
context.errors);\n  context.currentAnimateTimings = timingAst;\n  let styleAst: StyleAst|KeyframesAst;\n  let
styleMetadata: AnimationStyleMetadata|AnimationKeyframesSequenceMetadata =\n  metadata.styles ?
metadata.styles : style({});\n  if (styleMetadata.type == AnimationMetadataType.Keyframes) {\n  styleAst =
this.visitKeyframes(styleMetadata as AnimationKeyframesSequenceMetadata, context);\n  } else {\n  let

```

```

styleMetadata = metadata.styles as AnimationStyleMetadata;\n    let isEmpty = false;\n    if (!styleMetadata) {\n      isEmpty = true;\n      const newStyleData: {[prop: string]: string|number} = {};\n      if (timingAst.easing) {\n        newStyleData['easing'] = timingAst.easing;\n      }\n      styleMetadata = style(newStyleData);\n    }\n    context.currentTime += timingAst.duration + timingAst.delay;\n    const _styleAst = this.visitStyle(styleMetadata,\n    context);\n    _styleAst.isEmptyStep = isEmpty;\n    styleAst\n    = _styleAst;\n  }\n\n  context.currentAnimateTimings = null;\n  return {\n    type:\n    AnimationMetadataType.Animate,\n    timings: timingAst,\n    style: styleAst,\n    options: null\n  };\n}\n\nvisitStyle(metadata: AnimationStyleMetadata, context: AnimationAstBuilderContext): StyleAst {\n  const ast =\n  this._makeStyleAst(metadata, context);\n  this._validateStyleAst(ast, context);\n  return ast;\n}\n\nprivate\n_makeStyleAst(metadata: AnimationStyleMetadata, context: AnimationAstBuilderContext):\n  StyleAst {\n  const styles: Array<(StyleDataMap | string)> = [];\n  const metadataStyles = Array.isArray(metadata.styles) ?\n  metadata.styles : [metadata.styles];\n\n  for (let styleTuple of metadataStyles) {\n    if (typeof styleTuple ===\n    'string') {\n      if (styleTuple === AUTO_STYLE) {\n        styles.push(styleTuple);\n      } else {\n        context.errors.push(invalidStyleValue(styleTuple));\n      }\n    } else {\n      styles.push(convertToMap(styleTuple));\n    }\n  }\n\n  let containsDynamicStyles = false;\n  let collectedEasing: string|null = null;\n  styles.forEach(styleData => {\n    if (styleData instanceof Map) {\n      if (styleData.has('easing')) {\n        collectedEasing = styleData.get('easing') as string;\n        styleData.delete('easing');\n      }\n      if\n      (!containsDynamicStyles) {\n        for (let value of styleData.values()) {\n          if\n          (value!.toString().indexOf(SUBSTITUTION_EXPR_START) >= 0) {\n            containsDynamicStyles = true;\n            break;\n          }\n        }\n      }\n    }\n  });\n\n  return {\n    type: AnimationMetadataType.Style,\n    styles,\n    easing: collectedEasing,\n    offset: metadata.offset,\n    containsDynamicStyles,\n    options: null\n  };\n}\n\nprivate _validateStyleAst(ast: StyleAst, context: AnimationAstBuilderContext): void {\n  const timings\n  = context.currentAnimateTimings;\n\n  let endTime = context.currentTime;\n  let startTime = context.currentTime;\n  if (timings && startTime > 0) {\n    startTime -= timings.duration + timings.delay;\n  }\n\n  ast.styles.forEach(tuple => {\n    if (typeof tuple ===\n    'string') return;\n\n    tuple.forEach((value, prop) => {\n      if (typeof ngDevMode === 'undefined' || ngDevMode)\n      {\n        if (!this._driver.validateStyleProperty(prop)) {\n          tuple.delete(prop);\n          context.unsupportedCSSPropertiesFound.add(prop);\n          return;\n        }\n      }\n      // This is guaranteed\n      to have a defined Map at this querySelector location making it\n      // safe to add the assertion here. It is set as a\n      default empty map in prior methods.\n      const collectedStyles =\n      context.collectedStyles.get(context.currentQuerySelector!);\n      const collectedEntry =\n      collectedStyles.get(prop);\n      let updateCollectedStyle = true;\n      if (collectedEntry) {\n        if (startTime\n        != endTime && startTime >= collectedEntry.startTime &&\n        endTime <= collectedEntry.endTime) {\n          context.errors.push(invalidParallelAnimation(\n            prop, collectedEntry.startTime,\n            collectedEntry.endTime, startTime, endTime));\n          updateCollectedStyle = false;\n        }\n      }\n      // we\n      always choose the smaller start time value since we\n      // want to have a record of the entire animation window\n      where\n      // the style property is being animated in between\n      startTime = collectedEntry.startTime;\n    }\n\n    if (updateCollectedStyle) {\n      collectedStyles.set(prop, {startTime, endTime});\n    }\n\n    if\n    (context.options) {\n      validateStyleParams(value, context.options, context.errors);\n    }\n  });\n}\n}\n\nvisitKeyframes(metadata: AnimationKeyframesSequenceMetadata, context: AnimationAstBuilderContext):\n  KeyframesAst {\n  const ast: KeyframesAst = {\n    type:\n    AnimationMetadataType.Keyframes, styles: [], options: null\n  };\n  if (!context.currentAnimateTimings) {\n    context.errors.push(invalidKeyframes());\n    return ast;\n  }\n\n  const MAX_KEYFRAME_OFFSET = 1;\n  let totalKeyframesWithOffsets = 0;\n  const offsets: number[] = [];\n  let offsetsOutOfOrder = false;\n  let\n  keyframesOutOfRange = false;\n  let previousOffset: number = 0;\n  const keyframes: StyleAst[] =\n  metadata.steps.map(styles => {\n    const style = this._makeStyleAst(styles, context);\n    let offsetVal:\n    number|null =\n    style.offset != null ? style.offset : consumeOffset(style.styles);\n    let offset: number = 0;\n
```

```

if (offsetVal != null) {\n    totalKeyframesWithOffsets++; \n    offset = style.offset = offsetVal; \n } \n
keyframesOutOfRange = keyframesOutOfRange || offset < 0 || offset > 1; \n    offsetsOutOfOrder =
offsetsOutOfOrder || offset < previousOffset; \n    previousOffset = offset; \n    offsets.push(offset); \n
    return style; \n }); \n \n if (keyframesOutOfRange) {\n    context.errors.push(invalidOffset()); \n } \n \n if
(offsetsOutOfOrder) {\n    context.errors.push(keyframeOffsetsOutOfOrder()); \n } \n \n const length =
metadata.steps.length; \n let generatedOffset = 0; \n if (totalKeyframesWithOffsets > 0 &&
totalKeyframesWithOffsets < length) {\n    context.errors.push(keyframesMissingOffsets()); \n } else if
(totalKeyframesWithOffsets == 0) {\n    generatedOffset = MAX_KEYFRAME_OFFSET / (length - 1); \n } \n \n
const limit = length - 1; \n const currentTime = context.currentTime; \n const currentAnimateTimings =
context.currentAnimateTimings; \n const animateDuration = currentAnimateTimings.duration; \n
keyframes.forEach((kf, i) => {\n    const offset = generatedOffset > 0 ? (i == limit ? 1 : (generatedOffset * i)) :
offsets[i]; \n    const durationUpToThisFrame = offset * animateDuration; \n    context.currentTime = currentTime
+ currentAnimateTimings.delay + durationUpToThisFrame; \n    currentAnimateTimings.duration =
durationUpToThisFrame; \n    this._validateStyleAst(kf, context); \n    kf.offset = offset; \n \n
ast.styles.push(kf); \n }); \n \n return ast; \n } \n \n visitReference(metadata: AnimationReferenceMetadata,
context: AnimationAstBuilderContext): \n ReferenceAst {\n    return {\n    type:
AnimationMetadataType.Reference, \n    animation: visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context), \n    options:
normalizeAnimationOptions(metadata.options) \n }; \n } \n \n visitAnimateChild(metadata:
AnimationAnimateChildMetadata, context: AnimationAstBuilderContext): \n AnimateChildAst {\n
context.depCount++; \n return {\n    type: AnimationMetadataType.AnimateChild, \n    options:
normalizeAnimationOptions(metadata.options) \n }; \n } \n \n visitAnimateRef(metadata:
AnimationAnimateRefMetadata, context: AnimationAstBuilderContext): \n AnimateRefAst
{\n    return {\n    type: AnimationMetadataType.AnimateRef, \n    animation:
this.visitReference(metadata.animation, context), \n    options: normalizeAnimationOptions(metadata.options) \n
}; \n } \n \n visitQuery(metadata: AnimationQueryMetadata, context: AnimationAstBuilderContext): \n QueryAst {\n
const parentSelector = context.currentQuerySelector!; \n const options = (metadata.options || {}) as
AnimationQueryOptions; \n \n context.queryCount++; \n context.currentQuery = metadata; \n const [selector,
includeSelf] = normalizeSelector(metadata.selector); \n context.currentQuerySelector = \n
parentSelector.length ? (parentSelector + ' ' + selector) : selector; \n    getOrSetDefaultValue(context.collectedStyles,
context.currentQuerySelector, new Map()); \n \n const animation = visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context); \n    context.currentQuery = null; \n
context.currentQuerySelector = parentSelector; \n \n return {\n    type:
AnimationMetadataType.Query, \n    selector, \n    limit: options.limit || 0, \n    optional: !!options.optional, \n
includeSelf, \n    animation, \n    originalSelector: metadata.selector, \n    options:
normalizeAnimationOptions(metadata.options) \n }; \n } \n \n visitStagger(metadata: AnimationStaggerMetadata,
context: AnimationAstBuilderContext): \n StaggerAst {\n    if (!context.currentQuery) {\n
context.errors.push(invalidStagger()); \n } \n    const timings = metadata.timings === 'full' ? \n    {duration: 0,
delay: 0, easing: 'full'} : \n    resolveTiming(metadata.timings, context.errors, true); \n \n return {\n    type:
AnimationMetadataType.Stagger, \n    animation: visitDslNode(this,
normalizeAnimationEntry(metadata.animation), context), \n    timings, \n    options: null \n }; \n } \n } \n \n function
normalizeSelector(selector: string): [string, boolean] {\n    const hasAmpersand = selector.split(/\\s*,\\s*/).find((token
=> token == SELF_TOKEN) ?
true : false; \n    if (hasAmpersand) {\n    selector = selector.replace(SELF_TOKEN_REGEX, ""); \n } \n \n // Note: the
:enter and :leave aren't normalized here since those \n // selectors are filled in at runtime during timeline building \n
selector = selector.replace(/@\\s*/g, NG_TRIGGER_SELECTOR) \n    .replace(/@\\s*/g, match =>
NG_TRIGGER_SELECTOR + '-' + match.slice(1)) \n    .replace(/:animating/g,
NG_ANIMATING_SELECTOR); \n \n return [selector, hasAmpersand]; \n } \n \n \n function normalizeParams(obj:

```

```

{[key: string]: any}|any): {[key: string]: any}|null {\n return obj ? copyObj(obj) : null;\n}\n\nexport type
StyleTimeTuple = {\n startTime: number; endTime: number;\n};\n\nexport class AnimationAstBuilderContext {\n
public queryCount: number = 0;\n public depCount: number = 0;\n public currentTransition:
AnimationTransitionMetadata|null = null;\n public currentQuery: AnimationQueryMetadata|null = null;\n public
currentQuerySelector: string|null = null;\n public
currentAnimateTimings: TimingAst|null = null;\n public currentTime: number = 0;\n public collectedStyles = new
Map<string, Map<string, StyleTimeTuple>>();\n public options: AnimationOptions|null = null;\n public
unsupportedCSSPropertiesFound: Set<string> = new Set<string>();\n constructor(public errors: Error[])
{\n}\n\nntype OffsetStyles = string|StyleDataMap;\n\nfunction consumeOffset(styles:
OffsetStyles|Array<OffsetStyles>): number|null {\n if (typeof styles == 'string') return null;\n\n let offset:
number|null = null;\n\n if (Array.isArray(styles)) {\n styles.forEach(styleTuple => {\n if (styleTuple instanceof
Map && styleTuple.has('offset')) {\n const obj = styleTuple as StyleDataMap;\n offset =
parseFloat(obj.get('offset') as string);\n obj.delete('offset');\n }\n });\n } else if (styles instanceof Map &&
styles.has('offset')) {\n const obj = styles;\n offset = parseFloat(obj.get('offset') as string);\n
obj.delete('offset');\n
}\n\n return offset;\n}\n\nfunction constructTimingAst(value: string|number|AnimateTimings, errors: Error[]) {\n if
(value.hasOwnProperty('duration')) {\n return value as AnimateTimings;\n }\n\n if (typeof value == 'number') {\n
const duration = resolveTiming(value, errors).duration;\n return makeTimingAst(duration, 0, "");\n }\n\n const
strValue = value as string;\n const isDynamic = strValue.split(/\\s+/).some(v => v.charAt(0) == '{' && v.charAt(1)
== '}');\n if (isDynamic) {\n const ast = makeTimingAst(0, 0, "") as any;\n ast.dynamic = true;\n ast.strValue =
strValue;\n return ast as DynamicTimingAst;\n }\n\n const timings = resolveTiming(strValue, errors);\n return
makeTimingAst(timings.duration, timings.delay, timings.easing);\n}\n\nfunction
normalizeAnimationOptions(options: AnimationOptions|null): AnimationOptions {\n if (options) {\n options =
copyObj(options);\n if (options['params']) {\n options['params'] = normalizeParams(options['params'])!;\n
}\n }\n } else {\n options = {};\n }\n return options;\n}\n\nfunction makeTimingAst(duration: number, delay:
number, easing: string|null): TimingAst {\n return {duration, delay, easing};\n}\n\n",/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\nimport {StyleDataMap} from
'@angular/animations';\n\nimport {AnimationEngineInstruction, AnimationTransitionInstructionType} from
'./render/animation_engine_instruction';\n\nexport interface AnimationTimelineInstruction extends
AnimationEngineInstruction {\n element: any;\n keyframes: Array<StyleDataMap>;\n preStyleProps: string[];\n
postStyleProps: string[];\n duration: number;\n delay: number;\n totalTime: number;\n easing: string|null;\n
stretchStartingKeyframe?: boolean;\n subTimeline: boolean;\n}\n\nexport function createTimelineInstruction(\n
element: any, keyframes: Array<StyleDataMap>, preStyleProps: string[],\n postStyleProps: string[], duration:
number, delay: number, easing: string|null = null,\n subTimeline: boolean = false): AnimationTimelineInstruction
{\n return {\n type: AnimationTransitionInstructionType.TimelineAnimation,\n element,\n keyframes,\n
preStyleProps,\n postStyleProps,\n duration,\n delay,\n totalTime: duration + delay,\n easing,\n
subTimeline\n };}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {AnimationTimelineInstruction} from
'./animation_timeline_instruction';\n\nexport class ElementInstructionMap {\n private _map = new Map<any,
AnimationTimelineInstruction[]>();\n\n get(element: any): AnimationTimelineInstruction[] {\n return
this._map.get(element) || [];\n }\n\n append(element:
any, instructions: AnimationTimelineInstruction[]) {\n let existingInstructions = this._map.get(element);\n if
(!existingInstructions) {\n this._map.set(element, existingInstructions = []);\n }\n\n
existingInstructions.push(...instructions);\n }\n\n has(element: any): boolean {\n return this._map.has(element);\n
}\n\n clear() {\n this._map.clear();\n }\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the

```

LICENSE file at <https://angular.io/license>

```

import { AnimateChildOptions, AnimateTimings,
AnimationMetadataType, AnimationOptions, AnimationQueryOptions, AUTO_STYLE, PRE_STYLE as
PRE_STYLE, StyleDataMap } from '@angular/animations';
import { invalidQuery } from
'./error_helpers';
import { AnimationDriver } from './render/animation_driver';
import { copyStyles,
interpolateParams, iteratorToArray, resolveTiming, resolveTimingValue, visitDslNode }
from './util';
import { AnimateAst, AnimateChildAst, AnimateRefAst, Ast, AstVisitor, DynamicTimingAst,
GroupAst, KeyframesAst, QueryAst, ReferenceAst, SequenceAst, StaggerAst, StateAst, StyleAst, TimingAst,
TransitionAst, TriggerAst } from './animation_ast';
import { AnimationTimelineInstruction,
createTimelineInstruction } from './animation_timeline_instruction';
import { ElementInstructionMap } from
'./element_instruction_map';
const ONE_FRAME_IN_MILLISECONDS = 1;
const ENTER_TOKEN =
'enter';
const ENTER_TOKEN_REGEX = new RegExp(ENTER_TOKEN, 'g');
const LEAVE_TOKEN =
'leave';
const LEAVE_TOKEN_REGEX = new RegExp(LEAVE_TOKEN, 'g');

```

\* The code within this file aims to generate web-animations-compatible keyframes from Angular's animation DSL code.

\* The code below will be converted from:

```

sequence([
  style({ opacity: 0 }),
  animate(1000, style({ opacity: 0 }))]
)
To:
keyframes = [{ opacity: 0, offset: 0 }, { opacity: 1, offset: 1 }]
duration = 1000
delay = 0
easing = ''

```

\* For this operation to cover the combination of animation verbs (style, animate, group, etc...) a combination of AST traversal and merge-sort-like algorithms are used.

\* [AST Traversal]

\* Each of the animation verbs, when executed, will return an string-map object representing what type of action it is (style, animate, group, etc...) and the data associated with it. This means that when functional composition mix of these functions is evaluated (like in the example above) then it will end up producing a tree of objects representing the animation itself.

\* When this animation object tree is processed by the visitor code below it will visit each of the verb statements within the visitor. And during each visit it will build the context of the animation keyframes by interacting with the `TimelineBuilder`.

\* [TimelineBuilder]

\* This class is responsible for tracking the styles and building a series of keyframe objects for a timeline between a start and end time. The builder starts off with an initial timeline and each time the AST comes across a `group()`, `keyframes()` or a combination of the two within a `sequence()` then it will generate a sub timeline for each step as well as a new one after they are complete.

\* As the AST is traversed, the timing state on each of the timelines will be incremented. If a sub timeline was created (based on one of the cases above) then the parent timeline will attempt to merge the styles used within the sub timelines into itself (only with group() this will happen).

\* This happens with a merge operation (much like how the merge works in mergeSort) and it will only copy the most recently used styles from the sub timelines into the parent timeline. This ensures that if the styles are used later on in another phase of the animation then they will be the most up-to-date values.

\* [How Missing Styles Are Updated]

\* Each timeline has a `backFill` property which is responsible for filling in new styles into already processed keyframes if a new style shows up later within the animation sequence.

```

sequence([
  style({ width: 0 }),
  animate(1000, style({ width: 100 })),
  animate(1000, style({ width: 200 })),
  animate(1000, style({ width: 300 })),
  animate(1000, style({ width: 400, height: 400 }))]
// notice how `height` doesn't exist anywhere
else

```

\* What is happening here is that the `height` value is added later in the sequence, but is missing from all previous animation steps. Therefore when a keyframe is created it would also be missing from all previous keyframes up until where it is first used. For the timeline keyframe generation to properly fill in the style it will place the previous value (the value from the parent timeline) or a default value of `\*` into the backFill map. The `copyStyles` method in util.ts handles propagating that backfill map to the styles object.

\* When a sub-timeline is created it will have its own backFill property. This is done so that styles present within the sub-timeline do not accidentally seep into the previous/future timeline keyframes.

\* [Validation]

\* The code in this file is not responsible for validation. That functionality happens with within the `AnimationValidatorVisitor` code.

```

export function buildAnimationTimelines(
  driver: AnimationDriver,
  rootElement: any,
  ast: Ast<AnimationMetadataType>,
  enterClassName: string,

```

```

leaveClassName: string, startingStyles: StyleDataMap = new Map(),\n  finalStyles: StyleDataMap = new Map(),
options: AnimationOptions,\n  subInstructions?: ElementInstructionMap, errors: Error[] = []):
AnimationTimelineInstruction[] {\n  return new AnimationTimelineBuilderVisitor().buildKeyframes(\n  driver,
rootElement,
  ast, enterClassName, leaveClassName, startingStyles, finalStyles,\n  options, subInstructions,
errors);\n}\n\nexport class AnimationTimelineBuilderVisitor implements AstVisitor {\n  buildKeyframes(\n  driver: AnimationDriver, rootElement: any, ast: Ast<AnimationMetadataType>,\n  enterClassName: string,
leaveClassName: string, startingStyles: StyleDataMap,\n  finalStyles: StyleDataMap, options:
AnimationOptions,\n  subInstructions?: ElementInstructionMap,\n  errors: Error[] = []):
AnimationTimelineInstruction[] {\n  subInstructions = subInstructions || new ElementInstructionMap();\n  const
context = new AnimationTimelineContext(\n  driver, rootElement, subInstructions, enterClassName,
leaveClassName, errors, []);\n  context.options = options;\n  const delay = options.delay ?
resolveTimingValue(options.delay) : 0;\n  context.currentTimeline.delayNextStep(delay);\n  context.currentTimeline.setStyles([startingStyles], null, context.errors, options);\n\n  visitDslNode(this, ast, context);\n  // this checks to see if an actual animation happened\n  const timelines =
context.timelines.filter(timeline => timeline.containsAnimation());\n  // note: we just want to apply the final
styles for the rootElement, so we do not\n  // just apply the styles to the last timeline but the last timeline
which\n  // element is the root one (basically `*-styles are replaced with the actual\n  // state style values
only for the root element)\n  if (timelines.length && finalStyles.size) {\n  let lastRootTimeline:
TimelineBuilder|undefined;\n  for (let i = timelines.length - 1; i >= 0; i--) {\n  const timeline = timelines[i];\n  if (timeline.element === rootElement) {\n  lastRootTimeline = timeline;\n  break;\n  }\n  }\n  (lastRootTimeline && !lastRootTimeline.allowOnlyTimelineStyles()) {\n  lastRootTimeline.setStyles([finalStyles], null, context.errors,
options);\n  }\n  }\n  return timelines.length ?\n  timelines.map(timeline => timeline.buildKeyframes()) :\n  [createTimelineInstruction(rootElement, [], [], [], 0, delay, "", false)];\n  }\n  visitTrigger(ast: TriggerAst,
context: AnimationTimelineContext): any {\n  // these values are not visited in this AST\n  }\n  visitState(ast:
StateAst, context: AnimationTimelineContext): any {\n  // these values are not visited in this AST\n  }\n  visitTransition(ast: TransitionAst, context: AnimationTimelineContext): any {\n  // these values are not visited in
this AST\n  }\n  visitAnimateChild(ast: AnimateChildAst, context: AnimationTimelineContext): any {\n  const
elementInstructions = context.subInstructions.get(context.element);\n  if (elementInstructions) {\n  const
innerContext = context.createSubContext(ast.options);\n  const startTime =
context.currentTimeline.currentTime;\n  const endTime = this._visitSubInstructions(\n  elementInstructions,
innerContext, innerContext.options as AnimateChildOptions);\n  if (startTime != endTime) {\n  // we do this
on the upper context because we created a sub context for\n  // the sub child animations\n  context.transformIntoNewTimeline(endTime);\n  }\n  }\n  context.previousNode = ast;\n  }\n  visitAnimateRef(ast: AnimateRefAst, context: AnimationTimelineContext): any {\n  const innerContext =
context.createSubContext(ast.options);\n  innerContext.transformIntoNewTimeline();\n  this._applyAnimationRefDelays([ast.options, ast.animation.options], context, innerContext);\n  this.visitReference(ast.animation, innerContext);\n  context.transformIntoNewTimeline(innerContext.currentTimeline.currentTime);\n  context.previousNode = ast;\n  }\n  private _applyAnimationRefDelays(\n  animationsRefsOptions: (AnimationOptions|null)[], context:
AnimationTimelineContext,\n  innerContext: AnimationTimelineContext) {\n  for (const animationRefOptions
of animationsRefsOptions) {\n  const animationDelay = animationRefOptions?.delay;\n  if (animationDelay)
{\n  const animationDelayValue = typeof animationDelay === 'number' ?\n  animationDelay :\n  resolveTimingValue(interpolateParams(\n  animationDelay, animationRefOptions?.params ?? {},
context.errors));\n  innerContext.delayNextStep(animationDelayValue);\n  }\n  }\n  }\n  private
_visitSubInstructions(\n  instructions: AnimationTimelineInstruction[], context: AnimationTimelineContext,\n  options: AnimateChildOptions): number {\n  const startTime = context.currentTimeline.currentTime;\n  let

```

```

furthestTime = startTime;\n\n // this is a special-case for when a user wants to skip a sub\n // animation from
being fired entirely.\n  const duration = options.duration !== null ? resolveTimingValue(options.duration) : null;\n  const delay = options.delay !== null ? resolveTimingValue(options.delay)
: null;\n  if (duration !== 0) {\n    instructions.forEach(instruction => {\n      const instructionTimings =\ncontext.appendInstructionToTimeline(instruction, duration, delay);\n      furthestTime =\nMath.max(furthestTime, instructionTimings.duration + instructionTimings.delay);\n    });\n  }\n  return
furthestTime;\n }\n\n visitReference(ast: ReferenceAst, context: AnimationTimelineContext) {\n
context.updateOptions(ast.options, true);\n  visitDslNode(this, ast.animation, context);\n  context.previousNode =
ast;\n }\n\n visitSequence(ast: SequenceAst, context: AnimationTimelineContext) {\n  const subContextCount =
context.subContextCount;\n  let ctx = context;\n  const options = ast.options;\n  if (options &&
(options.params || options.delay)) {\n    ctx = context.createSubContext(options);\n
ctx.transformIntoNewTimeline();\n    if (options.delay !== null) {\n      if (ctx.previousNode.type ==
AnimationMetadataType.Style)
{\n        ctx.currentTimeline.snapshotCurrentStyles();\n        ctx.previousNode =
DEFAULT_NOOP_PREVIOUS_NODE;\n      }\n      const delay = resolveTimingValue(options.delay);\n
ctx.delayNextStep(delay);\n    }\n  }\n  if (ast.steps.length) {\n    ast.steps.forEach(s => visitDslNode(this, s,
ctx));\n    // this is here just in case the inner steps only contain or end with a style() call\n
ctx.currentTimeline.applyStylesToKeyframe();\n    // this means that some animation function within the
sequence\n    // ended up creating a sub timeline (which means the current\n    // timeline cannot overlap with the
contents of the sequence)\n    if (ctx.subContextCount > subContextCount) {\n
ctx.transformIntoNewTimeline();\n    }\n  }\n  context.previousNode = ast;\n }\n\n visitGroup(ast: GroupAst,
context: AnimationTimelineContext) {\n  const innerTimelines: TimelineBuilder[] = [];\n  let furthestTime =
context.currentTimeline.currentTime;\n
  const delay = ast.options && ast.options.delay ? resolveTimingValue(ast.options.delay) : 0;\n
ast.steps.forEach(s => {\n    const innerContext = context.createSubContext(ast.options);\n    if (delay) {\n
innerContext.delayNextStep(delay);\n    }\n    visitDslNode(this, s, innerContext);\n    furthestTime =
Math.max(furthestTime, innerContext.currentTimeline.currentTime);\n
innerTimelines.push(innerContext.currentTimeline);\n  });\n  // this operation is run after the AST loop because
otherwise\n  // if the parent timeline's collected styles were updated then\n  // it would pass in invalid data into the
new-to-be forked items\n  innerTimelines.forEach(\n    timeline =>
context.currentTimeline.mergeTimelineCollectedStyles(timeline));\n
context.transformIntoNewTimeline(furthestTime);\n  context.previousNode = ast;\n }\n\n private
_visitTiming(ast: TimingAst, context: AnimationTimelineContext): AnimateTimings
{\n  if ((ast as DynamicTimingAst).dynamic) {\n    const strValue = (ast as DynamicTimingAst).strValue;\n
const timingValue =\n      context.params ? interpolateParams(strValue, context.params, context.errors) :
strValue;\n    return resolveTiming(timingValue, context.errors);\n  } else {\n    return {duration: ast.duration,
delay: ast.delay, easing: ast.easing};\n  }\n }\n\n visitAnimate(ast: AnimateAst, context:
AnimationTimelineContext) {\n  const timings = context.currentAnimateTimings = this._visitTiming(ast.timings,
context);\n  const timeline = context.currentTimeline;\n  if (timings.delay) {\n
context.incrementTime(timings.delay);\n    timeline.snapshotCurrentStyles();\n  }\n  const style = ast.style;\n
if (style.type == AnimationMetadataType.Keyframes) {\n    this.visitKeyframes(style, context);\n  } else {\n
context.incrementTime(timings.duration);\n    this.visitStyle(style as StyleAst, context);\n
timeline.applyStylesToKeyframe();\n
  }\n  context.currentAnimateTimings = null;\n  context.previousNode = ast;\n }\n\n visitStyle(ast: StyleAst,
context: AnimationTimelineContext) {\n  const timeline = context.currentTimeline;\n  const timings =
context.currentAnimateTimings!;\n  // this is a special case for when a style() call\n  // directly follows an
animate() call (but not inside of an animate() call)\n  if (!timings && timeline.hasCurrentStyleProperties()) {\n
timeline.forwardFrame();\n  }\n  const easing = (timings && timings.easing) || ast.easing;\n  if

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(ast.isEmptyStep) {\n  timeline.applyEmptyStep(easing);\n } else {\n  timeline.setStyles(ast.styles, easing,
context.errors, context.options);\n }\n\n context.previousNode = ast;\n }\n\n visitKeyframes(ast: KeyframesAst,
context: AnimationTimelineContext) {\n  const currentAnimateTimings = context.currentAnimateTimings!;\n  const startTime = (context.currentTimeline!).duration;\n  const
duration = currentAnimateTimings.duration;\n  const innerContext = context.createSubContext();\n  const
innerTimeline = innerContext.currentTimeline;\n  innerTimeline.easing = currentAnimateTimings.easing;\n\n  ast.styles.forEach(step => {\n    const offset: number = step.offset || 0;\n    innerTimeline.forwardTime(offset *
duration);\n    innerTimeline.setStyles(step.styles, step.easing, context.errors, context.options);\n  });\n\n  innerTimeline.applyStylesToKeyframe();\n }\n\n // this will ensure that the parent timeline gets all the styles
from\n // the child even if the new timeline below is not used\n
context.currentTimeline.mergeTimelineCollectedStyles(innerTimeline);\n\n // we do this because the window
between this timeline and the sub timeline\n // should ensure that the styles within are exactly the same as they
were before\n  context.transformIntoNewTimeline(startTime + duration);\n  context.previousNode = ast;\n }\n\n visitQuery(ast:
QueryAst, context: AnimationTimelineContext) {\n  // in the event that the first step before this is a style step we
need\n // to ensure the styles are applied before the children are animated\n  const startTime =
context.currentTimeline.currentTime;\n  const options = (ast.options || {}) as AnimationQueryOptions;\n  const
delay = options.delay ? resolveTimingValue(options.delay) : 0;\n\n  if (delay &&\n
(context.previousNode.type === AnimationMetadataType.Style ||\n    (startTime === 0 &&
context.currentTimeline.hasCurrentStyleProperties())) {\n    context.currentTimeline.snapshotCurrentStyles();\n
context.previousNode = DEFAULT_NOOP_PREVIOUS_NODE;\n  }\n\n  let furthestTime = startTime;\n  const elms = context.invokeQuery(\n    ast.selector, ast.originalSelector, ast.limit, ast.includeSelf,\n  options.optional ? true : false, context.errors);\n\n  context.currentQueryTotal = elms.length;\n  let
sameElementTimeline: TimelineBuilder\n  = null;\n  elms.forEach((element, i) => {\n    context.currentQueryIndex = i;\n    const innerContext =
context.createSubContext(ast.options, element);\n    if (delay) {\n      innerContext.delayNextStep(delay);\n
}\n\n    if (element === context.element) {\n      sameElementTimeline = innerContext.currentTimeline;\n
}\n\n    visitDslNode(this, ast.animation, innerContext);\n\n    // this is here just incase the inner steps only contain
or end\n // with a style() call (which is here to signal that this is a preparatory\n // call to style an element
before it is animated again)\n    innerContext.currentTimeline.applyStylesToKeyframe();\n\n    const endTime =
innerContext.currentTimeline.currentTime;\n    furthestTime = Math.max(furthestTime, endTime);\n  });\n\n  context.currentQueryIndex = 0;\n  context.currentQueryTotal = 0;\n
context.transformIntoNewTimeline(furthestTime);\n\n  if (sameElementTimeline) {\n
context.currentTimeline.mergeTimelineCollectedStyles(sameElementTimeline);\n
context.currentTimeline.snapshotCurrentStyles();\n  }\n\n  context.previousNode = ast;\n }\n\n visitStagger(ast: StaggerAst, context: AnimationTimelineContext) {\n  const parentContext =
context.parentContext!;\n  const tl = context.currentTimeline;\n  const timings = ast.timings;\n  const duration =
Math.abs(timings.duration);\n  const maxTime = duration * (context.currentQueryTotal - 1);\n  let delay =
duration * context.currentQueryIndex;\n\n  let staggerTransformer = timings.duration < 0 ? 'reverse' :
timings.easing;\n  switch (staggerTransformer) {\n    case 'reverse':\n      delay = maxTime - delay;\n
break;\n    case 'full':\n      delay = parentContext.currentStaggerTime;\n      break;\n  }\n\n  const timeline =
context.currentTimeline;\n  if (delay) {\n    timeline.delayNextStep(delay);\n  }\n\n  const startingTime =
timeline.currentTime;\n  visitDslNode(this,
ast.animation, context);\n  context.previousNode = ast;\n\n  // time = duration + delay\n // the reason why this
computation is so complex is because\n // the inner timeline may either have a delay value or a stretched\n //
keyframe depending on if a subtimeline is not used or is used.\n  parentContext.currentStaggerTime =\n
(tl.currentTime - startingTime) + (tl.startTime - parentContext.currentTimeline.startTime);\n  }\n\n\nexport declare
type StyleAtTime = {\n  time: number; value: string | number;\n};\n\nconst DEFAULT_NOOP_PREVIOUS_NODE

```



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= <Ast<AnimationMetadataType>>{};\nexport class AnimationTimelineContext {\n  public parentContext:
AnimationTimelineContext|null = null;\n  public currentTimeline: TimelineBuilder;\n  public
currentAnimateTimings: AnimateTimings|null = null;\n  public previousNode: Ast<AnimationMetadataType> =
DEFAULT_NOOP_PREVIOUS_NODE;\n  public subContextCount = 0;\n  public options: AnimationOptions =
{};\n  public currentQueryIndex: number
= 0;\n  public currentQueryTotal: number = 0;\n  public currentStaggerTime: number = 0;\n\n  constructor(\n
private _driver: AnimationDriver, public element: any,\n    public subInstructions: ElementInstructionMap, private
_enterClassName: string,\n    private _leaveClassName: string, public errors: Error[], public timelines:
TimelineBuilder[],\n    initialTimeline?: TimelineBuilder) {\n    this.currentTimeline = initialTimeline || new
TimelineBuilder(this._driver, element, 0);\n    timelines.push(this.currentTimeline);\n  }\n\n  get params() {\n
return this.options.params;\n  }\n\n  updateOptions(options: AnimationOptions|null, skipIfExists?: boolean) {\n  if
(!options) return;\n\n  const newOptions = options as any;\n  let optionsToUpdate = this.options;\n\n  // NOTE:
this will get patched up when other animation methods support duration overrides\n  if (newOptions.duration !=
null) {\n    (optionsToUpdate as any).duration = resolveTimingValue(newOptions.duration);\n
  }\n\n  if (newOptions.delay != null) {\n    optionsToUpdate.delay = resolveTimingValue(newOptions.delay);\n
  }\n\n  const newParams = newOptions.params;\n  if (newParams) {\n    let paramsToUpdate: {[name: string]:
any} = optionsToUpdate.params!;\n    if (!paramsToUpdate) {\n      paramsToUpdate = this.options.params =
{};\n    }\n\n    Object.keys(newParams).forEach(name => {\n      if (!skipIfExists ||
!paramsToUpdate.hasOwnProperty(name)) {\n        paramsToUpdate[name] =
interpolateParams(newParams[name], paramsToUpdate, this.errors);\n      }\n    });\n  }\n\n  private
_copyOptions() {\n    const options: AnimationOptions = {};\n    if (this.options) {\n      const oldParams =
this.options.params;\n      if (oldParams) {\n        const params: {[name: string]: any} = options['params'] =
{};\n        Object.keys(oldParams).forEach(name => {\n          params[name] = oldParams[name];\n        });\n      }\n    }\n    return options;\n  }\n\n  createSubContext(options: AnimationOptions|null = null, element?: any, newTime?: number):\n  AnimationTimelineContext {\n    const target = element || this.element;\n    const context = new
AnimationTimelineContext(\n      this._driver, target, this.subInstructions, this._enterClassName,
this._leaveClassName,\n      this.errors, this.timelines, this.currentTimeline.fork(target, newTime || 0));\n    context.previousNode = this.previousNode;\n    context.currentAnimateTimings = this.currentAnimateTimings;\n    context.options = this._copyOptions();\n    context.updateOptions(options);\n    context.currentQueryIndex =
this.currentQueryIndex;\n    context.currentQueryTotal = this.currentQueryTotal;\n    context.parentContext = this;\n    this.subContextCount++;\n    return context;\n  }\n\n  transformIntoNewTimeline(newTime?: number) {\n    this.previousNode = DEFAULT_NOOP_PREVIOUS_NODE;\n    this.currentTimeline =
this.currentTimeline.fork(this.element, newTime);\n
    this.timelines.push(this.currentTimeline);\n    return this.currentTimeline;\n  }\n\n  appendInstructionToTimeline(\n    instruction: AnimationTimelineInstruction, duration: number|null,\n    delay:
number|null): AnimateTimings {\n    const updatedTimings: AnimateTimings = {\n      duration: duration != null ?
duration : instruction.duration,\n      delay: this.currentTimeline.currentTime + (delay != null ? delay : 0) +
instruction.delay,\n      easing: "\n    };\n    const builder = new SubTimelineBuilder(\n      this._driver,
instruction.element, instruction.keyframes, instruction.preStyleProps,\n      instruction.postStyleProps,
updatedTimings, instruction.stretchStartingKeyframe);\n    this.timelines.push(builder);\n    return
updatedTimings;\n  }\n\n  incrementTime(time: number) {\n    this.currentTimeline.forwardTime(this.currentTimeline.duration + time);\n  }\n\n  delayNextStep(delay: number) {\n
// negative delays are not yet supported\n  if (delay > 0) {\n    this.currentTimeline.delayNextStep(delay);\n  }\n\n  invokeQuery(\n    selector: string, originalSelector:
string, limit: number, includeSelf: boolean,\n    optional: boolean, errors: Error[]): any[] {\n    let results: any[] =
[];\n    if (includeSelf) {\n      results.push(this.element);\n    }\n    if (selector.length > 0) { // only if :self is used
then the selector can be empty\n      selector = selector.replace(ENTER_TOKEN_REGEX, ' +

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this._enterClassName);\n    selector = selector.replace(LEAVE_TOKEN_REGEX, '.' + this._leaveClassName);\n    const multi = limit !== 1;\n    let elements = this._driver.query(this.element, selector, multi);\n    if (limit !== 0) {\n      elements = limit < 0 ? elements.slice(elements.length + limit, elements.length) :\n        elements.slice(0, limit);\n    }\n    results.push(...elements);\n  }\n  if (!optional && results.length === 0) {\n    errors.push(invalidQuery(originalSelector));\n  }\n  return results;\n}\n\nexport class TimelineBuilder {\n  public duration: number = 0;\n  //\n  TODO(issue/24571): remove '!'.\n  public easing!: string|null;\n  private _previousKeyframe: StyleDataMap = new\n  Map();\n  private _currentKeyframe: StyleDataMap = new Map();\n  private _keyframes = new Map<number,\n  StyleDataMap>();\n  private _styleSummary = new Map<string, StyleAtTime>();\n  private _localTimelineStyles:\n  StyleDataMap = new Map();\n  private _globalTimelineStyles: StyleDataMap;\n  private _pendingStyles:\n  StyleDataMap = new Map();\n  private _backFill: StyleDataMap = new Map();\n  private\n  _currentEmptyStepKeyframe: StyleDataMap|null = null;\n\n  constructor(\n    private _driver: AnimationDriver,\n    public element: any, public startTime: number,\n    private _elementTimelineStylesLookup?: Map<any,\n    StyleDataMap>) {\n    if (!this._elementTimelineStylesLookup) {\n      this._elementTimelineStylesLookup = new\n      Map<any, StyleDataMap>();\n    }\n    this._globalTimelineStyles\n    = this._elementTimelineStylesLookup.get(element)!;\n    if (!this._globalTimelineStyles) {\n      this._globalTimelineStyles = this._localTimelineStyles;\n      this._elementTimelineStylesLookup.set(element,\n      this._localTimelineStyles);\n    }\n    this._loadKeyframe();\n  }\n\n  containsAnimation(): boolean {\n    switch\n    (this._keyframes.size) {\n      case 0:\n        return false;\n      case 1:\n        return this.hasCurrentStyleProperties();\n      default:\n        return true;\n    }\n  }\n\n  hasCurrentStyleProperties(): boolean {\n    return\n    this._currentKeyframe.size > 0;\n  }\n\n  get currentTime() {\n    return this.startTime + this.duration;\n  }\n\n  delayNextStep(delay: number) {\n    // in the event that a style() step is placed right before a stagger()\n    // and that\n    style() step is the very first style() value in the animation\n    // then we need to make a copy of the keyframe [0,\n    copy, 1] so that the delay\n    // properly applies the style() values\n    to work with the stagger...\n    const hasPreStyleStep = this._keyframes.size === 1 &&\n    this._pendingStyles.size;\n    if (this.duration || hasPreStyleStep) {\n      this.forwardTime(this.currentTime +\n      delay);\n    } else {\n      this.startTime +=\n      delay;\n    }\n  }\n\n  fork(element: any, currentTime?: number): TimelineBuilder {\n    this.applyStylesToKeyframe();\n    return new TimelineBuilder(\n      this._driver, element, currentTime ||\n      this.currentTime, this._elementTimelineStylesLookup);\n  }\n\n  private _loadKeyframe() {\n    if\n    (this._currentKeyframe) {\n      this._previousKeyframe = this._currentKeyframe;\n    }\n    this._currentKeyframe =\n    this._keyframes.get(this.duration)!;\n    if (!this._currentKeyframe) {\n      this._currentKeyframe = new Map();\n      this._keyframes.set(this.duration, this._currentKeyframe);\n    }\n  }\n\n  private forwardFrame() {\n    this.duration +=\n    ONE_FRAME_IN_MILLISECONDS;\n  }\n\n  private _loadKeyframe();\n  forwardTime(time: number) {\n    this.applyStylesToKeyframe();\n    this.duration\n    = time;\n    this._loadKeyframe();\n  }\n\n  private _updateStyle(prop: string, value: string|number) {\n    this._localTimelineStyles.set(prop, value);\n    this._globalTimelineStyles.set(prop, value);\n    this._styleSummary.set(prop, {time: this.currentTime, value});\n  }\n\n  allowOnlyTimelineStyles() {\n    return\n    this._currentEmptyStepKeyframe !== this._currentKeyframe;\n  }\n\n  applyEmptyStep(easing: string|null) {\n    if\n    (easing) {\n      this._previousKeyframe.set('easing', easing);\n    }\n    // special case for animate(duration):\n    //\n    // all missing styles are filled with a `*` value then\n    // if any destination styles are filled in later on the same\n    //\n    // keyframe then they will override the overridden styles\n    // We use `_globalTimelineStyles` here because there\n    //\n    // may be\n    // styles in previous keyframes that are not present in this timeline\n  }\n\n  for (let [prop, value] of this._globalTimelineStyles) {\n    this._backFill.set(prop, value || AUTO_STYLE);\n    this._currentKeyframe.set(prop, AUTO_STYLE);\n  }\n  this._currentEmptyStepKeyframe =\n  this._currentKeyframe;\n}\n\nsetStyles(\n  input: Array<(StyleDataMap | string)>, easing: string|null, errors:\n  Error[],\n  options?: AnimationOptions) {\n  if (easing) {\n    this._previousKeyframe.set('easing', easing);\n  }\n  const params = (options && options.params) || {};\n  const styles = flattenStyles(input,\n
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this._globalTimelineStyles);\n  for (let [prop, value] of styles) {\n    const val = interpolateParams(value, params,\n    errors);\n    this._pendingStyles.set(prop, val);\n    if (!this._localTimelineStyles.has(prop)) {\n      this._backFill.set(prop, this._globalTimelineStyles.get(prop) ?? AUTO_STYLE);\n    }\n    this._updateStyle(prop, val);\n  }\n  applyStylesToKeyframe() {\n    if (this._pendingStyles.size === 0)\n      return;\n    this._pendingStyles.forEach((val, prop) => {\n      this._currentKeyframe.set(prop, val);\n    });\n    this._pendingStyles.clear();\n    this._localTimelineStyles.forEach((val, prop) => {\n      if\n      (!this._currentKeyframe.has(prop)) {\n        this._currentKeyframe.set(prop, val);\n      }\n    });\n  }\n  snapshotCurrentStyles() {\n    for (let [prop, val] of this._localTimelineStyles) {\n      this._pendingStyles.set(prop,\n      val);\n      this._updateStyle(prop, val);\n    }\n  }\n  getFinalKeyframe() {\n    return\n    this._keyframes.get(this.duration);\n  }\n  get properties() {\n    const properties: string[] = [];\n    for (let prop in\n    this._currentKeyframe) {\n      properties.push(prop);\n    }\n    return properties;\n  }\n  mergeTimelineCollectedStyles(timeline: TimelineBuilder) {\n    timeline._styleSummary.forEach((details1, prop)\n    => {\n      const details0 = this._styleSummary.get(prop);\n      if (!details0 || details1.time > details0.time) {\n        this._updateStyle(prop, details1.value);\n      }\n    });\n  }\n  buildKeyframes(): AnimationTimelineInstruction\n  {\n    this.applyStylesToKeyframe();\n    const preStyleProps = new Set<string>();\n    const postStyleProps = new\n    Set<string>();\n    const isEmpty = this._keyframes.size === 1 && this.duration === 0;\n    let finalKeyframes:\n    Array<StyleDataMap> = [];\n    this._keyframes.forEach((keyframe, time) => {\n      const finalKeyframe =\n      copyStyles(keyframe, new Map(), this._backFill);\n      finalKeyframe.forEach((value, prop) => {\n        if (value\n        === PRE_STYLE) {\n          preStyleProps.add(prop);\n        } else if (value === AUTO_STYLE) {\n          postStyleProps.add(prop);\n        }\n      });\n      if (!isEmpty) {\n        finalKeyframe.set('offset', time /\n        this.duration);\n      }\n      finalKeyframes.push(finalKeyframe);\n    });\n    const preProps: string[] =\n    preStyleProps.size ? iteratorToArray(preStyleProps.values()) : [];\n    const postProps: string[]\n    = postStyleProps.size ? iteratorToArray(postStyleProps.values()) : [];\n    // special case for a 0-second animation\n    (which is designed just to place styles onscreen)\n    if (isEmpty) {\n      const kf0 = finalKeyframes[0];\n      const\n      kf1 = new Map(kf0);\n      kf0.set('offset', 0);\n      kf1.set('offset', 1);\n      finalKeyframes = [kf0, kf1];\n    }\n    return createTimelineInstruction(\n    this.element, finalKeyframes, preProps, postProps, this.duration,\n    this.startTime,\n    this.easing, false);\n  }\n}\n\nclass SubTimelineBuilder extends TimelineBuilder {\n  public\n  timings: AnimateTimings;\n  constructor(\n  driver: AnimationDriver, element: any, public keyframes:\n  Array<StyleDataMap>,\n  public preStyleProps: string[], public postStyleProps: string[], timings:\n  AnimateTimings,\n  private _stretchStartingKeyframe: boolean = false) {\n    super(driver, element,\n    timings.delay);\n    this.timings = { duration: timings.duration, delay: timings.delay, easing:\n    timings.easing };\n  }\n  override containsAnimation(): boolean {\n    return this.keyframes.length > 1;\n  }\n  override buildKeyframes(): AnimationTimelineInstruction {\n    let keyframes = this.keyframes;\n    let {delay,\n    duration, easing} = this.timings;\n    if (this._stretchStartingKeyframe && delay) {\n      const newKeyframes:\n      Array<StyleDataMap> = [];\n      const totalTime = duration + delay;\n      const startingGap = delay / totalTime;\n      // the original starting keyframe now starts once the delay is done\n      const newFirstKeyframe =\n      copyStyles(keyframes[0]);\n      newFirstKeyframe.set('offset', 0);\n      newKeyframes.push(newFirstKeyframe);\n      const oldFirstKeyframe = copyStyles(keyframes[0]);\n      oldFirstKeyframe.set('offset', roundOffset(startingGap));\n      newKeyframes.push(oldFirstKeyframe);\n    } /*\n    When the keyframe is stretched then it means that the delay before the animation\n    starts is gone. Instead the\n    first keyframe\n    is placed at the start of the animation\n    and it is then copied to where it starts when the original delay is over.\n    This basically\n    means nothing animates during that delay, but the styles are still rendered. For this\n    to\n    work the original offset values that exist in the original keyframes must be\n    \"warped\"\n    so that they can take the\n    new keyframe + delay into account.\n    delay=1000, duration=1000, keyframes = 0 .5 1\n    turns into\n    delay=0, duration=2000, keyframes = 0 .33 .66 1\n    */\n    // offsets between 1 ... n -1 are all warped by the\n    keyframe stretch\n    const limit = keyframes.length - 1;\n    for (let i = 1; i <= limit; i++) {\n      let kf =\n      copyStyles(keyframes[i]);\n      const oldOffset = kf.get('offset') as number;\n      const timeAtKeyframe = delay +

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oldOffset * duration;\n      kf.set('offset', roundOffset(timeAtKeyframe / totalTime));\n
newKeyframes.push(kf);\n  }\n  //
  the new starting keyframe should be added at the start\n    duration = totalTime;\n    delay = 0;\n    easing =
";\n\n  keyframes = newKeyframes;\n  }\n\n  return createTimelineInstruction(\n    this.element, keyframes,
this.preStyleProps, this.postStyleProps, duration, delay, easing,\n    true);\n  }\n\n\nfunction roundOffset(offset:
number, decimalPoints = 3): number {\n  const mult = Math.pow(10, decimalPoints - 1);\n  return Math.round(offset
* mult) / mult;\n}\n\nfunction flattenStyles(input: Array<(StyleDataMap | string)>, allStyles: StyleDataMap) {\n
const styles: StyleDataMap = new Map();\n  let allProperties: string[]\n  IterableIterator<string>;\n  input.forEach(token => {\n    if (token === '*') {\n      allProperties = allProperties || allStyles.keys();\n      for (let
prop of allProperties) {\n        styles.set(prop, AUTO_STYLE);\n      }\n    } else {\n      copyStyles(token as
StyleDataMap, styles);\n    }\n  });\n  return styles;\n}\n", "/*\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{AnimationMetadata, AnimationMetadataType, AnimationOptions, StyleDataMap} from
'@angular/animations';\n\nimport {buildingFailed, validationFailed} from './error_helpers';\n\nimport
{AnimationDriver} from './render/animation_driver';\n\nimport {ENTER_CLASSNAME, LEAVE_CLASSNAME,
normalizeStyles} from './util';\n\nimport {warnValidation} from './warning_helpers';\n\nimport {Ast} from
'./animation_ast';\n\nimport {buildAnimationAst} from './animation_ast_builder';\n\nimport {buildAnimationTimelines}
from './animation_timeline_builder';\n\nimport {AnimationTimelineInstruction} from
'./animation_timeline_instruction';\n\nimport {ElementInstructionMap} from './element_instruction_map';\n\n\nexport
class Animation {\n  private _animationAst: Ast<AnimationMetadataType>;\n  constructor(private _driver:
AnimationDriver, input: AnimationMetadata|AnimationMetadata[]) {\n    const errors: Error[] = [];\n    const
warnings: string[] = [];\n    const ast = buildAnimationAst(_driver, input, errors, warnings);\n    if (errors.length) {\n
      throw validationFailed(errors);\n    }\n    if (warnings.length) {\n      warnValidation(warnings);\n    }\n
this._animationAst = ast;\n  }\n\n  buildTimelines(\n    element: any, startingStyles:
StyleDataMap|Array<StyleDataMap>,\n    destinationStyles: StyleDataMap|Array<StyleDataMap>, options:
AnimationOptions,\n    subInstructions?: ElementInstructionMap): AnimationTimelineInstruction[] {\n    const
start = Array.isArray(startingStyles) ? normalizeStyles(startingStyles) :\n
<StyleDataMap>startingStyles;\n    const dest = Array.isArray(destinationStyles) ?
normalizeStyles(destinationStyles) :\n
<StyleDataMap>destinationStyles;\n
const errors: any = [];\n    subInstructions = subInstructions || new ElementInstructionMap();\n    const result =
buildAnimationTimelines(\n      this._driver, element, this._animationAst, ENTER_CLASSNAME,
LEAVE_CLASSNAME, start, dest,\n      options, subInstructions, errors);\n    if (errors.length) {\n      throw
buildingFailed(errors);\n    }\n    return result;\n  }\n}\n", "/*\n
* @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\n\n * @publicApi\n */\n\nexport abstract class
AnimationStyleNormalizer {\n  abstract normalizePropertyName(propertyName: string, errors: Error[]): string;\n
  abstract normalizeStyleValue(\n    userProvidedProperty: string, normalizedProperty: string, value:
string|number,\n    errors: Error[]): string;\n}\n", "/*\n
* @publicApi\n */\n\nexport class
NoopAnimationStyleNormalizer {\n  normalizePropertyName(propertyName:
string, errors: Error[]): string {\n    return propertyName;\n  }\n\n  normalizeStyleValue(\n
userProvidedProperty: string, normalizedProperty: string, value: string|number,\n    errors: Error[]): string {\n
return <any>value;\n  }\n}\n", "/*\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {invalidCssUnitValue} from './error_helpers';\n\nimport
{dashCaseToCamelCase} from './util';\n\nimport {AnimationStyleNormalizer} from
'./animation_style_normalizer';\n\n\nconst DIMENSIONAL_PROP_SET = new Set([\n  'width',\n  'height',\n
'minWidth',\n  'minHeight',\n  'maxWidth',\n  'maxHeight',\n  'left',\n  'top',\n  'bottom',\n  'right',\n  'fontSize',\n

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'outlineWidth',\n 'outlineOffset',\n 'paddingTop',\n 'paddingLeft',\n 'paddingBottom',\n 'paddingRight',\n
'marginTop',\n 'marginLeft',\n 'marginBottom',\n
'marginRight',\n 'borderRadius',\n 'borderWidth',\n 'borderTopWidth',\n 'borderLeftWidth',\n
'borderRightWidth',\n 'borderBottomWidth',\n 'textIndent',\n 'perspective"\n]);\n\nexport class
WebAnimationsStyleNormalizer extends AnimationStyleNormalizer {\n  override
normalizePropertyName(propertyName: string, errors: Error[]): string {\n    return
dashCaseToCamelCase(propertyName);\n  }\n  override normalizeStyleValue(\n    userProvidedProperty: string,
normalizedProperty: string, value: string|number,\n    errors: Error[]): string {\n    let unit: string = "";\n    const
strVal = value.toString().trim();\n\n    if (DIMENSIONAL_PROP_SET.has(normalizedProperty) && value !== 0
&& value !== '0') {\n      if (typeof value === 'number') {\n        unit = 'px';\n      } else {\n        const
valAndSuffixMatch = value.match(/^[+-]?[\\d\\.]+([a-z]*)$/);\n        if (valAndSuffixMatch &&
valAndSuffixMatch[1].length == 0) {\n          errors.push(invalidCssUnitValue(userProvidedProperty,
value));\n        }\n      }\n    }\n    return strVal + unit;\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {StyleDataMap} from '@angular/animations';\n\nimport
{AnimationEngineInstruction, AnimationTransitionInstructionType} from
'./render/animation_engine_instruction';\n\nimport {AnimationTimelineInstruction} from
'./animation_timeline_instruction';\n\nexport interface AnimationTransitionInstruction extends
AnimationEngineInstruction {\n  element: any;\n  triggerName: string;\n  isRemovalTransition: boolean;\n  fromState: string;\n  fromStyles: StyleDataMap;\n  toState: string;\n  toStyles: StyleDataMap;\n  timelines:
AnimationTimelineInstruction[];\n  queriedElements: any[];\n  preStyleProps: Map<any, Set<string>>;\n  postStyleProps: Map<any, Set<string>>;\n  totalTime: number;\n  errors?: Error[];\n}\n\nexport function createTransitionInstruction(\n  element: any, triggerName: string,
fromState: string, toState: string,\n  isRemovalTransition: boolean, fromStyles: StyleDataMap, toStyles:
StyleDataMap,\n  timelines: AnimationTimelineInstruction[], queriedElements: any[],\n  preStyleProps: Map<any, Set<string>>, postStyleProps: Map<any, Set<string>>, totalTime: number,\n  errors?: Error[]): AnimationTransitionInstruction {\n  return {\n    type: AnimationTransitionInstructionType.TransitionAnimation,\n    element,\n    triggerName,\n    isRemovalTransition,\n    fromState,\n    fromStyles,\n    toState,\n    toStyles,\n    timelines,\n    queriedElements,\n    preStyleProps,\n    postStyleProps,\n    totalTime,\n    errors\n  };\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{AnimationOptions, StyleDataMap} from '@angular/animations';\n\nimport {AnimationDriver} from
'./render/animation_driver';\n\nimport {getOrSetDefaultValue} from './render/shared';\n\nimport {copyObj,
interpolateParams, iteratorToArray} from './util';\n\nimport {StyleAst, TransitionAst} from
'./animation_ast';\n\nimport {buildAnimationTimelines} from './animation_timeline_builder';\n\nimport
{AnimationTimelineInstruction} from './animation_timeline_instruction';\n\nimport {TransitionMatcherFn} from
'./animation_transition_expr';\n\nimport {AnimationTransitionInstruction, createTransitionInstruction} from
'./animation_transition_instruction';\n\nimport {ElementInstructionMap} from './element_instruction_map';\n\nimport
{AnimationStyleNormalizer} from './style_normalization/animation_style_normalizer';\n\nconst EMPTY_OBJECT
= {};\n\nexport class AnimationTransitionFactory {\n  constructor(\n    private _triggerName: string, public ast:
TransitionAst,\n    private _stateStyles: Map<string, AnimationStateStyles>)\n  {\n  }\n\n  match(currentState: any, nextState: any, element: any, params: {[key: string]: any}): boolean {\n    return
oneOrMoreTransitionsMatch(this.ast.matchers, currentState, nextState, element, params);\n  }\n\n  buildStyles(stateName: string|boolean|undefined, params: {[key: string]: any}, errors: Error[]): StyleDataMap
{\n    let styler = this._stateStyles.get('*');\n    if (stateName !== undefined) {\n      styler =
this._stateStyles.get(stateName?.toString()) || styler;\n    }\n    return styler ? styler.buildStyles(params, errors) : new
Map();\n  }\n\n  build(\n    driver: AnimationDriver, element: any, currentState: any, nextState: any,\n    enterClassName: string, leaveClassName: string, currentOptions?: AnimationOptions,\n    nextOptions?:

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AnimationOptions, subInstructions?: ElementInstructionMap,\n  skipAstBuild?: boolean):
AnimationTransitionInstruction {\n  const errors: Error[] = [];\n  const transitionAnimationParams =
this.ast.options
  && this.ast.options.params || EMPTY_OBJECT;\n  const currentAnimationParams = currentOptions &&
currentOptions.params || EMPTY_OBJECT;\n  const currentStateStyles = this.buildStyles(currentState,
currentAnimationParams, errors);\n  const nextAnimationParams = nextOptions && nextOptions.params ||
EMPTY_OBJECT;\n  const nextStateStyles = this.buildStyles(nextState, nextAnimationParams, errors);\n  const
queriedElements = new Set<any>();\n  const preStyleMap = new Map<any, Set<string>>();\n  const
postStyleMap = new Map<any, Set<string>>();\n  const isRemoval = nextState === 'void';\n  const
animationOptions: AnimationOptions = {\n    params: applyParamDefaults(nextAnimationParams,
transitionAnimationParams),\n    delay: this.ast.options?.delay,\n  }; \n  const timelines = skipAstBuild ?\n[] :\n  buildAnimationTimelines(\n    driver, element, this.ast.animation, enterClassName, leaveClassName,
currentStateStyles,\n    nextStateStyles,
    animationOptions, subInstructions, errors);\n  let totalTime = 0;\n  timelines.forEach(tl => {\n    totalTime =
Math.max(tl.duration + tl.delay, totalTime);\n  });\n  if (errors.length) {\n    return
createTransitionInstruction(\n    element, this._triggerName, currentState, nextState, isRemoval,
currentStateStyles,\n    nextStateStyles, [], [], preStyleMap, postStyleMap, totalTime, errors);\n  }\n  timelines.forEach(tl => {\n    const elm = tl.element;\n    const preProps = getOrElseDefault(
preStyleMap, elm, new Set<string>());\n    tl.preStyleProps.forEach(prop => preProps.add(prop));\n    const postProps =
getOrElseDefault(postStyleMap, elm, new Set<string>());\n    tl.postStyleProps.forEach(prop =>
postProps.add(prop));\n    if (elm !== element) {\n      queriedElements.add(elm);\n    }\n    if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n      checkNonAnimatableInTimelines(timelines, this._triggerName,
driver);\n    }\n    const queriedElementsList = iteratorToArray(queriedElements.values());\n    return
createTransitionInstruction(\n    element, this._triggerName, currentState, nextState, isRemoval,
currentStateStyles,\n    nextStateStyles, timelines, queriedElementsList, preStyleMap, postStyleMap,
totalTime);\n  })\n}\n\n * Checks inside a set of timelines if they try to animate a css property which is not
considered\n * animatable, in that case it prints a warning on the console.\n * Besides that the function doesn't have
any other effect.\n * Note: this check is done here after the timelines are built instead of doing on a lower level
so\n * that we can make sure that the warning appears only once per instruction (we can aggregate here\n * all the
issues instead of finding them separately).\n * @param timelines The built timelines for the current
instruction.\n * @param triggerName The name of the trigger for the current instruction.\n * @param driver
Animation driver used to perform the check.\n\nfunction checkNonAnimatableInTimelines(\n  timelines:
AnimationTimelineInstruction[], triggerName: string, driver: AnimationDriver): void {\n  if
(!driver.validateAnimatableStyleProperty) {\n    return;\n  }\n  const invalidNonAnimatableProps = new
Set<string>();\n  timelines.forEach(({keyframes}) => {\n    const nonAnimatablePropsInitialValues = new
Map<string, string|number>();\n    keyframes.forEach(keyframe => {\n      for (const [prop, value] of
keyframe.entries()) {\n        if (!driver.validateAnimatableStyleProperty!(prop)) {\n          if
(nonAnimatablePropsInitialValues.has(prop) && !invalidNonAnimatableProps.has(prop)) {\n            const
propInitialValue = nonAnimatablePropsInitialValues.get(prop);\n            if (propInitialValue !== value) {\n
invalidNonAnimatableProps.add(prop);\n          }\n        } else {\n          nonAnimatablePropsInitialValues.set(prop, value);\n        }\n      }\n    });\n  });\n  if (invalidNonAnimatableProps.size > 0) {\n    console.warn(\n      `Warning: The
animation trigger \"${triggerName}\" is attempting to animate the following` +\n      ' not animatable properties: ' +
Array.from(invalidNonAnimatableProps).join(', ') + '\n' +\n      '(to check the list of all animatable properties visit
https://developer.mozilla.org/en-US/docs/Web/CSS/CSS\_animated\_properties);\n    }\n  }\n}\n\nfunction
oneOrMoreTransitionsMatch(\n  matchFns: TransitionMatcherFn[], currentState: any, nextState: any, element:
any,\n  params: {[key: string]: any}): boolean {\n  return matchFns.some(fn => fn(currentState, nextState, element,
params));\n}\n\nfunction applyParamDefaults(userParams: Record<string, any>, defaults: Record<string, any>) {\n

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const result: Record<string, any> = copyObj(defaults);\n\n for (const key in userParams) {\n  if
(userParams.hasOwnProperty(key) && userParams[key] != null) {\n   result[key] = userParams[key];\n
  }\n }\n\n return result;\n}\n\nexport class AnimationStateStyles {\n  constructor(\n   private styles: StyleAst,\n  private defaultParams: {[key: string]: any},\n   private normalizer: AnimationStyleNormalizer) {\n}\n\n  buildStyles(params: {[key: string]: any}, errors: Error[]): StyleDataMap {\n   const finalStyles: StyleDataMap =
new Map();\n   const combinedParams = copyObj(this.defaultParams);\n   Object.keys(params).forEach(key => {\n
    const value = params[key];\n    if (value !== null) {\n     combinedParams[key] = value;\n    }\n   });\n
  this.styles.styles.forEach(value => {\n   if (typeof value !== 'string') {\n    value.forEach((val, prop) => {\n
    if (val) {\n     val = interpolateParams(val, combinedParams, errors);\n    }\n    const normalizedProp =
this.normalizer.normalizePropertyName(prop, errors);\n    val = this.normalizer.normalizeStyleValue(prop,\n
    normalizedProp, val, errors);\n    finalStyles.set(normalizedProp,\n     val);\n   });\n  });\n  return finalStyles;\n}\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport { AnimationMetadataType, StyleDataMap } from
'@angular/animations';\nimport { SequenceAst, TransitionAst, TriggerAst } from './animation_ast';\nimport
{ AnimationStateStyles, AnimationTransitionFactory } from './animation_transition_factory';\nimport
{ AnimationStyleNormalizer } from './style_normalization/animation_style_normalizer';\n\n\nexport function
buildTrigger(\n  name: string, ast: TriggerAst, normalizer: AnimationStyleNormalizer): AnimationTrigger {\n
return new AnimationTrigger(name, ast, normalizer);\n}\n\nexport class AnimationTrigger {\n  public
transitionFactories: AnimationTransitionFactory[] = [];\n  public fallbackTransition: AnimationTransitionFactory;\n
  public
  states = new Map<string, AnimationStateStyles>();\n\n  constructor(\n   public name: string, public ast:
TriggerAst, private _normalizer: AnimationStyleNormalizer) {\n   ast.states.forEach(ast => {\n    const
defaultParams = (ast.options && ast.options.params) || {};\n    this.states.set(ast.name, new
AnimationStateStyles(ast.style, defaultParams, _normalizer);\n   });\n\n   balanceProperties(this.states, 'true', '1');\n
  balanceProperties(this.states, 'false', '0');\n\n   ast.transitions.forEach(ast => {\n
  this.transitionFactories.push(new AnimationTransitionFactory(name, ast, this.states);\n  });\n
  this.fallbackTransition = createFallbackTransition(name, this.states, this._normalizer);\n}\n\n  get
containsQueries() {\n   return this.ast.queryCount > 0;\n }\n\n  matchTransition(currentState: any, nextState: any,\n
  element: any, params: {[key: string]: any}): AnimationTransitionFactory|null {\n   const entry =\n
  this.transitionFactories.find(f\n   => f.match(currentState, nextState, element, params));\n   return entry || null;\n }\n\n  matchStyles(currentState:
  any, params: {[key: string]: any}, errors: Error[]): StyleDataMap {\n   return
  this.fallbackTransition.buildStyles(currentState, params, errors);\n }\n}\n\nfunction createFallbackTransition(\n
  triggerName: string, states: Map<string, AnimationStateStyles>,\n   normalizer: AnimationStyleNormalizer):
  AnimationTransitionFactory {\n   const matchers = [(fromState: any, toState: any) => true];\n   const animation:
  SequenceAst = {type: AnimationMetadataType.Sequence, steps: [], options: null};\n   const transition: TransitionAst
  = {\n    type: AnimationMetadataType.Transition,\n    animation,\n    matchers,\n    options: null,\n    queryCount:
  0,\n    depCount: 0\n  };\n   return new AnimationTransitionFactory(triggerName, transition, states);\n}\n\nfunction
  balanceProperties(\n   stateMap: Map<string, AnimationStateStyles>, key1: string, key2: string) {\n   if
  (stateMap.has(key1))\n   {\n    if (!stateMap.has(key2)) {\n     stateMap.set(key2, stateMap.get(key1)!);\n    }\n   } else if
  (stateMap.has(key2)) {\n    stateMap.set(key1, stateMap.get(key2)!);\n   }\n }\n\n"/**\n * @license\n * Copyright
  Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
  * found in the LICENSE file at https://angular.io/license\n */\nimport { AnimationMetadata,\n  AnimationMetadataType, AnimationOptions, AnimationPlayer, AUTO_STYLE, StyleDataMap } from
  '@angular/animations';\nimport { Ast } from './dsl/animation_ast';\nimport { buildAnimationAst } from
  './dsl/animation_ast_builder';\nimport { buildAnimationTimelines } from './dsl/animation_timeline_builder';\nimport

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{AnimationTimelineInstruction} from './dsl/animation_timeline_instruction';\nimport {ElementInstructionMap}
from './dsl/element_instruction_map';\nimport {AnimationStyleNormalizer} from
'./dsl/style_normalization/animation_style_normalizer';\nimport {createAnimationFailed,
missingOrDestroyedAnimation, missingPlayer, registerFailed} from './error_helpers';\nimport
{ENTER_CLASSNAME, LEAVE_CLASSNAME} from './util';\nimport {warnRegister} from
'./warning_helpers';\n\nimport {AnimationDriver} from './animation_driver';\nimport {getOrSetDefaultValue,
listenOnPlayer, makeAnimationEvent, normalizeKeyframes, optimizeGroupPlayer} from './shared';\n\nconst
EMPTY_INSTRUCTION_MAP = new ElementInstructionMap();\n\nexport class TimelineAnimationEngine {\n
private _animations = new Map<string, Ast<AnimationMetadataType>>();\n private _playersById = new
Map<string, AnimationPlayer>();\n public players: AnimationPlayer[] = [];\n\n constructor(\n public
bodyNode: any, private _driver: AnimationDriver,\n private _normalizer: AnimationStyleNormalizer) {\n\n
register(id: string, metadata: AnimationMetadata|AnimationMetadata[]) {\n const errors: Error[] = [];\n const
warnings: string[] = [];\n const ast = buildAnimationAst(this._driver,
metadata, errors, warnings);\n if (errors.length) {\n throw registerFailed(errors);\n } else {\n if
(warnings.length) {\n warnRegister(warnings);\n }\n this._animations.set(id, ast);\n }\n\n private
_buildPlayer(\n i: AnimationTimelineInstruction, preStyles: StyleDataMap,\n postStyles?: StyleDataMap):
AnimationPlayer {\n const element = i.element;\n const keyframes = normalizeKeyframes(\n this._driver,
this._normalizer, element, i.keyframes, preStyles, postStyles);\n return this._driver.animate(element, keyframes,
i.duration, i.delay, i.easing, [], true);\n }\n\n create(id: string, element: any, options: AnimationOptions = {}):
AnimationPlayer {\n const errors: Error[] = [];\n const ast = this._animations.get(id);\n let instructions:
AnimationTimelineInstruction[];\n const autoStylesMap = new Map<any, StyleDataMap>();\n\n if (ast) {\n
instructions = buildAnimationTimelines(\n this._driver,
element, ast, ENTER_CLASSNAME, LEAVE_CLASSNAME, new Map(), new Map(),\n options,
EMPTY_INSTRUCTION_MAP, errors);\n instructions.forEach(inst => {\n const styles =
getOrSetDefaultValue(\n autoStylesMap, inst.element, new Map<string, string|number|null>());\n
inst.postStyleProps.forEach(prop => styles.set(prop, null));\n });\n } else {\n
errors.push(missingOrDestroyedAnimation());\n instructions = [];\n }\n\n if (errors.length) {\n throw
createAnimationFailed(errors);\n }\n\n autoStylesMap.forEach((styles, element) => {\n styles.forEach((_,
prop) => {\n styles.set(prop, this._driver.computeStyle(element, prop, AUTO_STYLE));\n });\n });\n\n
const players = instructions.map(i => {\n const styles = autoStylesMap.get(i.element);\n return
this._buildPlayer(i, new Map(), styles);\n });\n const player = optimizeGroupPlayer(players);\n
this._playersById.set(id, player);\n
player.onDestroy() => this.destroy(id);\n\n this.players.push(player);\n return player;\n }\n\n destroy(id:
string) {\n const player = this._getPlayer(id);\n player.destroy();\n this._playersById.delete(id);\n const index
= this.players.indexOf(player);\n if (index >= 0) {\n this.players.splice(index, 1);\n }\n }\n\n private
_getPlayer(id: string): AnimationPlayer {\n const player = this._playersById.get(id);\n if (!player) {\n throw
missingPlayer(id);\n }\n return player;\n }\n\n listen(id: string, element: string, eventName: string, callback:
(event: any) => any):\n () => void {\n // triggerName, fromState, toState are all ignored for timeline
animations\n const baseEvent = makeAnimationEvent(element, "", "");\n listenOnPlayer(this._getPlayer(id),
eventName, baseEvent, callback);\n return () => {};\n }\n\n command(id: string, element: any, command: string,
args: any[]): void {\n if (command == 'register')
{\n this.register(id, args[0] as AnimationMetadata | AnimationMetadata[]);\n return;\n }\n\n if (command
== 'create') {\n const options = (args[0] || {}) as AnimationOptions;\n this.create(id, element, options);\n
return;\n }\n\n const player = this._getPlayer(id);\n switch (command) {\n case 'play':\n player.play();\n
break;\n case 'pause':\n player.pause();\n break;\n case 'reset':\n player.reset();\n break;\n
case 'restart':\n player.restart();\n break;\n case 'finish':\n player.finish();\n break;\n case
'init':\n player.init();\n break;\n case 'setPosition':\n player.setPosition(parseFloat(args[0] as
string));\n break;\n case 'destroy':\n this.destroy(id);\n break;\n }\n }\n\n"/**\n * @license\n *

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Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed
by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport
{AnimationOptions, AnimationPlayer, AUTO_STYLE, NoopAnimationPlayer, AnimationGroupPlayer as
AnimationGroupPlayer, PRE_STYLE as PRE_STYLE, StyleDataMap} from '@angular/animations';\n\nimport
{AnimationTimelineInstruction} from './dsl/animation_timeline_instruction';\nimport
{AnimationTransitionFactory} from './dsl/animation_transition_factory';\nimport {AnimationTransitionInstruction}
from './dsl/animation_transition_instruction';\nimport {AnimationTrigger} from './dsl/animation_trigger';\nimport
{ElementInstructionMap} from './dsl/element_instruction_map';\nimport {AnimationStyleNormalizer} from
'./dsl/style_normalization/animation_style_normalizer';\nimport {missingEvent, missingTrigger, transitionFailed,
triggerTransitionsFailed, unregisteredTrigger, unsupportedTriggerEvent} from './error_helpers';\nimport {copyObj,
ENTER_CLASSNAME, eraseStyles, LEAVE_CLASSNAME, NG_ANIMATING_CLASSNAME,
NG_ANIMATING_SELECTOR, NG_TRIGGER_CLASSNAME, NG_TRIGGER_SELECTOR, setStyles} from
'./util';\n\nimport {AnimationDriver} from './animation_driver';\nimport {getOrSetDefaultValue, listenOnPlayer,
makeAnimationEvent, normalizeKeyframes, optimizeGroupPlayer} from './shared';\n\nconst
QUEUED_CLASSNAME = 'ng-animate-queued';\nconst QUEUED_SELECTOR = 'ng-animate-queued';\nconst
DISABLED_CLASSNAME = 'ng-animate-disabled';\nconst DISABLED_SELECTOR = 'ng-animate-
disabled';\nconst STAR_CLASSNAME = 'ng-star-inserted';\nconst STAR_SELECTOR = 'ng-star-
inserted';\n\nconst EMPTY_PLAYER_ARRAY: TransitionAnimationPlayer[] = [];\nconst
NULL_REMOVAL_STATE: ElementAnimationState = {\n  namespaceId: '',\n  setForRemoval: false,\n  setForMove: false,\n  hasAnimation: false,\n  removedBeforeQueried: false\n};\nconst
NULL_REMOVED_QUERIED_STATE: ElementAnimationState = {\n  namespaceId: '',\n  setForMove: false,\n  setForRemoval: false,\n  hasAnimation: false,\n  removedBeforeQueried: true\n};\n\ninterface
TriggerListener {\n  name: string;\n  phase: string;\n  callback: (event: any) => any;\n}\n\nexport interface
QueueInstruction {\n  element: any;\n  triggerName: string;\n  fromState: StateValue;\n  toState: StateValue;\n  transition: AnimationTransitionFactory;\n  player: TransitionAnimationPlayer;\n  isFallbackTransition:
boolean;\n}\n\nexport const REMOVAL_FLAG = '__ng_removed';\n\nexport interface ElementAnimationState {\n  setForRemoval: boolean;\n  setForMove: boolean;\n  hasAnimation: boolean;\n  namespaceId: string;\n  removedBeforeQueried: boolean;\n  previousTriggersValues?: Map<string, string>;\n}\n\nexport class StateValue
{\n  public value: string;\n  public options: AnimationOptions;\n\n  get params(): {[key: string]: any} {\n    return
this.options.params as {[key: string]: any};\n  }\n\n  constructor(input: any, public namespaceId: string = '') {\n
const isObj = input && input.hasOwnProperty('value');\n    const value = isObj ? input['value'] : input;\n
    this.value = normalizeTriggerValue(value);\n    if (isObj) {\n      const options = copyObj(input as any);\n
delete options['value'];\n      this.options = options as AnimationOptions;\n    } else {\n      this.options = {};\n    }\n  }\n  if (!this.options.params) {\n    this.options.params = {};\n  }\n  }\n\n  absorbOptions(options: AnimationOptions)
{\n    const newParams = options.params;\n    if (newParams) {\n      const oldParams = this.options.params!;\n
Object.keys(newParams).forEach(prop => {\n      if (oldParams[prop] == null) {\n        oldParams[prop] =
newParams[prop];\n      }\n    });\n  }\n}\n\nexport const VOID_VALUE = 'void';\nexport const
DEFAULT_STATE_VALUE = new StateValue(VOID_VALUE);\n\nexport class AnimationTransitionNamespace
{\n  public players: TransitionAnimationPlayer[] = [];\n  private _triggers = new Map<string,
AnimationTrigger>();\n  private _queue: QueueInstruction[] = [];\n  private _elementListeners = new Map<any,
TriggerListener>();\n  private _hostClassName: string;\n\n  constructor(\n    public id: string, public
hostElement: any, private _engine: TransitionAnimationEngine) {\n    this._hostClassName = 'ng-tns-' + id;\n
addClass(hostElement, this._hostClassName);\n  }\n\n  listen(element: any, name: string, phase: string, callback:
(event: any) => boolean): () => any {\n    if (!this._triggers.has(name)) {\n      throw missingTrigger(phase, name);\n    }\n\n    if (phase == null || phase.length == 0) {\n      throw missingEvent(name);\n    }\n\n    if
(!isTriggerEventValid(phase)) {\n      throw unsupportedTriggerEvent(phase, name);\n    }\n\n    const listeners =
getOrSetDefaultValue(this._elementListeners, element, []);\n    const data = {name, phase, callback};\n
listeners.push(data);\n\n    const triggersWithStates =\n      getOrSetDefaultValue(this._engine.statesByElement,

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element, new Map<string, StateValue>());\n  if (!triggersWithStates.has(name)) {\n    addClass(element,
    NG_TRIGGER_CLASSNAME);\n    addClass(element, NG_TRIGGER_CLASSNAME + '-' + name);\n    triggersWithStates.set(name, DEFAULT_STATE_VALUE);\n  }\n\n  return () => {\n    // the event listener is
    removed AFTER the flush has occurred such\n    // that leave animations callbacks can fire (otherwise if the node\n    // is removed in between then the listeners would be deregistered)\n    this._engine.afterFlush() => {\n      const
      index = listeners.indexOf(data);\n      if (index >= 0) {\n        listeners.splice(index, 1);\n      }\n      if
      (!this._triggers.has(name)) {\n        triggersWithStates.delete(name);\n      }\n    };\n  }\n\n  register(name:
  string, ast: AnimationTrigger): boolean {\n    if (this._triggers.has(name)) {\n      // throw\n      return false;\n    } else
    {\n      this._triggers.set(name, ast);\n      return true;\n    }\n  }\n\n  private _getTrigger(name: string) {\n    const
    trigger = this._triggers.get(name);\n\n    if (!trigger) {\n      throw unregisteredTrigger(name);\n    }\n    return trigger;\n  }\n\n  trigger(element: any,
  triggerName: string, value: any, defaultToFallback: boolean = true):\n  TransitionAnimationPlayer|undefined {\n    const trigger = this._getTrigger(triggerName);\n    const player = new TransitionAnimationPlayer(this.id,
  triggerName, element);\n\n    let triggersWithStates = this._engine.statesByElement.get(element);\n    if
    (!triggersWithStates) {\n      addClass(element, NG_TRIGGER_CLASSNAME);\n      addClass(element,
    NG_TRIGGER_CLASSNAME + '-' + triggerName);\n      this._engine.statesByElement.set(element,
    triggersWithStates = new Map<string, StateValue>());\n    }\n\n    let fromState =
    triggersWithStates.get(triggerName);\n    const toState = new StateValue(value, this.id);\n    const isObj = value &&
    value.hasOwnProperty('value');\n    if (!isObj && fromState) {\n      toState.absorbOptions(fromState.options);\n    }\n\n    triggersWithStates.set(triggerName,
    toState);\n\n    if (!fromState) {\n      fromState = DEFAULT_STATE_VALUE;\n    }\n\n    const isRemoval =
    toState.value === VOID_VALUE;\n\n    // normally this isn't reached by here, however, if an object expression\n
    // is passed in then it may be a new object each time. Comparing the value\n    // is important since that will stay the
    same despite there being a new object.\n    // The removal arc here is special cased because the same element is
    triggered\n    // twice in the event that it contains animations on the outer/inner portions\n    // of the host container\n    if (!isRemoval && fromState.value === toState.value) {\n      // this means that despite the value not changing,
    some inner params\n    // have changed which means that the animation final styles need to be applied\n    if
    (!objEquals(fromState.params, toState.params)) {\n      const errors: Error[] = [];\n      const fromStyles =
    trigger.matchStyles(fromState.value, fromState.params, errors);\n\n      const toStyles = trigger.matchStyles(toState.value, toState.params, errors);\n      if (errors.length) {\n
    this._engine.reportError(errors);\n      } else {\n        this._engine.afterFlush() => {\n          eraseStyles(element,
    fromStyles);\n          setStyles(element, toStyles);\n        };\n      }\n    }\n\n    return;\n  }\n\n  const
  playersOnElement: TransitionAnimationPlayer[] =\n    getOrElseDefault(this._engine.playersByElement,
  element, []);\n  playersOnElement.forEach(player => {\n    // only remove the player if it is queued on the
  EXACT same trigger/namespace\n    // we only also deal with queued players here because if the animation has\n
    // started then we want to keep the player alive until the flush happens\n    // (which is where the previousPlayers
    are passed into the new player)\n    if (player.namespaceId == this.id && player.triggerName == triggerName &&
    player.queued) {\n      player.destroy();\n    }\n\n    });\n\n    let transition =\n      trigger.matchTransition(fromState.value, toState.value, element, toState.params);\n\n    let isFallbackTransition = false;\n    if (!transition) {\n      if (!defaultToFallback) return;\n      transition =
    trigger.fallbackTransition;\n      isFallbackTransition = true;\n    }\n\n    this._engine.totalQueuedPlayers++;\n\n    this._queue.push(\n      element, triggerName, transition, fromState, toState, player, isFallbackTransition);\n\n    if (!isFallbackTransition) {\n      addClass(element, QUEUED_CLASSNAME);\n      player.onStart() => {\n        removeClass(element, QUEUED_CLASSNAME);\n      };\n    }\n\n    player.onDone() => {\n      let index =
    this.players.indexOf(player);\n      if (index >= 0) {\n        this.players.splice(index, 1);\n      }\n\n      const players =
    this._engine.playersByElement.get(element);\n      if (players) {\n        let index = players.indexOf(player);\n        if
    (index >= 0) {\n          players.splice(index,

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1);\n    }\n  });\n\n  this.players.push(player);\n  playersOnElement.push(player);\n\n  return player;\n}\n\n deregister(name: string) {\n  this._triggers.delete(name);\n\n  this._engine.statesByElement.forEach(stateMap => stateMap.delete(name));\n\n  this._elementListeners.forEach((listeners, element) => {\n    this._elementListeners.set(element,\n    listeners.filter(entry => {\n      return entry.name !== name;\n    }));\n  });\n\n  clearElementCache(element:\n  any) {\n    this._engine.statesByElement.delete(element);\n    this._elementListeners.delete(element);\n    const\n    elementPlayers = this._engine.playersByElement.get(element);\n    if (elementPlayers) {\n      elementPlayers.forEach(player => player.destroy());\n      this._engine.playersByElement.delete(element);\n    }\n  }\n\n  private _signalRemovalForInnerTriggers(rootElement: any, context: any) {\n    const elements =\n    this._engine.driver.query(rootElement, NG_TRIGGER_SELECTOR, true);\n\n    // emulate a leave animation for all inner nodes within this node.\n    // If there are no animations found for any of\n    the nodes then clear the cache\n    // for the element.\n    elements.forEach(elm => {\n      // this means that an inner\n      remove() operation has already kicked off\n      // the animation on this element...\n      if (elm[REMOVAL_FLAG])\n      return;\n\n      const namespaces = this._engine.fetchNamespacesByElement(elm);\n      if (namespaces.size) {\n        namespaces.forEach(ns => ns.triggerLeaveAnimation(elm, context, false, true));\n      } else {\n        this.clearElementCache(elm);\n      }\n\n      // If the child elements were removed along with the parent, their\n      animations might not\n      // have completed. Clear all the elements from the cache so we don't end up with a memory\n      leak.\n      this._engine.afterFlushAnimationsDone(\n        () => elements.forEach(elm =>\n        this.clearElementCache(elm));\n      );\n\n      triggerLeaveAnimation(\n        element: any, context:\n        any, destroyAfterComplete?: boolean,\n        defaultToFallback?: boolean): boolean {\n        const triggerStates =\n        this._engine.statesByElement.get(element);\n        const previousTriggersValues = new Map<string, string>();\n        if\n        (triggerStates) {\n          const players: TransitionAnimationPlayer[] = [];\n          triggerStates.forEach((state,\n          triggerName) => {\n            previousTriggersValues.set(triggerName, state.value);\n            // this check is here in the\n            event that an element is removed\n            // twice (both on the host level and the component level)\n            if\n            (this._triggers.has(triggerName)) {\n              const player = this.trigger(element, triggerName, VOID_VALUE,\n              defaultToFallback);\n              if (player) {\n                players.push(player);\n              }\n            }\n\n            if\n            (players.length) {\n              this._engine.markElementAsRemoved(this.id, element, true, context,\n              previousTriggersValues);\n              if (destroyAfterComplete) {\n                optimizeGroupPlayer(players).onDone()\n                => this._engine.processLeaveNode(element);\n              }\n              return true;\n            }\n            return false;\n          });\n\n          prepareLeaveAnimationListeners(element: any) {\n            const listeners = this._elementListeners.get(element);\n            const elementStates = this._engine.statesByElement.get(element);\n            // if this statement fails then it means that\n            the element was picked up\n            // by an earlier flush (or there are no listeners at all to track the leave).\n            if (listeners\n            && elementStates) {\n              const visitedTriggers = new Set<string>();\n              listeners.forEach(listener => {\n                const triggerName = listener.name;\n                if (visitedTriggers.has(triggerName)) return;\n                visitedTriggers.add(triggerName);\n                const trigger = this._triggers.get(triggerName)!;\n                const transition =\n                trigger.fallbackTransition;\n                const fromState = elementStates.get(triggerName) ||\n                DEFAULT_STATE_VALUE;\n                const toState = new StateValue(VOID_VALUE);\n\n                const player = new TransitionAnimationPlayer(this.id, triggerName, element);\n                this._engine.totalQueuedPlayers++;\n                this._queue.push({\n                  element,\n                  triggerName,\n                  transition,\n                  fromState,\n                  toState,\n                  player,\n                  isFallbackTransition: true\n                });\n              });\n\n              removeNode(element: any, context: any): void {\n                const engine = this._engine;\n                if\n                (element.childElementCount) {\n                  this._signalRemovalForInnerTriggers(element, context);\n                }\n\n                // this\n                means that a * => VOID animation was detected and kicked off\n                if (this.triggerLeaveAnimation(element, context,\n                true)) return;\n\n                // find the player that is animating and make sure that the\n                // removal is delayed until that\n                player has completed\n                let containsPotentialParentTransition = false;\n                if (engine.totalAnimations) {\n                  const\n                  currentPlayers =\n                  engine.players.length ? engine.playersByQueriedElement.get(element)\n                  : [];\n\n                  // when this `if` statement` does not continue forward it means that\n                  // a previous animation query has\n                  selected the current element and\n                  // is animating it. In this situation want to continue forwards and\n                  // allow

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the element to be queued up for animation later.\n    if (currentPlayers && currentPlayers.length) {\n
containsPotentialParentTransition = true;\n    } else {\n        let parent = element;\n        while (parent =\n
parent.parentNode) {\n            const triggers = engine.statesByElement.get(parent);\n            if (triggers) {\n
containsPotentialParentTransition = true;\n                break;\n            }\n        }\n    }\n\n    // at this stage we know\n
that the element will either get removed\n    // during flush or will be picked up by a parent query. Either way\n    //\n
we need to fire the listeners for this element when it DOES get\n    // removed (once the query parent animation is\n
done or\n
after flush)\n    this.prepareLeaveAnimationListeners(element);\n\n    // whether or not a parent has an animation we\n
need to delay the deferral of the leave\n    // operation until we have more information (which we do after flush() has\n
been called)\n    if (containsPotentialParentTransition) {\n        engine.markElementAsRemoved(this.id, element,\n
false, context);\n    } else {\n        const removalFlag = element[REMOVAL_FLAG];\n        if (!removalFlag ||\n
removalFlag === NULL_REMOVAL_STATE) {\n            // we do this after the flush has occurred such\n            // that\n
the callbacks can be fired\n            engine.afterFlush(() => this.clearElementCache(element));\n
engine.destroyInnerAnimations(element);\n            engine._onRemovalComplete(element, context);\n        }\n    }\n\n
insertNode(element: any, parent: any): void {\n    addClass(element, this._hostClassName);\n}\n\n
drainQueuedTransitions(microtaskId: number): QueueInstruction[] {\n    const instructions: QueueInstruction[]\n
= [];\n    this._queue.forEach(entry => {\n        const player = entry.player;\n        if (player.destroyed) return;\n\n
const element = entry.element;\n        const listeners = this._elementListeners.get(element);\n        if (listeners) {\n
listeners.forEach((listener: TriggerListener) => {\n            if (listener.name === entry.triggerName) {\n                const\n
baseEvent = makeAnimationEvent(\n                    element, entry.triggerName, entry.fromState.value,\n
entry.toState.value);\n                (baseEvent as any)['_data'] = microtaskId;\n                listenOnPlayer(entry.player,\n
listener.phase, baseEvent, listener.callback);\n            }\n        });\n        if (player.markedForDestroy) {\n
this._engine.afterFlush(() => {\n            // now we can destroy the element properly since the event listeners have\n
// been bound to the player\n            player.destroy();\n        });\n        } else {\n            instructions.push(entry);\n        }\n
});\n\n    this._queue = [];\n    return instructions.sort((a, b) => {\n        // if depCount === 0 them move to front\n        //\n
otherwise if a contains b then move back\n        const d0 = a.transition.ast.depCount;\n        const d1 =\n
b.transition.ast.depCount;\n        if (d0 === 0 || d1 === 0) {\n            return d0 - d1;\n        }\n        return\n
this._engine.driver.containsElement(a.element, b.element) ? 1 : -1;\n    });\n}\n\n
destroy(context: any) {\n    this.players.forEach(p => p.destroy());\n    this._signalRemovalForInnerTriggers(this.hostElement, context);\n}\n\n
elementContainsData(element: any): boolean {\n    let containsData = false;\n    if\n
(this._elementListeners.has(element)) containsData = true;\n    containsData =\n        (this._queue.find(entry =>\n
entry.element === element) ? true : false) || containsData;\n    return containsData;\n}\n\n
export interface\n
QueuedTransition {\n    element: any;\n    instruction: AnimationTransitionInstruction;\n    player:\n
TransitionAnimationPlayer;\n}\n\n
export\n
class TransitionAnimationEngine {\n    public players: TransitionAnimationPlayer[] = [];\n    public newHostElements\n
= new Map<any, AnimationTransitionNamespace>();\n    public playersByElement = new Map<any,\n
TransitionAnimationPlayer[]>();\n    public playersByQueriedElement = new Map<any,\n
TransitionAnimationPlayer[]>();\n    public statesByElement = new Map<any, Map<string, StateValue>>();\n    public\n
disabledNodes = new Set<any>();\n    public totalAnimations = 0;\n    public totalQueuedPlayers = 0;\n    private\n
_namespaceLookup: {[id: string]: AnimationTransitionNamespace} = {};\n    private _namespaceList:\n
AnimationTransitionNamespace[] = [];\n    private _flushFns: (() => any)[] = [];\n    private _whenQuietFns: (() =>\n
any)[] = [];\n    public namespacesByHostElement = new Map<any, AnimationTransitionNamespace>();\n    public\n
collectedEnterElements: any[] = [];\n    public collectedLeaveElements: any[] = [];\n\n    // this method is designed to\n
be overridden by the code that uses this engine\n
    public onRemovalComplete = (element: any, context: any) => {};\n\n    /** @internal */\n
_onRemovalComplete(element: any, context: any) {\n        this.onRemovalComplete(element, context);\n    }\n\n
constructor(\n        public bodyNode: any, public driver: AnimationDriver,\n        private _normalizer:

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AnimationStyleNormalizer) {}
\n\n get queuedPlayers(): TransitionAnimationPlayer[] {\n  const players:
TransitionAnimationPlayer[] = [];\n  this._namespaceList.forEach(ns => {\n    ns.players.forEach(player => {\n
if (player.queued) {\n      players.push(player);\n    }\n  });\n  return players;\n }\n\n
createNamespace(namespaceId: string, hostElement: any) {\n  const ns = new
AnimationTransitionNamespace(namespaceId, hostElement, this);\n  if (this.bodyNode &&
this.driver.containsElement(this.bodyNode, hostElement)) {\n    this._balanceNamespaceList(ns, hostElement);\n
} else {\n  // defer this later until flush during when the host element
has\n  // been inserted so that we know exactly where to place it in\n  // the namespace list\n
this.newHostElements.set(hostElement, ns);\n\n  // given that this host element is a part of the animation code, it\n
// may or may not be inserted by a parent node that is of an\n  // animation renderer type. If this happens then
we can still have\n  // access to this item when we query for :enter nodes. If the parent\n  // is a renderer then
the set data-structure will normalize the entry\n  this.collectEnterElement(hostElement);\n  }\n  return
this._namespaceLookup[namespaceId] = ns;\n }\n\n private _balanceNamespaceList(ns:
AnimationTransitionNamespace, hostElement: any) {\n  const namespaceList = this._namespaceList;\n  const
namespacesByHostElement = this.namespacesByHostElement;\n  const limit = namespaceList.length - 1;\n  if
(limit >= 0) {\n    let found = false;\n    // Find the closest ancestor with an existing namespace so
we can then insert `ns` after it,\n    // establishing a top-down ordering of namespaces in `this._namespaceList`.\n
let ancestor = this.driver.getParentElement(hostElement);\n    while (ancestor) {\n      const ancestorNs =
namespacesByHostElement.get(ancestor);\n      if (ancestorNs) {\n        // An animation namespace has been
registered for this ancestor, so we insert `ns`\n        // right after it to establish top-down ordering of animation
namespaces.\n        const index = namespaceList.indexOf(ancestorNs);\n        namespaceList.splice(index + 1, 0,
ns);\n        found = true;\n        break;\n      }\n      ancestor = this.driver.getParentElement(ancestor);\n    }\n
if (!found) {\n      // No namespace exists that is an ancestor of `ns`, so `ns` is inserted at the front to\n      // ensure
that any existing descendants are ordered after `ns`, retaining the desired\n      // top-down ordering.\n
namespaceList.unshift(ns);\n
    }\n  } else {\n    namespaceList.push(ns);\n  }\n\n  namespacesByHostElement.set(hostElement, ns);\n
return ns;\n }\n\n register(namespaceId: string, hostElement: any) {\n  let ns =
this._namespaceLookup[namespaceId];\n  if (!ns) {\n    ns = this.createNamespace(namespaceId, hostElement);\n
  }\n  return ns;\n }\n\n registerTrigger(namespaceId: string, name: string, trigger: AnimationTrigger) {\n  let ns =
this._namespaceLookup[namespaceId];\n  if (ns && ns.register(name, trigger)) {\n    this.totalAnimations++;\n
  }\n }\n\n destroy(namespaceId: string, context: any) {\n  if (!namespaceId) return;\n\n  const ns =
this._fetchNamespace(namespaceId);\n\n  this.afterFlush(() => {\n
this.namespacesByHostElement.delete(ns.hostElement);\n  delete this._namespaceLookup[namespaceId];\n
const index = this._namespaceList.indexOf(ns);\n  if (index >= 0) {\n    this._namespaceList.splice(index, 1);\n
  }\n });\n\n  this.afterFlushAnimationsDone()\n
=> ns.destroy(context));\n }\n\n private _fetchNamespace(id: string) {\n  return this._namespaceLookup[id];\n
}\n\n fetchNamespacesByElement(element: any): Set<AnimationTransitionNamespace> {\n  // normally there
should only be one namespace per element, however\n  // if @triggers are placed on both the component element
and then\n  // its host element (within the component code) then there will be\n  // two namespaces returned. We
use a set here to simply deduplicate\n  // the namespaces in case (for the reason described above) there are multiple
triggers\n  const namespaces = new Set<AnimationTransitionNamespace>();\n  const elementStates =
this.statesByElement.get(element);\n  if (elementStates) {\n    for (let stateValue of elementStates.values()) {\n
if (stateValue.namespaceId) {\n      const ns = this._fetchNamespace(stateValue.namespaceId);\n      if (ns) {\n
        namespaces.add(ns);\n      }\n    }\n  }\n\n  return namespaces;\n }\n\n trigger(namespaceId: string, element: any, name: string, value: any):
boolean {\n  if (isElementNode(element)) {\n    const ns = this._fetchNamespace(namespaceId);\n    if (ns) {\n
      ns.trigger(element, name, value);\n      return true;\n    }\n  }\n  return false;\n }\n\n insertNode(namespaceId:
string, element: any, parent: any, insertBefore: boolean): void {\n  if (!isElementNode(element)) return;\n  //

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special case for when an element is removed and reinserted (move operation)\n // when this occurs we do not want
to use the element for deletion later\n const details = element[REMOVAL_FLAG] as ElementAnimationState;\n
if (details && details.setForRemoval) {\n details.setForRemoval = false;\n details.setForMove = true;\n
const index = this.collectedLeaveElements.indexOf(element);\n if (index >= 0) {\n
this.collectedLeaveElements.splice(index, 1);\n }\n }\n // in the
event that the namespaceId is blank then the caller\n // code does not contain any animation code in it, but it is\n
// just being called so that the node is marked as being inserted\n if (namespaceId) {\n const ns =
this._fetchNamespace(namespaceId);\n // This if-statement is a workaround for router issue #21947.\n // The
router sometimes hits a race condition where while a route\n // is being instantiated a new navigation arrives,
triggering leave\n // animation of DOM that has not been fully initialized, until this\n // is resolved, we need to
handle the scenario when DOM is not in a\n // consistent state during the animation.\n if (ns) {\n
ns.insertNode(element, parent);\n }\n }\n // only *directives and host elements are inserted before\n if
(insertBefore) {\n this.collectEnterElement(element);\n }\n }\n collectEnterElement(element: any) {\n
this.collectedEnterElements.push(element);\n }\n
markElementAsDisabled(element: any, value: boolean) {\n if (value) {\n if (!this.disabledNodes.has(element))
{\n this.disabledNodes.add(element);\n addClass(element, DISABLED_CLASSNAME);\n }\n } else
if (this.disabledNodes.has(element)) {\n this.disabledNodes.delete(element);\n removeClass(element,
DISABLED_CLASSNAME);\n }\n }\n removeNode(namespaceId: string, element: any, isHostElement:
boolean, context: any): void {\n if (isElementNode(element)) {\n const ns = namespaceId ?
this._fetchNamespace(namespaceId) : null;\n if (ns) {\n ns.removeNode(element, context);\n } else {\n
this.markElementAsRemoved(namespaceId, element, false, context);\n }\n if (isHostElement) {\n const
hostNS = this.namespacesByHostElement.get(element);\n if (hostNS && hostNS.id !== namespaceId) {\n
hostNS.removeNode(element, context);\n }\n }\n } else {\n this._onRemovalComplete(element,
context);\n }\n }\n markElementAsRemoved(\n namespaceId: string, element: any, hasAnimation?:
boolean, context?: any,\n previousTriggersValues?: Map<string, string>) {\n
this.collectedLeaveElements.push(element);\n element[REMOVAL_FLAG] = {\n namespaceId,\n
setForRemoval: context,\n hasAnimation,\n removedBeforeQueried: false,\n previousTriggersValues\n
};\n }\n listen(\n namespaceId: string, element: any, name: string, phase: string,\n callback: (event: any) =>
boolean): () => any {\n if (isElementNode(element)) {\n return
this._fetchNamespace(namespaceId).listen(element, name, phase, callback);\n }\n return () => {};\n }\n
private _buildInstruction(\n entry: QueueInstruction, subTimelines: ElementInstructionMap, enterClassName:
string,\n leaveClassName: string, skipBuildAst?: boolean) {\n return entry.transition.build(\n this.driver,
entry.element, entry.fromState.value, entry.toState.value,
enterClassName,\n leaveClassName, entry.fromState.options, entry.toState.options, subTimelines,
skipBuildAst);\n }\n destroyInnerAnimations(containerElement: any) {\n let elements =
this.driver.query(containerElement, NG_TRIGGER_SELECTOR, true);\n elements.forEach(element =>
this.destroyActiveAnimationsForElement(element));\n if (this.playersByQueriedElement.size == 0) return;\n
elements = this.driver.query(containerElement, NG_ANIMATING_SELECTOR, true);\n
elements.forEach(element => this.finishActiveQueriedAnimationOnElement(element));\n }\n
destroyActiveAnimationsForElement(element: any) {\n const players = this.playersByElement.get(element);\n if
(players) {\n players.forEach(player => {\n // special case for when an element is set for destruction, but
hasn't started.\n // in this situation we want to delay the destruction until the flush occurs\n // so that any
event listeners attached to the player
are triggered.\n if (player.queued) {\n player.markedForDestroy = true;\n } else {\n
player.destroy();\n }\n });\n }\n }\n finishActiveQueriedAnimationOnElement(element: any) {\n const
players = this.playersByQueriedElement.get(element);\n if (players) {\n players.forEach(player =>
player.finish());\n }\n }\n whenRenderingDone(): Promise<any> {\n return new Promise<void>(resolve =>
{\n if (this.players.length) {\n return optimizeGroupPlayer(this.players).onDone(() => resolve());\n } else

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    resolve();\n    }\n  });\n  }\n\n  processLeaveNode(element: any) {\n    const details =\n    element[REMOVAL_FLAG] as ElementAnimationState;\n    if (details && details.setForRemoval) {\n      // this\n      will prevent it from removing it twice\n      element[REMOVAL_FLAG] = NULL_REMOVAL_STATE;\n      if\n      (details.namespaceId) {\n        this.destroyInnerAnimations(element);\n        const ns =\n        this._fetchNamespace(details.namespaceId);\n\n        if (ns) {\n          ns.clearElementCache(element);\n          }\n          }\n          this._onRemovalComplete(element,\n          details.setForRemoval);\n          }\n          }\n          if (element.classList?.contains(DISABLED_CLASSNAME)) {\n            this.markElementAsDisabled(element, false);\n            }\n            }\n            this.driver.query(element, DISABLED_SELECTOR,\n            true).forEach(node => {\n              this.markElementAsDisabled(node, false);\n              });\n              }\n              }\n              flush(microtaskId: number\n              = -1) {\n                let players: AnimationPlayer[] = [];\n                if (this.newHostElements.size) {\n                  this.newHostElements.forEach((ns, element) => this._balanceNamespaceList(ns, element));\n                  }\n                  }\n                  this.newHostElements.clear();\n                  }\n                  }\n                  if (this.totalAnimations && this.collectedEnterElements.length) {\n                    for\n                    (let i = 0; i < this.collectedEnterElements.length; i++) {\n                      const elm = this.collectedEnterElements[i];\n                      addClass(elm, STAR_CLASSNAME);\n                      }\n                      }\n                      if (this._namespaceList.length &&\n                      (this.totalQueuedPlayers || this.collectedLeaveElements.length)) {\n                        const cleanupFns: Function[] = [];\n                        try\n                        {\n                          players = this._flushAnimations(cleanupFns, microtaskId);\n                          } finally {\n                            for (let i = 0; i <\n                            cleanupFns.length; i++) {\n                              cleanupFns[i]();\n                              }\n                              }\n                              } else {\n                                for (let i = 0; i <\n                                this.collectedLeaveElements.length; i++) {\n                                  const element = this.collectedLeaveElements[i];\n                                  this.processLeaveNode(element);\n                                  }\n                                  }\n                                  this.totalQueuedPlayers = 0;\n                                  this.collectedEnterElements.length = 0;\n                                  this.collectedLeaveElements.length = 0;\n                                  this._flushFns.forEach(fn\n                                  => fn());\n                                  this._flushFns = [];\n                                  if (this._whenQuietFns.length) {\n                                    // we move these over to a variable so\n                                    that\n                                    // if any new callbacks are registered in another\n                                    // flush they do not populate the existing set\n                                    const quietFns = this._whenQuietFns;\n                                    this._whenQuietFns = [];\n                                    if (players.length)\n                                    {\n                                      optimizeGroupPlayer(players).onDone(() => {\n                                        quietFns.forEach(fn => fn());\n                                        });\n                                        } else\n                                        {\n                                          quietFns.forEach(fn => fn());\n                                          }\n                                          }\n                                          }\n                                          reportError(errors: Error[]) {\n                                            throw\n                                            triggerTransitionsFailed(errors);\n                                            }\n                                            }\n                                            private _flushAnimations(cleanupFns: Function[], microtaskId:\n                                            number):\n                                            TransitionAnimationPlayer[] {\n                                              const subTimelines = new ElementInstructionMap();\n                                              const\n                                              skippedPlayers: TransitionAnimationPlayer[] = [];\n                                              const skippedPlayersMap = new Map<any,\n                                              AnimationPlayer[]>();\n                                              const queuedInstructions: QueuedTransition[] = [];\n                                              const queriedElements = new\n                                              Map<any, TransitionAnimationPlayer[]>();\n                                              const allPreStyleElements = new Map<any, Set<string>>();\n                                              const allPostStyleElements = new Map<any, Set<string>>();\n                                              const disabledElementsSet = new Set<any>();\n                                              this.disabledNodes.forEach(node => {\n                                                disabledElementsSet.add(node);\n                                                const nodesThatAreDisabled =\n                                                this.driver.query(node,\n                                                QUEUED_SELECTOR, true);\n                                                for (let i = 0; i < nodesThatAreDisabled.length; i++) {\n                                                  disabledElementsSet.add(nodesThatAreDisabled[i]);\n                                                  }\n                                                  });\n                                                  const bodyNode = this.bodyNode;\n                                                  const allTriggerElements = Array.from(this.statesByElement.keys());\n                                                  const enterNodeMap =\n                                                  buildRootMap(allTriggerElements, this.collectedEnterElements);\n                                                  // this must occur before the instructions are\n                                                  built below such that\n                                                  // the :enter queries match the elements (since the timeline queries\n                                                  // are fired during\n                                                  instruction building).\n                                                  const enterNodeMapIds = new Map<any, string>();\n                                                  let i = 0;\n                                                  enterNodeMap.forEach((nodes, root) => {\n                                                    const className = ENTER_CLASSNAME + i++;\n                                                    enterNodeMapIds.set(root, className);\n                                                    nodes.forEach(node => addClass(node, className));\n                                                    });\n                                                    }\n                                                    const allLeaveNodes: any[] = [];\n                                                    const mergedLeaveNodes = new Set<any>();\n                                                    const\n                                                    leaveNodesWithoutAnimations = new Set<any>();\n\n                                                    for (let i = 0; i < this.collectedLeaveElements.length; i++) {\n                                                      const element =\n                                                      this.collectedLeaveElements[i];\n                                                      const details = element[REMOVAL_FLAG] as ElementAnimationState;\n                                                      if (details && details.setForRemoval) {\n                                                        allLeaveNodes.push(element);\n                                                        }\n                                                        mergedLeaveNodes.add(element);\n                                                        if (details.hasAnimation) {\n                                                          this.driver.query(element,\n                                                          STAR_SELECTOR, true).forEach(elm => mergedLeaveNodes.add(elm));\n                                                          } else {\n
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leaveNodesWithoutAnimations.add(element);\n    }\n    }\n    }\n    const leaveNodeMapIds = new Map<any,\nstring>();\n    const leaveNodeMap = buildRootMap(allTriggerElements, Array.from(mergedLeaveNodes));\n    leaveNodeMap.forEach((nodes, root) => {\n        const className = LEAVE_CLASSNAME + i++;\n        leaveNodeMapIds.set(root, className);\n        nodes.forEach(node => addClass(node, className));\n    });\n\n    cleanupFns.push(() => {\n        enterNodeMap.forEach((nodes, root) => {\n            const\n            className = enterNodeMapIds.get(root);\n            nodes.forEach(node => removeClass(node, className));\n        });\n\n        leaveNodeMap.forEach((nodes, root) => {\n            const className = leaveNodeMapIds.get(root);\n            nodes.forEach(node => removeClass(node, className));\n        });\n\n        allLeaveNodes.forEach(element => {\n            this.processLeaveNode(element);\n        });\n    });\n\n    const allPlayers: TransitionAnimationPlayer[] = [];\n    const\n    erroneousTransitions: AnimationTransitionInstruction[] = [];\n    for (let i = this._namespaceList.length - 1; i >= 0; i--)\n    {\n        const ns = this._namespaceList[i];\n        ns.drainQueuedTransitions(microtaskId).forEach(entry => {\n            const player = entry.player;\n            const element = entry.element;\n            allPlayers.push(player);\n\n            if\n            (this.collectedEnterElements.length) {\n                const details = element[REMOVAL_FLAG] as\n                ElementAnimationState;\n                // animations for move operations (elements being removed\n                and reinserted,\n                // e.g. when the order of an *ngFor list changes) are currently not supported\n                if (details\n                && details.setForMove) {\n                    if (details.previousTriggersValues &&\n                    details.previousTriggersValues.has(entry.triggerName)) {\n                        const previousValue =\n                        details.previousTriggersValues.get(entry.triggerName) as string;\n                        // we need to restore the previous\n                        trigger value since the element has\n                        // only been moved and hasn't actually left the DOM\n                        const\n                        triggersWithStates = this.statesByElement.get(entry.element);\n                        if (triggersWithStates &&\n                        triggersWithStates.has(entry.triggerName)) {\n                            const state = triggersWithStates.get(entry.triggerName);\n                            state.value = previousValue;\n                            triggersWithStates.set(entry.triggerName, state);\n                        }\n                    }\n\n                    player.destroy();\n                    return;\n                }\n\n                const nodeIsOrphaned = !bodyNode || !this.driver.containsElement(bodyNode, element);\n                const\n                leaveClassName = leaveNodeMapIds.get(element);\n                const enterClassName =\n                enterNodeMapIds.get(element);\n                const instruction = this._buildInstruction(\n                entry, subTimelines,\n                enterClassName, leaveClassName, nodeIsOrphaned);\n                if (instruction.errors && instruction.errors.length) {\n                    erroneousTransitions.push(instruction);\n                    return;\n                }\n\n                // even though the element may not be in\n                the DOM, it may still\n                // be added at a later point (due to the mechanics of content\n                // projection and/or\n                dynamic component insertion) therefore it's\n                // important to still style the element.\n                if (nodeIsOrphaned)\n                {\n                    player.onStart(() => eraseStyles(element, instruction.fromStyles));\n                    player.onDestroy(() =>\n                    setStyles(element, instruction.toStyles));\n                    skippedPlayers.push(player);\n\n                    return;\n                }\n\n                // if an unmatched transition is queued and ready to go\n                // then it SHOULD NOT\n                render an animation and cancel the\n                // previously running animations.\n                if (entry.isFallbackTransition) {\n                    player.onStart(() => eraseStyles(element, instruction.fromStyles));\n                    player.onDestroy(() =>\n                    setStyles(element, instruction.toStyles));\n                    skippedPlayers.push(player);\n                    return;\n                }\n\n                // this\n                means that if a parent animation uses this animation as a sub-trigger\n                // then it will instruct the timeline builder\n                not to add a player delay, but\n                // instead stretch the first keyframe gap until the animation starts. This is\n                //\n                important in order to prevent extra initialization styles from being\n                // required by the user for the animation.\n                const timelines: AnimationTimelineInstruction[] = [];\n                instruction.timelines.forEach(tl => {\n                    tl.stretchStartingKeyframe = true;\n                    if (!this.disabledNodes.has(tl.element)) {\n                        timelines.push(tl);\n                    }\n                });\n                instruction.timelines = timelines;\n                subTimelines.append(element,\n                instruction.timelines);\n\n                const tuple = {instruction, player, element};\n                queuedInstructions.push(tuple);\n                instruction.queriedElements.forEach(\n                element =>\n                getOrSetDefaultValue(queriedElements, element, []).push(player));\n\n                instruction.preStyleProps.forEach((stringMap, element) => {\n                    if (stringMap.size) {\n                        let setVal:\n                        Set<string> = allPreStyleElements.get(element);\n                        if (!setVal) {\n                            allPreStyleElements.set(element,\n                            setVal = new Set<string>());\n                        }\n                        stringMap.forEach( (_, prop) => setVal.add(prop));\n                    }\n                })\n            }\n        });\n    }\n}

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});\n\n    instruction.postStyleProps.forEach((stringMap, element) => {\n        let setVal: Set<string> =
allPostStyleElements.get(element)!;\n
        if (!setVal) {\n            allPostStyleElements.set(element, setVal = new Set<string>());\n        }\n
stringMap.forEach( (_, prop) => setVal.add(prop));\n    });\n    });\n    }\n\n    if (erroneousTransitions.length) {\n
        const errors: Error[] = [];\n        erroneousTransitions.forEach(instruction => {\n
            errors.push(transitionFailed(instruction.triggerName, instruction.errors!));\n        });\n\n        allPlayers.forEach(player
=> player.destroy());\n        this.reportError(errors);\n    }\n\n    const allPreviousPlayersMap = new Map<any,
TransitionAnimationPlayer[]>();\n    // this map tells us which element in the DOM tree is contained by\n    // which
animation. Further down this map will get populated once\n    // the players are built and in doing so we can use it to
efficiently\n    // figure out if a sub player is skipped due to a parent player having priority.\n    const
animationElementMap = new Map<any, any>();\n
    queuedInstructions.forEach(entry => {\n        const element = entry.element;\n        if (subTimelines.has(element))
{\n            animationElementMap.set(element, element);\n            this._beforeAnimationBuild(\n
                entry.player.namespaceId, entry.instruction, allPreviousPlayersMap);\n        }\n    });\n\n
skippedPlayers.forEach(player => {\n        const element = player.element;\n        const previousPlayers =\n
this._getPreviousPlayers(element, false, player.namespaceId, player.triggerName, null);\n
        previousPlayers.forEach(prevPlayer => {\n            getOrSetDefaultValue(allPreviousPlayersMap, element,
[]).push(prevPlayer);\n            prevPlayer.destroy();\n        });\n    });\n\n    // this is a special case for nodes that will be
removed either by\n    // having their own leave animations or by being queried in a container\n    // that will be
removed once a parent animation is complete. The idea\n    // here is that * styles must be identical to ! styles
because of\n
    // backwards compatibility (* is also filled in by default in many places).\n    // Otherwise * styles will return an
empty value or "auto" since the element\n    // passed to getComputedStyle will not be visible (since * ===
destination)\n    const replaceNodes = allLeaveNodes.filter(node => {\n        return replacePostStylesAsPre(node,
allPreStyleElements, allPostStyleElements);\n    });\n\n    // POST STAGE: fill the * styles\n    const postStylesMap
= new Map<any, StyleDataMap>();\n    const allLeaveQueriedNodes = cloakAndComputeStyles(\n
        postStylesMap, this.driver, leaveNodesWithoutAnimations, allPostStyleElements, AUTO_STYLE);\n\n
allLeaveQueriedNodes.forEach(node => {\n        if (replacePostStylesAsPre(node, allPreStyleElements,
allPostStyleElements)) {\n            replaceNodes.push(node);\n        }\n    });\n\n    // PRE STAGE: fill the ! styles\n
const preStylesMap = new Map<any, StyleDataMap>();\n    enterNodeMap.forEach((nodes, root) => {\n
        cloakAndComputeStyles(\n
            preStylesMap, this.driver, new Set(nodes), allPreStyleElements, PRE_STYLE);\n    });\n\n
replaceNodes.forEach(node => {\n        const post = postStylesMap.get(node);\n        const pre =
preStylesMap.get(node);\n        postStylesMap.set(\n            node,\n            new Map([...Array.from(post?.entries() ??
[]), ...Array.from(pre?.entries() ?? [])]);\n        });\n\n        const rootPlayers: TransitionAnimationPlayer[] = [];\n        const
subPlayers: TransitionAnimationPlayer[] = [];\n        const NO_PARENT_ANIMATION_ELEMENT_DETECTED =
{\n        };\n        queuedInstructions.forEach(entry => {\n            const {element, player, instruction} = entry;\n            // this means
that it was never consumed by a parent animation which\n            // means that it is independent and therefore should be
set for animation\n            if (subTimelines.has(element)) {\n                if (disabledElementsSet.has(element)) {\n
                    player.onDestroy(() => setStyles(element, instruction.toStyles));\n                    player.disabled = true;\n
                    player.overrideTotalTime(instruction.totalTime);\n                    skippedPlayers.push(player);\n                    return;\n
                }\n\n                // this will flow up the DOM and query the map to figure out\n                // if a parent animation has priority
over it. In the situation\n                // that a parent is detected then it will cancel the loop. If\n                // nothing is detected, or
it takes a few hops to find a parent,\n                // then it will fill in the missing nodes and signal them as having\n                // a
detected parent (or a NO_PARENT value via a special constant).\n                let parentWithAnimation: any =
NO_PARENT_ANIMATION_ELEMENT_DETECTED;\n                if (animationElementMap.size > 1) {\n                    let
elm = element;\n                    const parentsToAdd: any[] = [];\n                    while (elm = elm.parentNode) {\n                        const
detectedParent = animationElementMap.get(elm);\n                        if (detectedParent) {\n                            parentWithAnimation =

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detectedParent;\n        break;\n    }\n    parentsToAdd.push(elm);\n    }\n    parentsToAdd.forEach(parent =>
animationElementMap.set(parent, parentWithAnimation);\n    }\n\n    const innerPlayer =
this._buildAnimation(\n        player.namespaceId, instruction, allPreviousPlayersMap, skippedPlayersMap,
preStylesMap,\n        postStylesMap);\n\n    player.setRealPlayer(innerPlayer);\n\n    if
(parentWithAnimation === NO_PARENT_ANIMATION_ELEMENT_DETECTED) {\n
rootPlayers.push(player);\n    } else {\n        const parentPlayers =
this.playersByElement.get(parentWithAnimation);\n        if (parentPlayers && parentPlayers.length) {\n
player.parentPlayer = optimizeGroupPlayer(parentPlayers);\n        }\n        skippedPlayers.push(player);\n    }\n
    } else {\n        eraseStyles(element, instruction.fromStyles);\n        player.onDestroy(() => setStyles(element,
instruction.toStyles));\n        // there still might be a ancestor player animating
this\n        // element therefore we will still add it as a sub player\n        // even if its animation may be disabled\n
subPlayers.push(player);\n        if (disabledElementsSet.has(element)) {\n            skippedPlayers.push(player);\n
        }\n    }\n});\n\n// find all of the sub players' corresponding inner animation players\n
subPlayers.forEach(player => {\n    // even if no players are found for a sub animation it\n    // will still complete
itself after the next tick since it's Noop\n    const playersForElement = skippedPlayersMap.get(player.element);\n
if (playersForElement && playersForElement.length) {\n        const innerPlayer =
optimizeGroupPlayer(playersForElement);\n        player.setRealPlayer(innerPlayer);\n    }\n});\n\n// the
reason why we don't actually play the animation is\n    // because all that a skipped player is designed to do is to\n
// fire the start/done transition callback events\n    skippedPlayers.forEach(player
=> {\n        if (player.parentPlayer) {\n            player.syncPlayerEvents(player.parentPlayer);\n        } else {\n
player.destroy();\n        }\n    });\n\n// run through all of the queued removals and see if they\n    // were picked up
by a query. If not then perform the removal\n    // operation right away unless a parent animation is ongoing.\n    for
(let i = 0; i < allLeaveNodes.length; i++) {\n        const element = allLeaveNodes[i];\n        const details =
element[REMOVAL_FLAG] as ElementAnimationState;\n        removeClass(element, LEAVE_CLASSNAME);\n\n        // this means the element has a removal animation that is being\n        // taken care of and therefore the inner
elements will hang around\n        // until that animation is over (or the parent queried animation)\n        if (details &&
details.hasAnimation) continue;\n\n        let players: TransitionAnimationPlayer[] = [];\n\n        // if this element is
queried or if it contains queried children\n        // then we
want for the element not to be removed from the page\n        // until the queried animations have finished\n        if
(queriedElements.size) {\n            let queriedPlayerResults = queriedElements.get(element);\n            if
(queriedPlayerResults && queriedPlayerResults.length) {\n                players.push(...queriedPlayerResults);\n            }\n\n
            let queriedInnerElements = this.driver.query(element, NG_ANIMATING_SELECTOR, true);\n            for (let j =
0; j < queriedInnerElements.length; j++) {\n                let queriedPlayers =
queriedElements.get(queriedInnerElements[j]);\n                if (queriedPlayers && queriedPlayers.length) {\n
                    players.push(...queriedPlayers);\n                }\n            }\n\n            const activePlayers = players.filter(p =>
!p.destroyed);\n            if (activePlayers.length) {\n                removeNodesAfterAnimationDone(this, element,
activePlayers);\n            } else {\n                this.processLeaveNode(element);\n            }\n        }\n\n        // this is required so the
cleanup method
doesn't remove them\n        allLeaveNodes.length = 0;\n\n        rootPlayers.forEach(player => {\n
this.players.push(player);\n        player.onDestroy(() => {\n            player.destroy();\n\n            const index =
this.players.indexOf(player);\n            this.players.splice(index, 1);\n        });\n        player.play();\n    });\n\n    return
rootPlayers;\n}\n\n    elementContainsData(namespaceId: string, element: any) {\n        let containsData = false;\n
const details = element[REMOVAL_FLAG] as ElementAnimationState;\n        if (details && details.setForRemoval)
containsData = true;\n        if (this.playersByElement.has(element)) containsData = true;\n        if
(this.playersByQueriedElement.has(element)) containsData = true;\n        if (this.statesByElement.has(element))
containsData = true;\n        return this._fetchNamespace(namespaceId).elementContainsData(element) ||
containsData;\n    }\n\n    afterFlush(callback: () => any) {\n        this._flushFns.push(callback);\n    }\n\n

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afterFlushAnimationsDone(callback:

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() => any) {\n  this._whenQuietFns.push(callback);\n}\n\nprivate _getPreviousPlayers(\n  element: string,\n  isQueriedElement: boolean, namespaceId?: string, triggerName?: string,\n  toStateValue?: any):\n  TransitionAnimationPlayer[] {\n  let players: TransitionAnimationPlayer[] = [];\n  if (isQueriedElement) {\n    const queriedElementPlayers = this.playersByQueriedElement.get(element);\n    if (queriedElementPlayers) {\n      players = queriedElementPlayers;\n    }\n  } else {\n    const elementPlayers =\n      this.playersByElement.get(element);\n    if (elementPlayers) {\n      const isRemovalAnimation = !toStateValue ||\n        toStateValue == VOID_VALUE;\n      elementPlayers.forEach(player => {\n        if (player.queued) return;\n        if (!isRemovalAnimation && player.triggerName != triggerName) return;\n        players.push(player);\n      });\n    }\n  }\n  if (namespaceId || triggerName) {\n    players = players.filter(player => {\n      if (namespaceId && namespaceId != player.namespaceId) return false;\n      if (triggerName && triggerName !=\n        player.triggerName) return false;\n      return true;\n    });\n  }\n  return players;\n}\n\nprivate\n_beforeAnimationBuild(\n  namespaceId: string, instruction: AnimationTransitionInstruction,\n  allPreviousPlayersMap: Map<any, TransitionAnimationPlayer[]>) {\n  const triggerName =\n    instruction.triggerName;\n  const rootElement = instruction.element;\n  // when a removal animation occurs,\n  ALL previous players are collected\n  // and destroyed (even if they are outside of the current namespace)\n  const\n    targetNameSpaceId: string|undefined =\n      instruction.isRemovalTransition ? undefined : namespaceId;\n  const\n    targetTriggerName: string|undefined =\n      instruction.isRemovalTransition ? undefined : triggerName;\n  for\n    (const timelineInstruction of instruction.timelines) {\n    const element = timelineInstruction.element;\n    const isQueriedElement = element !== rootElement;\n    const players =\n      getOrSetDefaultValue(allPreviousPlayersMap, element, []);\n    const previousPlayers =\n      this._getPreviousPlayers(\n        element, isQueriedElement, targetNameSpaceId, targetTriggerName,\n        instruction.toState);\n    previousPlayers.forEach(player => {\n      const realPlayer = (player as\n        TransitionAnimationPlayer).getRealPlayer() as any;\n      if (realPlayer.beforeDestroy) {\n        realPlayer.beforeDestroy();\n      }\n      player.destroy();\n      players.push(player);\n    });\n  }\n  // this\n  needs to be done so that the PRE/POST styles can be\n  // computed properly without interfering with the previous\n  animation\n  eraseStyles(rootElement, instruction.fromStyles);\n}\n\nprivate _buildAnimation(\n  namespaceId: string, instruction: AnimationTransitionInstruction,\n  allPreviousPlayersMap: Map<any,\n  TransitionAnimationPlayer[]>,\n  skippedPlayersMap: Map<any, AnimationPlayer[]>,\n  preStylesMap: Map<any, StyleDataMap>,\n  postStylesMap: Map<any, StyleDataMap>): AnimationPlayer {\n  const triggerName = instruction.triggerName;\n  const rootElement = instruction.element;\n  // we first run this\n  so that the previous animation player\n  // data can be passed into the successive animation players\n  const\n    allQueriedPlayers: TransitionAnimationPlayer[] = [];\n  const allConsumedElements = new Set<any>();\n  const\n    allSubElements = new Set<any>();\n  const allNewPlayers = instruction.timelines.map(timelineInstruction => {\n    const element = timelineInstruction.element;\n    allConsumedElements.add(element);\n    // FIXME (matsko):\n    make sure to-be-removed animations are removed properly\n    const details = element[REMOVAL_FLAG];\n    if (details && details.removedBeforeQueried)\n      return new NoopAnimationPlayer(timelineInstruction.duration,\n        timelineInstruction.delay);\n    const isQueriedElement = element !== rootElement;\n    const previousPlayers =\n      flattenGroupPlayers((allPreviousPlayersMap.get(element) ||\n        EMPTY_PLAYER_ARRAY)\n        .map(p => p.getRealPlayer()))\n        .filter(p => {\n          // the `element` is not apart of the AnimationPlayer definition, but\n          // Mock/WebAnimations\n          // use the element within their implementation. This will be added in Angular5 to\n          // AnimationPlayer\n          const pp = p as any;\n          return pp.element ? pp.element === element : false;\n        });\n    const\n      preStyles = preStylesMap.get(element);\n    const\n      postStyles = postStylesMap.get(element);\n    const\n      keyframes = normalizeKeyframes(\n        this.driver, this._normalizer, element, timelineInstruction.keyframes,\n        preStyles,\n        postStyles);\n    const player = this._buildPlayer(timelineInstruction, keyframes,\n      previousPlayers);\n    // this means that
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this particular player belongs to a sub trigger. It is\n // important that we match this player up with the
corresponding (@trigger.listener)\n if (timelineInstruction.subTimeline && skippedPlayersMap) {\n
allSubElements.add(element);\n }\n\n if (isQueriedElement) {\n const wrappedPlayer = new
TransitionAnimationPlayer(namespaceId, triggerName, element);\n wrappedPlayer.setRealPlayer(player);\n
allQueriedPlayers.push(wrappedPlayer);\n }\n\n return player;\n });\n\n allQueriedPlayers.forEach(player
=> {\n getOrElseDefault(this.playersByQueriedElement, player.element, []).push(player);\n
player.onDone(() => deleteOrUnsetInMap(this.playersByQueriedElement, player.element, player));\n });\n\n
allConsumedElements.forEach(element => addClass(element, NG_ANIMATING_CLASSNAME));\n const
player = optimizeGroupPlayer(allNewPlayers);\n player.onDestroy(() => {\n
allConsumedElements.forEach(element =>
removeClass(element, NG_ANIMATING_CLASSNAME));\n setStyles(rootElement, instruction.toStyles);\n
});\n\n // this basically makes all of the callbacks for sub element animations\n // be dependent on the upper
players for when they finish\n allSubElements.forEach(element => {\n
getOrElseDefault(skippedPlayersMap, element, []).push(player);\n });\n\n return player;\n })\n\n private
_buildPlayer(\n instruction: AnimationTimelineInstruction, keyframes: Array<StyleDataMap>,\n
previousPlayers: AnimationPlayer[]): AnimationPlayer {\n if (keyframes.length > 0) {\n return
this.driver.animate(\n instruction.element, keyframes, instruction.duration, instruction.delay,\n
instruction.easing, previousPlayers);\n }\n\n // special case for when an empty transition|definition is provided\n
// ... there is no point in rendering an empty animation\n return new NoopAnimationPlayer(instruction.duration,
instruction.delay);\n
}\n\n\nexport class TransitionAnimationPlayer implements AnimationPlayer {\n private _player:
AnimationPlayer = new NoopAnimationPlayer();\n private _containsRealPlayer = false;\n\n private
_queuedCallbacks = new Map<string, ((event: any) => any)[>];\n public readonly destroyed = false;\n //
TODO(issue/24571): remove '!\n public parentPlayer!: AnimationPlayer;\n\n public markedForDestroy: boolean
= false;\n public disabled = false;\n\n readonly queued: boolean = true;\n public readonly totalTime: number =
0;\n\n constructor(public namespaceId: string, public triggerName: string, public element: any) {\n\n
setRealPlayer(player: AnimationPlayer) {\n if (this._containsRealPlayer) return;\n\n this._player = player;\n
this._queuedCallbacks.forEach((callbacks, phase) => {\n callbacks.forEach(callback => listenOnPlayer(player,
phase, undefined, callback));\n });\n\n this._queuedCallbacks.clear();\n this._containsRealPlayer = true;\n
this.overrideTotalTime(player.totalTime);\n
\n (this as {queued: boolean}).queued = false;\n }\n\n getRealPlayer() {\n return this._player;\n }\n\n
overrideTotalTime(totalTime: number) {\n (this as any).totalTime = totalTime;\n }\n\n syncPlayerEvents(player:
AnimationPlayer) {\n const p = this._player as any;\n if (p.triggerCallback) {\n player.onStart(() =>
p.triggerCallback!(start));\n }\n player.onDone(() => this.finish());\n player.onDestroy(() => this.destroy());\n
}\n\n private _queueEvent(name: string, callback: (event: any) => any): void {\n
getOrElseDefault(this._queuedCallbacks, name, []).push(callback);\n }\n\n onDone(fn: () => void): void {\n
if (this.queued) {\n this._queueEvent('done', fn);\n }\n\n this._player.onDone(fn);\n }\n\n onStart(fn: () =>
void): void {\n if (this.queued) {\n this._queueEvent('start', fn);\n }\n\n this._player.onStart(fn);\n }\n\n
onDestroy(fn: () => void): void {\n if (this.queued) {\n
this._queueEvent('destroy', fn);\n }\n\n this._player.onDestroy(fn);\n }\n\n init(): void {\n
this._player.init();\n }\n\n hasStarted(): boolean {\n return this.queued ? false : this._player.hasStarted();\n
}\n\n play(): void {\n !this.queued && this._player.play();\n }\n\n pause(): void {\n !this.queued &&
this._player.pause();\n }\n\n restart(): void {\n !this.queued && this._player.restart();\n }\n\n finish(): void {\n
this._player.finish();\n }\n\n destroy(): void {\n (this as {destroyed: boolean}).destroyed = true;\n
this._player.destroy();\n }\n\n reset(): void {\n !this.queued && this._player.reset();\n }\n\n setPosition(p: any):
void {\n if (!this.queued) {\n this._player.setPosition(p);\n }\n }\n\n getPosition(): number {\n return
this.queued ? 0 : this._player.getPosition();\n }\n\n /** @internal *\n triggerCallback(phaseName: string): void
{\n const p = this._player as any;\n if (p.triggerCallback)

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    {\n    p.triggerCallback(phaseName);\n    }\n }\n}\n\nfunction deleteOrUnsetInMap<T, V>(map: Map<T, V[]>,
key: T, value: V) {\n let currentValues = map.get(key);\n if (currentValues) {\n if (currentValues.length) {\n
const index = currentValues.indexOf(value);\n currentValues.splice(index, 1);\n }\n if (currentValues.length
== 0) {\n map.delete(key);\n }\n }\n return currentValues;\n}\n}\n\nfunction normalizeTriggerValue(value: any):
any {\n // we use `!= null` here because it's the most simple\n // way to test against a `"falsy"` value without
mixing\n // in empty strings or a zero value. DO NOT OPTIMIZE.\n return value != null ? value :
null;\n}\n}\n\nfunction isElementNode(node: any) {\n return node && node['nodeType'] === 1;\n}\n}\n\nfunction
isTriggerEventValid(eventName: string): boolean {\n return eventName == 'start' || eventName ==
'done';\n}\n}\n\nfunction cloakElement(element: any, value?: string) {\n const oldValue = element.style.display;\n
element.style.display = value != null ? value : 'none';\n return oldValue;\n}\n}\n\nfunction
cloakAndComputeStyles(\n valuesMap: Map<any, StyleDataMap>, driver: AnimationDriver, elements:
Set<any>,\n elementPropsMap: Map<any, Set<string>>, defaultStyle: string): any[] {\n const cloakVals: string[]
= [];\n elements.forEach(element => cloakVals.push(cloakElement(element)));\n\n const failedElements: any[] =
[];\n\n elementPropsMap.forEach((props: Set<string>, element: any) => {\n const styles: StyleDataMap = new
Map();\n props.forEach(prop => {\n const value = driver.computeStyle(element, prop, defaultStyle);\n
styles.set(prop, value);\n\n // there is no easy way to detect this because a sub element could be removed\n //
by a parent animation element being detached.\n if (!value || value.length == 0) {\n
element[REMOVAL_FLAG] = NULL_REMOVED_QUERIED_STATE;\n failedElements.push(element);\n
}\n });\n valuesMap.set(element,
styles);\n });\n\n // we use a index variable here since Set.forEach(a, i) does not return\n // an index value for the
closure (but instead just the value)\n let i = 0;\n elements.forEach(element => cloakElement(element,
cloakVals[i++]));\n\n return failedElements;\n}\n}\n\n/*\nSince the Angular renderer code will return a collection of
inserted\nnodes in all areas of a DOM tree, it's up to this algorithm to figure\nout which nodes are roots for each
animation @trigger.\n\nBy placing each inserted node into a Set and traversing upwards, it\nis possible to find the
@trigger elements and well any direct *star\ninsertion nodes, if a @trigger root is found then the enter element\nis
placed into the Map[@trigger] spot.\n */\n\nfunction buildRootMap(roots: any[], nodes: any[]): Map<any, any[]> {\n
const rootMap = new Map<any, any[]>();\n roots.forEach(root => rootMap.set(root, []));\n if (nodes.length == 0)
return rootMap;\n\n const NULL_NODE = 1;\n const nodeSet = new Set(nodes);\n
const localRootMap = new Map<any, any>();\n\n function getRoot(node: any): any {\n if (!node) return
NULL_NODE;\n\n let root = localRootMap.get(node);\n if (root) return root;\n\n const parent =
node.parentNode;\n if (rootMap.has(parent)) { // ngIf inside @trigger\n root = parent;\n } else if
(nodeSet.has(parent)) { // ngIf inside ngIf\n root = NULL_NODE;\n } else { // recurse upwards\n root =
getRoot(parent);\n }\n\n localRootMap.set(node, root);\n return root;\n }\n\n nodes.forEach(node => {\n
const root = getRoot(node);\n if (root !== NULL_NODE) {\n rootMap.get(root)!.push(node);\n }\n });\n\n
return rootMap;\n}\n}\n\nfunction addClass(element: any, className: string) {\n
element.classList?.add(className);\n}\n}\n\nfunction removeClass(element: any, className: string) {\n
element.classList?.remove(className);\n}\n}\n\nfunction removeNodesAfterAnimationDone(\n engine:
TransitionAnimationEngine, element: any, players: AnimationPlayer[])
{\n optimizeGroupPlayer(players).onDone(() => engine.processLeaveNode(element));\n}\n}\n\nfunction
flattenGroupPlayers(players: AnimationPlayer[]): AnimationPlayer[] {\n const finalPlayers: AnimationPlayer[] =
[];\n _flattenGroupPlayersRecur(players, finalPlayers);\n return finalPlayers;\n}\n}\n\nfunction
_flattenGroupPlayersRecur(players: AnimationPlayer[], finalPlayers: AnimationPlayer[]) {\n for (let i = 0; i <
players.length; i++) {\n const player = players[i];\n if (player instanceof AnimationGroupPlayer) {\n
_flattenGroupPlayersRecur(player.players, finalPlayers);\n } else {\n finalPlayers.push(player);\n }\n
}\n}\n}\n\nfunction objEquals(a: {[key: string]: any}, b: {[key: string]: any}): boolean {\n const k1 = Object.keys(a);\n
const k2 = Object.keys(b);\n if (k1.length != k2.length) return false;\n for (let i = 0; i < k1.length; i++) {\n const
prop = k1[i];\n if (!b.hasOwnProperty(prop) || a[prop] !== b[prop]) return false;\n }\n return

```

```

true;\n}\n\nfunction replacePostStylesAsPre(\n  element: any, allPreStyleElements: Map<any, Set<string>>,\n  allPostStyleElements: Map<any, Set<string>>): boolean {\n  const postEntry =\n  allPostStyleElements.get(element);\n  if (!postEntry) return false;\n\n  let preEntry =\n  allPreStyleElements.get(element);\n  if (preEntry) {\n    postEntry.forEach(data => preEntry!.add(data));\n  } else {\n    allPreStyleElements.set(element, postEntry);\n  }\n\n  allPostStyleElements.delete(element);\n  return\n  true;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is\n governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { AnimationMetadata, AnimationPlayer, AnimationTriggerMetadata } from\n '@angular/animations';\nimport { TriggerAst } from './dsl/animation_ast';\nimport { buildAnimationAst } from\n './dsl/animation_ast_builder';\nimport { AnimationTrigger, buildTrigger } from './dsl/animation_trigger';\nimport\n { AnimationStyleNormalizer } from './dsl/style_normalization/animation_style_normalizer';\nimport\n { triggerBuildFailed } from './error_helpers';\nimport { warnTriggerBuild } from './warning_helpers';\nimport\n { AnimationDriver } from './animation_driver';\nimport { parseTimelineCommand } from './shared';\nimport\n { TimelineAnimationEngine } from './timeline_animation_engine';\nimport { TransitionAnimationEngine } from\n './transition_animation_engine';\n\nexport class AnimationEngine {\n  private _transitionEngine:\n  TransitionAnimationEngine;\n  private _timelineEngine: TimelineAnimationEngine;\n\n  private _triggerCache:\n  {[key: string]: AnimationTrigger} = {};\n\n  // this method is designed to be overridden by the code that uses this\n  engine\n  public onRemovalComplete = (element: any, context: any) => {};\n\n  constructor(\n    private\n    bodyNode: any, private _driver: AnimationDriver,\n    private _normalizer: AnimationStyleNormalizer) {\n    this._transitionEngine\n    = new TransitionAnimationEngine(bodyNode, _driver, _normalizer);\n    this._timelineEngine = new\n    TimelineAnimationEngine(bodyNode, _driver, _normalizer);\n\n    this._transitionEngine.onRemovalComplete =\n    (element: any, context: any) =>\n      this.onRemovalComplete(element, context);\n  }\n\n  registerTrigger(\n    componentId: string, namespaceId: string, hostElement: any, name: string,\n    metadata:\n    AnimationTriggerMetadata): void {\n    const cacheKey = componentId + '-' + name;\n    let trigger =\n    this._triggerCache[cacheKey];\n    if (!trigger) {\n      const errors: Error[] = [];\n      const warnings: string[] = [];\n      const ast = buildAnimationAst(\n        this._driver, metadata as AnimationMetadata, errors, warnings) as\n        TriggerAst;\n      if (errors.length) {\n        throw triggerBuildFailed(name, errors);\n      }\n      if (warnings.length)\n        {\n          warnTriggerBuild(name, warnings);\n        }\n      trigger = buildTrigger(name, ast, this._normalizer);\n      this._triggerCache[cacheKey] = trigger;\n    }\n    this._transitionEngine.registerTrigger(namespaceId, name,\n    trigger);\n  }\n\n  register(namespaceId: string, hostElement: any) {\n    this._transitionEngine.register(namespaceId,\n    hostElement);\n  }\n\n  destroy(namespaceId: string, context: any) {\n    this._transitionEngine.destroy(namespaceId,\n    context);\n  }\n\n  onInsert(namespaceId: string, element: any, parent: any, insertBefore: boolean): void {\n    this._transitionEngine.insertNode(namespaceId, element, parent, insertBefore);\n  }\n\n  onRemove(namespaceId:\n  string, element: any, context: any, isHostElement?: boolean): void {\n    this._transitionEngine.removeNode(namespaceId, element, isHostElement || false, context);\n  }\n\n  disableAnimations(element: any, disable: boolean) {\n    this._transitionEngine.markElementAsDisabled(element,\n    disable);\n  }\n\n  process(namespaceId: string, element: any, property: string, value: any) {\n    if\n    (property.charAt(0) == '@') {\n      const [id, action] = parseTimelineCommand(property);\n      const args = value as any[];\n      this._timelineEngine.command(id, element, action, args);\n    } else {\n      this._transitionEngine.trigger(namespaceId, element, property, value);\n    }\n  }\n\n  listen(\n    namespaceId:\n    string, element: any, eventName: string, eventPhase: string,\n    callback: (event: any) => any): () => any {\n    //\n    @@listen\n    if (eventName.charAt(0) == '@') {\n      const [id, action] = parseTimelineCommand(eventName);\n      return this._timelineEngine.listen(id, element, action, callback);\n    }\n    return\n    this._transitionEngine.listen(namespaceId, element, eventName, eventPhase, callback);\n  }\n\n  flush(microtaskId:\n  number = -1): void {\n    this._transitionEngine.flush(microtaskId);\n  }\n\n  get players(): AnimationPlayer[] {\n    return (this._transitionEngine.players as AnimationPlayer[])\n      .concat(this._timelineEngine.players as

```

```

AnimationPlayer[];
}

whenRenderingDone():
Promise<any> {
  return this._transitionEngine.whenRenderingDone();
}

/**
 * @license
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 * that can be found in the LICENSE file at https://angular.io/license
 */
import { StyleDataMap } from
 '@angular/animations';
import { eraseStyles, setStyles } from './util';

Returns an instance of
`SpecialCasedStyles` if and when any special (non animateable) styles are
detected.

In CSS there exist
properties that cannot be animated within a keyframe animation
(whether it be via CSS keyframes or web-
animations) and the animation implementation
will ignore them. This function is designed to detect those special
cased styles and
return a container that will be executed at the start and end of the animation.

@returns
an instance of `SpecialCasedStyles` if any special styles are detected otherwise
`null`

export
function packageNonAnimatableStyles(
  element: any, styles: StyleDataMap|Array<StyleDataMap>):
SpecialCasedStyles|null {
  let startStyles: StyleDataMap|null = null;
  let endStyles: StyleDataMap|null = null;

  if (Array.isArray(styles) && styles.length) {
    startStyles = filterNonAnimatableStyles(styles[0]);
    if
      (styles.length > 1) {
      endStyles = filterNonAnimatableStyles(styles[styles.length - 1]);
    }
  } else if (styles
instanceof Map) {
    startStyles = filterNonAnimatableStyles(styles);
  }

  return (startStyles || endStyles) ?
  new SpecialCasedStyles(element, startStyles, endStyles) :
  null;
}

/**
 * Designed to
 * be executed during a keyframe-based animation to apply any special-cased styles.
 * When started (when the
 * `start()` method is run) then the provided `startStyles` will be applied. When finished (when the `finish()`
 * method is called) the
 * `endStyles` will be applied as well any any starting
 * styles. Finally when
 * `destroy()` is called then all styles will be removed.
 */
export class SpecialCasedStyles {
  static initialStylesByElement = (/* @__PURE__ */ new WeakMap<any, StyleDataMap>());

  private _state
= SpecialCasedStylesState.Pending;
  private _initialStyles!: StyleDataMap;

  constructor(
    private
    _element: any, private _startStyles: StyleDataMap|null, private _endStyles: StyleDataMap|null) {
    let
    initialStyles = SpecialCasedStyles.initialStylesByElement.get(_element);
    if (!initialStyles) {
      SpecialCasedStyles.initialStylesByElement.set(_element, initialStyles = new Map());
    }
    this._initialStyles =
    initialStyles;
  }

  start() {
    if (this._state < SpecialCasedStylesState.Started) {
      if (this._startStyles) {
        setStyles(this._element, this._startStyles, this._initialStyles);
      }
      this._state =
      SpecialCasedStylesState.Started;
    }
  }

  finish() {
    this.start();

    if (this._state < SpecialCasedStylesState.Finished) {
      setStyles(this._element, this._initialStyles);
      if
      (this._endStyles) {
        setStyles(this._element, this._endStyles);
        this._endStyles = null;
      }
      this._state =
      SpecialCasedStylesState.Started;
    }
  }

  destroy() {
    this.finish();
    if (this._state <
    SpecialCasedStylesState.Destroyed) {
      SpecialCasedStyles.initialStylesByElement.delete(this._element);
      if
      (this._startStyles) {
        eraseStyles(this._element, this._startStyles);
        this._endStyles = null;
      }
      if
      (this._endStyles) {
        eraseStyles(this._element, this._endStyles);
        this._endStyles = null;
      }
      setStyles(this._element, this._initialStyles);
      this._state =
      SpecialCasedStylesState.Destroyed;
    }
  }
}

/**
 * An enum of states reflective of what the status of `SpecialCasedStyles` is.
 * Depending on
 * how `SpecialCasedStyles` is interacted with,
 * the start and end
 * styles may not be applied in the same way. This enum ensures that if and when
 * the ending
 * styles are applied then the starting styles are applied. It is
 * also used to reflect what the current status of the
 * special cased styles are
 * which helps prevent the starting/ending styles not be applied twice. It is
 * also used to
 * cleanup the styles once `SpecialCasedStyles` is destroyed.
 */
const enum SpecialCasedStylesState {
  Pending =
  0,
  Started = 1,
  Finished = 2,
  Destroyed = 3,
}

function filterNonAnimatableStyles(
  styles:
  StyleDataMap): StyleDataMap|null {
  let result: StyleDataMap|null = null;
  styles.forEach((val, prop) => {
    if
    (isNonAnimatableStyle(prop)) {
      result = result || new Map();
      result.set(prop, val);
    }
  });
  return
  result;
}

function isNonAnimatableStyle(prop: string) {
  return prop === 'display' || prop ===
  'position';
}

/**
 * @license
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 *
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import { AnimationPlayer, StyleDataMap } from '@angular/animations';

```

```

{computeStyle} from '../util';\nimport {SpecialCasedStyles} from '../special_cased_styles';\nimport
{DOMAnimation} from '../dom_animation';\n\nexport class WebAnimationsPlayer implements AnimationPlayer {\n
private _onDoneFns: Function[] = [];\n private _onStartFns: Function[] = [];\n private _onDestroyFns: Function[] =
[];\n private _duration: number;\n private _delay: number;\n private _initialized = false;\n private _finished =
false;\n private _started = false;\n private _destroyed = false;\n private _finalKeyframe?: StyleDataMap;\n\n // the
following original fns are persistent copies of the _onStartFns and _onDoneFns\n // and are used to reset the fns to
their original values upon reset()\n // (since the _onStartFns and _onDoneFns get deleted
after they are called)\n private _originalOnDoneFns: Function[] = [];\n private _originalOnStartFns: Function[] =
[];\n\n // TODO(issue/24571): remove '!'\n public readonly domPlayer!: DOMAnimation;\n public time = 0;\n\n
public parentPlayer: AnimationPlayer|null = null;\n public currentSnapshot: StyleDataMap = new Map();\n\n
constructor(\n public element: any, public keyframes: Array<StyleDataMap>,\n public options: {[key: string]:
string|number},\n private _specialStyles?: SpecialCasedStyles|null) {\n this._duration =
<number>options['duration'];\n this._delay = <number>options['delay'] || 0;\n this.time = this._duration +
this._delay;\n }\n\n private _onFinish() {\n if (!this._finished) {\n this._finished = true;\n
this._onDoneFns.forEach(fn => fn());\n this._onDoneFns = [];\n }\n }\n\n init(): void {\n
this._buildPlayer();\n this._preparePlayerBeforeStart();\n }\n\n private _buildPlayer(): void {\n if
(this._initialized)
return;\n this._initialized = true;\n\n const keyframes = this.keyframes;\n (this as {domPlayer:
DOMAnimation}).domPlayer =\n this._triggerWebAnimation(this.element, keyframes, this.options);\n
this._finalKeyframe = keyframes.length ? keyframes[keyframes.length - 1] : new Map();\n
this.domPlayer.addEventListener('finish', () => this._onFinish());\n }\n\n private _preparePlayerBeforeStart() {\n
// this is required so that the player doesn't start to animate right away\n if (this._delay) {\n
this._resetDomPlayerState();\n } else {\n this.domPlayer.pause();\n }\n }\n\n private
_convertKeyframesToObject(keyframes: Array<StyleDataMap>): any[] {\n const kfs: any[] = [];\n
keyframes.forEach(frame => {\n kfs.push(Object.fromEntries(frame));\n });\n return kfs;\n }\n\n /**
@internal */\n _triggerWebAnimation(element: any, keyframes: Array<StyleDataMap>, options: any):
DOMAnimation {\n // jscompiler doesn't seem
to know animate is a native property because it's not fully\n // supported yet across common browsers (we polyfill
it for Edge/Safari) [CL #143630929]\n return element['animate'](this._convertKeyframesToObject(keyframes),
options) as DOMAnimation;\n }\n\n onStart(fn: () => void): void {\n this._originalOnStartFns.push(fn);\n
this._onStartFns.push(fn);\n }\n\n onDone(fn: () => void): void {\n this._originalOnDoneFns.push(fn);\n
this._onDoneFns.push(fn);\n }\n\n onDestroy(fn: () => void): void {\n this._onDestroyFns.push(fn);\n }\n\n
play(): void {\n this._buildPlayer();\n if (!this.hasStarted()) {\n this._onStartFns.forEach(fn => fn());\n
this._onStartFns = [];\n this._started = true;\n if (this._specialStyles) {\n this._specialStyles.start();\n
}\n }\n this.domPlayer.play();\n }\n\n pause(): void {\n this.init();\n this.domPlayer.pause();\n }\n\n
finish(): void {\n this.init();\n if (this._specialStyles)
{\n this._specialStyles.finish();\n }\n this._onFinish();\n this.domPlayer.finish();\n }\n\n reset(): void {\n
this._resetDomPlayerState();\n this._destroyed = false;\n this._finished = false;\n this._started = false;\n
this._onStartFns = this._originalOnStartFns;\n this._onDoneFns = this._originalOnDoneFns;\n }\n\n private
_resetDomPlayerState() {\n if (this.domPlayer) {\n this.domPlayer.cancel();\n }\n }\n\n restart(): void {\n
this.reset();\n this.play();\n }\n\n hasStarted(): boolean {\n return this._started;\n }\n\n destroy(): void {\n
if (!this._destroyed) {\n this._destroyed = true;\n this._resetDomPlayerState();\n this._onFinish();\n if
(this._specialStyles) {\n this._specialStyles.destroy();\n }\n this._onDestroyFns.forEach(fn => fn());\n
this._onDestroyFns = [];\n }\n }\n\n setPosition(p: number): void {\n if (this.domPlayer === undefined) {\n
this.init();\n
}\n this.domPlayer.currentTime = p * this.time;\n }\n\n getPosition(): number {\n return
this.domPlayer.currentTime / this.time;\n }\n\n getTotalTime(): number {\n return this._delay + this._duration;\n
}\n\n beforeDestroy() {\n const styles: StyleDataMap = new Map();\n if (this.hasStarted()) {\n // note: this

```



```

code is invoked only when the `play` function was called prior to this\n    // (thus `hasStarted` returns true), this
implies that the code that initializes\n    // `_finalKeyframe` has also been executed and the non-null assertion can
be safely used here\n    const finalKeyframe = this._finalKeyframe!;\n    finalKeyframe.forEach((val, prop) => {\n
    if (prop !== 'offset') {\n        styles.set(prop, this._finished ? val : computeStyle(this.element, prop));\n    }\n
});\n    }\n    this.currentSnapshot = styles;\n    }\n\n /** @internal *\n    triggerCallback(phaseName: string): void
{\n    const methods = phaseName
==== 'start' ? this._onStartFns : this._onDoneFns;\n    methods.forEach(fn => fn());\n    methods.length = 0;\n
}\n}\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport { AnimationPlayer, StyleDataMap } from '@angular/animations';\nimport
{ allowPreviousPlayerStylesMerge, balancePreviousStylesIntoKeyframes, camelCaseToDashCase, copyStyles,
normalizeKeyframes } from '../util';\nimport { AnimationDriver } from '../animation_driver';\nimport
{ containsElement, getParentElement, invokeQuery, validateStyleProperty, validateWebAnimatableStyleProperty }
from '../shared';\nimport { packageNonAnimatableStyles } from '../special_cased_styles';\nimport
{ WebAnimationsPlayer } from '../web_animations_player';\nexport class WebAnimationsDriver implements
AnimationDriver {\n    validateStyleProperty(prop: string): boolean {\n        // Perform
actual validation in dev mode only, in prod mode this check is a noop.\n        if (typeof ngDevMode === 'undefined' ||
ngDevMode) {\n            return validateStyleProperty(prop);\n        }\n        return true;\n    }\n\n    validateAnimatableStyleProperty(prop: string): boolean {\n        // Perform actual validation in dev mode only, in prod
mode this check is a noop.\n        if (typeof ngDevMode === 'undefined' || ngDevMode) {\n            const cssProp =
camelCaseToDashCase(prop);\n            return validateWebAnimatableStyleProperty(cssProp);\n        }\n        return true;\n
}\n\n    matchesElement(_element: any, _selector: string): boolean {\n        // This method is deprecated and no longer in
use so we return false.\n        return false;\n    }\n\n    containsElement(elm1: any, elm2: any): boolean {\n        return
containsElement(elm1, elm2);\n    }\n\n    getParentElement(element: unknown): unknown {\n        return
getParentElement(element);\n    }\n\n    query(element: any, selector: string, multi: boolean): any[] {\n        return
invokeQuery(element,
selector, multi);\n    }\n\n    computeStyle(element: any, prop: string, defaultValue?: string): string {\n        return
(window.getComputedStyle(element) as any)[prop] as string;\n    }\n\n    animate(\n        element: any, keyframes:
Array<Map<string, string|number>>, duration: number, delay: number,\n        easing: string, previousPlayers:
AnimationPlayer[] = []): AnimationPlayer {\n        const fill = delay == 0 ? 'both' : 'forwards';\n        const playerOptions:
{[key: string]: string|number} = {duration, delay, fill};\n        // we check for this to avoid having a null|undefined
value be present\n        // for the easing (which results in an error for certain browsers #9752)\n        if (easing) {\n
            playerOptions['easing'] = easing;\n        }\n\n        const previousStyles: StyleDataMap = new Map();\n        const
previousWebAnimationPlayers = <WebAnimationsPlayer[]>previousPlayers.filter(\n            player => player
instanceof WebAnimationsPlayer);\n        if (allowPreviousPlayerStylesMerge(duration, delay))\n            {\n                previousWebAnimationPlayers.forEach(player => {\n                    player.currentSnapshot.forEach((val, prop) =>
                    previousStyles.set(prop, val));\n                });\n            }\n\n        let _keyframes = normalizeKeyframes(keyframes).map(styles =>
copyStyles(styles));\n        _keyframes = balancePreviousStylesIntoKeyframes(element, _keyframes,
previousStyles);\n        const specialStyles = packageNonAnimatableStyles(element, _keyframes);\n        return new
WebAnimationsPlayer(element, _keyframes, playerOptions, specialStyles);\n    }\n}\n", "/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nexport { Animation as Animation } from
'/dsl/animation';\nexport { AnimationStyleNormalizer as AnimationStyleNormalizer,
NoopAnimationStyleNormalizer as NoopAnimationStyleNormalizer } from
'/dsl/style_normalization/animation_style_normalizer';\nexport { WebAnimationsStyleNormalizer
as WebAnimationsStyleNormalizer } from '/dsl/style_normalization/web_animations_style_normalizer';\nexport
{ NoopAnimationDriver as NoopAnimationDriver } from './render/animation_driver';\nexport { AnimationEngine as
AnimationEngine } from './render/animation_engine_next';\nexport { containsElement as containsElement,

```

getParentElement as getParentElement, invokeQuery as invokeQuery, validateStyleProperty as  
validateStyleProperty} from './render/shared';\nexport {WebAnimationsDriver as WebAnimationsDriver} from  
 './render/web\_animations/web\_animations\_driver';\nexport {WebAnimationsPlayer as WebAnimationsPlayer} from  
 './render/web\_animations/web\_animations\_player';\nexport {allowPreviousPlayerStylesMerge as  
allowPreviousPlayerStylesMerge, normalizeKeyframes as normalizeKeyframes} from './util';\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license  
that can be\n \* found in the LICENSE file  
at https://angular.io/license\n \*/\n\n/\*\*\n \* @module\n \* @description\n \* Entry point for all animation APIs of the  
animation browser package.\n \*/\nexport {AnimationDriver} from './render/animation\_driver';\nexport \* from  
 './private\_export';\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source  
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 './src/browser';\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source  
code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*/\n\n// This file is not used to build this module. It is only used during editing\n// by the TypeScript language  
service and during build for verification. `ngc` replaces this file with production index.ts  
when it rewrites private symbol names.\nexport \* from './public\_api';\n"/\*\*\n \* Generated bundle index. Do  
not edit.\n \*/\nexport \* from  
 './index';\n"], "names": ["RuntimeError", "normalizeKeyframes", "PRE\_STYLE", "AnimationGroupPlayer"], "mapping  
s": ";;;;;;;;;AAAA;;;;;;;;;AAMG;AAMH,MAAM,UAAU,GAAG,OAAO,CAAC;AAErB,SAAU,kBAaKB,CAAC,GA  
AkB,EAAA;AACnD,IAAA,OAAO,IAAIA,aAAY,CAEnB,IAAA,8CAAA,SAAS,IAAI,CAAA,2BAAA,EAA8B,G  
AAG,CAAA,aAAA,CAAe,CAAC,CAAC;AACtE,CAAC;SAEe,iBAaIB,GAAA;IAC/B,OAAO,IAAIA,aAAY,CA  
AA,IAAA,6CAEnB,SAAS,IAAI,kEAaKe,CAAC,CAAC;AACvF,CAAC;SAEe,kBAaKB,GAAA;IAChC,OAAO,I  
AAIA,aAAY,CAAA,IAAA,8CAEnB,SAAS,IAAI,+DAA+D,CAAC,CAAC;AACpF,CAAC;AAEK,SAAU,kBAaK  
B,CAAC,OAAe,EAAA;AACChD,IAAA,OAAO,IAAIA,aAAY,CAAA,IAAA,8CAEnB,SAAS;QAACL,CAA+C,4CA  
AA,EAAA,OAAO,CAA8B,4BAAA,CAAA,CAAC,CAAC;AACChG,CAAC;AAEK,SAAU,iBAaIB,CAAC,OAAe,  
EAAA;AAC/C,IAAA,OAAO,IAAIA,aAAY,CAEnB,IAAA,6CAAA,SAAS,IAAI,CAAA,+CAAA,EAaKD,OAAO,  
CAAA,CAAe,CAAC,CAAC;AACChF,CAAC;AAEK,SAAU,eAAe,CAAC,QAAgB,EAAA;AAC9C,IAAA,OAAO,I  
AAIA,aAAY,CAEnB,IAAA,2CAAA,SAAS,IAAI,CAAA,2CAAA,EAA8C,QAAQ,CAAA,CAAe,CAAC,CAAC;A  
AC7E,CAAC;AAEe,SAAA,mBAaMB,CAAC,oBAA4B,EAAE,KAAa,EAAA;AAC7E,IAAA,OAAO,IAAIA,aA  
Y,CAAA,IAAA,gDAEnB,SAAS,IAAI,uCAAuC,oBAAoB,CAAA,CAAA,EAaI,KAAK,CAAA,CAAe,CAAC,CA  
AC;AAC3F,CAAC;SAEe,cAAc,GAAA;AAC5B,IAAA,OAAO,IAAIA,aAAY,CAAA,IAAA,yCAEnB,SAAS;AAC  
L,QAAA,wFAAwF,CAAC,CAAC;AACpG,CAAC;SAEe,iBAaIB,GAAA;IAC/B,OAAO,IAAIA,aAAY,CAAA,IA  
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# 1.204 angular-core 14.3.0

## 1.204.1 Available under license :

No license file was found, but licenses were detected in source scan.

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"../..../..../packages/core/src/render3/interfaces/i18n.ts", "../..../..../packages/core/src/render3/i18n/i18n\_locale\_id.ts", "../..../..../packages/core/src/render3/node\_manipulation\_i18n.ts", "../..../..../packages/core/src/render3/i18n/i18n\_insert\_before\_index.ts", "../..../..../packages/core/src/render3/i18n/i18n\_util.ts", "../..../..../packages/core/src/render3/i18n/i18n\_apply.ts", "../..../..../packages/core/src/render3/instructions/i18n\_icu\_container\_visitor.ts", "../..../..../packages/core/src/render3/i18n/i18n\_debug.ts", "../..../..../packages/core/src/render3/i18n/i18n\_parse.ts", "../..../..../packages/core/src/render3/i18n/i18n\_postprocess.ts", "../..../..../packages/core/src/render3/instructions/i18n.ts", "../..../..../packages/core/src/render3/instructions/all.ts", "../..../..../packages/core/src/render3/di\_setup.ts", "../..../..../packages/core/src/render3/features/providers\_feature.ts", "../..../..../packages/core/src/linker/ng\_module\_factory.ts", 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../..../packages/core/src/core.ts","../..../..../packages/core/public_api.ts","../..../..../packages/core/index.ts","..
../..../..../packages/core/core.ts"],"sourcesContent":["/**\n
```

```
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport function\ngetClosureSafeProperty<T>(objWithPropertyToExtract: T): string {\n  for (let key in objWithPropertyToExtract)\n    if (objWithPropertyToExtract[key] === getClosureSafeProperty as any) {\n      return key;\n    }\n  throw\n  Error('Could not find renamed property on target object.);\n\n/**\n * Sets properties on a target object from a source object, but only if\n * the property doesn't already exist on the target object.\n * @param target The target to set properties on\n * @param source The source of the property keys and values to set\n */\nexport function\nfillProperties(target: {[key: string]:\n  string}, source: {[key: string]: string}) {\n  for (const key in source) {\n    if (source.hasOwnProperty(key) &&\n        !target.hasOwnProperty(key)) {\n      target[key] = source[key];\n    }\n  }\n\n  /**\n * @license\n * Copyright
```

```
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport function stringify(token: any): string {\n  if (typeof token === 'string')\n    return token;\n  if (Array.isArray(token))\n    return '[' +\n      token.map(stringify).join(', ') + ']';\n  if (token == null)\n    return '' + token;\n  if (token.OverridesName)\n    return `${token.OverridesName}`;\n  if (token.name)\n    return\n      `${token.name}`;\n  const res = token.toString();\n  if (res == null)\n    return '' + res;\n  const\n  newLineIndex = res.indexOf('\\n');\n  return newLineIndex === -1 ? res : res.substring(0,\n  newLineIndex);\n\n  /**\n * @license\n * Copyright
```

```
* Concatenates two strings with separator, allocating new strings only when necessary.\n * @param before before string\n * @param separator separator string\n * @param after after string\n * @returns concatenated string\n */\nexport function concatStringsWhiteSpace(before: string|null, after: string|null): string {\n  return (before\n    == null || before === '') ?\n    (after == null || after === '') ?\n      before : before + ' ' +\n      after;\n\n  /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is\n * governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
```

```

*\n\nimport {Type} from './interface/type';\nimport {getClosureSafeProperty} from './util/property';\nimport
{stringify} from './util/stringify';\n\n\n/**\n * An interface that a function passed into {@link forwardRef} has to
implement.\n *\n * @usageNotes\n * ### Example\n *\n * {@example core/di/ts/forward_ref/forward_ref_spec.ts region='forward_ref_fn'}\n * @publicApi\n */\nexport
interface ForwardRefFn {\n (): any;\n}\n\nconst __forward_ref__ = getClosureSafeProperty({__forward_ref__:
getClosureSafeProperty});\n\n\n/**\n * Allows to refer to references which are not yet defined.\n *\n * For instance,
`forwardRef` is used when the `token` which we need to refer to for the purposes of\n * DI is declared, but not yet
defined. It is also used when the `token` which we use when creating\n * a query is not yet defined.\n *\n *
@usageNotes\n * ### Example\n * {@example core/di/ts/forward_ref/forward_ref_spec.ts region='forward_ref'}\n
* @publicApi\n */\nexport function forwardRef(forwardRefFn: ForwardRefFn): Type<any> {\n
(<any>forwardRefFn).__forward_ref__ = forwardRef;\n (<any>forwardRefFn).toString = function() {\n return
stringify(this());\n };
\n return (<Type<any>><any>forwardRefFn);\n}\n\n\n/**\n * Lazily retrieves the reference
value from a forwardRef.\n
*\n * Acts as the identity function when given a non-forward-ref value.\n *\n * @usageNotes\n * ### Example\n
*\n * {@example core/di/ts/forward_ref/forward_ref_spec.ts region='resolve_forward_ref'}\n *\n * @see
`forwardRef`\n * @publicApi\n */\nexport function resolveForwardRef<T>(type: T): T {\n return
isForwardRef(type) ? type() : type;\n}\n\n\n/**\n * Checks whether a function is wrapped by a `forwardRef`.
*\nexport
function isForwardRef(fn: any): fn is() => any {\n return typeof fn === 'function' &&
fn.hasOwnProperty('__forward_ref__') &&\n fn.__forward_ref__ === forwardRef;\n}\n\n","/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n\n/**\n * Base URL for the error details
page.\n *\n * Keep the files below in full sync:\n * - packages/compiler-
cli/src/ngtsc/diagnostics/src/error_details_base_url.ts\n * - packages/core/src/error_details_base_url.ts\n
*\nexport const ERROR_DETAILS_PAGE_BASE_URL = 'https://angular.io/errors';\n\n","/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport
{ERROR_DETAILS_PAGE_BASE_URL} from './error_details_base_url';\n\n\n/**\n * The list of error codes used in
runtime code of the `core` package.\n * Reserved error code range: 100-999.\n *\n * Note: the minus sign denotes
the fact that a particular code has a detailed guide on\n * angular.io. This extra annotation is needed to avoid
introducing a separate set to store\n * error codes which have guides, which might leak into runtime code.\n *\n *
Full list of available error guides can be found at https://angular.io/errors.
*\nexport const enum
RuntimeErrorCode {\n // Change Detection Errors\n EXPRESSION_CHANGED_AFTER_CHECKED = -100,\n
RECURSIVE_APPLICATION_REF_TICK
= 101,\n\n // Dependency Injection Errors\n CYCLIC_DI_DEPENDENCY = -200,\n
PROVIDER_NOT_FOUND = -201,\n INVALID_FACTORY_DEPENDENCY = 202,\n
MISSING_INJECTION_CONTEXT = -203,\n INVALID_INJECTION_TOKEN = 204,\n
INJECTOR_ALREADY_DESTROYED = 205,\n PROVIDER_IN_WRONG_CONTEXT = 207,\n
MISSING_INJECTION_TOKEN = 208,\n INVALID_MULTI_PROVIDER = 209,\n\n // Template Errors\n
MULTIPLE_COMPONENTS_MATCH = -300,\n EXPORT_NOT_FOUND = -301,\n PIPE_NOT_FOUND = -
302,\n UNKNOWN_BINDING = 303,\n UNKNOWN_ELEMENT = 304,\n
TEMPLATE_STRUCTURE_ERROR = 305,\n INVALID_EVENT_BINDING = 306,\n\n // Bootstrap Errors\n
MULTIPLE_PLATFORMS = 400,\n PLATFORM_NOT_FOUND = 401,\n ERROR_HANDLER_NOT_FOUND
= 402,\n BOOTSTRAP_COMPONENTS_NOT_FOUND = 403,\n PLATFORM_ALREADY_DESTROYED =
404,\n ASYNC_INITIALIZERS_STILL_RUNNING = 405,\n APPLICATION_REF_ALREADY_DESTROYED
= 406,\n RENDERER_NOT_FOUND = 407,\n\n // Styling Errors\n\n // Declarations Errors\n\n // i18n Errors\n
INVALID_I18N_STRUCTURE
= 700,\n MISSING_LOCALE_DATA = 701,\n\n // standalone errors\n
IMPORT_PROVIDERS_FROM_STANDALONE = 800,\n\n // JIT Compilation Errors\n // Other\n

```

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INVALID_DIFFER_INPUT = 900,\n NO_SUPPORTING_DIFFER_FACTORY = 901,\n
VIEW_ALREADY_ATTACHED = 902,\n INVALID_INHERITANCE = 903,\n
UNSAFE_VALUE_IN_RESOURCE_URL = 904,\n UNSAFE_VALUE_IN_SCRIPT = 905,\n
MISSING_GENERATED_DEF = 906,\n TYPE_IS_NOT_STANDALONE = 907,\n MISSING_ZONEJS = 908,\n
UNEXPECTED_ZONE_STATE = 909,\n UNSAFE_IFRAME_ATTRS = -910,\n\n/**\n * Class that represents
a runtime error.\n * Formats and outputs the error message in a consistent way.\n *\n * Example:\n *\n * throw
new RuntimeError(\n *   RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,\n *   ngDevMode &&
'Injector has already been destroyed.);\n *\n * Note: the `message` argument contains a descriptive error
message as a string in development\n * mode (when the `ngDevMode` is defined). In production mode (after tree-
shaking pass), the\n * `message`
argument becomes `false`, thus we account for it in the typings and the runtime logic.\n */\nexport class
RuntimeError<T extends number = RuntimeErrorCode> extends Error {\n  constructor(public code: T, message:
null|false|string) {\n    super(formatRuntimeError<T>(code, message));\n  }\n}\n\n/**\n * Called to format a runtime
error.\n * See additional info on the `message` argument type in the `RuntimeError` class description.\n */\nexport
function formatRuntimeError<T extends number = RuntimeErrorCode>(\n  code: T, message: null|false|string):
string {\n  // Error code might be a negative number, which is a special marker that instructs the logic to\n //
generate a link to the error details page on angular.io.\n  const fullCode = `NG0${Math.abs(code)}`;\n  let
errorMessage = `${fullCode}${message ? ': ' + message.trim() : ''}`;\n  if (ngDevMode && code < 0) {\n    const
addPeriodSeparator = !errorMessage.match(/[,;!?]$/);\n    const separator = addPeriodSeparator ? '!'
: ');\n    errorMessage =\n      `${errorMessage}${separator} Find more at
${ERROR_DETAILS_PAGE_BASE_URL}/${fullCode}`;\n  }\n  return errorMessage;\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * Used for stringify render
output in Ivy.\n * Important! This function is very performance-sensitive and we should\n * be extra careful not to
introduce megamorphic reads in it.\n * Check `core/test/render3/perf/render_stringify` for benchmarks and alternate
implementations.\n */\nexport function renderStringify(value: any): string {\n  if (typeof value === 'string') return
value;\n  if (value === null) return '';\n  // Use `String` so that it invokes the `toString` method of the value. Note that
this\n // appears to be faster than calling `value.toString` (see `render_stringify` benchmark).\n  return
String(value);\n}\n\n\n/**\n * Used to stringify a value so that it can be displayed in an error message.\n * Important! This function contains a
megamorphic read and should only be\n * used for error messages.\n */\nexport function stringifyForError(value:
any): string {\n  if (typeof value === 'function') return value.name || value.toString();\n  if (typeof value === 'object'
&& value != null && typeof value.type === 'function') {\n    return value.type.name || value.type.toString();\n  }\n  return
renderStringify(value);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {ImportedNgModuleProviders} from './di/interface/provider';\nimport
{RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from './interface/type';\nimport {stringify}
from './util/stringify';\nimport {stringifyForError} from './util/stringify_utils';\n\n\n/**\n * Called when directives inject each other (creating a circular dependency)\n */\nexport function
throwCyclicDependencyError(token: string, path?: string[]): never {\n  const depPath = path ? ``. Dependency path:
${path.join(' > ')} > ${token}` : '';\n  throw new RuntimeError(\n
RuntimeErrorCode.CYCLIC_DI_DEPENDENCY,\n    `Circular dependency in DI detected for
${token}${depPath}`);\n}\n\nexport function throwMixedMultiProviderError() {\n  throw new Error(`Cannot mix
multi providers and regular providers`);\n}\n\nexport function throwInvalidProviderError(\n  ngModuleType?:
Type<unknown>, providers?: any[], provider?: any): never {\n  if (ngModuleType && providers) {\n    const
providerDetail = providers.map(v => v == provider ? '?' + provider + '?' : '...');\n    throw new Error(`Invalid provider
for the NgModule '${\n      stringify(ngModuleType)}' - only instances of Provider and Type are allowed, got:
[${\n        providerDetail.join(', ')}]`);\n  } else if

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((provider as ImportedNgModuleProviders).providers) {\n  throw new RuntimeError(\n
RuntimeErrorCode.PROVIDER_IN_WRONG_CONTEXT,\n    `Invalid providers from 'importProvidersFrom'
present in a non-environment injector. 'importProvidersFrom' can't be used for component providers.`);\n } else {\n
  throw new Error('Invalid provider');\n }\n}\n\n/** Throws an error when a token is not found in DI. */\nexport
function throwProviderNotFoundError(token: any, injectorName?: string): never {\n  const injectorDetails =
injectorName ? ` in ${injectorName}` : '';\n  throw new RuntimeError(\n
RuntimeErrorCode.PROVIDER_NOT_FOUND,\n    ngDevMode && `No provider for
${stringifyForError(token)} found${injectorDetails}`);\n}\n\n",/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n// The functions in this file verify that
the assumptions we are making\n// about state in an instruction are correct before implementing any logic.\n// They
are meant only to be called in dev mode as sanity checks.\n\nimport {stringify} from './stringify';\n\nexport function
assertNumber(actual: any, msg: string): asserts actual is number {\n  if (!(typeof actual === 'number')) {\n
  throwError(msg, typeof actual, 'number', '===');\n }\n}\n\nexport function assertNumberInRange(\n  actual: any,
minInclusive: number, maxInclusive: number): asserts actual is number {\n  assertNumber(actual, 'Expected a
number');\n  assertLessThanOrEqual(actual, maxInclusive, 'Expected number to be less than or equal to');\n
  assertGreaterThanOrEqual(actual, minInclusive, 'Expected number to be greater than or equal to');\n}\n\nexport
function assertString(actual: any, msg: string): asserts actual is string {\n  if (!(typeof actual === 'string')) {\n
  throwError(msg, actual === null ? 'null' : typeof actual, 'string', '===');\n }\n}\n\nexport
function assertFunction(actual: any, msg: string): asserts actual is Function {\n  if (!(typeof actual === 'function'))
{\n  throwError(msg, actual === null ? 'null' : typeof actual, 'function', '===');\n }\n}\n\nexport function
assertEqual<T>(actual: T, expected: T, msg: string) {\n  if (actual === expected) {\n  throwError(msg, actual,
expected, '===');\n }\n}\n\nexport function assertNotEqual<T>(actual: T, expected: T, msg: string): asserts actual is
T {\n  if (actual !== expected) {\n  throwError(msg, actual, expected, '!==');\n }\n}\n\nexport function
assertSame<T>(actual: T, expected: T, msg: string): asserts actual is T {\n  if (actual === expected) {\n
  throwError(msg, actual, expected, '===');\n }\n}\n\nexport function assertNotSame<T>(actual: T, expected: T, msg:
string) {\n  if (actual !== expected) {\n  throwError(msg, actual, expected, '!==');\n }\n}\n\nexport function
assertLessThan<T>(actual: T, expected: T, msg: string): asserts actual is T {\n
  if (!(actual < expected)) {\n  throwError(msg, actual, expected, '<');\n }\n}\n\nexport function
assertLessThanOrEqual<T>(actual: T, expected: T, msg: string): asserts actual is T {\n  if (!(actual <= expected))
{\n  throwError(msg, actual, expected, '<=');\n }\n}\n\nexport function assertGreaterThan<T>(actual: T, expected:
T, msg: string): asserts actual is T {\n  if (actual > expected) {\n  throwError(msg, actual, expected, '>');\n
}\n}\n\nexport function assertGreaterThanOrEqual<T>(actual: T, expected: T, msg: string): asserts actual is T
{\n  if (actual >= expected) {\n  throwError(msg, actual, expected, '>=');\n }\n}\n\nexport function
assertNotDefined<T>(actual: T, msg: string) {\n  if (actual !== null) {\n  throwError(msg, actual, null, '===');\n
}\n}\n\nexport function assertDefined<T>(actual: T|null|undefined, msg: string): asserts actual is T {\n  if (actual ===
null) {\n  throwError(msg, actual, null, '!==');\n }\n}\n\nexport function throwError(msg:
string): never;\n\nexport function throwError(msg: string, actual: any, expected: any, comparison: string):
never;\n\nexport function throwError(msg: string, actual?: any, expected?: any, comparison?: string): never {\n  throw
new Error(\n    `ASSERTION ERROR: ${msg}` +\n    (comparison === null ? " : ` [Expected=> ${expected}]
${comparison} ${actual} <=Actual]`);\n }\n}\n\nexport function assertDomNode(node: any): asserts node is Node {\n
// If we're in a worker, `Node` will not be defined.\n  if (!(typeof Node !== 'undefined' && node instanceof Node)
&&\n    !(typeof node === 'object' && node !== null &&\n      node.constructor.name ===
'WebWorkerRenderNode')) {\n  throwError(`The provided value must be an instance of a DOM Node but got
${stringify(node)}`);\n }\n}\n\nexport function assertIndexInRange(arr: any[], index: number) {\n
  assertDefined(arr, 'Array must be defined.);\n  const maxLen = arr.length;\n  if (index < 0 || index >= maxLen) {\n
  throwError(`Index expected

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to be less than `{maxLen}` but got `{index}`);  
`export function assertOneOf(value: any, ...validValues: any[]) {  
 if (validValues.indexOf(value) !== -1) return true;  
 throwError(`Expected value to be one of ${JSON.stringify(validValues)} but was ${JSON.stringify(value)}.`);  
}`  
`@license`  
`Copyright Google LLC All Rights Reserved.`  
`Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license`  
`import {Type} from '../interface/type';  
import {getClosureSafeProperty} from '../util/property';  
import {ClassProvider, ConstructorProvider, ExistingProvider, FactoryProvider, StaticClassProvider, ValueProvider} from './provider';`  

Information about how a type or `InjectionToken` interfaces with the DI system.  
At a minimum, this includes a `factory` which defines how to create the given type `T`, possibly requesting injection of other types if necessary.  
Optionally, a `providedIn` parameter specifies that the given type belongs to a particular `Injector`, `NgModule`, or a special scope (e.g. `'root'`). A value of `null` indicates that the injectable does not belong to any scope.  
`@codeGenApi`  
`@publicApi` The ViewEngine compiler emits code with this type for injectables. This code is deployed to npm, and should be treated as public api.  
`export interface InjectableDeclaration<T> {  
 /** Specifies that the given type belongs to a particular injector: InjectorType such as NgModule, 'root' the root injector, 'any' all injectors, null, does not belong to any injector. Must be explicitly listed in the injector providers.  
 providedIn: InjectorType<any>|'root'|'platform'|'any'|'environment'|null;  
 /** The token to which this definition belongs.  
 Note that this may not be the same as the type that the factory will create.  
 token: unknown;  
 /** Factory method to execute to create an instance of the injectable.  
 factory: (t?: Type<any>) => T;  
 /** In a case of no explicit injector, a location where the instance of the injectable is stored.  
 value: T|undefined;  
 /** Information about the providers to be included in an Injector as well as how the given type which carries the information should be created by the DI system.  
 An InjectorDef can import other types which have InjectorDefs, forming a deep nested structure of providers with a defined priority (identically to how NgModule's also have an import/dependency structure).  
 NOTE: This is a private type and should not be exported.  
 @codeGenApi  
 @publicApi  
 @export interface InjectorDef<T> {  
 // TODO(alxhub): Narrow down the type here once decorators properly change the return type of the class they are decorating (to add the prov property for example).  
 providers: (Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|StaticClassProvider|ClassProvider|any[])[];  
 imports: (InjectorType<any>|InjectorTypeWithProviders<any>|any)[];  
 }  
 /** A Type which has a prov: InjectableDeclaration static field.  
 InjectableTypes contain their own Dependency Injection metadata and are usable in an InjectorDef-based StaticInjector.  
 @publicApi  
 @export interface InjectableType<T> extends Type<T> {  
 /** Opaque type whose structure is highly version dependent. Do not rely on any properties.  
 prov: unknown;  
 }  
 /** A type which has an InjectorDef static field.  
 InjectableTypes can be used to configure a StaticInjector.  
 This is an opaque type whose structure is highly version dependent. Do not rely on any properties.  
 @publicApi  
 @export interface InjectorType<T> extends Type<T> {  
 fac?: unknown;  
 inj: unknown;  
 }  
 /** Describes the InjectorDef equivalent of a ModuleWithProviders, an InjectorType with an associated array of providers.  
 Objects of this type can be listed in the imports section of an InjectorDef.  
 NOTE: This is a private type and should not be exported.  
 @export interface InjectorTypeWithProviders<T> {  
 ngModule: InjectorType<T>;  
 providers?: (Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|StaticClassProvider|ClassProvider|any[])[];  
 }  
 /** Construct an injectable definition which defines how a token will be constructed by the DI system, and in which injectors (if any) it will be available.  
 This should be assigned to a static prov field on a type, which will then be an InjectableType.  
 Options: providedIn determines which injectors will include the injectable, by either associating it with an @NgModule or other InjectorType, or`

by specifying that this injectable should be provided in the `root` injector, which will be the application-level injector in most apps. The factory gives the zero argument function which will create an instance of the injectable. The factory can call `inject` to access the `Injector` and request injection of dependencies.

```

@codeGenApi
@publicApi
This instruction has been emitted by ViewEngine for some time and is deployed to npm.

export function defineInjectable<T>(opts: { token: unknown, providedIn?: Type<any> | 'root' | 'platform' | 'any' | 'environment' | null, factory: () => T }): unknown {
  token: opts.token,
  providedIn: opts.providedIn as any || null,
  factory: opts.factory,
  value: undefined,
} as InjectableDeclaration<T>;
}

@deprecated in v8, delete after v10. This API should be used only by generated code, and that code should now use defineInjectable instead.

@publicApi
export
const defineInjectable = defineInjectable;

Construct an `InjectorDef` which configures an injector.

This should be assigned to a static injector def (`inj`) field on a type, which will then be an `InjectorType`.

Options:
  providers: an optional array of providers to add to the injector. Each provider must either have a factory or point to a type which has a `prov` static property (the type must be an `InjectableType`).
  imports: an optional array of imports of other `InjectorType`s or `InjectorTypeWithModule`s whose providers will also be added to the injector. Locally provided types will override providers from imports.

@codeGenApi
export function defineInjector(options: { providers?: any[], imports?: any[] }): unknown {
  return { providers: options.providers || [], imports: options.imports || [] };
}

Read the injectable def (`prov`) for `type` in a way which is immune to accidentally reading inherited value.

@param type A type which may have its own (non-inherited) `prov`.

export function getInjectableDef<T>(type: any): InjectableDeclaration<T> | null {
  return getOwnDefinition(type, NG_PROV_DEF) || getOwnDefinition(type, NG_INJECTABLE_DEF);
}

export function isInjectable(type: any): boolean {
  return getInjectableDef(type) !== null;
}

Return definition only if it is defined directly on `type` and is not inherited from a base class of `type`.

export function getOwnDefinition<T>(type: any, field: string): InjectableDeclaration<T> | null {
  return type.hasOwnProperty(field) ? type[field] : null;
}

Read the injectable def (`prov`) for `type` or read the `prov` from one of its ancestors.

@param type A type which may have `prov`, via inheritance.

@deprecated Will be removed in a future version of Angular, where an error will occur in the scenario if we find the `prov` on an ancestor only.

export function getInheritedInjectableDef<T>(type: any): InjectableDeclaration<T> | null {
  const def = type && (type[NG_PROV_DEF] || type[NG_INJECTABLE_DEF]);
  if (def) {
    const typeName = getTypeName(type);
    // TODO(FW-1307): Re-add ngDevMode when closure can handle it
    // ngDevMode && console.warn(`DEPRECATED: DI is instantiating a token "${typeName}" that inherits its @Injectable decorator but does not provide one itself. This will become an error in a future version of Angular. Please add @Injectable() to the "${typeName}" class.`);
    return def;
  } else {
    return null;
  }
}

Gets the name of a type, accounting for some cross-browser differences.

export function getTypeName(type: any): string {
  // `Function.prototype.name` behaves differently between IE and other browsers. In most browsers it'll always return the name of the function itself, no matter how many other functions it inherits from. On IE the function doesn't have its own `name` property, but it takes it from the lowest level in the prototype chain. E.g. if we have `class Foo extends Parent` most browsers will evaluate `Foo.name` to `Foo` while IE will return `Parent`. We work around the issue by converting the function to a string and parsing its name out that way via a regex.
  if (type.hasOwnProperty('name')) {
    return type.name;
  }
  const match = (" + type).match(/function\s*([^\s(]+)/);
  return match === null ? "": match[1];
}

Read the injector def type in a way which is immune to accidentally reading inherited value.

@param type type which may have an injector def (`inj`)

export function getInjectorDef<T>(type: any): InjectorDef<T> | null {
  return type && (type.hasOwnProperty(NG_INJ_DEF) || type.hasOwnProperty(NG_INJECTOR_DEF)) ? (type as any)[NG_INJ_DEF] : null;
}

export const NG_PROV_DEF =

```

```

getClosureSafeProperty({prov: getClosureSafeProperty});\nexport const NG_INJ_DEF =
getClosureSafeProperty({inj: getClosureSafeProperty});\n\n// We need to keep these around so we can read off old
defs if new defs are unavailable\nexport const NG_INJECTABLE_DEF =
getClosureSafeProperty({ngInjectableDef: getClosureSafeProperty});\nexport const NG_INJECTOR_DEF =
getClosureSafeProperty({ngInjectorDef: getClosureSafeProperty});\n\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n * \n\n/*\n * Special flag indicating that a decorator is of type
`Inject`. It's used to make `Inject`\n * decorator tree-shakable (so we don't have to rely on the `instanceof` checks).\n
*\n * Note: this flag is not included into the `InjectFlags` since it's an internal-only API.\n */\nexport const enum
DecoratorFlags {\n  Inject = -1\n}\n\n/*\n * Injection flags
for DI.\n */\n * @publicApi\n * @deprecated use an options object for `inject` instead.\n */\nexport enum
InjectFlags {\n  // TODO(alxhub): make this 'const' (and remove `InternalInjectFlags` enum) when ngc no longer\n
// writes exports of it into ngfactory files.\n\n  /** Check self and check parent injector if needed */\n  Default =
0b0000,\n\n  /**\n   * Specifies that an injector should retrieve a dependency from any injector until reaching the\n
* host element of the current component. (Only used with Element Injector)\n   */\n  Host = 0b0001,\n\n  /** Don't
ascend to ancestors of the node requesting injection. */\n  Self = 0b0010,\n\n  /** Skip the node that is requesting
injection. */\n  SkipSelf = 0b0100,\n\n  /** Inject `defaultValue` instead if token not found. */\n  Optional =
0b1000,\n}\n\n/*\n * This enum is an exact copy of the `InjectFlags` enum above, but the difference is that this is
a\n * const enum, so actual enum values would be inlined in generated code. The
`InjectFlags` enum can\n * be turned into a const enum when ViewEngine is removed (see TODO at the
`InjectFlags` enum\n * above). The benefit of inlining is that we can use these flags at the top level without
affecting\n * tree-shaking (see `no-toplevel-property-access` tslint rule for more info).\n * Keep this enum in sync
with `InjectFlags` enum above.\n */\nexport const enum InternalInjectFlags {\n  /** Check self and check parent
injector if needed */\n  Default = 0b0000,\n\n  /**\n   * Specifies that an injector should retrieve a dependency from
any injector until reaching the\n   * host element of the current component. (Only used with Element Injector)\n   */\n
  Host = 0b0001,\n\n  /** Don't ascend to ancestors of the node requesting injection. */\n  Self = 0b0010,\n\n  /**
Skip the node that is requesting injection. */\n  SkipSelf = 0b0100,\n\n  /** Inject `defaultValue` instead if token not
found. */\n  Optional = 0b1000,\n\n  /**\n   * This token is being injected into a
pipe.\n   */\n  ForPipe = 0b10000,\n}\n\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n * \n\nimport {throwProviderNotFoundError} from
'./render3/errors_di';\nimport {assertNotEqual} from './util/assert';\nimport {stringify} from
'./util/stringify';\nimport {getInjectableDef, InjectableDeclaration} from './interface/defs';\nimport {InjectFlags}
from './interface/injector';\nimport {ProviderToken} from './provider_token';\n\n\n/*\n * Current implementation of
inject.\n * \n * By default, it is `injectInjectorOnly`, which makes it `Injector`-only aware. It can be changed\n * to
`directiveInject`, which brings in the `NodeInjector` system of ivy. It is designed this\n
* way for two reasons:\n * 1. `Injector` should not depend on ivy logic.\n * 2. To maintain tree shake-ability we
don't want to bring in unnecessary code.\n */\nlet _injectImplementation: (<T>(token: ProviderToken<T>, flags?:
InjectFlags) => T | null)\n  undefined;\nexport function getInjectImplementation() {\n  return
_injectImplementation;\n}\n\n\n/*\n * Sets the current inject implementation.\n */\nexport function
setInjectImplementation(\n  impl: (<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)\n  undefined):
(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)\n  undefined {\n  const previous =
_injectImplementation;\n  _injectImplementation = impl;\n  return previous;\n}\n\n\n/*\n * Injects `root` tokens in
limp mode.\n * \n * If no injector exists, we can still inject tree-shakable providers which have `providedIn` set to\n
* `root`. This is known as the limp mode injection. In such case the value is stored in the\n * injectable
definition.\n

```

```

*^/nexport function injectRootLimpMode<T>(\n  token: ProviderToken<T>, notFoundValue: T|undefined, flags:
InjectFlags): T|null {\n  const injectableDef: InjectableDeclaration<T>|null = getInjectableDef(token);\n  if
(injectableDef && injectableDef.providedIn === 'root') {\n    return injectableDef.value === undefined ?
injectableDef.value = injectableDef.factory() :\n                                injectableDef.value;\n  }\n  if (flags &
InjectFlags.Optional) return null;\n  if (notFoundValue !== undefined) return notFoundValue;\n
throwProviderNotFoundError(stringify(token), 'Injector');\n}\n\n/n\n/**\n * Assert that `_injectImplementation` is not
`fn`.\n * This is useful, to prevent infinite recursion.\n * @param fn Function which it should not equal to\n
*^/nexport function assertInjectImplementationNotEqual(\n  fn: (<T>(token: ProviderToken<T>, flags?:
InjectFlags) => T | null)) {\n  ngDevMode &&\n    assertNotEqual(_injectImplementation, fn, 'Calling
inject would cause infinite recursion');\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *^/n\n/**\n * Convince closure compiler that the wrapped function has no side-effects.\n
*\n * Closure compiler always assumes that `toString` has no side-effects. We use this quirk to\n * allow us to
execute a function but have closure compiler mark the call as no-side-effects.\n * It is important that the return value
for the `noSideEffects` function be assigned\n * to something which is retained otherwise the call to `noSideEffects`
will be removed by closure\n * compiler.\n *^/nexport function noSideEffects<T>(fn: () => T): T {\n  return
{toString: fn}.toString() as unknown as T;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *^/n * Use of this source code is governed by an MIT-style license that can
be\n * found in the LICENSE file at https://angular.io/license\n *^/n\n/**\n * The strategy that the default change
detector uses to detect changes.\n * When set, takes effect the next time change detection is triggered.\n *^/n * @see
{@link ChangeDetectorRef#usage-notes Change detection usage}\n *^/n * @publicApi\n *^/nexport enum
ChangeDetectionStrategy {\n  /**\n   * Use the `CheckOnce` strategy, meaning that automatic change detection is
deactivated\n   * until reactivated by setting the strategy to `Default` (`CheckAlways`).\n   * Change detection can
still be explicitly invoked.\n   * This strategy applies to all child directives and cannot be overridden.\n   *^/n
OnPush = 0,\n  /**\n   * Use the default `CheckAlways` strategy, in which change detection is automatic until\n   *
explicitly deactivated.\n   *^/n  Default = 1,\n}\n\n/**\n * Defines the possible states of the default change
detector.\n * @see `ChangeDetectorRef`\n *^/nexport enum ChangeDetectorStatus {\n  /**\n   * A state in which, after calling `detectChanges()`, the change detector\n   * state becomes `Checked`, and must be
explicitly invoked or reactivated.\n   *^/n  CheckOnce,\n  /**\n   * A state in which change detection is skipped
until the change detector mode\n   * becomes `CheckOnce`.\n   *^/n  Checked,\n  /**\n   * A state in which change
detection continues automatically until explicitly\n   * deactivated.\n   *^/n  CheckAlways,\n  /**\n   * A state in
which a change detector sub tree is not a part of the main tree and\n   * should be skipped.\n   *^/n  Detached,\n  /**\n   * Indicates that the change detector encountered an error checking a binding\n   * or calling a directive
lifecycle method and is now in an inconsistent state. Change\n   * detectors in this state do not detect changes.\n
*^/n  Errored,\n  /**\n   * Indicates that the change detector has been destroyed.\n   *^/n  Destroyed,\n}\n\n/**\n * Reports whether a given strategy is currently the default for change
detection.\n * @param changeDetectionStrategy The strategy to check.\n * @returns True if the given strategy is
the current default, false otherwise.\n * @see `ChangeDetectorStatus`\n * @see `ChangeDetectorRef`\n *^/nexport
function isDefaultChangeDetectionStrategy(changeDetectionStrategy: ChangeDetectionStrategy):\n  boolean {\n  return
changeDetectionStrategy === null ||\n    changeDetectionStrategy ===
ChangeDetectionStrategy.Default;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *^/n\n/**\n * Defines the CSS styles encapsulation policies for the {@link Component}
decorator's\n * `encapsulation` option.\n *^/n * See {@link Component#encapsulation encapsulation}.\n *^/n *
@usageNotes\n * ### Example\n *^/n * {@example core/ts/metadata/encapsulation.ts region='longform'}\n *^/n *
@publicApi\n *^/nexport enum ViewEncapsulation
{\n  // TODO: consider making `ViewEncapsulation` a `const enum` instead. See\n //
https://github.com/angular/angular/issues/44119 for additional information.\n  /**\n   * Emulates a native Shadow

```

DOM encapsulation behavior by adding a specific attribute to the `* component's host element` and applying the same attribute to all the CSS selectors provided `* via { @link Component#styles styles } or { @link Component#styleUrls styleUrls }.` `* This is the default option.` `* Emulated = 0,` `// Historically the 1 value was for `Native` encapsulation which has been removed as of v11.` `/** * Doesn't provide any sort of CSS style encapsulation, meaning that all the styles provided * via { @link Component#styles styles } or { @link Component#styleUrls styleUrls } are applicable * to any HTML element of the application regardless of their host Component.` `* None = 2,` `/** * Uses the browser's native Shadow DOM API to encapsulate CSS styles,`

meaning that it creates `* a ShadowRoot for the component's host element which is then used to encapsulate * all the Component's styling.` `* ShadowDom = 3}` `"/** * @license * Copyright Google LLC All Rights Reserved. * Use of this source code is governed by an MIT-style license that can be * found in the LICENSE file at https://angular.io/license * ^\n// TODO(jteplitz602): Load WorkerGlobalScope from lib.webworker.d.ts file #3492\ndeclare var WorkerGlobalScope: any /** TODO #9100 */;\n// CommonJS / Node have global context exposed as "global" variable.\n// We don't want to include the whole node.d.ts this this compilation unit so we'll just fake\n// the global "global" var for now.\ndeclare var global: any /** TODO #9100 */;\n// Always use __globalThis if available, which is the spec-defined global variable across all\n// environments, then fallback to __global first, because in Node tests both __global and\n// __window may be defined and __global should be __global in that case. Note: Typeof/Instanceof\n// checks are considered side-effects in Terser. We explicitly mark this as side-effect free:\n// https://github.com/terser/terser/issues/250.\nconst __global: any = (/ * @__PURE__ */ (\n () => (typeof globalThis !== 'undefined' && globalThis) ||\n (typeof global !== 'undefined' && global) || (typeof window !== 'undefined' && window) ||\n (typeof self !== 'undefined' && typeof WorkerGlobalScope !== 'undefined' &&\n self instanceof WorkerGlobalScope && self)));\n/** * Attention: whenever providing a new value, be sure to add an * entry into the corresponding `...externs.js` file, * so that closure won't use that global for its purposes. * ^\nexport { __global as global };"/** * @license * Copyright Google LLC All Rights Reserved. * Use of this source code is governed by an MIT-style license that can be * found in the LICENSE file at https://angular.io/license * ^\nimport { global } from './global';\ndeclare global { /** * Values of ngDevMode * Depending on the current state of the application, ngDevMode may have one of several values. * For convenience, the “truthy” value which enables dev mode is also an object which contains * Angular’s performance counters. This is not necessary, but cuts down on boilerplate for the * perf counters. * ngDevMode may also be set to false. This can happen in one of a few ways: * - The user explicitly sets `window.ngDevMode = false` somewhere in their app. * - The user calls `enableProdMode()`. * - The URL contains a `ngDevMode=false` text. * Finally, ngDevMode may not have been defined at all. * ^\n const ngDevMode: null|NgDevModePerfCounters;\n interface NgDevModePerfCounters {\n namedConstructors: boolean;\n firstCreatePass: number;\n tNode: number;\n tView: number;\n rendererCreateTextNode: number;\n rendererSetText: number;\n rendererCreateElement: number;\n rendererAddEventListener: number;\n rendererSetAttribute: number;\n rendererRemoveAttribute: number;\n rendererSetProperty: number;\n rendererSetClassName: number;\n rendererAddClass: number;\n rendererRemoveClass: number;\n rendererSetStyle: number;\n rendererRemoveStyle: number;\n rendererDestroy: number;\n rendererDestroyNode: number;\n rendererMoveNode: number;\n rendererRemoveNode: number;\n rendererAppendChild: number;\n rendererInsertBefore: number;\n rendererCreateComment: number;\n } }\nexport function ngDevModeResetPerfCounters(): NgDevModePerfCounters {\n const locationString = typeof location !== 'undefined' ? location.toString() : '';\n const newCounters: NgDevModePerfCounters = {\n namedConstructors: locationString.indexOf('ngDevMode=namedConstructors') != -1,\n firstCreatePass: 0,\n tNode: 0,\n tView: 0,\n rendererCreateTextNode: 0,\n rendererSetText: 0,\n rendererCreateElement: 0,\n rendererAddEventListener: 0,\n rendererSetAttribute: 0,\n rendererRemoveAttribute: 0,\n rendererSetProperty: 0,\n rendererSetClassName: 0,\n rendererAddClass: 0,\n rendererRemoveClass: 0,\n rendererSetStyle: 0,\n rendererRemoveStyle: 0,\n rendererDestroy: 0,\n rendererDestroyNode: 0,\n`

```

rendererMoveNode: 0,\n  rendererRemoveNode: 0,\n  rendererAppendChild: 0,\n  rendererInsertBefore: 0,\n  rendererCreateComment: 0,\n  };\n\n // Make sure to refer to ngDevMode as ['ngDevMode'] for closure.\n const
allowNgDevModeTrue = locationString.indexOf('ngDevMode=false') === -1;\n  global['ngDevMode'] =
allowNgDevModeTrue && newCounters;\n  return newCounters;\n}\n\n/**\n * This function checks to see if the
`ngDevMode` has been set. If yes,\n * then we honor it, otherwise we default to dev mode with additional checks.\n
*\n * The idea is that unless we are doing production build where we explicitly\n * set `ngDevMode === false` we
should be helping
the developer by providing\n * as much early warning and errors as possible.\n *\n * `defineComponent` is
guaranteed to have been called before any component template functions\n * (and thus Ivy instructions), so a single
initialization there is sufficient to ensure ngDevMode\n * is defined for the entire instruction set.\n *\n * When
checking `ngDevMode` on toplevel, always init it before referencing it\n * (e.g. `((typeof ngDevMode ===
'undefined' || ngDevMode) && initNgDevMode()))`, otherwise you can\n * get a `ReferenceError` like in
https://github.com/angular/angular/issues/31595.\n
*\n * Details on possible values for `ngDevMode` can be found
on its docstring.\n *\n * NOTE:\n * - changes to the `ngDevMode` name must be synced with `compiler-
cli/src/tooling.ts`.\n *\n * ^\n\nexport function initNgDevMode(): boolean {\n // The below checks are to ensure that
calling `initNgDevMode` multiple times does not\n // reset the counters.\n // If the `ngDevMode` is not an object,
then it
means we have not created the perf counters\n // yet.\n if (typeof ngDevMode === 'undefined' || ngDevMode) {\n
if (typeof ngDevMode !== 'object') {\n   ngDevModeResetPerfCounters();\n } }\n  return typeof ngDevMode !==
'undefined' && !!ngDevMode;\n}\n  return false;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n * ^\n\nimport {initNgDevMode} from './ng_dev_mode';\n\n/**\n * This
file contains reusable \"empty\" symbols that can be used as default return values\n * in different parts of the
rendering code. Because the same symbols are returned, this\n * allows for identity checks against these values to be
consistently used by the framework\n * code.\n *\n * ^\n\nexport const EMPTY_OBJ: {} = {};\n\nexport const
EMPTY_ARRAY: any[] = [];\n\n// freezing the values prevents any code from accidentally inserting new values
in\n\nif
((typeof ngDevMode === 'undefined' || ngDevMode) && initNgDevMode()) {\n // These property accesses can be
ignored because ngDevMode will be set to false\n // when optimizing code and the whole if statement will be
dropped.\n // tslint:disable-next-line:no-toplevel-property-access\n Object.freeze(EMPTY_OBJ);\n //
tslint:disable-next-line:no-toplevel-property-access\n Object.freeze(EMPTY_ARRAY);\n}\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n * ^\n\nimport {getClosureSafeProperty}
from './util/property';\n\nexport const NG_COMP_DEF = getClosureSafeProperty({cmp:
getClosureSafeProperty});\n\nexport const NG_DIR_DEF = getClosureSafeProperty({dir:
getClosureSafeProperty});\n\nexport const NG_PIPE_DEF = getClosureSafeProperty({pipe:
getClosureSafeProperty});\n\nexport const NG_MOD_DEF = getClosureSafeProperty({mod:
getClosureSafeProperty});\n\nexport
const NG_FACTORY_DEF = getClosureSafeProperty({fac: getClosureSafeProperty});\n\n\n/**\n * If a directive is
diPublic, bloomAdd sets a property on the type with this constant as\n * the key and the directive's unique ID as the
value. This allows us to map directives to their\n * bloom filter bit for DI.\n *\n * ^\n\n// TODO(misko): This is wrong.
The NG_ELEMENT_ID should never be minified.\n\nexport const NG_ELEMENT_ID =
getClosureSafeProperty({__NG_ELEMENT_ID__: getClosureSafeProperty});\n\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n * ^\n\nimport {ChangeDetectionStrategy} from
'./change_detection/constants';\n\nimport {NG_PROV_DEF} from './di/interface/defs';\n\nimport {Mutable, Type}
from './interface/type';\n\nimport {NgModuleDef} from './metadata/ng_module_def';\n\nimport {SchemaMetadata}
from './metadata/schema';\n\nimport

```

```

{ViewEncapsulation} from './metadata/view';\nimport {noSideEffects} from './util/closure';\nimport
{EMPTY_ARRAY, EMPTY_OBJ} from './util/empty';\nimport {initNgDevMode} from
 './util/ng_dev_mode';\nimport {stringify} from './util/stringify';\n\nimport {NG_COMP_DEF, NG_DIR_DEF,
NG_MOD_DEF, NG_PIPE_DEF} from './fields';\nimport {ComponentDef, ComponentDefFeature,
ComponentTemplate, ComponentType, ContentQueriesFunction, DependencyTypeList, DirectiveDef,
DirectiveDefFeature, DirectiveDefList, HostBindingsFunction, PipeDef, PipeDefList, TypeOrFactory,
ViewQueriesFunction} from './interfaces/definition';\nimport {TAttributes, TConstantsOrFactory} from
 './interfaces/node';\nimport {CssSelectorList} from './interfaces/projection';\n\n\n/** Counter used to generate
unique IDs for component definitions. *\nlet componentDefCount = 0;\n\n\n/** Create a component definition
object.\n *\n * # Example\n *```\n * class MyDirective {\n * // Generated by Angular Template
Compiler\n * // [Symbol] syntax will not be supported by TypeScript until v2.7\n * static cmp =
defineComponent({\n * ... \n * });\n * }\n *```\n * @codeGenApi\n */\nexport function
defineComponent<T>(componentDefinition: {\n /**\n * Directive type, needed to configure the injector.\n *\n
type: Type<T>;\n\n /** The selectors that will be used to match nodes to this component. *\n
selectors?:
CssSelectorList;\n\n /**\n * The number of nodes, local refs, and pipes in this component template.\n *\n
*\n Used to calculate the length of this component's LView array, so we\n * can pre-fill the array and set the binding
start index.\n *\n // TODO(kara): remove queries from this count\n decls: number;\n\n /**\n * The number of
bindings in this component template (including pure fn bindings).\n *\n * Used to calculate the length of this
component's LView array, so we\n * can pre-fill the array and set the host binding start index.\n *\n
vars:
number;\n\n
/**\n * A map of input names.\n *\n * The format is in: `{[actualPropertyName: string]:(string|[string,
string])}`.\n *\n * Given:\n *```\n * class MyComponent {\n * @Input()\n * publicInput1: string;\n *\n
* @Input('publicInput2')\n * declaredInput2: string;\n * }\n *```\n *\n * is described as:\n *```\n * {\n *
publicInput1: 'publicInput1',\n * declaredInput2: ['publicInput2', 'declaredInput2'],\n * }\n *```\n *\n
* Which the minifier may translate to:\n *```\n * {\n * minifiedPublicInput1: 'publicInput1',\n *
minifiedDeclaredInput2: ['publicInput2', 'declaredInput2'],\n * }\n *```\n *\n * This allows the render to re-
construct the minified, public, and declared names\n * of properties.\n *\n * NOTE:\n * - Because declared and
public name are usually same we only generate the array\n * `[public', 'declared']` format when they differ.\n *
- The reason why this API and `outputs`
API is not the same is that `NgOnChanges` has\n * inconsistent behavior in that it uses declared names rather
than minified or public. For\n * this reason `NgOnChanges` will be deprecated and removed in future version and
this\n * API will be simplified to be consistent with `output`.\n *\n inputs?: {[P in keyof T]?: string | [string,
string]};\n\n /**\n * A map of output names.\n *\n * The format is in: `{[actualPropertyName: string]:string}`.\n
*\n * Which the minifier may translate to: `{[minifiedPropertyName: string]:string}`.\n *\n * This allows the
render to re-construct the minified and non-minified names\n * of properties.\n *\n outputs?: {[P in keyof T]?:
string};\n\n /**\n * Function executed by the parent template to allow child directive to apply host bindings.\n
*\n *\n hostBindings?: HostBindingsFunction<T>;\n\n /**\n * The number of bindings in this directive
`hostBindings` (including pure fn bindings).\n *\n * Used to
calculate the length of the component's LView array, so we\n * can pre-fill the array and set the host binding start
index.\n *\n hostVars?: number;\n\n /**\n * Assign static attribute values to a host element.\n *\n * This
property will assign static attribute values as well as class and style\n * values to a host element. Since attribute
values can consist of different types of values, the\n * `hostAttrs` array must include the values in the following
format:\n *\n * attrs = [\n * // static attributes (like `title`, `name`, `id`...)\n * attr1, value1, attr2, value,\n *
*\n * // a single namespace value (like `x:id`)\n * NAMESPACE_MARKER, namespaceUri1, name1, value1,\n *
*\n * // another single namespace value (like `x:name`)\n * NAMESPACE_MARKER, namespaceUri2, name2,
value2,\n *
*\n * // a series of CSS classes that will be applied to the element (no spaces)\n *
CLASSES_MARKER, class1, class2, class3,\n *
*\n * // a series

```



of CSS styles (property + value) that will be applied to the element

```

 * STYLES_MARKER, prop1, value1,
prop2, value2
 * ]
 * All non-class and non-style attributes must be defined at the start of the list
 * first before all class and style values are set. When there is a change in value
 * type (like when classes and styles are introduced) a marker must be used to separate
 * the entries. The marker values themselves are set via entries
found in the
 * [AttributeMarker] enum.
 * ^ hostAttrs?: TAttributes;
 * /
 * Function to create
instances of content queries associated with a given directive.
 * ^ contentQueries?:
ContentQueriesFunction<T>;
 * /
 * Defines the name that can be used in the template to assign this directive
to a variable.
 * See: { @link Directive.exportAs }
 * ^ exportAs?: string[];
 * /
 * Template
function use for rendering DOM.
 * This function has following structure.
 * ``
 * function Template<T>(ctx:T, creationMode: boolean) {
 *   if (creationMode) {
 *     // Contains creation
mode instructions.
 *   }
 *   // Contains binding update instructions
 * }
 * ``
 * Common
instructions are:
 * Creation mode instructions:
 * - `elementStart`, `elementEnd`
 * - `text`
 * -
`container`
 * - `listener`
 * Binding update instructions:
 * - `bind`
 * - `elementAttribute`
 * -
`elementProperty`
 * - `elementClass`
 * - `elementStyle`
 * ^ template: ComponentTemplate<T>;
 * /
 * Constants for the nodes in the component's view.
 * Includes attribute arrays, local definition arrays
etc.
 * ^ consts?: TConstantsOrFactory;
 * /
 * An array of `ngContent[selector]` values that were found
in the template.
 * ^ ngContentSelectors?: string[];
 * /
 * Additional set of instructions specific to view
query processing. This could be seen as a
 * set of instruction
to be inserted into the template function.
 * Query-related instructions need to be pulled out to a specific
function as a timing of
 * execution is different as compared to all other instructions (after change detection hooks
but
 * before view hooks).
 * ^ viewQuery?: ViewQueriesFunction<T> | null;
 * /
 * A list of optional
features to apply.
 * See: { @link NgOnChangesFeature }, { @link ProvidersFeature }
 * ^ features?:
ComponentDefFeature[];
 * /
 * Defines template and style encapsulation options available for Component's
{ @link Component }.
 * ^ encapsulation?: ViewEncapsulation;
 * /
 * Defines arbitrary developer-defined
data to be stored on a renderer instance.
 * This is useful for renderers that delegate to other renderers.
 * ^
 * see: animation
 * ^ data?: {[kind: string]: any};
 * /
 * A set of styles that the component needs to be
present for component to render correctly.
 * ^ styles?:
string[];
 * /
 * The strategy that the default change detector uses to detect changes.
 * When set, takes
effect the next time change detection is triggered.
 * ^ changeDetection?: ChangeDetectionStrategy;
 * /
 * Registry of directives, components, and pipes that may be found in this component's view.
 * This property
is either an array of types or a function that returns the array of types. This
 * function may be necessary to
support forward declarations.
 * ^ dependencies?: TypeOrFactory<DependencyTypeList>;
 * /
 * The set
of schemas that declare elements to be allowed in the component's template.
 * ^ schemas?: SchemaMetadata[] |
null;
 * /
 * Whether this directive/component is standalone.
 * ^ standalone?: boolean;
 * )};
unknown {
return noSideEffects() => {
 // Initialize ngDevMode. This must be the first statement in defineComponent.
 // See the `initNgDevMode` docstring for more information.
 (typeof ngDevMode === 'undefined' || ngDevMode) && initNgDevMode();
 const type =
componentDefinition.type;
 const standalone = componentDefinition.standalone === true;
 const
declaredInputs: {[key: string]: string} = {} as any;
 const def: Mutable<ComponentDef<any>, keyof
ComponentDef<any>> = {
 type: type,
 providersResolver: null,
 decls: componentDefinition.decls,
 vars: componentDefinition.vars,
 factory: null,
 template: componentDefinition.template || null!,
 consts: componentDefinition.consts || null,
 ngContentSelectors: componentDefinition.ngContentSelectors,
 hostBindings: componentDefinition.hostBindings || null,
 hostVars: componentDefinition.hostVars || 0,
 hostAttrs: componentDefinition.hostAttrs || null,
 contentQueries: componentDefinition.contentQueries || null,
 declaredInputs: declaredInputs,
 inputs: null!, // assigned in noSideEffects
 outputs: null!, //
assigned in noSideEffects
 exportAs: componentDefinition.exportAs || null,
 onPush:
componentDefinition.changeDetection === ChangeDetectionStrategy.OnPush,
 directiveDefs: null!, // assigned
in noSideEffects
 pipeDefs: null!, // assigned in noSideEffects
 standalone,
 dependencies:

```

```
standalone && componentDefinition.dependencies || null,\n  getStandaloneInjector: null,\n  selectors:\n    componentDefinition.selectors || EMPTY_ARRAY,\n  viewQuery: componentDefinition.viewQuery || null,\n  features: componentDefinition.features as DirectiveDefFeature[] || null,\n  data: componentDefinition.data || {},\n  encapsulation: componentDefinition.encapsulation || ViewEncapsulation.Emulated,\n  id:\n    `c${componentDefCount++}`,\n  styles: componentDefinition.styles || EMPTY_ARRAY,\n  _: null,\n  setInput: null,\n  schemas: componentDefinition.schemas || null,\n  tView: null,\n  }; \n  const dependencies =\n    componentDefinition.dependencies;\n\n  const feature = componentDefinition.features;\n  def.inputs = invertObject(componentDefinition.inputs,\n    declaredInputs),\n  def.outputs = invertObject(componentDefinition.outputs),\n  feature && feature.forEach((fn\n    => fn(def));\n  def.directiveDefs = dependencies ?\n    (() => (typeof dependencies === 'function' ?\n    dependencies() : dependencies))\n    .map(extractDirectiveDef)\n    .filter(nonNull)) : null;\n  def.pipeDefs = dependencies ?\n    (() => (typeof dependencies === 'function' ? dependencies() :\n    dependencies))\n    .map(getPipeDef)\n    .filter(nonNull)) : null;\n\n  return def;\n});\n\n/**\n * Generated next to NgModules to monkey-patch directive and pipe references onto a component's\n * definition, when generating a direct reference in the component file would otherwise create an\n * import cycle.\n * \n * See [this explanation](https://hackmd.io/Odw80D0pR6yfsOjg_7XCJg?view)\n for more details.\n * \n * @codeGenApi\n * \n * @ngexport function setComponentScope(\n  type:\n    ComponentType<any>, directives: Type<any>[] | (() => Type<any>[]),\n  pipes: Type<any>[] | (() =>\n    Type<any>[]): void {\n  const def = (type.cmp as ComponentDef<any>);\n  def.directiveDefs = () =>\n    (typeof\n      directives === 'function' ? directives() : directives).map(extractDirectiveDef) as\n      DirectiveDefList;\n  def.pipeDefs = () =>\n    (typeof pipes === 'function' ? pipes() : pipes).map(getPipeDef) as\n      PipeDefList;\n  }\n * \n * @ngexport function extractDirectiveDef(type: Type<any>):\n    DirectiveDef<any> | ComponentDef<any> | null {\n  return getComponentDef(type) ||\n    getDirectiveDef(type);\n  }\n * \n * @ngexport function nonNull<T>(value: T | null): T {\n  return value !== null;\n  }\n */\n * @codeGenApi\n * \n * @ngexport function defineNgModule<T>(def: {\n  /** Token representing the module. Used by\n  DI. */\n  type: T;\n  /** List of components to bootstrap. */\n  bootstrap?: Type<any>[]\n  | (() => Type<any>[]);\n  /** List of components, directives, and pipes declared by this module. */\n  declarations?: Type<any>[] | (() => Type<any>[]);\n  /** List of modules or `ModuleWithProviders` imported by\n  this module. */\n  imports?: Type<any>[] | (() => Type<any>[]);\n  /** List of modules,\n  `ModuleWithProviders`, components, directives, or pipes exported by this\n  * module. */\n  exports?:\n    Type<any>[] | (() => Type<any>[]);\n  /** The set of schemas that declare elements to be allowed in the\n  NgModule. */\n  schemas?: SchemaMetadata[] | null;\n  /** Unique ID for the module that is used with\n  `getModuleFactory`. */\n  id?: string | null;\n  }): unknown {\n  return noSideEffects(() => {\n    const res:\n      NgModuleDef<T> = {\n      type: def.type,\n      bootstrap: def.bootstrap || EMPTY_ARRAY,\n      declarations:\n        def.declarations || EMPTY_ARRAY,\n      imports: def.imports || EMPTY_ARRAY,\n      exports: def.exports ||\n        EMPTY_ARRAY,\n      transitiveCompileScopes:\n        null,\n      schemas: def.schemas || null,\n      id: def.id || null,\n      }; \n    return res;\n  });\n  }\n  * \n * Adds the\n  module metadata that is necessary to compute the module's transitive scope to an\n  * existing module definition.\n  * \n * Scope metadata of modules is not used in production builds, so calls to this function can be\n  * marked pure to\n  tree-shake it from the bundle, allowing for all referenced declarations\n  * to become eligible for tree-shaking as\n  well.\n  * \n * @codeGenApi\n * \n * @ngexport function setNgModuleScope(type: any, scope: {\n  /** List of components,\n  directives, and pipes declared by this module. */\n  declarations?: Type<any>[] | (() => Type<any>[]);\n  /** List of\n  modules or `ModuleWithProviders` imported by this module. */\n  imports?: Type<any>[] | (() =>\n    Type<any>[]);\n  /** List of modules, `ModuleWithProviders`, components, directives, or pipes exported by\n  this\n  * module. */\n  exports?: Type<any>[] | (() => Type<any>[]);\n  }):\n    unknown {\n  return noSideEffects(() => {\n    const ngModuleDef = getNgModuleDef(type, true);\n    ngModuleDef.declarations = scope.declarations || EMPTY_ARRAY;\n    ngModuleDef.imports = scope.imports ||\n      EMPTY_ARRAY;\n    ngModuleDef.exports = scope.exports || EMPTY_ARRAY;\n  });\n  }\n  * \n * Inverts an
```

inputs or outputs lookup such that the keys, which were the minified keys, are part of the values, and the values are parsed so that the publicName of the property is the new key e.g. for class Comp { @Input() propName1: string; @Input('publicName2') declaredPropName2: number; } will be serialized as { propName1: 'propName1', declaredPropName2: ['publicName2', 'declaredPropName2'] } which is then translated by the minifier as { minifiedPropName1: 'propName1', minifiedPropName2: ['publicName2', 'declaredPropName2'] } becomes: (public name => minifiedName) { 'propName1': 'minifiedPropName1', 'publicName2': 'minifiedPropName2' } Optionally the function can take `secondary` which will result in: (public name => declared name) { 'propName1': 'propName1', 'publicName2': 'declaredPropName2' } \n\nfunction invertObject<T>(obj?: {[P in keyof T]: string|[string, string]}, secondary?: {[key: string]: string}): {[P in keyof T]: string} {\n if (obj == null) return EMPTY\_OBJ as any;\n const newLookup: any = {};\n for (const minifiedKey in obj) {\n if (obj.hasOwnProperty(minifiedKey)) {\n let publicName: string|[string, string] = obj[minifiedKey]!;\n let declaredName = publicName;\n if (Array.isArray(publicName)) {\n declaredName = publicName[1];\n publicName = publicName[0];\n }\n newLookup[publicName] = minifiedKey;\n if (secondary) {\n (secondary[publicName] = declaredName as string);\n }\n }\n }\n return newLookup;\n}\n\n/\*\* Create a directive definition object.\n \* # Example\n \* ts\n \* class MyDirective {\n \* // Generated by Angular Template Compiler\n \* // [Symbol] syntax will not be supported by TypeScript until v2.7\n \* static dir = defineDirective({\n \* ...\n \* });\n \* }\n \* @codeGenApi\n \*/\nexport const defineDirective =\n defineComponent as any as<T>(directiveDefinition: {\n /\*\* Directive type, needed to configure the injector.\n \* type: Type<T>;\n /\*\* The selectors that will be used to match nodes to this directive.\n \* selectors?: CssSelectorList;\n /\*\* A map of input names.\n \* The format is in:\n \* `[{actualPropertyName: string]:(string|[string, string])}`.\n \* Given:\n \* class\n \* MyComponent {\n \* @Input()\n \* publicInput1: string;\n \* @Input('publicInput2')\n \* declaredInput2: string;\n \* }\n \* is described as:\n \* {\n \* publicInput1: 'publicInput1',\n \* declaredInput2: ['declaredInput2', 'publicInput2'],\n \* }\n \* Which the minifier may translate to:\n \* {\n \* minifiedPublicInput1: 'publicInput1',\n \* minifiedDeclaredInput2: ['publicInput2', 'declaredInput2'],\n \* }\n \* This allows the render to re-construct the minified, public, and declared names of properties.\n \* NOTE:\n \* - Because declared and public name are usually same we only generate the array\n \* `['declared', 'public']` format when they differ.\n \* - The reason why this API and `outputs` API is not the same is that `NgOnChanges` has inconsistent behavior in that it uses declared names rather than minified or public. For this reason `NgOnChanges` will be deprecated and removed in future version and this API will be simplified to be consistent with `output`.\n \* inputs?: {[P in keyof T]: string | [string, string]};\n /\*\* A map of output names.\n \* The format is in:\n \* `[{actualPropertyName: string]:string}`.\n \* Which the minifier may translate to:\n \* `[{minifiedPropertyName: string]:string}`.\n \* This allows the render to re-construct the minified and non-minified names of properties.\n \* outputs?: {[P in keyof T]: string};\n /\*\* A list of optional features to apply.\n \* See: { @link NgOnChangesFeature }, { @link ProvidersFeature }, { @link InheritDefinitionFeature }\n \* features?: DirectiveDefFeature[];\n /\*\* Function executed by the parent template to allow child directive to apply host bindings.\n \* hostBindings?: HostBindingsFunction<T>;\n /\*\* The number of bindings in this directive `hostBindings` (including pure fn bindings).\n \* Used to calculate the length of the component's LView array, so we can pre-fill the array and set the host binding start index.\n \* hostVars?: number;\n /\*\* Assign static attribute values to a host element.\n \* This property will assign static attribute values as well as class and style values to a host element. Since attribute values can consist of different types of values, the `hostAttrs` array must include the values in the following

```

format:\n      *\n      * attrs = [\n      * // static attributes (like `title`, `name`, `id`...)\n      * attr1, value1, attr2,
value,\n      *\n      * // a single namespace value (like `x:id`)\n      * NAMESPACE_MARKER, namespaceUri1,
name1, value1,\n      *\n      * // another single namespace value (like `x:name`)\n      * NAMESPACE_MARKER, namespaceUri2,
name2, value2,\n      *\n      * // a series of CSS classes that will be applied to the element (no spaces)\n      *
CLASSES_MARKER, class1, class2, class3,\n      *\n      * // a series of CSS styles (property + value) that will be
applied to the element\n      * STYLES_MARKER, prop1, value1, prop2, value2\n      * ]\n      *\n      * All non-
class and non-style attributes must be defined at the start of the list\n      * first before all class and style values are
set. When there is a change in value\n      * type (like when classes and styles are introduced) a marker must be used
to separate\n      * the entries. The marker values themselves are set via entries found in the\n      *
[AttributeMarker] enum.\n      *\n      hostAttrs?: TAttributes;\n      *\n      /**\n      * Function to create instances of
content queries associated with a given directive.\n      *
*\n      contentQueries?: ContentQueriesFunction<T>;\n      *\n      /**\n      * Additional set of instructions specific to
view query processing. This could be seen as a\n      * set of instructions to be inserted into the template function.\n      *
*\n      viewQuery?: ViewQueriesFunction<T>| null;\n      *\n      /**\n      * Defines the name that can be used in the
template to assign this directive to a variable.\n      *\n      * See: {@link Directive.exportAs}\n      *
*\n      exportAs?: string[];\n      * }) => never;\n      *\n      /**\n      * Create a pipe definition object.\n      *\n      * # Example\n      *
*\n      * class
MyPipe implements PipeTransform {\n      * // Generated by Angular Template Compiler\n      * static pipe =
definePipe({\n      * ...*\n      * });\n      * }\n      *
*\n      * @param pipeDef Pipe definition generated by the compiler\n      *
*\n      * @codeGenApi\n      *
*\n      * @export function definePipe<T>(pipeDef: {\n      * /** Name of the pipe. Used for matching pipes in
template to pipe defs. *\n      * name: string,\n      * }\n      * /** Pipe class
reference. Needed to extract pipe lifecycle hooks. *\n      * type: Type<T>,\n      * /** Whether the pipe is pure. *\n      *
pure?: boolean,\n      * /**\n      * Whether the pipe is standalone.\n      *
*\n      * standalone?: boolean,\n      * }): unknown {\n      *
return (<PipeDef<T>>{\n      * type: pipeDef.type,\n      * name: pipeDef.name,\n      * factory: null,\n      * pure: pipeDef.pure
!== false,\n      * standalone: pipeDef.standalone === true,\n      * onDestroy: pipeDef.type.prototype.ngOnDestroy || null\n
});\n      * }\n      *
*\n      * The following getter methods retrieve the definition from the type. Currently the retrieval\n      *
honors inheritance, but in the future we may change the rule to require that definitions are\n      * explicit. This would
require some sort of migration strategy.\n      *
*\n      * @export function getComponentDef<T>(type: any):
ComponentDef<T>|null {\n      * return type[NG_COMP_DEF] || null;\n      * }\n      *
*\n      * @export function getDirectiveDef<T>(type:
any): DirectiveDef<T>|null {\n      * return type[NG_DIR_DEF] || null;\n      * }\n      *
*\n      * @export function getPipeDef<T>(type:
any): PipeDef<T>|null {\n      * return type[NG_PIPE_DEF] || null;\n      * }\n      *
*\n      * @export function isStandalone<T>(type:
Type<T>): boolean {\n      * const def = getComponentDef(type) || getDirectiveDef(type) || getPipeDef(type);\n      *
return def !== null ? def.standalone : false;\n      * }\n      *
*\n      * @export function getNgModuleDef<T>(type: any, throwNotFound: true):
NgModuleDef<T>;\n      *
*\n      * @export function getNgModuleDef<T>(type: any): NgModuleDef<T>|null;\n      *
*\n      * @export function
getNgModuleDef<T>(type: any, throwNotFound?: boolean): NgModuleDef<T>|null {\n      * const ngModuleDef =
type[NG_MOD_DEF] || null;\n      * if (!ngModuleDef && throwNotFound === true) {\n      * throw new Error(`Type
${stringify(type)} does not have 'mod' property.`);\n      * }\n      * return ngModuleDef;\n      * }\n      *
*\n      * @license\n      *
Copyright Google LLC All Rights Reserved.\n      *
*\n      * Use of this source code is governed by an MIT-style license
that can be\n      * found in the LICENSE file at https://angular.io/license\n      *
*\n      * @import {Injector} from
'././di/injector';\n      *
*\n      * @import {ProviderToken}
from '././di/provider_token';\n      *
*\n      * @import {Type} from '././interface/type';\n      *
*\n      * @import {SchemaMetadata} from
'././metadata/schema';\n      *
*\n      * @import {Sanitizer} from '././sanitization/sanitizer';\n      *
*\n      * @import {LContainer} from
'./container';\n      *
*\n      * @import {ComponentDef, ComponentTemplate, DirectiveDef, DirectiveDefList,
HostBindingsFunction, PipeDef, PipeDefList, ViewQueriesFunction} from './definition';\n      *
*\n      * @import {I18nUpdateOpCodes, T18n, TIcu} from './i18n';\n      *
*\n      * @import {TConstants, TNode} from './node';\n      *
*\n      * @import {LQueries,
TQueries} from './query';\n      *
*\n      * @import {Renderer, RendererFactory} from './renderer';\n      *
*\n      * @import {RComment, RElement}
from './renderer_dom';\n      *
*\n      * @import {TStylingKey, TStylingRange} from './styling';\n      *
*\n      * // Below are constants for
LView indices to help us look up LView members\n      * // without having to remember the specific indices.\n      * // Uglify

```

will inline these when minifying so there shouldn't be a cost.\nexport const HOST = 0;\nexport const TVIEW = 1;\nexport const FLAGS = 2;\nexport const PARENT = 3;\nexport const NEXT = 4;\nexport const TRANSPLANTED\_VIEWS\_TO\_REFRESH = 5;\nexport const T\_HOST = 6;\nexport const CLEANUP = 7;\nexport const CONTEXT = 8;\nexport const INJECTOR = 9;\nexport const RENDERER\_FACTORY = 10;\nexport const RENDERER = 11;\nexport const SANITIZER = 12;\nexport const CHILD\_HEAD = 13;\nexport const CHILD\_TAIL = 14;\n// FIXME(misko): Investigate if the three declarations aren't all same thing.\nexport const DECLARATION\_VIEW = 15;\nexport const DECLARATION\_COMPONENT\_VIEW = 16;\nexport const DECLARATION\_LCONTAINER = 17;\nexport const PREORDER\_HOOK\_FLAGS = 18;\nexport const QUERIES = 19;\nexport const ID = 20;\nexport const EMBEDDED\_VIEW\_INJECTOR = 21;\n// Size of LView's header. Necessary to adjust for it when setting slots.\n \* IMPORTANT: `HEADER\_OFFSET` should only be referred to in the `\*` instructions to translate instruction index into `LView` index. All other indexes should be in the `LView` index space and there should be no need to refer to `HEADER\_OFFSET` anywhere else.\n \* ^\nexport const HEADER\_OFFSET = 22;\n\n\n// This interface replaces the real LView interface if it is an arg or a\n// return value of a public instruction. This ensures we don't need to expose the actual interface, which should be kept private.\nexport interface OpaqueViewState {\n \_\_brand\_\_: 'Brand for OpaqueViewState that nothing will match';\n}\n \* LView` stores all of the information needed to process the instructions as they are invoked from the template. Each embedded view and component view has its own `LView`. When processing a particular view, we set the `viewData` to that `LView`. When that view is done processing, the `viewData` is set back to whatever the original `viewData` was before (the parent `LView`).\n \* Keeping separate state for each view facilitates view insertion / deletion, so we don't have to edit the data array based on which views are present.\n \* ^\nexport interface LView<T = unknown> extends Array<any> {\n /\*\*\n \* Human readable representation of the `LView`.\n \*\n \* NOTE: This property only exists if `ngDevMode` is set to `true` and it is not present in production. Its presence is purely to help debug issue in development, and should not be relied on in production application.\n \*\n \* debug?: LViewDebug;\n \*\n \* The node into which this `LView` is inserted.\n \* ^\n [HOST]: RElement|null;\n \*\n \* The static data for this view. We need a reference to this so we can easily walk up the node tree in DI and get the TView.data array associated with a node (where the directive defs are stored).\n \*\n \* readonly[TVIEW]: TView;\n \*\n \* Flags for this view. See LViewFlags for more info. ^\n [FLAGS]: LViewFlags;\n \*\n \* This may store an {@link LView} or {@link LContainer}.\n \*\n \* `LView` - The parent view. This is needed when we exit the view and must restore the previous LView. Without this, the render method would have to keep a stack of views as it is recursively rendering templates.\n \*\n \* `LContainer` - The current view is part of a container, and is an embedded view.\n \* ^\n [PARENT]: LView|LContainer|null;\n \*\n \* The next sibling LView or LContainer.\n \*\n \* Allows us to propagate between sibling view states that aren't in the same container. Embedded views already have a node.next, but it is only set for views in the same container. We need a way to link component views and views across containers as well.\n \* ^\n [NEXT]: LView|LContainer|null;\n \*\n \* Queries active for this view - nodes from a view are reported to those queries. ^\n [QUERIES]: LQueries|null;\n \*\n \* Store the `TNode` of the location where the current `LView` is inserted into.\n \*\n \* Given:\n \* ```\n \* <div>\n \* <ng-template><span></span></ng-template>\n \* </div>\n \* ```\n \* We end up with two `TView`s - `parent` `TView` which contains `<div><!-- anchor --></div>` - `child` `TView` which contains `<span></span>`\n \*\n \* Typically the `child` is inserted into the declaration location of the `parent`, but it can be inserted anywhere. Because it can be inserted anywhere it is not possible to store the insertion information in the `TView` and instead we must store it in the `LView[T\_HOST]`.\n \*\n \* So to determine where is our insertion parent we would execute:\n \* ```\n \* const parentLView = IView[PARENT];\n \* const parentTNode = IView[T\_HOST];\n \* const insertionParent = parentLView[parentTNode.index];\n \* ```\n \*\n \* If `null`, this is the root view of an application (root component is in this view) and it has no parents.\n \* ^\n [T\_HOST]: TNode|null;\n \*\n \* When a view is destroyed, listeners need to be released and outputs need

to be unsubscribed. This context array stores both listener functions wrapped with their context and output subscription instances for a particular view. These change per LView instance, so they cannot be stored on TView. Instead, TView.cleanup saves an index to the necessary context in this array. After LView is created it is possible to attach additional instance specific functions at the end of the LView[CLEANUP] because we know that no more T level cleanup functions will be added here.

[CLEANUP]: any[] | null; - For dynamic views, this is the context with which to render the template (e.g. NgForContext), or {} if not defined explicitly. - For root view of the root component it's a reference to the component instance itself. - For components, the context is a reference to the component instance itself. - For inline views, the context is null.

[CONTEXT]: T; An optional Module Injector to be used as fall back after Element Injectors are consulted.

readonly[INJECTOR]: Injector | null; Factory to be used for creating Renderer.

[RENDERER\_FACTORY]: RendererFactory; Renderer to be used for this view.

[RENDERER]: Renderer; An optional custom sanitizer.

[SANITIZER]: Sanitizer | null; Reference to the first LView or LContainer beneath this LView in the hierarchy. Necessary to store this so views can traverse through their nested views to remove listeners and call onDestroy callbacks.

[CHILD\_HEAD]: LView | LContainer | null; The last LView or LContainer beneath this LView in the hierarchy. The tail allows us to quickly add a new state to the end of the view list without having to propagate starting from the first child.

[CHILD\_TAIL]: LView | LContainer | null; View where this view's template was declared. The template for a dynamically created view may be declared in a different view than it is inserted. We already track the "insertion view" (view where the template was inserted) in LView[PARENT], but we also need access to the "declaration view" (view where the template was declared). Otherwise, we wouldn't be able to call the view's template function with the proper contexts. Context should be inherited from the declaration view tree, not the insertion view tree.

Example (AppComponent template):

```
<ng-template #foo></ng-template>    <-- declared here -->
<some-comp [tpl]="foo"></some-comp>    <-- inserted inside this component -->
```

The <ng-template> above is declared in the AppComponent template, but it will be passed into SomeComp and inserted there. In this case, the declaration view would be the AppComponent, but the insertion view would be SomeComp. When we are removing views, we would want to traverse through the insertion view to clean up listeners. When we are calling the template function during change detection, we need the declaration view to get inherited context.

[DECLARATION\_VIEW]: LView | null; Points to the declaration component view, used to track transplanted LView's. See: DECLARATION\_VIEW which points to the actual LView where it was declared, whereas DECLARATION\_COMPONENT\_VIEW points to the component which may not be same as DECLARATION\_VIEW.

Example:

```
<#VIEW #myComp>
<div *ngIf="true">
<ng-template #myTpl>...</ng-template>
</div>
</#VIEW>
```

In the above case DECLARATION\_VIEW for myTpl points to the LView of ngIf whereas DECLARATION\_COMPONENT\_VIEW points to LView of the myComp which owns the template.

The reason for this is that all embedded views are always check-always whereas the component view can be check-always or on-push. When we have a transplanted view it is important to determine if we have transplanted a view from check-always declaration to on-push insertion point. In such a case the transplanted view needs to be added to the LContainer in the declared LView and CD during the declared view CD (in addition to the CD at the insertion point.) (Any transplanted views which are intra Component are of no interest because the CD strategy of declaration and insertion will always be the same, because it is the same component.)

Queries already track moved views in LView[DECLARATION\_LCONTAINER] and LContainer[MOVED\_VIEWS]. However the queries also track LView's which moved within the same component LView. Transplanted views are a subset of moved views, and we use DECLARATION\_COMPONENT\_VIEW to differentiate them. As in this example:

Example showing intra component LView movement:

```
<#VIEW #myComp>
<div
```

```

*ngIf="condition;
  then thenBlock else elseBlock"></div>\n * <ng-template #thenBlock>Content to render when condition is
true.</ng-template>\n * <ng-template #elseBlock>Content to render when condition is false.</ng-template>\n *
</#VIEW>\n * ```\n * The `thenBlock` and `elseBlock` is moved but not transplanted.\n * \n * Example
showing inter component `LView` movement (transplanted view).\n * ```\n * <#VIEW #myComp>\n * <ng-
template #myTpl>...</ng-template>\n * <insertion-component [template]="myTpl"></insertion-
component>\n * </#VIEW>\n * ```\n * In the above example `myTpl` is passed into a different component. If
`insertion-component`\n * instantiates `myTpl` and `insertion-component` is on-push then the `LContainer` needs
to be\n * marked as containing transplanted views and those views need to be CD as part of the\n * declaration
CD.\n * \n * \n * When change detection runs, it iterates over `[MOVED_VIEWS]` and CDs any child `LView`s
where\n *
the `DECLARATION_COMPONENT_VIEW` of the current component and the child `LView` does not match\n
* (it has been transplanted across components.)\n * \n * Note: `[DECLARATION_COMPONENT_VIEW]` points
to itself if the LView is a component view (the\n * simplest / most common case).\n * \n * see also:\n * -
https://hackmd.io/@mhevery/rJUJsvv9H write up of the problem\n * -
`LContainer[HAS_TRANSPLANTED_VIEWS]` which marks which `LContainer` has transplanted views.\n * -
`LContainer[TRANSPLANT_HEAD]` and `LContainer[TRANSPLANT_TAIL]` storage for transplanted\n * -
`LView[DECLARATION_LCONTAINER]` similar problem for queries\n * - `LContainer[MOVED_VIEWS]`
similar problem for queries\n * \n * \n * [DECLARATION_COMPONENT_VIEW]: LView;\n * \n * \n * A declaration
point of embedded views (ones instantiated based on the content of a\n * <ng-template>), null for other types of
views.\n * \n * We need to track all embedded views created from a given declaration
point so we can prepare\n * query matches in a proper order (query matches are ordered based on their declaration
point and\n * _not_ the insertion point).\n * \n * \n * [DECLARATION_LCONTAINER]: LContainer|null;\n * \n * \n *
More flags for this view. See PreOrderHookFlags for more info.\n * \n * \n * [PREORDER_HOOK_FLAGS]:
PreOrderHookFlags;\n * \n * \n * \n * The number of direct transplanted views which need a refresh or have
descendants themselves\n * that need a refresh but have not marked their ancestors as Dirty. This tells us that
during\n * change detection we should still descend to find those children to refresh, even if the parents\n * are
not `Dirty`/`CheckAlways`.\n * \n * \n * [TRANSPLANTED_VIEWS_TO_REFRESH]: number;\n * \n * \n * Unique ID of
the view. Used for `__ngContext__` lookups in the `LView` registry. \n * \n * \n * [ID]: number;\n * \n * \n *
Optional
injector assigned to embedded views that takes\n * precedence over the element and module injectors.\n * \n * \n
readonly[EMBEDDED_VIEW_INJECTOR]:
Injector|null;\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Flags associated with an LView (saved in LView[FLAGS]) \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
export const enum
LViewFlags {\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
The state of the init phase on the first 2 bits \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
InitPhaseStateIncrementer =
0b000000000001,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
InitPhaseStateMask = 0b000000000011,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether or not the view is in
creationMode.\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
This must be stored in the view rather than using `data` as a marker so that\n * we can
properly support embedded views. Otherwise, when exiting a child view\n * back into the parent view, `data` will
be defined and `creationMode` will be\n * improperly reported as false.\n * \n * \n * \n * \n * \n * \n * \n *
CreationMode =
0b00000000100,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether or not this LView instance is on its first processing pass.\n * \n * \n * \n * \n * \n * \n * \n *
An
LView instance is considered to be on its "first pass" until it\n * has completed one creation mode run and one
update mode run. At this\n * time, the flag is turned off.\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
FirstLViewPass = 0b00000001000,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether
this view has default change detection strategy (checks always) or onPush \n * \n * \n * \n * \n * \n * \n *
CheckAlways =
0b00000010000,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether or not this view is currently dirty (needing check) \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Dirty =
0b00000100000,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether or not this view is currently attached to change detection tree. \n * \n * \n * \n * \n * \n * \n *
Attached =
0b000001000000,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether or not this view is destroyed. \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Destroyed = 0b000010000000,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether or not this view is the root view \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
IsRoot = 0b000100000000,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Whether this moved LView
was needs to be refreshed at the insertion location because the\n * declaration was dirty.\n * \n * \n * \n *
RefreshTransplantedView = 0b001000000000,\n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n * \n *
Indicates that the view **or any of its ancestors** have an

```

embedded view injector. `*/\n HasEmbeddedViewInjector = 0b001000000000,\n\n /**\n * Index of the current  
init phase on last 21 bits\n */\n IndexWithinInitPhaseIncrementer = 0b010000000000,\n\n IndexWithinInitPhaseShift = 11,\n\n IndexWithinInitPhaseReset  
= 0b001111111111,\n\n} \n\n /**\n * Possible states of the init phase:\n * - 00: OnInit hooks to be run.\n * - 01:  
AfterContentInit hooks to be run\n * - 10: AfterViewInit hooks to be run\n * - 11: All init hooks have been run\n */\n\nexport const enum InitPhaseState {\n\n OnInitHooksToBeRun = 0b00,\n AfterContentInitHooksToBeRun =  
0b01,\n AfterViewInitHooksToBeRun = 0b10,\n InitPhaseCompleted = 0b11,\n} \n\n /** More flags associated  
with an LView (saved in LView[PREORDER_HOOK_FLAGS]) */\n\nexport const enum PreOrderHookFlags {\n\n /**\n * The index of the next pre-order hook to be called in the hooks array, on the first 16\n * bits\n */\n\n IndexOfTheNextPreOrderHookMaskMask = 0b0111111111111111,\n\n /**\n * The number of init hooks that  
have already been called, on the last 16 bits\n */\n\n NumberOfInitHooksCalledIncrementer =  
0b01000000000000000000,\n\n NumberOfInitHooksCalledShift = 16,\n\n NumberOfInitHooksCalledMask =  
0b11111111111111110000000000000000,\n\n} \n\n /**\n * Stores a set  
of OpCodes to process `HostBindingsFunction` associated with a current view.\n */\n\n * In order to invoke  
`HostBindingsFunction` we need:\n * 1. `elementIdx`: Index to the element associated with the  
`HostBindingsFunction`.\n * 2. `directiveIdx`: Index to the directive associated with the `HostBindingsFunction`.  
(This will become the context for the `HostBindingsFunction` invocation.)\n * 3. `bindingRootIdx`: Location  
where the bindings for the `HostBindingsFunction` start. Internally `HostBindingsFunction` binding indexes  
start from `0` so we need to add `bindingRootIdx` to it.\n * 4. `HostBindingsFunction`: A host binding  
function to execute.\n */\n\n * The above information needs to be encoded into the `HostBindingOpCodes` in an  
efficient manner.\n * 1. `elementIdx` is encoded into the `HostBindingOpCodes` as `~elementIdx` (so a negative  
number);\n * 2. `directiveIdx`\n * 3. `bindingRootIdx`\n * 4. `HostBindingsFunction` is passed in as is.\n */\n\n * The  
`HostBindingOpCodes`  
array contains:\n * - negative number to select the element index.\n * - followed by 1 or more of:\n * - a number  
to select the directive index\n * - a number to select the bindingRoot index\n * - and a function to invoke.\n */\n\n *  
## Example\n *  
```  
const hostBindingOpCodes = [\n * ~30, // Select element 30\n * 40,\n * 45, MyDir.dir.hostBindings // Invoke host bindings on MyDir on element 30;\n * //  
directiveIdx = 40; bindingRootIdx = 45;\n * 50, 55, OtherDir.dir.hostBindings // Invoke host bindings on  
OtherDire on element 30\n * // directiveIdx = 50; bindingRootIdx = 55;\n * ]\n *  
```  
## Pseudocode\n *  
```  
const hostBindingOpCodes = tView.hostBindingOpCodes;\n * if (hostBindingOpCodes  
=== null) return;\n * for (let i = 0; i < hostBindingOpCodes.length; i++) {\n * const opCode =  
hostBindingOpCodes[i] as number;\n * if (opCode < 0)  
{\n * // Negative numbers are element indexes.\n * setSelectedIndex(~opCode);\n * } else {\n * // Positive  
numbers are NumberTuple which store bindingRootIndex and directiveIndex.\n * const directiveIdx = opCode;\n * const bindingRootIdx = hostBindingOpCodes[++i] as number;\n * const hostBindingFn =  
hostBindingOpCodes[++i] as HostBindingsFunction<any>;\n *  
setBindingRootForHostBindings(bindingRootIdx, directiveIdx);\n * const context = IView[directiveIdx];\n * hostBindingFn(RenderFlags.Update, context);\n * }\n * }\n *  
```  
*/\n\nexport interface HostBindingOpCodes  
extends Array<number|HostBindingsFunction<any>> {\n\n __brand__: 'HostBindingOpCodes';\n debug?:  
string[];\n}\n\n /**\n * Explicitly marks `TView` as a specific type in `ngDevMode`\n */\n\n * It is useful to know  
conceptually what time of `TView` we are dealing with when debugging an application (even if the runtime does  
not need it.) For this reason we store this information  
in the `ngDevMode` `TView` and then use it for better debugging experience.\n */\n\nexport const enum  
TViewType {\n\n /**\n * Root `TView` is the used to bootstrap components into. It is used in conjunction with  
`LView` which takes an existing DOM node not owned by Angular and wraps it in `TView`/`LView` so that  
other components can be loaded into it.\n */\n\n Root = 0,\n\n /**\n * `TView` associated with a Component. This  
would be the `TView` directly associated with the component view (as opposed an `Embedded` `TView` which  
would be a child of `Component` `TView`)\n */\n\n Component = 1,\n\n /**\n * `TView` associated with a`



```

template. Such as `*ngIf`, `` etc... A `Component` can have zero or more `Embedded`
`TVView`s.
  * `Embedded = 2` Converts `TVViewType` into human readable text.
  * Make sure this matches with `TVViewType`
  * `export const TVViewTypeAsString = ['Root', // 0 `Component', // 1 `Embedded',
  // 2] as const;`
  * The static data for an LView (shared between all templates of a given type).
  * Stored on the `ComponentDef.tView`.
  * `export interface TVView {`
  *   `Type of `TVView`
  *   `(Root|Component|Embedded)`.
  *   `type: TVViewType;`
  *   `This is a blueprint used to generate LView instances for this TVView. Copying this blueprint is faster than creating a new LView from scratch.`
  *   `blueprint: LView;`
  *   `The template function used to refresh the view of dynamically created views and components. Will be null for inline views.`
  *   `template: ComponentTemplate<{}>|null;`
  *   `A function containing query-related instructions.`
  *   `viewQuery: ViewQueriesFunction<{}>|null;`
  *   `A `TNode` representing the declaration location of this `TVView` (not part of this TVView).`
  *   `declTNode: TNode|null;`
  *   `// FIXME(misko): Why does `TVView` not have `declarationTVView` property?`
  *   `Whether or not this template has been processed in creation mode.`
  *   `firstCreatePass: boolean;`
  *   `Whether or not this template has been processed in update mode (e.g. change detected)`
  *   `firstUpdatePass` is used by styling to set up `TData` to contain metadata about the styling instructions. (Mainly to build up a linked list of styling priority order.)
  *   `Typically this function gets cleared after first execution. If exception is thrown then this flag can remain turned un until there is first successful (no exception) pass. This means that individual styling instructions keep track of if they have already been added to the linked list to prevent double adding.`
  *   `firstUpdatePass: boolean;`
  *   `Static data equivalent of LView.data[]. Contains TNodes, PipeDefInternal or TII8n.`
  *   `data: TData;`
  *   `The binding start index is the index at which the data array starts to store bindings only. Saving this value ensures that we will begin reading bindings at the correct point in the array when we are in update mode.`
  *   `-1 means that it has not been initialized.`
  *   `bindingStartIndex: number;`
  *   `The index where the "expando" section of `LView` begins. The expando section contains injectors, directive instances, and host binding values. Unlike the "decls" and "vars" sections of `LView`, the length of this section cannot be calculated at compile-time because directives are matched at runtime to preserve locality.`
  *   `We store this start index so we know where to start checking host bindings in `setHostBindings`.`
  *   `expandoStartIndex: number;`
  *   `Whether or not there are any static view queries tracked on this view.`
  *   `We store this so we know whether or not we should do a view query refresh after creation mode to collect static query results.`
  *   `staticViewQueries: boolean;`
  *   `Whether or not there are any static content queries tracked on this view.`
  *   `We store this so we know whether or not we should do a content query refresh after creation mode to collect static query results.`
  *   `staticContentQueries: boolean;`
  *   `A reference to the first child node located in the view.`
  *   `firstChild: TNode|null;`
  *   `Stores the OpCodes to be replayed during change-detection to process the `HostBindings``
  *   `See `HostBindingOpCodes` for encoding details.`
  *   `hostBindingOpCodes: HostBindingOpCodes|null;`
  *   `Full registry of directives and components that may be found in this view.`
  *   `It's necessary to keep a copy of the full def list on the TVView so it's possible to render template functions without a host component.`
  *   `directiveRegistry: DirectiveDefList|null;`
  *   `Full registry of pipes that may be found in this view.`
  *   `The property is either an array of `PipeDefs` or a function which returns the array of `PipeDefs`. The function is necessary to be able to support forward declarations.`
  *   `It's necessary to keep a copy of the full def list on the TVView so it's possible to render template functions without a host component.`
  *   `pipeRegistry: PipeDefList|null;`
  *   `Array of ngOnInit, ngOnChanges and ngDoCheck hooks that should be executed for this view in creation mode.`
  *   `This array has a flat structure and contains TNode indices, directive indices (where an instance can be found in `LView`) and hook functions. TNode index is followed by the directive index and a hook function. If there are multiple hooks for a given TNode, the TNode index is not repeated and the next lifecycle hook information is stored right after the previous hook function. This is done so that at runtime the

```

system can efficiently iterate over all of the functions to invoke without having to make any decisions/lookups.

- `preOrderHooks: HookData`: Array of `ngOnChanges` and `ngDoCheck` hooks that should be executed for this view in update mode. This array has the same structure as the `preOrderHooks` one.
- `preOrderCheckHooks: HookData`: Array of `ngAfterContentInit` and `ngAfterContentChecked` hooks that should be executed for this view in creation mode.
- `Even indices: Directive index`
- `Odd indices: Hook function`
- `contentHooks: HookData`: Array of `ngAfterContentChecked` hooks that should be executed for this view in update mode.
- `Even indices: Directive index`
- `Odd indices: Hook function`
- `contentCheckHooks: HookData`: Array of `ngAfterViewInit` and `ngAfterViewChecked` hooks that should be executed for this view in creation mode.
- `Even indices: Directive index`
- `Odd indices: Hook function`
- `viewHooks: HookData`: Array of `ngAfterViewChecked` hooks that should be executed for this view in update mode.
- `Even indices: Directive index`
- `Odd indices: Hook function`
- `viewCheckHooks: HookData`: Array of `ngOnDestroy` hooks that should be executed when this view is destroyed.
- `Even indices: Directive index`
- `Odd indices: Hook function`
- `destroyHooks: DestroyHookData`: When a view is destroyed, listeners need to be released and outputs need to be unsubscribed. This cleanup array stores both listener data (in chunks of 4) and output data (in chunks of 2) for a particular view. Combining the arrays saves on memory (70 bytes per array) and on a few bytes of code size (for two separate for loops).
- If it's a native DOM listener or output subscription being stored:
  - 1st index is: event name `name = tView.cleanup[i+0]`
  - 2nd index is: index of native element or a function that retrieves global target (window, document or body) reference based on the native element:
    - `typeof idxOrTargetGetter === 'function'`: global target getter function
    - `typeof idxOrTargetGetter === 'number'`: index of native element
  - 3rd index is: index of listener function `listener = LView[CLEANUP][tView.cleanup[i+2]]`
  - 4th index is: `useCaptureOrIndex = tView.cleanup[i+3]`
    - `typeof useCaptureOrIndex === 'boolean'`: useCapture boolean
    - `typeof useCaptureOrIndex === 'number'`: `useCaptureOrIndex >= 0`removeListener = LView[CLEANUP][useCaptureOrIndex]`
    - `useCaptureOrIndex < 0`subscription = LView[CLEANUP][useCaptureOrIndex]`
- If it's an output subscription or query list destroy hook:
  - 1st index is: output unsubscribe function / query list destroy function
  - 2nd index is: index of function context in `LView.cleanupInstances[]`
- `tView.cleanup[i+0].call(LView[CLEANUP][tView.cleanup[i+1]])`: cleanup: any[]|null
- A list of element indices for child components that will need to be refreshed when the current view has finished its check. These indices have already been adjusted for the `HEADER_OFFSET`.
- components: number[]|null
- A collection of queries tracked in a given view.
- queries: TQueries|null
- An array of indices pointing to directives with content queries alongside with the corresponding query index. Each entry in this array is a tuple of:
  - index of the first content query index declared by a given directive;
  - index of a directive.
- We are storing those indexes so we can refresh content queries as part of a view refresh process.
- contentQueries: number[]|null
- Set of schemas that declare elements to be allowed inside the view.
- schemas: SchemaMetadata[]|null
- Array of constants for the view. Includes attribute arrays, local definition arrays etc.
- Used for directive matching, attribute bindings, local definitions and more.
- consts: TConstants|null
- Indicates that there was an error before we managed to complete the first create pass of the view. This means that the view is likely corrupted and we should try to recover it.
- incompleteFirstPass: boolean;
- Single hook callback function. `export type HookFn = () => void;`
- Information necessary to call a hook. E.g. the callback that needs to be invoked and the index at which to find its context.
- export type HookEntry = number|HookFn;
- Array of hooks that should be executed for a view and their directive indices.
- For each node of the view, the following data is stored:
  - Node index (optional)
  - 2) A series of number/function pairs where:
    -

even indices are directive indices\n \* - odd indices are hook functions\n \*\n \* Special cases:\n \* - a negative directive index flags an init hook (ngOnInit, ngAfterContentInit, ngAfterViewInit)\n \*/\nexport type HookData = HookEntry[];\n\n/\*\*\n \* Array of destroy hooks that should be executed for a view and their directive indices.\n \*\n \* The array is set up as a series of number/function or number/(number|function)[]:\n \* - Even indices represent the context with which hooks should be called.\n \* - Odd indices are the hook functions themselves. If a value at an odd index is an array,\n \* it represents the destroy hooks of a `multi` provider where:\n \* - Even indices represent the index of the provider for which we've registered a destroy hook,\n \* inside of the `multi` provider array.\n \* - Odd indices are the destroy hook functions.\n \* For example:\n \* LView: `[0, 1, 2, AService, 4, [BService, CService, DService]]`\n \* destroyHooks: `[3, AService.ngOnDestroy, 5, [0, BService.ngOnDestroy, 2, DService.ngOnDestroy]]`\n \*\n \* In the example above `AService` is a type provider with an `ngOnDestroy`, whereas `BService`, `CService` and `DService` are part of a `multi` provider where only `BService` and `DService` have an `ngOnDestroy` hook.\n \*/\nexport type DestroyHookData = (HookEntry|HookData)[];\n\n/\*\*\n \* Static data that corresponds to the instance-specific data array on an LView.\n \*\n \* Each node's static data is stored in tData at the same index that it's stored\n \* in the data array. Any nodes that do not have static data store a null value in\n \* tData to avoid a sparse array.\n \*\n \* Each pipe's definition is stored here at the same index as its pipe instance in\n \* the data array.\n \*\n \* Each host property's name is stored here at the same index as its value in the\n \* data array.\n \*\n \* Each property binding name is stored here at the same index as its value in\n \* the data array. If the binding is an interpolation, the static string values\n \* are stored parallel to the dynamic values. Example:\n \*\n \* id="prefix {{ v0 }}" a {{ v1 }} b {{ v2 }} suffix`\n \*\n \* LView | TView.data\n \*-----\n \* v0 value | 'a'\n \* v1 value | 'b'\n \* v2 value | id prefix suffix\n \*\n \* Injector bloom filters are also stored here.\n \*/\nexport type TData = (TNode|PipeDef<any>|DirectiveDef<any>|ComponentDef<any>|number|TStylingRange|\nTStylingKey|ProviderToken<any>|TI18n|I18nUpdateOpCodes|Ticu|null|string)[];\n\n// Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n\n/\*\*\n \* Human readable version of the `LView`.\n \*\n \* `LView` is a data structure used internally to keep track of views. The `LView` is designed for\n \* efficiency and so at times it is difficult to read or write tests which assert on its values. For\n \* this reason when `ngDevMode` is true we patch a `LView.debug` property which points to\n \* `LViewDebug` for easier debugging and test writing. It is the intent of `LViewDebug` to be used\n \* in tests.\n \*/\nexport interface LViewDebug<T = unknown> {\n /\*\*\n \* Flags associated with the `LView` unpacked into a more readable state.\n \*\n \* See `LViewFlags` for the flag meanings.\n \*\n \* readonly flags: {\n initPhaseState: number,\n creationMode: boolean,\n firstViewPass: boolean,\n checkAlways: boolean,\n dirty: boolean,\n attached: boolean,\n destroyed: boolean,\n isRoot: boolean,\n indexWithinInitPhase: number,\n };\n\n /\*\*\n \* Associated TView\n \*\n \* readonly tView: TView;\n\n /\*\*\n \* Parent view (or container)\n \*\n \* readonly parent: LViewDebug|LContainerDebug|null;\n\n /\*\*\n \* Next sibling to the `LView`.\n \*\n \* readonly next: LViewDebug|LContainerDebug|null;\n\n /\*\*\n \* The context used for evaluation of the `LView`.\n \*\n \* (Usually the component)\n \*\n \* readonly context: T;\n\n /\*\*\n \* Hierarchical tree of nodes.\n \*\n \* readonly nodes: DebugNode[];\n\n /\*\*\n \* Template structure (no instance data).\n \*\n \* (Shows how TNodes are connected)\n \*\n \* readonly template: string;\n\n /\*\*\n \* HTML representation of the `LView`.\n \*\n \* This is only approximate to actual HTML as child `LView`s are removed.\n \*\n \* readonly html: string;\n\n /\*\*\n \* The host element to which this `LView` is attached.\n \*\n \* readonly hostHTML: string|null;\n\n /\*\*\n \* Child `LView`s\n \*\n \* readonly childViews: Array<LViewDebug|LContainerDebug>;\n\n /\*\*\n \* Sub range of `LView` containing decls (DOM elements).\n \*\n \* readonly decls: LViewDebugRange;\n\n /\*\*\n \* Sub range of `LView` containing vars (bindings).\n \*\n \* readonly vars: LViewDebugRange;\n\n /\*\*\n \* Sub range of `LView` containing expando (used by DI).\n \*\n \* readonly expando: LViewDebugRange;\n}\n\n/\*\*\n \* Human readable version of the `LContainer`.\n \*\n \* `LContainer` is a data structure used internally to keep track of child views. The `LContainer` is designed for\n \* efficiency and so at times it is difficult to read or write tests which assert on\n \* its values. For this reason when `ngDevMode` is true we patch a `LContainer.debug` property which\n \* points to `LContainerDebug` for easier

debugging and test writing. It is the intent of `LContainerDebug`` to be used in tests. `LContainerDebug`` export interface `LContainerDebug`` {  
 readonly native: RComment;  
 Child `LView`s.  
 readonly views: LViewDebug[];  
 readonly parent: LViewDebug|null;  
 readonly movedViews: LView[]|null;  
 readonly host: RElement|RComment|LView;  
 readonly next: LViewDebug|LContainerDebug|null;  
 readonly hasTransplantedViews: boolean;

`LView`` is subdivided to ranges where the actual data is stored. Some of these ranges such as `decls`` and `vars`` are known at compile time. Other such as `i18n`` and `expando`` are runtime only

\* concepts. `LViewDebugRange`` export interface `LViewDebugRange`` {  
 /\*\* The starting index in `LView` where the range begins. (Inclusive)  
 start: number;  
 /\*\* The ending index in `LView` where the range ends. (Exclusive)  
 end: number;  
 /\*\* The length of the range  
 length: number;  
 /\*\* The merged content of the range. `t` contains data from `TView.data` and `l` contains `LView` data at an index.  
 content: LViewDebugRangeContent[];

For convenience the static and instance portions of `TView`` and `LView`` are merged into a single object in `LViewRange``. `LViewRange`` export interface `LViewDebugRangeContent`` {  
 /\*\* Index into original `LView` or `TView.data`.  
 index: number;  
 /\*\* Value from the `TView.data[index]` location.  
 t: any;  
 /\*\* Value from the `LView[index]` location.  
 l: any;

A logical node which comprise into `LView`s`. `LViewRange`` export interface `DebugNode`` {  
 /\*\* HTML representation of the node.  
 html: string|null;  
 /\*\* Associated `TNode`  
 tNode: TNode;  
 /\*\* Human readable node type.  
 type: string;  
 /\*\* DOM native node.  
 native: Node;  
 /\*\* Child nodes  
 children: DebugNode[];  
 /\*\* A list of Component/Directive types which need to be instantiated an this location.  
 factories: Type<unknown>[];  
 /\*\* A list of Component/Directive instances which were instantiated an this location.  
 instances: unknown[];  
 /\*\* NodeInjector information.  
 injector: NodeInjectorDebug;  
 /\*\* Injector resolution path.  
 injectorResolutionPath: any;

`NodeInjectorDebug`` export interface `NodeInjectorDebug`` {  
 /\*\* Instance bloom. Does the current injector have a provider with a given bloom mask.  
 bloom: string;  
 /\*\* Cumulative bloom. Do any of the above injectors have a provider with a given bloom mask.  
 cumulativeBloom: string;  
 /\*\* A list of providers associated with this injector.  
 providers: (Type<unknown>|DirectiveDef<unknown>|ComponentDef<unknown>);  
 /\*\* A list of providers associated with this injector visible to the view of the component only.  
 viewProviders: Type<unknown>[];

Location of the parent `TNode``.  
 parentInjectorIndex: number;

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```

import {TNode} from './node';
import {RComment, RElement} from './renderer_dom';
import {HOST, LView, NEXT, PARENT, T_HOST, TRANSPLANTED_VIEWS_TO_REFRESH} from './view';

```

Special location which allows easy identification of type. If we have an array which was retrieved from the `LView`` and that array has `true`` at `TYPE`` location, we know it is `LContainer``. `LContainer`` export const `TYPE = 1;`  
 Below are constants for `LContainer`` indices to help us look up `LContainer`` members without having to remember the specific indices.  
 Uglify will inline these when minifying so there shouldn't be a cost.  
 Flag to signify that this `LContainer`` may have transplanted views which need to be change detected. (see: `LView[DECLARATION_COMPONENT_VIEW]``). This flag, once set, is never unset for the `LContainer``. This means that when unset we can skip a lot of work in `refreshEmbeddedViews``. But when set we still need to verify that the `MOVED_VIEWS`` are transplanted and on-push.  
 export const `HAS_TRANSPLANTED_VIEWS = 2;`  
 PARENT, NEXT, TRANSPLANTED\_VIEWS\_TO\_REFRESH are indices 3, 4, and 5  
 As we already have these constants in `LView``, we don't need to re-create them.  
 T\_HOST is index 6  
 We already have this constants in `LView``, we don't need to re-create it.  
 export const `NATIVE = 7;`  
 export const `VIEW_REFS = 8;`  
 export const `MOVED_VIEWS = 9;`  
 Size of `LContainer``'s header. Represents the index after which all views in the container will be inserted. We need to keep a record of current views so we know which views are already in the DOM (and don't

need to be re-added) and so we can remove views from the DOM when they are no longer required.

```

const CONTAINER_HEADER_OFFSET = 10;

```

The state associated with a container. This is an array so that its structure is closer to LView. This helps when traversing the view tree (which is a mix of containers and component views), so we can jump to viewOrContainer[NEXT] in the same way regardless of type.

```

export interface LContainer extends Array<any> {
  // The host element of this LContainer. The host could be an LView if this container is on a component node. In that case, the component LView is its HOST.
  readonly [HOST]: RElement|RComment|LView;
  // This is a type field which allows us to differentiate `LContainer` from `StylingContext` in an efficient way. The value is always set to `true`
  [TYPE]: true;
  // Flag to signify that this `LContainer` may have transplanted views which need to be change detected. (see: `LView[DECLARATION_COMPONENT_VIEW]`)
  // This flag, once set, is never unset for the `LContainer`.
  [HAS_TRANSPLANTED_VIEWS]: boolean;
  // Access to the parent view is necessary so we can propagate back up from inside a container to parent[NEXT].
  [PARENT]: LView;
  // This allows us to jump from a container to a sibling container or component view with the same parent, so we can remove listeners efficiently.
  [NEXT]: LView|LContainer|null;
  // The number of direct transplanted views which need a refresh or have descendants themselves

```

```

  // that need a refresh but have not marked their ancestors as Dirty. This tells us that during change detection we should still descend to find those children to refresh, even if the parents are not `Dirty`/`CheckAlways`.
  [TRANSPLANTED_VIEWS_TO_REFRESH]: number;
  // A collection of views created based on the underlying `<ng-template>` element but inserted into a different `LContainer`. We need to track views created from a given declaration point since queries collect matches from the embedded view declaration point and not the insertion point.
  [MOVED_VIEWS]: LView[]|null;
  // Pointer to the `TNode` which represents the host of the container.
  [T_HOST]: TNode;
  // The comment element that serves as an anchor for this LContainer.
  readonly [NATIVE]: RComment;
  // TODO(misko): remove as this value can be gotten by unwrapping `[HOST]`
  // Array of `ViewRef`s used by any `ViewContainerRef`s that point to this container.
  // This is lazily initialized by `ViewContainerRef` when the first view is inserted.
  // NOTE: This is stored as `any[]` because render3 should really not be aware of `ViewRef` and doing so creates circular dependency.
  [VIEW_REFS]: unknown[]|null;
}

```

Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.

```

export const unusedValueExportToPlacateAjd = 1;

```

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```

import {LContainer, TYPE} from './container';
import {ComponentDef, DirectiveDef} from './definition';
import {TNode, TNodeFlags} from './node';
import {RNode} from './renderer_dom';
import {FLAGS, LView, LViewFlags} from './view';

```

```

// True if `value` is `LView`.
@param value wrapped value of `RNode`, `LView`, `LContainer`
export function isLView(value: RNode|LView|LContainer|{}|null): value is LView {
  return Array.isArray(value) && typeof value[TYPE] === 'object';
}
// True if `value` is `LContainer`.
@param value wrapped value of `RNode`, `LView`, `LContainer`
export function isLContainer(value: RNode|LView|LContainer|{}|null): value is LContainer {
  return Array.isArray(value) && value[TYPE] === true;
}
export function isContentQueryHost(tNode: TNode): boolean {
  return (tNode.flags & TNodeFlags.hasContentQuery) !== 0;
}
export function isComponentHost(tNode: TNode): boolean {
  return (tNode.flags & TNodeFlags.isComponentHost) === TNodeFlags.isComponentHost;
}
export function isDirectiveHost(tNode: TNode): boolean {
  return (tNode.flags & TNodeFlags.isDirectiveHost) === TNodeFlags.isDirectiveHost;
}
export function isComponentDef<T>(def: DirectiveDef<T>): def is ComponentDef<T> {
  return (def as ComponentDef<T>).template

```

```

  !== null;
}
export function isRootView(target: LView): boolean {
  return (target[FLAGS] & LViewFlags.IsRoot) !== 0;
}

```

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```

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*/
import { assertDefined, assertEquals, assertNumber, throwError } from
'./util/assert';
import { getComponentDef, getNgModuleDef } from './definition';
import { LContainer } from
'./interfaces/container';
import { DirectiveDef } from './interfaces/definition';
import { TIcu } from
'./interfaces/i18n';
import { NodeInjectorOffset } from './interfaces/injector';
import { TNode } from
'./interfaces/node';
import { isLContainer, isLView } from './interfaces/type_checks';
import
{ DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LView, T_HOST, TVIEW, TView } from
'./interfaces/view';
// [Assert functions do not constraint type when they are guarded
by a truthy
// expression.](https://github.com/microsoft/TypeScript/issues/37295)
export function
assertTNodeForLView(tNode: TNode, IView: LView) {
  assertTNodeForTView(tNode,
  IView[TVIEW]);
}
export function assertTNodeForTView(tNode: TNode, tView: TView) {
  assertTNode(tNode);
  tNode.hasOwnProperty('tView_') &&
  assertEquals(
  (tNode as any as {tView_:
  TView}).tView_, tView,
  'This TNode does not belong to this TView.');
```

```

}
export function
assertTNode(tNode: TNode) {
  assertDefined(tNode, 'TNode must be defined');
```

```

  if (!(tNode && typeof tNode
  === 'object' && tNode.hasOwnProperty('directiveStylingLast'))) {
    throwError('Not of type TNode, got: ' +
    tNode);
  }
}
export function assertTIcu(tIcu: TIcu) {
  assertDefined(tIcu, 'Expected TIcu to be defined');
```

```

  if (!(typeof tIcu.currentCaseLViewIndex === 'number')) {
    throwError('Object is not of TIcu type.');
```

```

  }
}
export function assertComponentType(
  actual: any,
  msg: string = 'Type passed in is not ComponentType, it does not have \'cmp\' property.')
```

```

  if (!getComponentDef(actual)) {
    throwError(msg);
  }
}
export function assertNgModuleType(
  actual:
  any,
  msg: string = 'Type passed in is not NgModuleType, it does not have \'mod\' property.')
```

```

  if (!getNgModuleDef(actual)) {
    throwError(msg);
  }
}
export function
assertCurrentTNodeIsParent(isParent: boolean) {
  assertEquals(isParent, true, 'currentTNode should be a
  parent');
```

```

}
export function assertHasParent(tNode: TNode|null) {
  assertDefined(tNode, 'currentTNode should
  exist!');
```

```

  assertDefined(tNode!.parent, 'currentTNode should have a parent');
```

```

}
export function
assertDataNext(IView: LView, index: number, arr?: any[]) {
  if (arr == null) arr = IView;
  assertEquals(
  arr.length, index, `index ${index} expected to be at the end of arr (length ${arr.length})`);
}
export function
assertLContainer(value: any): asserts value is
  LContainer {
  assertDefined(value, 'LContainer must be defined');
```

```

  assertEquals(isLContainer(value), true,
  'Expecting LContainer');
```

```

}
export function assertLViewOrUndefined(value: any): asserts value is
  LView|null|undefined {
  value && assertEquals(isLView(value), true, 'Expecting LView or undefined or
  null');
```

```

}
export function assertLView(value: any): asserts value is LView {
  assertDefined(value, 'LView must
  be defined');
```

```

  assertEquals(isLView(value), true, 'Expecting LView');
```

```

}
export function
assertFirstCreatePass(tView: TView, errMessage?: string) {
  assertEquals(
  tView.firstCreatePass, true,
  errMessage || 'Should only be called in first create pass.');
```

```

}
export function assertFirstUpdatePass(tView:
  TView, errMessage?: string) {
  assertEquals(
  tView.firstUpdatePass, true, errMessage || 'Should only be called
  in first update pass.');
```

```

}
// **
// * This is a basic sanity check that an object is probably a directive def.
DirectiveDef is
  an
  interface, so we can't do a direct instanceof check.
*/
export function assertDirectiveDef<T>(obj: any): asserts
  obj is DirectiveDef<T> {
  if (obj.type === undefined || obj.selectors == undefined || obj.inputs === undefined) {
    throwError(
    `Expected a DirectiveDef/ComponentDef and this object does not seem to have the expected
    shape.`);
  }
}
export function
assertIndexInDeclRange(IView: LView, index: number) {
  const tView =
  IView[1];
  assertBetween(HEADER_OFFSET, tView.bindingStartIndex, index);
}
export function
assertIndexInVarsRange(IView: LView, index: number) {
  const tView = IView[1];
  assertBetween(tView.bindingStartIndex, tView.expandoStartIndex, index);
}
export function
assertIndexInExpandoRange(IView: LView, index: number) {
  const tView = IView[1];
  assertBetween(tView.expandoStartIndex, IView.length, index);
}
export function
assertBetween(lower:
  number, upper: number, index: number) {
  if (!(lower <= index && index < upper))

```

```

{\n  throwError('Index out of range (expecting ${lower} <= ${index} < ${upper})');\n }\n}\n\nexport function
assertProjectionSlots(IView: LView, errMessage?: string) {\n
assertDefined(IView[DECLARATION_COMPONENT_VIEW], 'Component views should exist.);\n
assertDefined(\n  IView[DECLARATION_COMPONENT_VIEW][T_HOST]!.projection,\n  errMessage ||\n    'Components with projection nodes (<ng-content>) must have projection slots defined.);\n}\n\nexport function
assertParentView(IView: LView|null, errMessage?: string) {\n  assertDefined(\n  IView,\n  errMessage ||
'Component views should always have a parent view (component\\'s host view));\n}\n\n\n/**\n * This is a basic
sanity check that the `injectorIndex` seems to point to what looks like a\n * NodeInjector data structure.\n * \n *
@param IView `LView` which should be checked.\n * @param injectorIndex index into the `LView` where the
`NodeInjector` is expected.\n */\nexport function assertNodeInjector(IView:
LView, injectorIndex: number) {\n  assertIndexInExpandoRange(IView, injectorIndex);\n
assertIndexInExpandoRange(IView, injectorIndex + NodeInjectorOffset.PARENT);\n
assertNumber(IView[injectorIndex + 0], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 1], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 2], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 3], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 4], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 5], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 6], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 7], 'injectorIndex should point to a bloom filter');\n  assertNumber(\n
IView[injectorIndex + NodeInjectorOffset.PARENT],\n    'injectorIndex should point
to parent injector');\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Type} from '../interface/type';\nimport {stringify} from
'../util/stringify';\nimport {NG_FACTORY_DEF} from './fields';\n\n\n/**\n * Definition of what a factory function
should look like.\n */\nexport type FactoryFn<T> = {\n /**\n * Subclasses without an explicit constructor call
through to the factory of their base\n * definition, providing it with their own constructor to instantiate.\n */\n <U>
extends T>(t?: Type<U>): U;\n\n /**\n * If no constructor to instantiate is provided, an instance of type T itself is
created.\n */\n (t?: undefined): T;\n};\n\n\nexport function getFactoryDef<T>(type: any, throwNotFound: true):
FactoryFn<T>;\nexport function getFactoryDef<T>(type: any): FactoryFn<T>|null;\n\nexport function
getFactoryDef<T>(type:
any, throwNotFound?: boolean): FactoryFn<T>|null {\n  const hasFactoryDef =
type.hasOwnProperty(NG_FACTORY_DEF);\n  if (!hasFactoryDef && throwNotFound === true &&
ngDevMode) {\n    throw new Error(`Type ${stringify(type)} does not have 'fac' property.`);\n  }\n  return
hasFactoryDef ? type[NG_FACTORY_DEF] : null;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\n\n/**\n * Represents a basic change from a previous to a new value
for a single\n * property on a directive instance. Passed as a value in a\n * { @link SimpleChanges } object to the
`ngOnChanges` hook.\n * \n * @see `OnChanges`\n * \n * @publicApi\n */\nexport class SimpleChange {\n
constructor(public previousValue: any, public currentValue: any, public firstChange: boolean) {\n /**\n * Check
whether the new value is the first value assigned.\n */\n
isFirstChange(): boolean {\n  return this.firstChange;\n }\n}\n\n\n/**\n * A hashtable of changes represented
by { @link SimpleChange } objects stored\n * at the declared property name they belong to on a Directive or
Component. This is\n * the type passed to the `ngOnChanges` hook.\n * \n * @see `OnChanges`\n * \n *
@publicApi\n */\nexport interface SimpleChanges {\n [propName: string]: SimpleChange;\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {OnChanges}
from '../..interface/lifecycle_hooks';\nimport {SimpleChange, SimpleChanges} from

```

```

'././interface/simple_change';\nimport {EMPTY_OBJ} from '././util/empty';\nimport {DirectiveDef,
DirectiveDefFeature} from '././interfaces/definition';\n\n/**\n * The NgOnChangesFeature decorates a component
with support for the ngOnChanges\n * lifecycle hook, so it should
be included in any component that implements\n * that hook.\n *\n * If the component or directive uses inheritance,
the NgOnChangesFeature MUST\n * be included as a feature AFTER {@link InheritDefinitionFeature},
otherwise\n * inherited properties will not be propagated to the ngOnChanges lifecycle\n * hook.\n *\n * Example
usage:\n *\n * ```\n * static cmp = defineComponent({\n *   ... \n *   inputs: {name: 'publicName'},\n *   features:
[NgOnChangesFeature]\n * });\n * ```\n *\n * @codeGenApi\n *\n * ^\n * \n * export function NgOnChangesFeature<T>():
DirectiveDefFeature {\n *   return NgOnChangesFeatureImpl;\n * }\n * \n * export function
NgOnChangesFeatureImpl<T>(definition: DirectiveDef<T>) {\n *   if (definition.type.prototype.ngOnChanges) {\n *
definition.setInput = ngOnChangesSetInput;\n *   }\n *   return
rememberChangeHistoryAndInvokeOnChangesHook;\n * }\n * \n * // This option ensures that the ngOnChanges lifecycle
hook will be inherited\n * // from superclasses (in InheritDefinitionFeature).\n * \n * \n * @nocollapse *\n * //
tslint:disable-next-line:no-toplevel-property-access\n * \n * (NgOnChangesFeature as DirectiveDefFeature).ngInherit =
true;\n * \n * \n * \n * This is a synthetic lifecycle hook which gets inserted into `TView.preOrderHooks` to simulate\n *
`ngOnChanges`.\n * \n * The hook reads the `NgSimpleChangesStore` data from the component instance and if
changes are\n * found it invokes `ngOnChanges` on the component instance.\n * \n * @param this Component
instance. Because this function gets inserted into `TView.preOrderHooks`,\n *   it is guaranteed to be called with
component instance.\n * \n * ^\n * \n * function rememberChangeHistoryAndInvokeOnChangesHook(this: OnChanges) {\n *
const simpleChangesStore = getSimpleChangesStore(this);\n *   const current = simpleChangesStore?.current;\n *   if
(current) {\n *     const previous = simpleChangesStore!.previous;\n *     if (previous === EMPTY_OBJ) {\n *
simpleChangesStore!.previous = current;\n *     } else {\n *       // New changes are copied to the previous store, so that
we don't
lose history for inputs\n *       // which were not changed this time\n *       for (let key in current) {\n *         previous[key] =
current[key];\n *       }\n *       simpleChangesStore!.current = null;\n *       this.ngOnChanges(current);\n *     }
}\n * \n * \n * function ngOnChangesSetInput<T>(this: DirectiveDef<T>, instance: T, value: any, publicName:
string, privateName: string): void {\n *   const simpleChangesStore = getSimpleChangesStore(instance) ||\n *   setSimpleChangesStore(instance, {previous: EMPTY_OBJ, current: null});\n *   const current =
simpleChangesStore.current || (simpleChangesStore.current = {});\n *   const previous =
simpleChangesStore.previous;\n *   const declaredName = (this.declaredInputs as {[key: string]:
string})[publicName];\n *   const previousChange = previous[declaredName];\n *   current[declaredName] = new
SimpleChange(\n *     previousChange && previousChange.currentValue, value, previous === EMPTY_OBJ);\n *   (instance as any)[privateName] = value;\n *   \n *   \n *   const SIMPLE_CHANGES_STORE
= '_ngSimpleChanges_';\n *   \n *   function getSimpleChangesStore(instance: any): null|NgSimpleChangesStore {\n *
return instance[SIMPLE_CHANGES_STORE] || null;\n *   }\n *   \n *   function setSimpleChangesStore(instance: any, store:
NgSimpleChangesStore): NgSimpleChangesStore {\n *     return instance[SIMPLE_CHANGES_STORE] =
store;\n *   }\n *   \n *   \n *   Data structure which is monkey-patched on the component instance and used by
`ngOnChanges`\n *   life-cycle hook to track previous input values.\n *   \n *   ^\n *   \n *   interface NgSimpleChangesStore {\n *
previous: SimpleChanges;\n *     current: SimpleChanges|null;\n *   }\n *   \n *   \n *   \n *   @license\n *   Copyright Google LLC All
Rights Reserved.\n *   \n *   Use of this source code is governed by an MIT-style license that can be\n *   found in the
LICENSE file at https://angular.io/license\n *   \n *   \n *   \n *   Profiler events is an enum used by the profiler to
distinguish between different calls of user\n *   code invoked throughout the application lifecycle.\n *   \n *   ^\n *   \n *   export const
enum ProfilerEvent {\n *     /**\n *      * Corresponds
to the point in time before the runtime has called the template function of a\n *      * component with
`RenderFlags.Create`.\n *      * ^\n *      * TemplateCreateStart,\n *      * \n *      * /**\n *      * Corresponds to the point in time after the runtime
has called the template function of a\n *      * component with `RenderFlags.Create`.\n *      * ^\n *      * TemplateCreateEnd,\n *      * \n *      * /**\n *      * Corresponds to the point in time before the runtime has called the template function of a\n *      * component
with `RenderFlags.Update`.\n *      * ^\n *      * TemplateUpdateStart,\n *      * \n *      * /**\n *      * Corresponds to the point in time after the

```



runtime has called the template function of a component with `RenderFlags.Update`.  
`TemplateUpdateEnd` corresponds to the point in time before the runtime has called a lifecycle hook of a component or directive.  
`LifecycleHookStart` corresponds to the point in time after the runtime has called a lifecycle hook of a component or directive.  
`LifecycleHookEnd` corresponds to the point in time before the runtime has evaluated an expression associated with an event or an output.  
`OutputStart` corresponds to the point in time after the runtime has evaluated an expression associated with an event or an output.  
`OutputEnd`  
Profiler function which the runtime will invoke before and after user code.  
export interface Profiler {  
 (event: ProfilerEvent, instance: {} | null, hookOrListener?: (e?: any) => any): void;  
 let profilerCallback: Profiler | null = null;  
 Sets the callback function which will be invoked before and after performing certain actions at runtime (for example, before and after running change detection).  
 Warning: this function is `INTERNAL` and should not be relied upon in application's code. The contract of the function might be changed in any release and/or the function can be removed completely.  
 @param profiler function provided by the caller or null value to disable profiling.  
 export const setProfiler = (profiler: Profiler | null) => {  
 profilerCallback = profiler;  
 };  
 Profiler function which wraps user code executed by the runtime.  
 @param event ProfilerEvent corresponding to the execution context  
 @param instance component instance  
 @param hookOrListener lifecycle hook function or output listener. The value depends on the execution context  
 @returns Profiler = function(  
 event: ProfilerEvent, instance: {} | null, hookOrListener?: (e?: any) => any) {  
 if (profilerCallback != null /\* both `null` and `undefined` \*/) {  
 profilerCallback(event, instance, hookOrListener);  
 }  
 };  
 "\*/  
 @license Copyright Google LLC All Rights Reserved.  
 Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at <https://angular.io/license>  
 export const SVG\_NAMESPACE = 'svg';  
 export const SVG\_NAMESPACE\_URI = 'http://www.w3.org/2000/svg';  
 export const MATH\_ML\_NAMESPACE = 'math';  
 export const MATH\_ML\_NAMESPACE\_URI = 'http://www.w3.org/1998/MathML/';  
 export function getNamespaceUri(namespace: string): string | null {  
 const name = namespace.toLowerCase();  
 return name === SVG\_NAMESPACE ? SVG\_NAMESPACE\_URI :  
 (name === MATH\_ML\_NAMESPACE ? MATH\_ML\_NAMESPACE\_URI : null);  
 }  
 "\*/  
 @license Copyright Google LLC All Rights Reserved.  
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 import {assertGreaterThan, assertGreaterThanOrEqual, assertIndexInRange, assertLessThan} from '../util/assert';  
 import {assertTNode, assertTNodeForLView} from '../assert';  
 import {LContainer, TYPE} from '../interfaces/container';  
 import {TConstants, TNode} from '../interfaces/node';  
 import {RNode} from '../interfaces/renderer\_dom';  
 import {isLContainer, isLView} from '../interfaces/type\_checks';  
 import {FLAGS, HEADER\_OFFSET, HOST, LView, LViewFlags, PARENT, PREORDER\_HOOK\_FLAGS, TData, TRANSPLANTED\_VIEWS\_TO\_REFRESH, TView} from '../interfaces/view';  
 For efficiency reasons we often put several different data types (`RNode`, `LView`, `LContainer`) in same location in `LView`. This is because we don't want to pre-allocate space for it because the storage is sparse. This file contains utilities for dealing with such data types.  
 How do we know what is stored at a given location in `LView`?  
 - `Array.isArray(value) === false` => `RNode` (The normal storage value)  
 - `Array.isArray(value) === true` => then the `value[0]` represents the wrapped value.  
 - `typeof value[TYPE] === 'object'` => `LView`  
 - This happens when we have a component at a given location  
 - `typeof value[TYPE] === true` => `LContainer`  
 - This happens when we have `LContainer` binding at a given location.  
 NOTE: it is assumed that `Array.isArray` and `typeof` operations are very efficient.  
 Returns `RNode`.  
 @param value wrapped value of `RNode`, `LView`, `LContainer`  
 export function unwrapRNode(value: RNode | LView | LContainer): RNode {  
 while (Array.isArray(value)) {  
 value = value[HOST] as any;  
 }  
 return value as RNode;  
 }  
 Returns `LView` or `null` if not found.  
 @param value wrapped value of `RNode`, `LView`, `LContainer`  
 export function unwrapLView(value:

```

RNode|LView|LContainer): LView|null {\n while (Array.isArray(value)) {\n // This check is same as `isLView()`
but we don't call at as we don't want to call\n // `Array.isArray()` twice and give JITer more work for inlining.\n
if (typeof value[TYPE] === 'object') return value as LView;\n value = value[HOST] as any;\n }\n return
null;\n}\n\n/**\n * Returns `LContainer` or `null` if not found.\n * @param value wrapped value
of `RNode`, `LView`, `LContainer`\n */\nexport function unwrapLContainer(value: RNode|LView|LContainer):
LContainer|null {\n while (Array.isArray(value)) {\n // This check is same as `isLContainer()` but we don't call at
as we don't want to call\n // `Array.isArray()` twice and give JITer more work for inlining.\n if (value[TYPE]
=== true) return value as LContainer;\n value = value[HOST] as any;\n }\n return null;\n}\n\n/**\n * Retrieves
an element value from the provided `viewData`, by unwrapping\n * from any containers, component views, or style
contexts.\n */\nexport function getNativeByIndex(index: number, IView: LView): RNode {\n ngDevMode &&
assertIndexInRange(IView, index);\n ngDevMode && assertGreaterThanOrEqual(index, HEADER_OFFSET,
'Expected to be past HEADER_OFFSET');\n return unwrapRNode(IView[index]);\n}\n\n/**\n * Retrieve an
`RNode` for a given `TNode` and `LView`.\n *\n * This function guarantees in dev mode to retrieve a non-null
`RNode`.\n *\n * @param
tNode\n *\n * @param IView\n */\nexport function getNativeByTNode(tNode: TNode, IView: LView): RNode {\n
ngDevMode && assertTNodeForLView(tNode, IView);\n ngDevMode && assertIndexInRange(IView,
tNode.index);\n const node: RNode = unwrapRNode(IView[tNode.index]);\n return node;\n}\n\n/**\n * Retrieve
an `RNode` or `null` for a given `TNode` and `LView`.\n *\n * Some `TNode`s don't have associated `RNode`s. For
example `Projection`\n *\n * @param tNode\n *\n * @param IView\n */\nexport function
getNativeByTNodeOrNull(tNode: TNode|null, IView: LView): RNode|null {\n const index = tNode === null ? -1 :
tNode.index;\n if (index !== -1) {\n ngDevMode && assertTNodeForLView(tNode!, IView);\n const node:
RNode|null = unwrapRNode(IView[index]);\n return node;\n }\n return null;\n}\n\n// fixme(misko): The return
Type should be `TNode|null`\nexport function getTNode(tView: TView, index: number): TNode {\n ngDevMode
&& assertGreaterThanOrEqual(index, -1, 'wrong index for TNode');\n ngDevMode
&& assertLessThan(index, tView.data.length, 'wrong index for TNode');\n const tNode = tView.data[index] as
TNode;\n ngDevMode && tNode !== null && assertTNode(tNode);\n return tNode;\n}\n\n/**\n * Retrieves a value
from any `LView` or `TData`.\n */\nexport function load<T>(view: LView|TData, index: number): T {\n ngDevMode
&& assertIndexInRange(view, index);\n return view[index];\n}\n\nexport function
getComponentLViewByIndex(nodeIndex: number, hostView: LView): LView {\n // Could be an LView or an
LContainer. If LContainer, unwrap to find LView.\n ngDevMode && assertIndexInRange(hostView, nodeIndex);\n
const slotValue = hostView[nodeIndex];\n const IView = isLView(slotValue) ? slotValue : slotValue[HOST];\n
return IView;\n}\n\n/**\n * Checks whether a given view is in creation mode\n */\nexport function isCreationMode(view:
LView): boolean {\n return (view[FLAGS] & LViewFlags.CreationMode) ===
LViewFlags.CreationMode;\n}\n\n/**\n * Returns a boolean for whether the view is attached
to the change detection tree.\n *\n * Note: This determines whether a view should be checked, not whether it's
inserted\n * into a container. For that, you'll want `viewAttachedToContainer` below.\n */\nexport function
viewAttachedToChangeDetector(view: LView): boolean {\n return (view[FLAGS] & LViewFlags.Attached) ===
LViewFlags.Attached;\n}\n\n/**\n * Returns a boolean for whether the view is attached to a container.\n */\nexport
function viewAttachedToContainer(view: LView): boolean {\n return isLContainer(view[PARENT]);\n}\n\n/**\n *
Returns a constant from `TConstants` instance.\n */\nexport function getConstant<T>(const: TConstants|null, index:
null|undefined): null;\nexport function getConstant<T>(const: TConstants, index: number): T|null;\nexport function
getConstant<T>(const: TConstants|null, index: number|null|undefined): T|null;\nexport function
getConstant<T>(const: TConstants|null, index: number|null|undefined): T|null {\n if (index === null || index ===
undefined) return null;\n
ngDevMode && assertIndexInRange(const!, index);\n return const![index] as unknown as T;\n}\n\n/**\n *
Resets the pre-order hook flags of the view.\n *\n * @param IView the LView on which the flags are reset\n */\nexport
function resetPreOrderHookFlags(IView: LView) {\n IView[PREORDER_HOOK_FLAGS] = 0;\n}\n\n/**\n *
Updates the `TRANSPLANTED_VIEWS_TO_REFRESH` counter on the `LContainer` as well as the parents\n *\n

```

whose counter goes from 0 to 1, indicating that there is a new child that has a view to refresh or counter goes from 1 to 0, indicating there are no more descendant views to refresh

```

export function
updateTransplantedViewCount(IContainer: LContainer, amount: 1|- 1) {
  IContainer[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;
  let viewOrContainer: LView|LContainer =
  IContainer;
  let parent: LView|LContainer|null = IContainer[PARENT];
  while (parent !== null &&
  ((amount === 1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH] === 1) ||
  (amount === -1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH] === 0))) {
    parent[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;
    viewOrContainer = parent;
    parent =
    parent[PARENT];
  }
}

```

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```

import {InjectFlags} from './di/interface/injector';
import {assertDefined,
assertEqual, assertGreaterThanOrEqual, assertLessThan, assertNotEqual, throwError} from './util/assert';
import {assertLViewOrUndefined, assertTNodeForLView, assertTNodeForTView} from './assert';
import {DirectiveDef}
from './interfaces/definition';
import {TNode, TNodeType} from './interfaces/node';
import {CONTEXT,
DECLARATION_VIEW, HEADER_OFFSET, LView, OpaqueViewState, T_HOST, TData, TVIEW, TView,
TViewType} from './interfaces/view';
import {MATH_ML_NAMESPACE, SVG_NAMESPACE} from
 './namespaces';
import {getTNode} from './util/view_utils';

interface LFrame {
  Parent LFrame;
  Child LFrame;
  child: LFrame|null;
  State of the current view being processed;
  An array of nodes (text, element, container, etc), pipes, their bindings, and any local variables that need to be stored between invocations;
  IView: LView;
  Current `TView` associated with the `LFrame.IView`.
  One can get `TView` from `LFrame[TVIEW]` however because it is so common it makes sense to store it in `LFrame` for perf reasons;
  tView: TView;
  Used to set the parent property when nodes are created and track query results;
  This is used in conjunction with `isParent`.
  currentTNode: TNode|null;
  If `isParent` is:
  - `true`: then `currentTNode` points to a parent node;
  - `false`: then `currentTNode` points to previous node (sibling);
  isParent: boolean;
  Index of currently selected element in LView;
  Used by binding instructions. Updated as part of advance instruction;
  selectedIndex: number;
  Current pointer to the binding index;
  bindingIndex: number;
  The last viewData retrieved by nextContext().
  Allows building nextContext() and reference() calls;
  e.g. const inner = x().$implicit; const outer = x().$implicit;
  contextLView: LView|null;
  Store the element depth count. This is used to identify the root elements of the template so that we can then attach patch data `LView` to only those elements. We know that those are the only places where the patch data could change, this way we will save on number of places where the patching occurs;
  elementDepthCount: number;
  Current namespace to be used when creating elements;
  currentNamespace: string|null;
  The root index from which pure function instructions should calculate their binding indices. In component views, this is TView.bindingStartIndex. In a host binding context, this is the TView.expandoStartIndex + any dirs/hostVars before the given dir;
  bindingRootIndex: number;
  Current index of a View or Content Query which needs to be processed next;
  We iterate over the list of Queries and increment current query index at every step;
  currentQueryIndex: number;
  When host binding is executing this points to the directive index;
  `TView.data[currentDirectiveIndex]` is `DirectiveDef`
  `LView[currentDirectiveIndex]` is directive instance;
  currentDirectiveIndex: number;
  Are we currently in i18n block as denoted by `elementStart` and `elementEnd`;
  This information is needed because while we are in i18n block all elements must be pre-declared in the translation. (i.e. `Hello #2World/#2!` pre-declares element at `#2` location.)
  This allocates `TNodeType.Placeholder` element at location `2`. If translator removes `#2` from translation than the runtime must also ensure the element at `2` does not get inserted into the DOM. The translation does not carry information about deleted elements.
}

```

Therefore the only way to know that an element is deleted is that it was not pre-declared in the translation.

This flag works by ensuring that elements which are created without pre-declaration (TNodeType.Placeholder) are not inserted into the DOM render tree. (It does mean that the element still gets instantiated along with all of its behavior [directives])

```
inI18n: boolean;
```

All implicit instruction state is stored here. It is useful to have a single object where all of the state is stored as a mental model (rather it being spread across many different variables).

PERF NOTE: Turns out that writing to a true global variable is slower than having an intermediate object with properties.

```
interface InstructionState {
  Current `LFrame`
  `null` if we have not called `enterView`
  IFrame: LFrame;
  Stores whether directives should be matched to elements.
  When template contains `ngNonBindable` then we need to prevent the runtime from matching directives on children of that element.
  Example:
  <my-comp my-directive> Should match component / directive.
  </my-comp> <div ngNonBindable> <my-comp my-directive> Should not match component / directive because we are in ngNonBindable.
  </my-comp>
  </div>
  bindingsEnabled: boolean;
}
const instructionState: InstructionState = {
  IFrame: createLFrame(null),
  bindingsEnabled: true,
};
```

In this mode, any changes in bindings will throw an ExpressionChangedAfterChecked error. Necessary to support ChangeDetectorRef.checkNoChanges().

The `checkNoChanges` function is invoked only in ngDevMode=true and verifies that no unintended changes exist in the change detector or its children.

```
let _isInCheckNoChangesMode = false;
```

Returns true if the instruction state stack is empty. Intended to be called from tests only (tree shaken otherwise).

```
export function specOnlyIsInstructionStateEmpty(): boolean {
  return instructionState.IFrame.parent === null;
}
export function getElementDepthCount() {
  return instructionState.IFrame.elementDepthCount;
}
export function increaseElementDepthCount() {
  instructionState.IFrame.elementDepthCount++;
}
export function decreaseElementDepthCount() {
  instructionState.IFrame.elementDepthCount--;
}
export function getBindingsEnabled(): boolean {
  return instructionState.bindingsEnabled;
}
```

Enables directive matching on elements.

Example:

```
<my-comp my-directive> Should match component / directive.
</my-comp> <div ngNonBindable> <!-- disableBindings() --> <my-comp my-directive> Should not match component / directive because we are in ngNonBindable.
</my-comp> <!-- enableBindings() --> </div>
```

@codeGenApi

```
export function enableBindings(): void {
  instructionState.bindingsEnabled = true;
}
export function disableBindings(): void {
  instructionState.bindingsEnabled = false;
}
```

Return the current `LView`.

```
export function getLView<T>(): LView<T> {
  return instructionState.IFrame.IView as LView<T>;
}
export function getTView(): TView {
  return instructionState.IFrame.tView;
}
```

Restores `contextViewData` to the given OpaqueViewState instance. Used in conjunction with the `getCurrentView` instruction to save a snapshot of the current view and restore it when listeners are invoked. This allows walking the declaration view tree in listeners to get vars from parent views.

@param viewToRestore The OpaqueViewState instance to restore.

@returns Context of the restored OpaqueViewState instance.

```
@codeGenApi
export function restoreView<T> = any>(viewToRestore: OpaqueViewState): T {
  instructionState.IFrame.contextLView = viewToRestore as any as LView;
  return (viewToRestore as any as LView)[CONTEXT] as unknown as T;
}
```

Clears the view set in `restoreView` from memory. Returns the passed in value so that it can be used as a return value of an instruction.

```
@codeGenApi
export function resetView<T>(value?: T): T|undefined {
  instructionState.IFrame.contextLView = null;
  return value;
}
export function getCurrentTNode(): TNode|null {
  let currentTNode = getCurrentTNodePlaceholderOk();
  while (currentTNode !== null &&
```

```

currentTNode.type === TNodeType.Placeholder) {\n  currentTNode = currentTNode.parent;\n } \n return
currentTNode;\n}\n\nexport function getCurrentTNodePlaceholderOk(): TNode|null {\n return
instructionState.IFrame.currentTNode;\n}\n\nexport function getCurrentParentTNode(): TNode|null {\n const
IFrame = instructionState.IFrame;\n const currentTNode
= IFrame.currentTNode;\n return IFrame.isParent ? currentTNode : currentTNode!.parent;\n}\n\nexport function
setCurrentTNode(tNode: TNode|null, isParent: boolean) {\n ngDevMode && tNode &&
assertTNodeForTView(tNode, instructionState.IFrame.tView);\n const IFrame = instructionState.IFrame;\n
IFrame.currentTNode = tNode;\n IFrame.isParent = isParent;\n}\n\nexport function isCurrentTNodeParent():
boolean {\n return instructionState.IFrame.isParent;\n}\n\nexport function setCurrentTNodeAsNotParent(): void {\n
instructionState.IFrame.isParent = false;\n}\n\nexport function setCurrentTNodeAsParent(): void {\n
instructionState.IFrame.isParent = true;\n}\n\nexport function getContextLView(): LView {\n const contextLView
= instructionState.IFrame.contextLView;\n ngDevMode && assertDefined(contextLView, 'contextLView must be
defined.);\n return contextLView!;\n}\n\nexport function isInCheckNoChangesMode(): boolean {\n !ngDevMode
&& throwError('Must never be called in production
mode');\n return !_isInCheckNoChangesMode;\n}\n\nexport function setIsInCheckNoChangesMode(mode:
boolean): void {\n !ngDevMode && throwError('Must never be called in production mode');\n
_isInCheckNoChangesMode = mode;\n}\n\n// top level variables should not be exported for performance reasons
(PERF_NOTES.md)\nexport function getBindingRoot() {\n const IFrame = instructionState.IFrame;\n let index =
IFrame.bindingRootIndex;\n if (index === -1) {\n index = IFrame.bindingRootIndex =
IFrame.tView.bindingStartIndex;\n }\n return index;\n}\n\nexport function getBindingIndex(): number {\n return
instructionState.IFrame.bindingIndex;\n}\n\nexport function setBindingIndex(value: number): number {\n return
instructionState.IFrame.bindingIndex = value;\n}\n\nexport function nextBindingIndex(): number {\n return
instructionState.IFrame.bindingIndex++;\n}\n\nexport function incrementBindingIndex(count: number): number {\n
const IFrame = instructionState.IFrame;\n const index = IFrame.bindingIndex;\n
IFrame.bindingIndex = IFrame.bindingIndex + count;\n return index;\n}\n\nexport function isInI18nBlock() {\n
return instructionState.IFrame.inI18n;\n}\n\nexport function setInI18nBlock(isInI18nBlock: boolean): void {\n
instructionState.IFrame.inI18n = isInI18nBlock;\n}\n\n/**\n * Set a new binding root index so that host template
functions can execute.\n *\n * Bindings inside the host template are 0 index. But because we don't know ahead of
time\n * how many host bindings we have we can't pre-compute them. For this reason they are all\n * 0 index and
we just shift the root so that they match next available location in the LView.\n *\n * @param bindingRootIndex
Root index for `hostBindings`\n *\n * @param currentDirectiveIndex `TData[currentDirectiveIndex]` will point to the
current directive\n *\n * whose `hostBindings` are being processed.\n *\n */\nexport function
setBindingRootForHostBindings(\n  bindingRootIndex: number, currentDirectiveIndex: number) {\n const
IFrame = instructionState.IFrame;\n IFrame.bindingIndex = IFrame.bindingRootIndex = bindingRootIndex;\n
setCurrentDirectiveIndex(currentDirectiveIndex);\n}\n\n/**\n * When host binding is executing this points to the
directive index.\n *\n * `TView.data[getCurrentDirectiveIndex()]` is `DirectiveDef`\n *\n * `LView[getCurrentDirectiveIndex()]` is directive instance.\n *\n */\nexport function getCurrentDirectiveIndex():
number {\n return instructionState.IFrame.currentDirectiveIndex;\n}\n\n/**\n * Sets an index of a directive whose
`hostBindings` are being processed.\n *\n * @param currentDirectiveIndex `TData` index where current directive
instance can be found.\n *\n */\nexport function setCurrentDirectiveIndex(currentDirectiveIndex: number): void {\n
instructionState.IFrame.currentDirectiveIndex = currentDirectiveIndex;\n}\n\n/**\n * Retrieve the current
`DirectiveDef` which is active when `hostBindings` instruction is being\n * executed.\n *\n * @param tData Current
`TData` where the `DirectiveDef`
will be looked up at.\n *\n */\nexport function getCurrentDirectiveDef(tData: TData): DirectiveDef<any>|null {\n
const currentDirectiveIndex = instructionState.IFrame.currentDirectiveIndex;\n return currentDirectiveIndex === -1
? null : tData[currentDirectiveIndex] as DirectiveDef<any>;\n}\n\nexport function getCurrentQueryIndex(): number
{\n return instructionState.IFrame.currentQueryIndex;\n}\n\nexport function setCurrentQueryIndex(value: number):
void {\n instructionState.IFrame.currentQueryIndex = value;\n}\n\n/**\n * Returns a `TNode` of the location where

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the current `LView` is declared at.\n * \n * @param IView an `LView` that we want to find parent `TNode` for.\n
*\nfunction getDeclarationTNode(IView: LView): TNode|null {\n  const tView = IView[TVIEW];\n  \n  // Return
the declaration parent for embedded views\n  if (tView.type === TViewType.Embedded) {\n    ngDevMode &&
assertDefined(tView.declTNode, 'Embedded TNodes should have declaration parents.);\n    return
tView.declTNode;\n
  }\n  \n  // Components don't have `TView.declTNode` because each instance of component could be\n  // inserted in
different location, hence `TView.declTNode` is meaningless.\n  // Falling back to `T_HOST` in case we cross
component boundary.\n  if (tView.type === TViewType.Component) {\n    return IView[T_HOST];\n  }\n  \n  //
Remaining TNode type is `TViewType.Root` which doesn't have a parent TNode.\n  return null;\n}\n\n**\n * This
is a light weight version of the `enterView` which is needed by the DI system.\n * \n * @param IView `LView`
location of the DI context.\n * @param tNode `TNode` for DI context\n * @param flags DI context flags. if
`SkipSelf` flag is set than we walk up the declaration\n * tree from `tNode` until we find parent declared
`TElementNode`.\n * @returns `true` if we have successfully entered DI associated with `tNode` (or with declared\n
* `TNode` if `flags` has `SkipSelf`). Failing to enter DI implies that no associated\n * `NodeInjector`
can be found and we should instead use `ModuleInjector`.\n * - If `true` than this call must be followed by
`leaveDI`\n * - If `false` than this call failed and we should NOT call `leaveDI`\n * \nexport function
enterDI(IView: LView, tNode: TNode, flags: InjectFlags) {\n  ngDevMode &&
assertLViewOrUndefined(IView);\n  \n  if (flags & InjectFlags.SkipSelf) {\n    ngDevMode &&
assertTNodeForTView(tNode, IView[TVIEW]);\n    let parentTNode = tNode as TNode | null;\n    let
parentLView = IView;\n    \n    while (true) {\n      ngDevMode && assertDefined(parentTNode, 'Parent TNode should
be defined');\n      parentTNode = parentTNode!.parent as TNode | null;\n      if (parentTNode === null && !(flags &
InjectFlags.Host)) {\n        parentTNode = getDeclarationTNode(parentLView);\n        if (parentTNode === null)
break;\n        \n        // In this case, a parent exists and is definitely an element. So it will definitely\n
// have an
existing IView as the declaration view, which is
why we can assume it's defined.\n        ngDevMode && assertDefined(parentLView, 'Parent LView should be
defined');\n        parentLView = parentLView[DECLARATION_VIEW]!;\n        \n        // In Ivy there are Comment
nodes that correspond to ngIf and NgFor embedded directives\n        // We want to skip those and look only at
Elements and ElementContainers to ensure\n        // we're looking at true parent nodes, and not content or other
types.\n        if (parentTNode.type & (TNodeType.Element | TNodeType.ElementContainer)) {\n          break;\n
        }\n        } else {\n          break;\n        }\n        }\n        if (parentTNode === null) {\n          // If we failed to find a parent TNode
this means that we should use module injector.\n          return false;\n        } else {\n          tNode = parentTNode;\n          IView
= parentLView;\n        }\n        }\n        ngDevMode && assertTNodeForLView(tNode, IView);\n        const lFrame =
instructionState.lFrame = allocLFrame();\n        lFrame.currentTNode = tNode;\n        lFrame.IView = IView;\n        \n
return true;\n}\n\n**\n * Swap the current IView with a new IView.\n * \n * For performance reasons we store the
IView in the top level of the module.\n * This way we minimize the number of properties to read. Whenever a new
view\n * is entered we have to store the IView for later, and when the view is\n * exited the state has to be restored\n
*\n * @param newView New IView to become active\n * @returns the previously active IView;\n * \nexport
function enterView(newView: LView): void {\n  ngDevMode && assertNotEqual(newView[0], newView[1] as
any, '????');\n  ngDevMode && assertLViewOrUndefined(newView);\n  const newLFrame = allocLFrame();\n  if
(ngDevMode) {\n    assertEquals(newLFrame.isParent, true, 'Expected clean LFrame');\n
    assertEquals(newLFrame.IView, null, 'Expected clean LFrame');\n    assertEquals(newLFrame.tView, null, 'Expected
clean LFrame');\n    assertEquals(newLFrame.selectedIndex, -1, 'Expected clean LFrame');\n
    assertEquals(newLFrame.elementDepthCount, 0, 'Expected
clean LFrame');\n    assertEquals(newLFrame.currentDirectiveIndex, -1, 'Expected clean LFrame');\n
    assertEquals(newLFrame.currentNamespace, null, 'Expected clean LFrame');\n
    assertEquals(newLFrame.bindingRootIndex, -1, 'Expected clean LFrame');\n
    assertEquals(newLFrame.currentQueryIndex, 0, 'Expected clean LFrame');\n  }\n  const tView =
newView[TVIEW];\n  instructionState.lFrame = newLFrame;\n  ngDevMode && tView.firstChild &&

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assertTNodeForTView(tView.firstChild, tView);\n newLFrame.currentTNode = tView.firstChild!;\n
newLFrame.IView = newView;\n newLFrame.tView = tView;\n newLFrame.contextLView = newView;\n
newLFrame.bindingIndex = tView.bindingStartIndex;\n newLFrame.inI18n = false;\n}\n\n/**\n * Allocates next
free LFrame. This function tries to reuse the `LFrame`s to lower memory pressure.\n */\nfunction allocLFrame() {\n
const currentLFrame = instructionState.IFrame;\n const childLFrame = currentLFrame === null ? null :
currentLFrame.child;\n const newLFrame
= childLFrame === null ? createLFrame(currentLFrame) : childLFrame;\n return newLFrame;\n}\n\nfunction
createLFrame(parent: LFrame|null): LFrame {\n const IFrame: LFrame = {\n currentTNode: null,\n isParent:
true,\n IView: null!,\n tView: null!,\n selectedIndex: -1,\n contextLView: null,\n elementDepthCount: 0,\n
currentNamespace: null,\n currentDirectiveIndex: -1,\n bindingRootIndex: -1,\n bindingIndex: -1,\n
currentQueryIndex: 0,\n parent: parent!,\n child: null,\n inI18n: false,\n }; \n parent !== null && (parent.child
= IFrame); // link the new LFrame for reuse.\n return IFrame;\n}\n\n/**\n * A lightweight version of leave which is
used with DI.\n *\n * This function only resets `currentTNode` and `LView` as those are the only properties\n *
used with DI (^enterDI()).\n *\n * NOTE: This function is reexported as `leaveDI`. However `leaveDI` has return
type of `void` where\n * as `leaveViewLight` has `LFrame`. This is so that `leaveViewLight`
can be used in `leaveView`.\n */\nfunction leaveViewLight(): LFrame {\n const oldLFrame =
instructionState.IFrame;\n instructionState.IFrame = oldLFrame.parent;\n oldLFrame.currentTNode = null!;\n
oldLFrame.IView = null!;\n return oldLFrame;\n}\n\n/**\n * This is a lightweight version of the `leaveView` which
is needed by the DI system.\n *\n * NOTE: this function is an alias so that we can change the type of the function to
have `void` \n * return type.\n */\nexport const leaveDI: () => void = leaveViewLight;\n\n/**\n * Leave the current
`LView`\n *\n * This pops the `LFrame` with the associated `LView` from the stack.\n *\n * IMPORTANT: We
must zero out the `LFrame` values here otherwise they will be retained. This is\n * because for performance reasons
we don't release `LFrame` but rather keep it for next use.\n */\nexport function leaveView() {\n const oldLFrame =
leaveViewLight();\n oldLFrame.isParent = true;\n oldLFrame.tView = null!;\n oldLFrame.selectedIndex
= -1;\n oldLFrame.contextLView = null;\n oldLFrame.elementDepthCount = 0;\n
oldLFrame.currentDirectiveIndex = -1;\n oldLFrame.currentNamespace = null;\n oldLFrame.bindingRootIndex = -
1;\n oldLFrame.bindingIndex = -1;\n oldLFrame.currentQueryIndex = 0;\n}\n\nexport function
nextContextImpl<T = any>(level: number): T {\n const contextLView = instructionState.IFrame.contextLView =\n
walkUpViews(level, instructionState.IFrame.contextLView!);\n return contextLView[CONTEXT] as unknown as
T;\n}\n\nfunction walkUpViews(nestingLevel: number, currentView: LView): LView {\n while (nestingLevel > 0)
{\n ngDevMode &&\n assertDefined(\n currentView[DECLARATION_VIEW],\n 'Declaration
view should be defined if nesting level is greater than 0.);\n currentView =
currentView[DECLARATION_VIEW]!\n nestingLevel--;\n }\n return currentView;\n}\n\n/**\n * Gets the
currently selected element index.\n *\n * Used with {@link property} instruction (and more
in the future) to identify the index in the\n * current `LView` to act on.\n */\nexport function getSelectedIndex() {\n
return instructionState.IFrame.selectedIndex;\n}\n\n/**\n * Sets the most recent index passed to {@link select}\n
*\n * Used with {@link property} instruction (and more in the future) to identify the index in the\n * current
`LView` to act on.\n *\n * (Note that if an "exit function" was set earlier (via `setElementExitFn`) then that will
be\n * run if and when the provided `index` value is different from the current selected index value.)\n */\nexport
function setSelectedIndex(index: number) {\n ngDevMode && index !== -1 &&\n
assertGreaterThanOrEqual(index, HEADER_OFFSET, 'Index must be past HEADER_OFFSET (or -1).);\n
ngDevMode &&\n assertLessThan(\n index, instructionState.IFrame.IView.length, 'Can\\\'t set index passed
end of LView');\n instructionState.IFrame.selectedIndex = index;\n}\n\n/**\n * Gets the `tNode` that represents
currently
selected element.\n */\nexport function getSelectedTNode() {\n const IFrame = instructionState.IFrame;\n return
getTNode(IFrame.tView, IFrame.selectedIndex);\n}\n\n/**\n * Sets the namespace used to create elements to
`http://www.w3.org/2000/svg` in global state.\n *\n * @codeGenApi\n */\nexport function namespaceSVG() {\n
instructionState.IFrame.currentNamespace = SVG_NAMESPACE;\n}\n\n/**\n * Sets the namespace used to create

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elements to `http://www.w3.org/1998/MathML/` in global state.\n *\n * @codeGenApi\n */\nexport function
namespaceMathML() {\n  instructionState.IFrame.currentNamespace = MATH_ML_NAMESPACE;\n}\n\n/**\n *
Sets the namespace used to create elements to `null`, which forces element creation to use\n * `createElement` rather
than `createElementNS`.\n *\n * @codeGenApi\n */\nexport function namespaceHTML() {\n
namespaceHTMLInternal();\n}\n\n/**\n * Sets the namespace used to create elements to `null`, which forces
element creation to use\n * `createElement`
rather than `createElementNS`.\n */\nexport function namespaceHTMLInternal() {\n
instructionState.IFrame.currentNamespace = null;\n}\n\nexport function getNamespace(): string|null {\n  return
instructionState.IFrame.currentNamespace;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport { AfterContentChecked, AfterContentInit,
AfterViewChecked, AfterViewInit, DoCheck, OnChanges, OnDestroy, OnInit } from
'./interface/lifecycle_hooks';\nimport { assertDefined, assertEqual, assertNotEqual } from './util/assert';\nimport
{ assertFirstCreatePass } from './assert';\nimport { NgOnChangesFeatureImpl } from
'./features/ng_onchanges_feature';\nimport { DirectiveDef } from './interfaces/definition';\nimport { TNode } from
'./interfaces/node';\nimport { FLAGS, HookData, InitPhaseState, LView, LViewFlags,
PREORDER_HOOK_FLAGS, PreOrderHookFlags,
TView } from './interfaces/view';\nimport { profiler, ProfilerEvent } from './profiler';\nimport
{ isInCheckNoChangesMode } from './state';\n\n\n/**\n * Adds all directive lifecycle hooks from the given
`DirectiveDef` to the given `TView`.\n *\n * Must be run *only* on the first template pass.\n *\n * Sets up the pre-
order hooks on the provided `tView`,\n * see { @link HookData } for details about the data structure.\n *\n *
@param directiveIndex The index of the directive in LView\n * @param directiveDef The definition containing the
hooks to setup in tView\n * @param tView The current TView\n */\nexport function registerPreOrderHooks(\n
directiveIndex: number, directiveDef: DirectiveDef<any>, tView: TView): void {\n  ngDevMode &&
assertFirstCreatePass(tView);\n  const { ngOnChanges, ngOnInit, ngDoCheck } =\n    directiveDef.type.prototype as
OnChanges & OnInit & DoCheck;\n  if (ngOnChanges as Function | undefined) {\n    const wrappedOnChanges =
NgOnChangesFeatureImpl(directiveDef);\n    (tView.preOrderHooks || (tView.preOrderHooks = [])).push(directiveIndex, wrappedOnChanges);\n
(tView.preOrderCheckHooks || (tView.preOrderCheckHooks = []))\n      .push(directiveIndex,
wrappedOnChanges);\n  }\n  if (ngOnInit) {\n    (tView.preOrderHooks || (tView.preOrderHooks = [])).push(0 -
directiveIndex, ngOnInit);\n  }\n  if (ngDoCheck) {\n    (tView.preOrderHooks || (tView.preOrderHooks =
[])).push(directiveIndex, ngDoCheck);\n    (tView.preOrderCheckHooks || (tView.preOrderCheckHooks =
[])).push(directiveIndex, ngDoCheck);\n  }\n}\n\n\n/**\n * Loops through the directives on the provided `tNode`
and queues hooks to be\n * run that are not initialization hooks.\n *\n * Should be executed during `elementEnd()`
and similar to\n * preserve hook execution order. Content, view, and destroy hooks for projected\n * components
and directives must be called *before* their hosts.\n *\n * Sets up the content, view, and destroy hooks on the
provided `tView`,\n * see { @link
HookData } for details about the data structure.\n *\n * NOTE: This does not set up `onChanges`, `onInit` or
`doCheck`, those are set up\n * separately at `elementStart`.\n *\n * @param tView The current TView\n * @param
tNode The TNode whose directives are to be searched for hooks to queue\n */\nexport function
registerPostOrderHooks(tView: TView, tNode: TNode): void {\n  ngDevMode && assertFirstCreatePass(tView);\n  // It's necessary to loop through the directives at elementEnd() (rather than processing in\n // directiveCreate) so we
can preserve the current hook order. Content, view, and destroy\n // hooks for projected components and directives
must be called *before* their hosts.\n  for (let i = tNode.directiveStart, end = tNode.directiveEnd; i < end; i++) {\n
const directiveDef = tView.data[i] as DirectiveDef<any>;\n    ngDevMode && assertDefined(directiveDef,
'Expecting DirectiveDef');\n    const lifecycleHooks:
AfterContentInit&AfterContentChecked&AfterViewInit&AfterViewChecked&\n

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    OnDestroy = directiveDef.type.prototype;\n    const {\n      ngAfterContentInit,\n      ngAfterContentChecked,\n      ngAfterViewInit,\n      ngAfterViewChecked,\n      ngOnDestroy\n    } = lifecycleHooks;\n    if\n    (ngAfterContentInit) {\n      (tView.contentHooks || (tView.contentHooks = [])).push(-i, ngAfterContentInit);\n    }\n    if (ngAfterContentChecked) {\n      (tView.contentHooks || (tView.contentHooks = [])).push(i,\n      ngAfterContentChecked);\n      (tView.contentCheckHooks || (tView.contentCheckHooks = [])).push(i,\n      ngAfterContentChecked);\n    }\n    if (ngAfterViewInit) {\n      (tView.viewHooks || (tView.viewHooks =\n      [])).push(-i, ngAfterViewInit);\n    }\n    if (ngAfterViewChecked) {\n      (tView.viewHooks || (tView.viewHooks =\n      [])).push(i, ngAfterViewChecked);\n      (tView.viewCheckHooks || (tView.viewCheckHooks = [])).push(i,\n      ngAfterViewChecked);\n    }\n    if (ngOnDestroy != null) {\n      (tView.destroyHooks || (tView.destroyHooks =\n      [])).push(i,\n      ngOnDestroy);\n    }\n  }\n}\n\n/**\n * Executes pre-order check hooks ( OnChanges, DoChanges) given a view where all the init hooks\n * were\n * executed once. This is a light version of executeInitAndCheckPreOrderHooks where we can skip read\n * / write of the init-hooks related flags.\n * @param IView The LView where hooks are defined\n * @param hooks\n * Hooks to be run\n * @param nodeIndex 3 cases depending on the value:\n * - undefined: all hooks from the array\n * should be executed (post-order case)\n * - null: execute hooks only from the saved index until the end of the array\n * (pre-order case, when\n * flushing the remaining hooks)\n * - number: execute hooks only from the saved index\n * until that node index exclusive (pre-order\n * case, when executing select(number))\n */\nexport function\nexecuteCheckHooks(IView:\n  LView, hooks: HookData, nodeIndex?: number|null) {\n  callHooks(IView, hooks,\n  InitPhaseState.InitPhaseCompleted, nodeIndex);\n}\n\n/**\n * Executes post-order init and check hooks (one of\n * AfterContentInit, AfterContentChecked,\n * AfterViewInit, AfterViewChecked) given a view where there are\n * pending init hooks to be executed.\n * @param IView The LView where hooks are defined\n * @param hooks\n * Hooks to be run\n * @param initPhase A phase for which hooks should be run\n * @param nodeIndex 3 cases\n * depending on the value:\n * - undefined: all hooks from the array should be executed (post-order case)\n * - null:\n * execute hooks only from the saved index until the end of the array (pre-order case, when\n * flushing the remaining\n * hooks)\n * - number: execute hooks only from the saved index until that node index exclusive (pre-order\n * case,\n * when executing select(number))\n */\nexport function executeInitAndCheckHooks(\n  IView: LView, hooks:\n  HookData, initPhase: InitPhaseState,\n  nodeIndex?: number|null) {\n  ngDevMode &&\n  assertNotEqual(\n    initPhase,\n  InitPhaseState.InitPhaseCompleted,\n    'Init pre-order hooks should not be called more than once');\n  if\n  ((IView[FLAGS] & LViewFlags.InitPhaseStateMask) === initPhase) {\n    callHooks(IView, hooks, initPhase,\n    nodeIndex);\n  }\n}\n\nexport function incrementInitPhaseFlags(IView: LView, initPhase: InitPhaseState): void {\n  ngDevMode &&\n  assertNotEqual(\n    initPhase, InitPhaseState.InitPhaseCompleted,\n    'Init hooks\n  phase should not be incremented after all init hooks have been run.);\n  let flags = IView[FLAGS];\n  if ((flags &\n  LViewFlags.InitPhaseStateMask) === initPhase) {\n    flags &= LViewFlags.IndexWithinInitPhaseReset;\n    flags\n    += LViewFlags.InitPhaseStateIncrementer;\n    IView[FLAGS] = flags;\n  }\n}\n\n/**\n * Calls lifecycle hooks with\n * their contexts, skipping init hooks if it's not\n * the first LView pass\n * @param currentView The current

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view\n
 * @param arr The array in which the hooks are found\n
 * @param initPhaseState the current state of the init
phase\n
 * @param currentNodeIndex 3 cases depending on the value:\n
 * - undefined: all hooks from the array
should be executed (post-order case)\n
 * - null: execute hooks only from the saved index until the end of the array
(pre-order case, when\n
 * flushing the remaining hooks)\n
 * - number: execute hooks only from the saved index
until that node index exclusive (pre-order\n
 * case, when executing select(number))\n
 * ^function callHooks(\n
currentView: LView, arr: HookData, initPhase: InitPhaseState,\n
currentNodeIndex: number|null|undefined): void
{\n
ngDevMode &&\n
assertEqual(\n
isInCheckNoChangesMode(), false,\n
'Hooks should never be
run when in check no changes mode.);\n
const startIndex = currentNodeIndex !== undefined ?\n
(currentView[PREORDER_HOOK_FLAGS] & PreOrderHookFlags.IndexOfTheNextPreOrderHookMaskMask) :\n
0;\n
const nodeIndexLimit
= currentNodeIndex != null ? currentNodeIndex - 1;\n
const max = arr.length - 1; // Stop the loop at length - 1,
because we look for the hook at i + 1\n
let lastNodeIndexFound = 0;\n
for (let i = startIndex; i < max; i++) {\n
const hook = arr[i + 1] as number | (() => void);\n
if (typeof hook === 'number') {\n
lastNodeIndexFound =
arr[i] as number;\n
if (currentNodeIndex != null && lastNodeIndexFound >= currentNodeIndex) {\n
break;\n
}\n
} else {\n
const isInitHook = arr[i] < 0;\n
if (isInitHook)\n
currentView[PREORDER_HOOK_FLAGS] += PreOrderHookFlags.NumberOfInitHooksCalledIncrementer;\n
if (lastNodeIndexFound < nodeIndexLimit || nodeIndexLimit == -1) {\n
callHook(currentView, initPhase, arr,
i);\n
currentView[PREORDER_HOOK_FLAGS] =\n
(currentView[PREORDER_HOOK_FLAGS] &
PreOrderHookFlags.NumberOfInitHooksCalledMask) + i +\n
2;\n
}\n
i++;\n
}\n
}\n
}\n
}\n
}\n
}\n
}
Execute
one hook against the current `LView`.\n
 * @param currentView The current view\n
 * @param initPhaseState
the current state of the init phase\n
 * @param arr The array in which the hooks are found\n
 * @param i The current
index within the hook data array\n
 * ^function callHook(currentView: LView, initPhase: InitPhaseState, arr:
HookData, i: number) {\n
const isInitHook = arr[i] < 0;\n
const hook = arr[i + 1] as () => void;\n
const
directiveIndex = isInitHook ? -arr[i] : arr[i] as number;\n
const directive = currentView[directiveIndex];\n
if
(isInitHook) {\n
const indexWithinInitPhase = currentView[FLAGS] >>
LViewFlags.IndexWithinInitPhaseShift;\n
// The init phase state must be always checked here as it may have been
recursively updated.\n
if (indexWithinInitPhase <\n
(currentView[PREORDER_HOOK_FLAGS] >>
PreOrderHookFlags.NumberOfInitHooksCalledShift) &&\n
(currentView[FLAGS] &
LViewFlags.InitPhaseStateMask) === initPhase) {\n
currentView[FLAGS]
+= LViewFlags.IndexWithinInitPhaseIncrementer;\n
profiler(ProfilerEvent.LifecycleHookStart, directive,
hook);\n
try {\n
hook.call(directive);\n
} finally {\n
profiler(ProfilerEvent.LifecycleHookEnd,
directive, hook);\n
}\n
}\n
} else {\n
profiler(ProfilerEvent.LifecycleHookStart, directive, hook);\n
try {\n
hook.call(directive);\n
} finally {\n
profiler(ProfilerEvent.LifecycleHookEnd, directive, hook);\n
}\n
}\n
}\n
}\n
}"/**\n
 * @license\n
 * Copyright Google LLC All Rights Reserved.\n
 * Use of this source code is
governed by an MIT-style license that can be\n
 * found in the LICENSE file at https://angular.io/license\n
 * ^\n
import {InjectFlags} from './di/interface/injector';\n
import {ProviderToken} from
'./di/provider_token';\n
import {assertDefined, assertEquals} from './util/assert';\n
import
{TDirectiveHostNode} from './node';\n
import {LView, TData} from './view';\n
}/**\n
 * Offsets of the
`NodeInjector` data
structure in the expando.\n
 * `NodeInjector` is stored in both `LView` as well as `TView.data`. All storage
requires 9 words.\n
 * First 8 are reserved for bloom filter and the 9th is reserved for the associated `TNode` as
well\n
 * as parent `NodeInjector` pointer. All indexes are starting with `index` and have an offset as\n
 * shown.\n
 * `LView` layout:\n
 * ``\n
 * index + 0: cumulative bloom filter\n
 * index + 1: cumulative bloom filter\n
 * index
+ 2: cumulative bloom filter\n
 * index + 3: cumulative bloom filter\n
 * index + 4: cumulative bloom filter\n
 * index
+ 5: cumulative bloom filter\n
 * index + 6: cumulative bloom filter\n
 * index + 7: cumulative bloom filter\n
 * index
+ 8: cumulative bloom filter\n
 * index + PARENT: Index to the parent injector. See `RelativeInjectorLocation`\n
 *

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`const parent = IView[index + NodeInjectorOffset.PARENT]`
index + 0: cumulative bloom filter
index + 1: cumulative bloom filter
* index + 2: cumulative bloom filter
* index + 3: cumulative bloom filter
* index + 4: cumulative bloom filter
* index + 5: cumulative bloom filter
* index + 6: cumulative bloom filter
* index + 7: cumulative bloom filter
* index + 8: cumulative bloom filter
* index + TNODE: TNode associated with this `NodeInjector`
`const tNode = tView.data[index + NodeInjectorOffset.TNODE]`
NodeInjectorOffset {
  TNODE = 8,
  PARENT = 8,
  BLOOM_SIZE = 8,
  SIZE = 9,
}
Represents a relative location of parent injector.
The interfaces encodes number of parents `LView`s to traverse and index in the `LView` pointing to the parent injector.
interface RelativeInjectorLocation {
  __brand__: 'RelativeInjectorLocationFlags';
}
export const enum RelativeInjectorLocationFlags {
  InjectorIndexMask = 0b11111111111111,
  ViewOffsetShift = 16,
  NO_PARENT = -1,
}
export const NO_PARENT_INJECTOR:
  RelativeInjectorLocation = -1 as any;
Each injector is saved in 9 contiguous slots in `LView` and 9 contiguous slots in `TView.data`. This allows us to store information about the current node's tokens (which can be shared in `TView`) as well as the tokens of its ancestor nodes (which cannot be shared, so they live in `LView`). Each of these slots (aside from the last slot) contains a bloom filter. This bloom filter determines whether a directive is available on the associated node or not. This prevents us from searching the directives array at this level unless it's probable the directive is in it. See:
https://en.wikipedia.org/wiki/Bloom\_filter for more about bloom filters.
Because all injectors have been flattened into `LView` and `TViewData`, they cannot typed using interfaces as they were previously. The start index of each `LInjector` and `TInjector` will differ based on where it is flattened into the main array, so it's not possible to know the indices ahead of time and save their types here. The interfaces are still included here for documentation purposes.
export interface LInjector extends Array<any> {
  // Cumulative bloom for directive IDs 0-31 (IDs are % BLOOM_SIZE)
  [0]: number;
  // Cumulative bloom for directive IDs 32-63
  [1]: number;
  // Cumulative bloom for directive IDs 64-95
  [2]: number;
  // Cumulative bloom for directive IDs 96-127
  [3]: number;
  // Cumulative bloom for directive IDs 128-159
  [4]: number;
  // Cumulative bloom for directive IDs 160 - 191
  [5]: number;
  // Cumulative bloom for directive IDs 192 - 223
  [6]: number;
  // Cumulative bloom for directive IDs 224 - 255
  [7]: number;
  // We need to store a reference to the injector's parent so DI can keep looking up the injector tree until it finds the dependency it's looking for.
  [PARENT_INJECTOR]: number;
}
export interface TInjector extends Array<any> {
  // Shared node bloom for directive IDs 0-31 (IDs are % BLOOM_SIZE)
  [0]: number;
  // Shared node bloom for directive IDs 32-63
  [1]: number;
  // Shared node bloom for directive IDs 64-95
  [2]: number;
  // Shared node bloom for directive IDs 96-127
  [3]: number;
  // Shared node bloom for directive IDs 128-159
  [4]: number;
  // Shared node bloom for directive IDs 160 - 191
  [5]: number;
  // Shared node bloom for directive IDs 192 - 223
  [6]: number;
  // Shared node bloom for directive IDs 224 - 255
  [7]: number;
  // Necessary to find directive indices for a particular node.
  [TNODE]: TElementNode|TElementContainerNode|TContainerNode;
}
Factory for creating instances of injectors in the NodeInjector.
This factory is complicated by the fact that it can resolve `multi` factories as well. NOTE: Some of the fields are optional which means that this class has two hidden classes.
- One without `multi` support (most common)
- One with `multi` values, (rare).
Since VMs can cache up to 4 inline hidden classes this is OK.
- Single factory: Only `resolving` and `factory` is defined.
- `providers` factory: `componentProviders` is a number and `index` points to `providers`.
export class NodeInjectorFactory {
  // The inject implementation to be activated when using the factory.
  injectImpl: null|(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T);
  // Marker set to true during factory invocation to see if we get into recursive loop.
  // Recursive loop causes an error to be displayed.
  resolving = false;
  // Marks that

```

the token can see other Tokens declared in `viewProviders` on the same node.

```

    * canSeeViewProviders:
    boolean;
    /**
     * An array of factories to use in case of `multi` provider.
     * multi?: Array<() => any>;
    */
    * Number of `multi`-providers which belong to the component.
    * This is needed because when multiple components and directives declare the `multi` provider
    * they have to be concatenated in the correct order.
    * Example:
    * If we have a component and directive active on a single element as declared here
    * ``
    * component:
    * providers: [ {provide: String, useValue: 'component', multi: true} ],
    * viewProviders: [ {provide: String, useValue: 'componentView', multi: true} ],
    * directive:
    * providers: [ {provide: String, useValue: 'directive', multi: true} ],
    * ``
    * Then the expected results are:
    * providers: ['component', 'directive']
    * viewProviders:
    * ['component', 'componentView', 'directive']
    * ``
    * The way to think about it is that the `viewProviders` have been inserted after the component
    * but before the directives, which is why we need to know how many `multi`s have been declared by
    * the component.
    * componentProviders?: number;
    /**
     * Current index of the Factory in the `data`. Needed for `viewProviders` and `providers` merging.
     * See `providerFactory`.
    */
    * index?: number;
    /**
     * Because the same `multi` provider can be declared in `providers` and `viewProviders` it is
     * possible for `viewProviders` to shadow the `providers`. For this reason we store the
     * `provideFactory` of the `providers` so that `providers` can be extended with `viewProviders`.
    * Example:
    * Given:
    * providers: [ {provide: String, useValue: 'all', multi: true} ],
    * viewProviders: [ {provide: String, useValue: 'viewOnly', multi: true} ],
    * ``
    * We have to return `['all']` in case of content injection, but `['all', 'viewOnly']` in case
    * of view injection. We further have to make sure that the shared instances (in our case
    * `all`) are the exact same instance in both the content as well as the view injection. (We
    * have to make sure that we don't double instantiate.) For this reason the `viewProviders`
    * `Factory` has a pointer to the shadowed `providers` factory so that it can instantiate the
    * `providers` ( `['all']` ) and then extend it with `viewProviders` ( `['all'] + ['viewOnly']` ).
    * providerFactory?: NodeInjectorFactory|null;
    constructor(
    /**
     * Factory to invoke in order to create a new instance.
    */
    public factory:
    (this: NodeInjectorFactory, _: undefined,
    /**
     * array where injectables tokens are stored. This is used in
     * case of an error reporting to produce friendlier errors.
    */
    tData: TData,
    /**
     * array where existing instances of injectables are stored. This is used in case
     * of multi shadow is needed. See `multi` field documentation.
    */
    IView: LView,
    /**
     * The TNode of the same element injector.
    */
    tNode: TDirectiveHostNode) => any,
    /**
     * Set to `true` if the token is declared in `viewProviders` (or if it is component).
    */
    isViewProvider: boolean,
    injectImplementation: null|(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T)) {
    ngDevMode && assertDefined(factory, 'Factory not specified');
    ngDevMode && assertEqual(typeof factory, 'function', 'Expected factory function.');
```

```

    this.canSeeViewProviders = isViewProvider;
    this.injectImpl = injectImplementation;
  }
}
export function isFactory(obj: any): obj is NodeInjectorFactory {
  return obj instanceof NodeInjectorFactory;
}
// Note: This hack is necessary so we don't erroneously get a circular dependency
// failure based on types.
export const unusedValueExportToPlacateAjd = 1;
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import {KeyValueArray} from './util/array_utils';
import {TStylingRange} from './interfaces/styling';
import {Ticu} from './i18n';
import {CssSelector} from './projection';
import {RNode} from './renderer_dom';
import {LView, TView} from './view';
/**
 * TNodeType corresponds to the {@link TNode} `type` property.
 * NOTE: type IDs are such that we use each bit to denote a type. This is done so that we can easily
 * check if the `TNode` is of more than one type.
 * `if (tNode.type === TNodeType.Text || tNode.type === TNodeType.Element)`
 * can be written as:
 * `if (tNode.type & (TNodeType.Text | TNodeType.Element))`
 * However any given `TNode` can only be of one type.
 */
export const enum TNodeType {
  /**
   * The TNode contains information about a DOM element aka {@link

```

```

RText}.n */n Text = 0b1,n/n /**n * The TNode contains information about a DOM element aka { @link
RElement}.n */n Element = 0b10,n/n /**n * The TNode contains information about an { @link LContainer}
for embedded views.n */n Container = 0b100,n/n /**n * The TNode contains information about an `<ng-
container>` element { @link RNode}.n */n ElementContainer = 0b1000,n/n /**n * The TNode contains
information about an `<ng-content>` projection.n */n Projection = 0b10000,n/n /**n * The TNode contains
information about an ICU comment used in `i18n`.n */n Icu = 0b100000,n/n /**n * Special node type
representing a placeholder for future `TNode` at this location.n */n * I18n translation blocks are created before
the element
nodes which they contain. (I18n blocks.n */n * can span over many elements.) Because i18n `TNode`s (representing
text) are created first they.n */n * often may need to point to element `TNode`s which are not yet created. In such a
case we create.n */n * a `Placeholder` `TNode`. This allows the i18n to structurally link the `TNode`s together.n */n *
without knowing any information about the future nodes which will be at that location.n */n * On
`firstCreatePass` When element instruction executes it will try to create a `TNode` at that.n */n * location. Seeing a
`Placeholder` `TNode` already there tells the system that it should reuse.n */n * existing `TNode` (rather than create a
new one) and just update the missing information.n */n * Placeholder = 0b1000000,n/n // Combined Types These
should never be used for `TNode.type` only as a useful way to check.n */n // if `TNode.type` is one of several
choices.n/n // See: https://github.com/microsoft/TypeScript/issues/35875 why we can't refer
to existing enum.n */n AnyRNode = 0b11, // Text | Element,n */n AnyContainer = 0b1100, // Container |
ElementContainer, // See:n/n/n /**n * Converts `TNodeType` into human readable text.n */n * Make sure this
matches with `TNodeType`.n */n */n export function toTNodeTypeAsString(tNodeType: TNodeType): string {n let
text = ";n (tNodeType & TNodeType.Text) && (text += '|Text');n (tNodeType & TNodeType.Element) && (text
+= '|Element');n (tNodeType & TNodeType.Container) && (text += '|Container');n (tNodeType &
TNodeType.ElementContainer) && (text += '|ElementContainer');n (tNodeType & TNodeType.Projection) &&
(text += '|Projection');n (tNodeType & TNodeType.Icu) && (text += '|IcuContainer');n (tNodeType &
TNodeType.Placeholder) && (text += '|Placeholder');n return text.length > 0 ? text.substring(1) : text;n }n/n /**n
* Corresponds to the TNode.flags property.n */n */n export const enum TNodeFlags {n /** Bit #1 - This bit is set if
the node is a host for any directive (including
a component) */n isDirectiveHost = 0x1,n/n /**n * Bit #2 - This bit is set if the node is a host for a
component.n */n * Setting this bit implies that the `isDirectiveHost` bit is set as well.n */n */n
isComponentHost = 0x2,n/n /** Bit #3 - This bit is set if the node has been projected */n isProjected = 0x4,n/n
/** Bit #4 - This bit is set if any directive on this node has content queries */n hasContentQuery = 0x8,n/n /** Bit
#5 - This bit is set if the node has any "class" inputs */n hasClassInput = 0x10,n/n /** Bit #6 - This bit is set if
the node has any "style" inputs */n hasStyleInput = 0x20,n/n /** Bit #7 This bit is set if the node has been
detached by i18n */n isDetached = 0x40,n/n /**n * Bit #8 - This bit is set if the node has directives with host
bindings.n */n * This flags allows us to guard host-binding logic and invoke it only on nodes.n */n * that actually
have directives with host bindings.n */n */n hasHostBindings
= 0x80,n/n/n /**n * Corresponds to the TNode.providerIndexes property.n */n */n export const enum
TNodeProviderIndexes {n /** The index of the first provider on this node is encoded on the least significant bits.
*/n ProvidersStartIndexMask = 0b00000000000001111111111111111111,n/n /**n * The count of view
providers from the component on this node is.n */n * encoded on the 20 most significant bits.n */n */n
CptViewProvidersCountShift = 20,n */n CptViewProvidersCountShifter =
0b00000000000100000000000000000000,n/n/n /**n * A set of marker values to be used in the attributes arrays.
These markers indicate that some.n */n * items are not regular attributes and the processing should be adapted
accordingly.n */n */n export const enum AttributeMarker {n /**n * An implicit marker which indicates that the
value in the array are of `attributeKey`,n */n * `attributeValue` format.n */n * NOTE: This is implicit as it is the
type when no marker is present in array. We indicate that.n
*/n * it should not be present at runtime by the negative number.n */n */n ImplicitAttributes = -1,n/n/n /**n * Marker
indicates that the following 3 values in the attributes array are:n */n * namespaceUri, attributeName, attributeValue.n

```

\* in that order.\n \* ^\n NamespaceURI = 0,\n\n /\*\*\n \* Signals class declaration.\n \* \n \* Each value following `Classes` designates a class name to include on the element.\n \* ## Example:\n \* \n \* Given:\n \* ```\n \* <div class="foo bar baz">...</div>\n \* ```\n \* \n \* the generated code is:\n \* ```\n \* var \_c1 = [AttributeMarker.Classes, 'foo', 'bar', 'baz'];\n \* ```\n \* ^\n Classes = 1,\n\n /\*\*\n \* Signals style declaration.\n \* \n \* Each pair of values following `Styles` designates a style name and value to include on the element.\n \* ## Example:\n \* \n \* Given:\n \* ```\n \* <div style="width:100px; height:200px; color:red">...</div>\n \* ```\n \* \n \* the generated code is:\n \* ```\n \* var \_c1 = [AttributeMarker.Styles, 'width', '100px', 'height', '200px', 'color', 'red'];\n \* ```\n \* ^\n Styles = 2,\n\n /\*\*\n \* Signals that the following attribute names were extracted from input or output bindings.\n \* \n \* For example, given the following HTML:\n \* \n \* ```\n \* <div moo="car" [foo]="exp" (bar)="doSth()">\n \* ```\n \* \n \* the generated code is:\n \* \n \* ```\n \* var \_c1 = ['moo', 'car', AttributeMarker.Bindings, 'foo', 'bar'];\n \* ```\n \* ^\n Bindings = 3,\n\n /\*\*\n \* Signals that the following attribute names were hoisted from an inline-template declaration.\n \* \n \* For example, given the following HTML:\n \* \n \* ```\n \* <div \*ngFor="let value of values; trackBy:trackBy" dirA [dirB]="value">\n \* ```\n \* \n \* the generated code for the `template()` instruction would include:\n \* \n \* ```\n \* ['dirA', "", AttributeMarker.Bindings, 'dirB', AttributeMarker.Template, 'ngFor', 'ngForOf',\n \* 'ngForTrackBy', 'let-value']\n \* ```\n \* \n \* while the generated code for the `element()` instruction inside the template function would include:\n \* \n \* ```\n \* ['dirA', "", AttributeMarker.Bindings, 'dirB']\n \* ```\n \* ^\n Template = 4,\n\n /\*\*\n \* Signals that the following attribute is `ngProjectAs` and its value is a parsed `CssSelector`.\n \* \n \* For example, given the following HTML:\n \* \n \* ```\n \* <h1 attr="value" ngProjectAs="[title]">\n \* ```\n \* \n \* the generated code for the `element()` instruction would include:\n \* \n \* ```\n \* ['attr', 'value', AttributeMarker.ProjectAs, ['', 'title', '']]\n \* ```\n \* ^\n ProjectAs = 5,\n\n /\*\*\n \* Signals that the following attribute will be translated by runtime i18n.\n \* \n \* For example, given the following HTML:\n \* \n \* ```\n \* <div moo="car" foo="value" i18n-foo [bar]="binding" i18n-bar>\n \* ```\n \* \n \* the generated code is:\n \* \n \* ```\n \* var \_c1 = ['moo', 'car', AttributeMarker.I18n, 'foo', 'bar'];\n \* ```\n \* ^\n I18n = 6,\n\n /\*\*\n \* A combination of:\n \* - Attribute names and values.\n \* - Special markers acting as flags to alter attributes processing.\n \* - Parsed ngProjectAs selectors.\n \* ^\nexport type TAttributes = (string|AttributeMarker|CssSelector)[];\n\n /\*\*\n \* Constants that are associated with a view. Includes:\n \* - Attribute arrays.\n \* - Local definition arrays.\n \* - Translated messages (i18n).\n \* ^\nexport type TConstants = (TAttributes|string)[];\n\n /\*\*\n \* Factory function that returns an array of consts. Consts can be represented as a function in case any additional statements are required to define consts in the list. An example is i18n where additional i18n calls are generated, which should be executed when consts are requested for the first time.\n \* ^\nexport type TConstantsFactory = () => TConstants;\n\n /\*\*\n \* TConstants type that describes how the `consts` field is generated on ComponentDef: it can be either an array or a factory function that returns that array.\n \* ^\nexport type TConstantsOrFactory = TConstants|TConstantsFactory;\n\n /\*\*\n \* Binding data (flyweight) for a particular node that is shared between all templates of a specific type.\n \* \n \* If a property is:\n \* - PropertyAliases: that property's data was generated and this is it\n \* - Null: that property's data was already generated and nothing was found.\n \* - Undefined: that property's data has not yet been generated\n \* \n \* see: [https://en.wikipedia.org/wiki/Flyweight\\_pattern](https://en.wikipedia.org/wiki/Flyweight_pattern) for more on the Flyweight pattern\n \* ^\nexport interface TNode {\n\n /\*\*\n \* The type of the TNode. See TNodeType. ^\n type: TNodeType;\n\n /\*\*\n \* Index of the TNode in TView.data and corresponding native element in LView. ^\n \* This is necessary to get from any TNode to its corresponding native element when traversing the node tree.\n \* \n \* If index is -1, this is a dynamically created container node or embedded view node.\n \* ^\n index: number;\n\n /\*\*\n \* Insert before existing DOM node index. ^\n \* When DOM nodes are being inserted, normally they are being appended as they are created. Under i18n case, the translated text nodes are created ahead of time as part of the `i18nStart` instruction which means that this `TNode` can't just be appended and instead needs to be inserted using `insertBeforeIndex` semantics. ^\n \* Additionally sometimes it is necessary to insert new text nodes as a child of this `TNode`. In such a case the value stores an

array of text nodes to insert.  
 Example:  
`<div i18n> Hello <span>World</span>! </div>`  
 In the above example the `i18nStart` instruction can create `Hello`, `World` and `!` text nodes. It can also insert `Hello` and `!` text node as a child of `<div>`, but it can't insert `World` because the `<span>` node has not yet been created. In such a case the `<span>` `TNode` will have an array which will direct the `<span>` to not only insert itself in front of `!` but also to insert the `World` (created by `i18nStart`) into `<span>` itself.

```

Pseudo code:
if (insertBeforeIndex === null) {
  // append as normal
} else if (Array.isArray(insertBeforeIndex)) {
  // First insert current TNode at correct location
  const currentNode = IView[this.index];
  parentNode.insertBefore(currentNode, IView[this.insertBeforeIndex[0]]);
  // Now append all of the children
  for(let i=1; i<this.insertBeforeIndex; i++) {
    currentNode.appendChild(IView[this.insertBeforeIndex[i]]);
  }
} else {
  parentNode.insertBefore(IView[this.index], IView[this.insertBeforeIndex]);
}

```

- null: Append as normal using `parentNode.appendChild`  
 - number: Append using `parentNode.insertBefore(IView[this.index], IView[this.insertBeforeIndex])`

**Initialization**  
 Because `i18nStart` executes before nodes are created, on `TView.firstCreatePass` it is not possible for `i18nStart` to set the `insertBeforeIndex` value as the corresponding `TNode` has not yet been created. For this reason the `i18nStart` creates a `TNodeType.Placeholder TNode` at that location. See `TNodeType.Placeholder` for more information.

**insertBeforeIndex: InsertBeforeIndex**  
 The index of the closest injector in this node's `LView`.  
 If the index `=== -1`, there is no injector on this node or any ancestor node in this view.  
 If the index `!=== -1`, it is the index of this node's injector OR the index of a parent injector in the same view. We pass the parent injector index down the node tree of a view so it's possible to find the parent injector without walking a potentially deep node tree.  
 Injector indices are not set across view boundaries because there could be multiple component hosts.  
 If `tNode.injectorIndex === tNode.parent.injectorIndex`, then the index belongs to a parent injector.

**injectorIndex: number**  
 Stores starting index of the directives.  
 NOTE: The first directive is always component (if present).  
**directiveStart: number**  
 Stores final exclusive index of the directives.  
 The area right behind the `directiveStart-directiveEnd` range is used to allocate the `HostBindingFunction`vars`` (or null if no bindings.) Therefore `directiveEnd` is used to set `LFrame.bindingRootIndex` before `HostBindingFunction` is executed.

**directiveEnd: number**  
 Stores the last directive which had a styling instruction.  
 Initial value of this is `-1` which means that no `hostBindings` styling instruction has executed. As `hostBindings` instructions execute they set the value to the index of the `DirectiveDef` which contained the last `hostBindings` styling instruction.  
 Valid values are:  
`-1` No `hostBindings` instruction has executed.  
`directiveStart <= directiveStylingLast < directiveEnd`: Points to the `DirectiveDef` of the last styling instruction which executed in the `hostBindings`.  
 This data is needed so that styling instructions know which static styling data needs to be collected from the `DirectiveDef.hostAttrs`. A styling instruction needs to collect all data since last styling instruction.

**directiveStylingLast: number**  
 Stores indexes of property bindings. This field is only set in the `ngDevMode` and holds indexes of property bindings so  `TestBed`  can get bound property metadata for a given node.  
**propertyBindings: number[]|null**  
 Stores if `Node` is `Component`, `isProjected`, `hasContentQuery`, `hasClassInput` and `hasStyleInput`  
 etc.  
**flags: TNodeFlags**  
 This number stores two values using its bits:  
 - the index of the first provider on that node (first 16 bits)  
 - the count of view providers from the component on this node (last 16 bits)  
 // TODO(misko): break this into actual vars.  
**providerIndexes: TNodeProviderIndexes**  
 The value name associated with this node.  
 if type: `TNodeType.Text`: text value  
`TNodeType.Element`: tag name  
`TNodeType.ICUContainer`: `TIcu` value  
 any;  
 Attributes associated with an element. We need to store attributes to support various use-cases (attribute injection, content projection with selectors, directives matching).  
 Attributes are stored statically because

reading them from the DOM would be way too slow for content projection and queries. Since attrs will always be calculated first, they will never need to be marked undefined by other instructions. For regular attributes a name of an attribute and its value alternate in the array. e.g. ['role', 'checkbox'] This array can contain flags that will indicate "special attributes" (attributes with namespaces, attributes extracted from bindings and outputs). attrs: TAttributes|null; Same as `TNode.attrs` but contains merged data across all directive host bindings. We need to keep `attrs` as unmerged so that it can be used for attribute selectors. We merge attrs here so that it can be used in a performant way for initial rendering. The `attrs` are merged in first pass in following order: Component's `hostAttrs` - Directives' `hostAttrs` - Template `TNode.attrs` associated with the current `TNode`. mergedAttrs: TAttributes|null; A set of local names under which a given element is exported in a template and visible to queries. An entry in this array can be created for different reasons: - an element itself is referenced, ex.: `

` - a component is referenced, ex.: `` - a directive is referenced, ex.: `

---

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\* For easier discussion assume this example:  

```

<parent>'s view definition:
<child id="c1">content1</child>
<child id="c2"><span>content2</span></child>
<child>'s view definition:
<ng-content id="cont1"></ng-content>

```

\* If `Array.isArray(projection)` then `TNode` is a host element:  
\* - `projection` stores the content nodes which are to be projected.  
\* - The nodes represent categories defined by the selector: For example:  

```

<ng-content/><ng-content select="abc"/>

```

would represent the heads for `<ng-content/>` and `<ng-content select="abc"/>` respectively.  
\* - The nodes we store in `projection` are heads only, we used `.next` to get their siblings.  
\* - The nodes `.next` is sorted/rewritten as part of the projection setup.  
\* - `projection` size is equal to the number of projections `<ng-content>`. The size of `c1` will be `1` because `<child>` has only one `<ng-content>`.  
\* - we store `projection` with the host (`c1`, `c2`) rather than the `<ng-content>` (`cont1`) because the same component (`<child>`) can be used in multiple locations (`c1`, `c2`) and as a result have different set of nodes to project.  
\* - without `projection` it would be difficult to efficiently traverse nodes to be projected.  
\* If `typeof projection === 'number'` then `TNode` is a `<ng-content>` element:  
\* - `projection` is an index of the host's `projection` Nodes.  
\* - This would return the first head node to project:  

```

getHost(currentTNode).projection[currentTNode.projection]

```

\* - When projecting nodes the parent node retrieved may be a `<ng-content>` node, in which case the process is recursive in nature.  
\* If `projection` is of type `RNode[]` than we have a collection of native nodes passed as projectable nodes during dynamic component creation.  

```

^ projection: (TNode|RNode[]|number|null);

```

\* A collection of all `style` static values for an element (including from host).  
\* This field will be populated if and when:  
\* - There are one or more initial `style`'s on an element (e.g. `<div style="width:200px;">`)  
\* - There are one or more initial `style`'s on a directive/component host (e.g. `@Directive({host: {style: "width:200px;"}})`)  
\* styles: `string|null`  
\* A collection of all `style` static values for an element excluding host sources.  
\* Populated when there are one or more initial `style`'s on an element (e.g. `<div style="width:200px;">`)  
\* Must be stored separately from `tNode.styles` to facilitate setting directive inputs that shadow the `style` property. If we used `tNode.styles` as is for shadowed inputs, we would feed host styles back into directives as `"inputs"`. If we used `tNode.attrs`, we would have to concatenate the attributes on every template pass. Instead, we process once on first create pass and store here.  

```

^ stylesWithoutHost: string|null;

```

\* A `KeyValueArray` version of residual `styles`.  
\* When there are styling instructions than each instruction stores the static styling which is of lower priority than itself. This means that there may be a higher priority styling than the instruction.  
\* Imagine:  

```

<div style="color: highest;" my-dir>
@Directive({
  host: {
    style: 'color: lowest;',
    '[styles.color]': 'exp // styleProp('color', ctx.exp);'
  })

```

\* In the above case: `color: lowest` is stored with `styleProp('color', ctx.exp);` instruction - `color: highest` is the residual and is stored here.  
\* - `undefined`: not initialized.  
\* - `null`: initialized but `styles` is `null`  
\* - `KeyValueArray`: parsed  

```

^ residualStyles: KeyValueArray<any>|undefined|null;

```

\* A collection of all class static values for an element (including from host).  
\* This field will be populated if and when:  
\* - There are one or more initial classes on an element (e.g. `<div class="one two three">`)  
\* - There are one or more initial classes on a directive/component host (e.g. `@Directive({host: {class: "SOME_CLASS"}})`)  
\* classes: `string|null`  
\* A collection of all class static values for an element excluding host sources.  
\* Populated when there are one or more initial classes on an element (e.g. `<div class="SOME_CLASS">`)  
\* Must be stored separately from `tNode.classes` to facilitate setting directive inputs that shadow the `class` property. If we used `tNode.classes` as is for shadowed inputs, we would feed host classes back into directives as `"inputs"`. If we used `tNode.attrs`, we would have to concatenate the attributes on every template pass. Instead, we process once on first create pass and store here.  

```

^ classesWithoutHost: string|null;

```

\* A `KeyValueArray` version of residual `classes`.  
\* Same as `TNode.residualStyles` but for classes.  
\* - `undefined`: not initialized.

```

`null`: initialized but `classes` is `null` \n * - `KeyValueArray`: parsed version of `classes`.\n */\n residualClasses:
KeyValueArray<any>|undefined|null;\n\n /**\n * Stores the head/tail index of the class bindings.\n *\n * - If no
bindings, the head and tail will both be 0.\n * - If there are template bindings, stores the head/tail of the class
bindings in the template.\n * - If no template bindings but there are host bindings, the head value will point to the
last\n * host binding for `class` (not the head of the linked list), tail will be 0.\n *\n * See:
`style_binding_list.ts` for details.\n *\n
* This is used by `insertTStylingBinding` to know where the next styling binding should be\n * inserted so that
they can be sorted in priority order.\n */\n classBindings: TStylingRange;\n\n /**\n * Stores the head/tail index
of the class bindings.\n *\n * - If no bindings, the head and tail will both be 0.\n * - If there are template
bindings, stores the head/tail of the style bindings in the template.\n * - If no template bindings but there are host
bindings, the head value will point to the last\n * host binding for `style` (not the head of the linked list), tail
will be 0.\n *\n * See: `style_binding_list.ts` for details.\n *\n * This is used by `insertTStylingBinding` to
know where the next styling binding should be\n * inserted so that they can be sorted in priority order.\n */\n
styleBindings: TStylingRange;\n}\n\n/**\n * See `TNode.insertBeforeIndex`\n */\nexport type InsertBeforeIndex =
null|number|number[];\n\n/**\n * Static data for an element
*/\nexport interface TElementNode extends TNode {\n /**\n * Index in the data[] array */\n index: number;\n child:
TElementNode|TTextNode|TElementContainerNode|TContainerNode|TProjectionNode|null;\n /**\n * Element
nodes will have parents unless they are the first node of a component or\n * embedded view (which means their
parent is in a different view and must be\n * retrieved using viewData[HOST_NODE]).\n */\n parent:
TElementNode|TElementContainerNode|null;\n tViews: null;\n\n /**\n * If this is a component TNode with
projection, this will be an array of projected\n * TNodes or native nodes (see TNode.projection for more info). If
it's a regular element node\n * or a component without projection, it will be null.\n */\n projection:
(TNode|RNode[]|null);\n\n /**\n * Stores tagName\n */\n value: string;\n}\n\n/**\n * Static data for a text node
*/\nexport interface TTextNode extends TNode {\n /**\n * Index in the data[] array */\n index: number;\n child:
null;\n\n /**\n * Text nodes will have parents unless they are the first node of a component or\n * embedded view (which
means their parent is in a different view and must be\n * retrieved using LView.node).\n */\n parent:
TElementNode|TElementContainerNode|null;\n tViews: null;\n projection: null;\n}\n\n/**\n * Static data for an
LContainer */\nexport interface TContainerNode extends TNode {\n /**\n * Index in the data[] array.\n *\n * If
it's -1, this is a dynamically created container node that isn't stored in\n * data[] (e.g. when you inject
ViewContainerRef) .\n */\n index: number;\n child: null;\n\n /**\n * Container nodes will have parents unless:\n
*\n * - They are the first node of a component or embedded view\n * - They are dynamically created\n */\n
parent: TElementNode|TElementContainerNode|null;\n tViews: TView|TView[]|null;\n projection: null;\n value:
null;\n}\n\n/**\n * Static data for an <ng-container> */\nexport interface TElementContainerNode
extends TNode {\n /**\n * Index in the LView[] array. */\n index: number;\n child:
TElementNode|TTextNode|TContainerNode|TElementContainerNode|TProjectionNode|null;\n parent:
TElementNode|TElementContainerNode|null;\n tViews: null;\n projection: null;\n}\n\n/**\n * Static data for an ICU
expression */\nexport interface TIcuContainerNode extends TNode {\n /**\n * Index in the LView[] array. */\n index:
number;\n child: null;\n parent: TElementNode|TElementContainerNode|null;\n tViews: null;\n projection: null;\n
value: TIcu;\n}\n\n/**\n * Static data for an LProjectionNode */\nexport interface TProjectionNode extends TNode {\n
/**\n * Index in the data[] array */\n child: null;\n /**\n * Projection nodes will have parents unless they are the first
node of a component\n * or embedded view (which means their parent is in a different view and must be\n *
retrieved using LView.node).\n */\n parent: TElementNode|TElementContainerNode|null;\n tViews: null;\n\n /**\n
* Index of the projection
node. (See TNode.projection for more info.) */\n projection: number;\n value: null;\n}\n\n/**\n * A union type
representing all TNode types that can host a directive.\n */\nexport type TDirectiveHostNode =
TElementNode|TContainerNode|TElementContainerNode;\n\n/**\n * This mapping is necessary so we can set input
properties and output listeners\n * properly at runtime when property names are minified or aliased.\n *\n * Key:

```

```

unminified / public input or output name\n * Value: array containing minified / internal name and related directive
index\n * The value must be an array to support inputs and outputs with the same name\n * on the same node.\n
*\nexport type PropertyAliases = {\n // This uses an object map because using the Map type would be too slow\n
[key: string]: PropertyAliasValue\n};\n\n/**\n * Store the runtime input or output names for all the directives.\n *\n * i+0: directive instance index\n * i+1: privateName\n *\n * e.g. [0, 'change-minified']\n *\nexport
type PropertyAliasValue = (number|string)[];\n\n/**\n * This array contains information about input properties
that\n * need to be set once from attribute data. It's ordered by\n * directive index (relative to element) so it's simple
to\n * look up a specific directive's initial input data.\n *\n * Within each sub-array:\n *\n * i+0: attribute name\n *
i+1: minified/internal input name\n * i+2: initial value\n *\n * If a directive on a node does not have any input
properties\n * that should be set from attributes, its index is set to null\n * to avoid a sparse array.\n *\n * e.g. [null,
['role-min', 'minified-input', 'button']]\n *\nexport type InitialInputData = (InitialInputs|null)[];\n\n/**\n * Used by
InitialInputData to store input properties\n * that should be set once from attributes.\n *\n * i+0: attribute name\n *
i+1: minified/internal input name\n * i+2: initial value\n *\n * e.g. ['role-min', 'minified-input', 'button']\n *\nexport
type InitialInputs = string[];\n\n// Note:

```

```

This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const
unusedValueExportToPlacateAjd = 1;\n\n/**\n * Type representing a set of TNodes that can have local refs (#foo)\n
placed on them.\n *\nexport type TNodeWithLocalRefs =
TContainerNode|TElementNode|TElementContainerNode;\n\n/**\n * Type for a function that extracts a value for a
local refs.\n * Example:\n * - `<div #nativeDivEl>` - `nativeDivEl` should point to the native `<div>` element;\n * -
`<ng-template #tplRef>` - `tplRef` should point to the `TemplateRef` instance;\n *\nexport type LocalRefExtractor
= (tNode: TNodeWithLocalRefs, currentView: LView) => any;\n\n/**\n * Returns `true` if the `TNode` has a
directive which has `@Input()` for `class` binding.\n *\n * ```\n * <div my-dir [class]="exp"></div>\n * ```\n *
and\n * ```\n * @Directive({\n * })\n * class MyDirective {\n *   @Input()\n *   class: string;\n * }\n * ```\n *\n * In
the above case it is necessary

```

```

to write the reconciled styling information into the\n * directive's input.\n *\n * @param tNode\n *\nexport
function hasClassInput(tNode: TNode) {\n return (tNode.flags & TNodeFlags.hasClassInput) !== 0;\n}\n\n/**\n *
Returns `true` if the `TNode` has a directive which has `@Input()` for `style` binding.\n *\n * ```\n * <div my-dir
[style]="exp"></div>\n * ```\n * and\n * ```\n * @Directive({\n * })\n * class MyDirective {\n *   @Input()\n *
class: string;\n * }\n * ```\n *\n * In the above case it is necessary to write the reconciled styling information into
the\n * directive's input.\n *\n * @param tNode\n *\nexport function hasStyleInput(tNode: TNode) {\n return
(tNode.flags & TNodeFlags.hasStyleInput) !== 0;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nimport {assertDefined, throwError} from './util/assert';\nimport
{TNode, TNodeType, toTNodeTypeAsString} from './interfaces/node';\n\nexport function assertTNodeType(\n
tNode: TNode|null, expectedTypes: TNodeType, message?: string): void {\n assertDefined(tNode, 'should be called
with a TNode');\n if ((tNode.type & expectedTypes) === 0) {\n throwError(\n message ||\n `Expected
[${toTNodeTypeAsString(expectedTypes)}] but got ${\n toTNodeTypeAsString(tNode.type)}.`);\n
}\n}\n\nexport function assertPureTNodeType(type: TNodeType) {\n if (!(type === TNodeType.Element ||
/>\n type === TNodeType.Text ||\n type === TNodeType.Container ||\n type ===
TNodeType.ElementContainer ||\n type === TNodeType.Icu ||\n type ===
TNodeType.Projection ||\n type === TNodeType.Placeholder)) {\n throwError(`Expected TNodeType
to have only a single type selected, but got ${\n toTNodeTypeAsString(type)}.`);\n
}\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\nimport {CharCode} from './util/char_code';\nimport {AttributeMarker, TAttributes} from
 './interfaces/node';\nimport {CssSelector} from './interfaces/projection';\nimport {Renderer} from
 './interfaces/renderer';\nimport {RElement} from './interfaces/renderer_dom';\n\n\n/**\n * Assigns all attribute
values to the provided element via the inferred renderer.\n *\n * This function accepts two forms of attribute

```

```

entries:\n *\n * default: (key, value):\n * attrs = [key1, value1, key2, value2]\n *\n * namespaced:
(NAMESPACE_MARKER, uri, name, value)\n * attrs = [NAMESPACE_MARKER, uri, name, value,
NAMESPACE_MARKER, uri, name, value]\n *\n * The `attrs` array can contain a mix of both the default and
namespaced entries.\n * The `"default"` values are set without a
marker, but if the function comes across\n * a marker value then it will attempt to set a namespaced value. If the
marker is\n * not of a namespaced value then the function will quit and return the index value\n * where it stopped
during the iteration of the attrs array.\n *\n * See [AttributeMarker] to understand what the namespace marker value
is.\n *\n * Note that this instruction does not support assigning style and class values to\n * an element. See
`elementStart` and `elementHostAttrs` to learn how styling values\n * are applied to an element.\n * @param
renderer The renderer to be used\n * @param native The element that the attributes will be assigned to\n * @param
attrs The attribute array of values that will be assigned to the element\n * @returns the index value that was last
accessed in the attributes array\n */
export function setUpAttributes(renderer: Renderer, native: RElement, attrs:
TAttributes): number {\n  let i = 0;\n  while (i < attrs.length) {\n    const value =
attrs[i];\n    if (typeof value === 'number') {\n      // only namespaces are supported. Other value types (such as
style/class\n      // entries) are not supported in this function.\n      if (value !== AttributeMarker.NamespaceURI) {\n
break;\n      }\n      // we just landed on the marker value ... therefore\n      // we should skip to the next entry\n
i++;\n      const namespaceURI = attrs[i++] as string;\n      const attrName = attrs[i++] as string;\n      const attrVal
= attrs[i++] as string;\n      ngDevMode && ngDevMode.rendererSetAttribute++;\n      renderer.setAttribute(native,
attrName, attrVal, namespaceURI);\n    } else {\n      // attrName is string;\n      const attrName = value as string;\n
const attrVal = attrs[++i];\n      // Standard attributes\n      ngDevMode && ngDevMode.rendererSetAttribute++;\n
if (isAnimationProp(attrName)) {\n        renderer.setProperty(native, attrName, attrVal);\n      } else {\n
renderer.setAttribute(native,
attrName, attrVal as string);\n      }\n      i++;\n    }\n  }\n  // another piece of code may iterate over the same
attributes array. Therefore\n  // it may be helpful to return the exact spot where the attributes array exited\n  //
whether by running into an unsupported marker or if all the static values were\n  // iterated over.\n  return
i;\n}\n\n/**\n * Test whether the given value is a marker that indicates that the following\n * attribute values in a
`TAttributes` array are only the names of attributes,\n * and not name-value pairs.\n * @param marker The attribute
marker to test.\n * @returns true if the marker is a `"name-only"` marker (e.g. `Bindings`, `Template` or `I18n`).\n
*/
export function isNameOnlyAttributeMarker(marker: string|AttributeMarker|CssSelector) {\n  return marker
=== AttributeMarker.Bindings || marker === AttributeMarker.Template ||\n  marker ===
AttributeMarker.I18n;\n}\n\nexport function isAnimationProp(name: string): boolean {\n  // Perf note: accessing
charCodeAt to check for the first character of a string is faster as\n  // compared to accessing a character at index 0
(ex. name[0]). The main reason for this is that\n  // charCodeAt doesn't allocate memory to return a substring.\n
return name.charCodeAt(0) === CharCode.AT_SIGN;\n}\n\n/**\n * Merges `src` `TAttributes` into `dst`
`TAttributes` removing any duplicates in the process.\n *\n * This merge function keeps the order of attrs same.\n
*\n * @param dst Location of where the merged `TAttributes` should end up.\n * @param src `TAttributes` which
should be appended to `dst`\n */
export function mergeHostAttrs(dst: TAttributes|null, src: TAttributes|null):
TAttributes|null {\n  if (src === null || src.length === 0) {\n    // do nothing\n  } else if (dst === null || dst.length
=== 0) {\n    // We have source, but dst is empty, just make a copy.\n    dst = src.slice();\n  } else {\n    let srcMarker:
AttributeMarker = AttributeMarker.ImplicitAttributes;\n    for (let i =
0; i < src.length; i++) {\n      const item = src[i];\n      if (typeof item === 'number') {\n        srcMarker = item;\n
} else {\n      if (srcMarker === AttributeMarker.NamespaceURI) {\n        // Case where we need to consume
`key1`, `key2`, `value` items.\n      } else if (\n        srcMarker === AttributeMarker.ImplicitAttributes ||\n
srcMarker === AttributeMarker.Styles) {\n        // Case where we have to consume `key1` and `value` only.\n
mergeHostAttribute(dst, srcMarker, item as string, null, src[++i] as string);\n      } else {\n        // Case where we
have to consume `key1` only.\n        mergeHostAttribute(dst, srcMarker, item as string, null, null);\n      }\n    }\n
}\n  return dst;\n}\n\n/**\n * Append `key`/`value` to existing `TAttributes` taking region marker and
duplicates into account.\n *\n * @param dst `TAttributes` to append to.\n * @param marker Region where the

```

```

`key`/`value` should be added.\n * @param key1
Key to add to `TAttributes`\n * @param key2 Key to add to `TAttributes` (in case of
`AttributeMarker.NamespaceURI`)\n * @param value Value to add or to overwrite to `TAttributes` Only used if
`marker` is not Class.\n *  

\nexport function mergeHostAttribute(\n  dst: TAttributes, marker: AttributeMarker,
key1: string, key2: string|null,\n  value: string|null): void {\n  let i = 0;\n  // Assume that new markers will be
inserted at the end.\n  let markerInsertPosition = dst.length;\n  // scan until correct type.\n  if (marker ===
AttributeMarker.ImplicitAttributes) {\n    markerInsertPosition = -1;\n  } else {\n    while (i < dst.length) {\n
const dstValue = dst[i++];\n    if (typeof dstValue === 'number') {\n      if (dstValue === marker) {\n
markerInsertPosition = -1;\n        break;\n      } else if (dstValue > marker) {\n        // We need to save this as we
want the markers to be inserted in specific order.\n        markerInsertPosition = i - 1;\n
        break;\n      }\n    }\n    }\n  }\n  // search until you find place of insertion\n  while (i < dst.length) {\n  const
item = dst[i];\n  if (typeof item === 'number') {\n    // since `i` started as the index after the marker, we did not
find it if we are at the next\n    // marker\n    break;\n  } else if (item === key1) {\n    // We already have same
token\n    if (key2 === null) {\n      if (value !== null) {\n        dst[i + 1] = value;\n      }\n      return;\n    }
else if (key2 === dst[i + 1]) {\n      dst[i + 2] = value!;\n      return;\n    }\n  }\n  // Increment counter.\n
i++;\n  if (key2 !== null) i++; \n  if (value !== null) i++; \n  }\n  // insert at location.\n  if (markerInsertPosition
!== -1) {\n    dst.splice(markerInsertPosition, 0, marker);\n    i = markerInsertPosition + 1;\n  }\n  dst.splice(i++, 0,
key1);\n  if (key2 !== null) {\n    dst.splice(i++, 0, key2);\n  }\n  if (value !== null) {\n    dst.splice(i++, 0,
value);\n  }\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/  

\nimport {assertGreaterThan, assertNotEqual, assertNumber} from '././util/assert';\nimport
{NO_PARENT_INJECTOR, RelativeInjectorLocation, RelativeInjectorLocationFlags} from
 '././interfaces/injector';\nimport {DECLARATION_VIEW, HEADER_OFFSET, LView} from
 '././interfaces/view';  

\n\n// Parent Injector Utils ///////////////////////////////////////////\nexport function
hasParentInjector(parentLocation: RelativeInjectorLocation): boolean {\n  return parentLocation !==
NO_PARENT_INJECTOR;\n}\n\nexport function getParentInjectorIndex(parentLocation:
RelativeInjectorLocation): number {\n  ngDevMode && assertNumber(parentLocation, 'Number expected');\n  ngDevMode && assertNotEqual(parentLocation as any, -1, 'Not a valid state.);\n  const parentInjectorIndex
= \n    (parentLocation as any as number) & RelativeInjectorLocationFlags.InjectorIndexMask;\n  ngDevMode && \n
assertGreaterThan(\n    parentInjectorIndex, HEADER_OFFSET,\n    'Parent injector must be
pointing past HEADER_OFFSET.);\n  return (parentLocation as any as number) &
RelativeInjectorLocationFlags.InjectorIndexMask;\n}\n\nexport function
getParentInjectorViewOffset(parentLocation: RelativeInjectorLocation): number {\n  return (parentLocation as any
as number) >> RelativeInjectorLocationFlags.ViewOffsetShift;\n}\n\n/**\n * Unwraps a parent injector location
number to find the view offset from the current injector,\n * then walks up the declaration view tree until the view is
found that contains the parent\n * injector.\n * \n * @param location The location of the parent injector, which
contains the view offset\n * @param startView The LView instance from which to start walking up the view tree\n *
@returns The LView instance that contains the parent
injector.\n */  

\nexport function getParentInjectorView(location: RelativeInjectorLocation, startView: LView): LView
{\n  let viewOffset = getParentInjectorViewOffset(location);\n  let parentView = startView;\n  // For most cases, the
parent injector can be found on the host node (e.g. for component\n // or container), but we must keep the loop here
to support the rarer case of deeply nested\n // <ng-template> tags or inline views, where the parent injector might
live many views\n // above the child injector.\n  while (viewOffset > 0) {\n    parentView =
parentView[DECLARATION_VIEW]!;\n    viewOffset--;\n  }\n  return parentView;\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */  

\nimport {isForwardRef, resolveForwardRef} from '././di/forward_ref';\nimport {injectRootLimpMode, setInjectImplementation} from
 '././di/inject_switch';\nimport

```

```

{Injector} from './di/injector';\nimport {InjectorMarkers} from './di/injector_marker';\nimport {InjectFlags} from
'./di/interface/injector';\nimport {ProviderToken} from './di/provider_token';\nimport {Type} from
'./interface/type';\nimport {assertDefined, assertEquals, assertIndexInRange} from './util/assert';\nimport
{noSideEffects} from './util/closure';\n\nimport {assertDirectiveDef, assertNodeInjector, assertTNodeForLView}
from './assert';\nimport {FactoryFn, getFactoryDef} from './definition_factory';\nimport
{throwCyclicDependencyError, throwProviderNotFoundError} from './errors_di';\nimport {NG_ELEMENT_ID,
NG_FACTORY_DEF} from './fields';\nimport {registerPreOrderHooks} from './hooks';\nimport {DirectiveDef}
from './interfaces/definition';\nimport {isFactory, NO_PARENT_INJECTOR, NodeInjectorFactory,
NodeInjectorOffset, RelativeInjectorLocation, RelativeInjectorLocationFlags} from './interfaces/injector';\nimport
{AttributeMarker, TContainerNode, TDirectiveHostNode,
TElementContainerNode, TElementNode, TNode, TNodeProviderIndexes, TNodeType} from
'./interfaces/node';\nimport {isComponentDef, isComponentHost} from './interfaces/type_checks';\nimport
{DECLARATION_COMPONENT_VIEW, DECLARATION_VIEW, EMBEDDED_VIEW_INJECTOR, FLAGS,
INJECTOR, LView, LViewFlags, T_HOST, TData, TVIEW, TView, TViewType} from './interfaces/view';\nimport
{assertTNodeType} from './node_assert';\nimport {enterDI, getCurrentTNode, getLView, leaveDI} from
'./state';\nimport {isNameOnlyAttributeMarker} from './util/attrs_utils';\nimport {getParentInjectorIndex,
getParentInjectorView, hasParentInjector} from './util/injector_utils';\nimport {stringifyForError} from
'./util/stringify_utils';\n\n\n/**\n * Defines if the call to `inject` should include `viewProviders` in its resolution.\n
*\n * This is set to true when we try to instantiate a component. This value is reset in\n * `getNodeInjectable` to a
value which matches the declaration location of the token about to be\n
* instantiated. This is done so that if we are injecting a token which was declared outside of\n * `viewProviders` we
don't accidentally pull `viewProviders` in.\n *\n * Example:\n *\n * ```\n * @Injectable()\n * class MyService {\n *
constructor(public value: String) {}\n *\n * @Component({\n *   providers: [\n *     MyService,\n *
provide: String, value: 'providers' ]\n *   viewProviders: [\n *     {provide: String, value: 'viewProviders'}\n *
]}\n * })\n * class MyComponent {\n *   constructor(myService: MyService, value: String) {\n *     // We expect that
Component can see into `viewProviders`\n *     expect(value).toEqual('viewProviders');\n *     // `MyService` was
not declared in `viewProviders` hence it can't see it.\n *     expect(myService.value).toEqual('providers');\n *
   }\n * }\n *\n * ```\n *\n * \nlet includeViewProviders = true;\n\nexport function setIncludeViewProviders(v: boolean):
boolean {\n  const oldValue = includeViewProviders;\n  includeViewProviders
= v;\n  return oldValue;\n}\n\n\n/**\n * The number of slots in each bloom filter (used by DI). The larger this
number, the fewer\n * directives that will share slots, and thus, the fewer false positives when checking for\n * the
existence of a directive.\n *\n * \nconst BLOOM_SIZE = 256;\n\nconst BLOOM_MASK = BLOOM_SIZE - 1;\n\n\n/**\n * The number of bits that is represented by a single bloom bucket. JS bit operations are 32 bits,\n * so each bucket
represents 32 distinct tokens which accounts for log2(32) = 5 bits of a bloom hash\n * number.\n *\n * \nconst
BLOOM_BUCKET_BITS = 5;\n\n\n/**\n * Counter used to generate unique IDs for directives. *\nlet nextNgElementId
= 0;\n\n\n/**\n * Value used when something wasn't found by an injector. *\nconst NOT_FOUND = {};\n\n\n/**\n *
Registers this directive as present in its node's injector by flipping the directive's\n * corresponding bit in the
injector's bloom filter.\n *\n * @param injectorIndex The index of the node injector where this token should
be registered\n * @param tView The TView for the injector's bloom filters\n * @param type The directive token to
register\n *\n * \nexport function bloomAdd(\n  injectorIndex: number, tView: TView, type:
ProviderToken<any>|string): void {\n  ngDevMode && assertEquals(tView.firstCreatePass, true, 'expected
firstCreatePass to be true');\n  let id: number|undefined;\n  if (typeof type === 'string') {\n    id = type.charCodeAt(0)
|| 0;\n  } else if (type.hasOwnProperty(NG_ELEMENT_ID)) {\n    id = (type as any)[NG_ELEMENT_ID];\n  }\n\n  // Set a unique ID on the directive type, so if something tries to inject the directive,\n  // we can easily retrieve the ID
and hash it into the bloom bit that should be checked.\n  if (id == null) {\n    id = (type as any)[NG_ELEMENT_ID]
= nextNgElementId++;\n  }\n\n  // We only have BLOOM_SIZE (256) slots in our bloom filter (8 buckets * 32 bits
each),\n  // so all unique IDs must be modulo-ed into a number from 0 - 255 to fit into the filter.\n  const bloomHash

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= id & BLOOM_MASK;\n\n // Create a mask that targets the specific bit associated with the directive.\n // JS bit
operations are 32 bits, so this will be a number between 2^0 and 2^31, corresponding\n // to bit positions 0 - 31 in a
32 bit integer.\n const mask = 1 << bloomHash;\n\n // Each bloom bucket in `tData` represents
`BLOOM_BUCKET_BITS` number of bits of `bloomHash`.\n // Any bits in `bloomHash` beyond
`BLOOM_BUCKET_BITS` indicate the bucket offset that the mask\n // should be written to.\n (tView.data as
number[])[injectorIndex + (bloomHash >> BLOOM_BUCKET_BITS)] |= mask;\n}\n\n/**\n * Creates (or gets an
existing) injector for a given element or container.\n * \n * @param tNode for which an injector should be retrieved /
created.\n * @param IView View where the node is stored\n * @returns Node injector\n * \n * ^\n * export function
getOrCreateNodeInjectorForNode(\n   tNode: TElementNode|TContainerNode|TElementContainerNode, IView:
LView): number {\n   const existingInjectorIndex
= getInjectorIndex(tNode, IView);\n   if (existingInjectorIndex !== -1) {\n     return existingInjectorIndex;\n   }\n\n   const tView = IView[TVIEW];\n   if (tView.firstCreatePass) {\n     tNode.injectorIndex = IView.length;\n     insertBloom(tView.data, tNode); // foundation for node bloom\n     insertBloom(IView, null); // foundation for
cumulative bloom\n     insertBloom(tView.blueprint, null);\n   }\n\n   const parentLoc =
getParentInjectorLocation(tNode, IView);\n   const injectorIndex = tNode.injectorIndex;\n\n   // If a parent injector
can't be found, its location is set to -1.\n   // In that case, we don't need to set up a cumulative bloom\n   if
(hasParentInjector(parentLoc)) {\n     const parentIndex = getParentInjectorIndex(parentLoc);\n     const parentLView
= getParentInjectorView(parentLoc, IView);\n     const parentData = parentLView[TVIEW].data as any;\n     //
Creates a cumulative bloom filter that merges the parent's bloom filter\n     // and its own cumulative bloom (which
contains tokens for all ancestors)\n     for (let i = 0; i < NodeInjectorOffset.BLOOM_SIZE; i++) {\n       IView[injectorIndex + i] = parentLView[parentIndex + i] | parentData[parentIndex + i];\n     }\n   }\n\n   IView[injectorIndex + NodeInjectorOffset.PARENT] = parentLoc;\n   return injectorIndex;\n}\n\nfunction
insertBloom(arr: any[], footer: TNode|null): void {\n   arr.push(0, 0, 0, 0, 0, 0, 0, 0, footer);\n}\n\n\nexport function
getInjectorIndex(tNode: TNode, IView: LView): number {\n   if (tNode.injectorIndex === -1 ||\n     // If the injector
index is the same as its parent's injector index, then the index has been\n     // copied down from the parent node. No
injector has been created yet on this node.\n     (tNode.parent && tNode.parent.injectorIndex ===
tNode.injectorIndex) ||\n     // After the first template pass, the injector index might exist but the parent values\n
// might not have been calculated yet for this instance\n     IView[tNode.injectorIndex +
NodeInjectorOffset.PARENT]
=== null) {\n     return -1;\n   } else {\n     ngDevMode && assertIndexInRange(IView, tNode.injectorIndex);\n     return tNode.injectorIndex;\n   }\n}\n\n/**\n * Finds the index of the parent injector, with a view offset if applicable.
Used to set the\n * parent injector initially.\n * \n * @returns Returns a number that is the combination of the number
of LViews that we have to go up\n * to find the LView containing the parent inject AND the index of the injector
within that LView.\n * \n * ^\n * export function getParentInjectorLocation(tNode: TNode, IView: LView):
RelativeInjectorLocation {\n   if (tNode.parent && tNode.parent.injectorIndex !== -1) {\n     // If we have a parent
`TNode` and there is an injector associated with it we are done, because\n     // the parent injector is within the
current `LView`.\n     return tNode.parent.injectorIndex as any; // ViewOffset is 0\n   }\n\n   // When parent injector
location is computed it may be outside of the current view. (ie it could\n
// be pointing to a declared parent location). This variable stores number of declaration parents\n // we need to
walk up in order to find the parent injector location.\n   let declarationViewOffset = 0;\n   let parentTNode:
TNode|null = null;\n   let IViewCursor: LView|null = IView;\n\n   // The parent injector is not in the current `LView`.
We will have to walk the declared parent\n // `LView` hierarchy and look for it. If we walk of the top, that means
that there is no parent\n // `NodeInjector`.\n   while (IViewCursor !== null) {\n     parentTNode =
getTNodeFromLView(IViewCursor);\n     if (parentTNode === null) {\n       // If we have no parent, than we are
done.\n       return NO_PARENT_INJECTOR;\n     }\n     ngDevMode && parentTNode &&
assertTNodeForLView(parentTNode!, IViewCursor[DECLARATION_VIEW]);\n     // Every iteration of the loop
requires that we go to the declared parent.\n     declarationViewOffset++;\n     IViewCursor =
IViewCursor[DECLARATION_VIEW];\n     if (parentTNode.injectorIndex

```

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!== -1) {\n    // We found a NodeInjector which points to something.\n    return (parentTNode.injectorIndex |\n        (declarationViewOffset << RelativeInjectorLocationFlags.ViewOffsetShift)) as any;\n    }\n }\n return
NO_PARENT_INJECTOR;\n}\n\n/**\n * Makes a type or an injection token public to the DI system by adding it to
an\n * injector's bloom filter.\n * \n * @param di The node injector in which a directive will be added\n * @param
token The type or the injection token to be made public\n * \n * @export function diPublicInInjector(\n    injectorIndex:
number, tView: TView, token: ProviderToken<any>): void {\n    bloomAdd(injectorIndex, tView,
token);\n}\n}\n\n/**\n * Inject static attribute value into directive constructor.\n * \n * This method is used with
`factory` functions which are generated as part of\n * `defineDirective` or `defineComponent`. The method retrieves
the static value\n * of an attribute. (Dynamic attributes are not supported since they are not
resolved\n * at the time of injection and can change over time.)\n * \n * # Example\n * Given:\n * ```\n *
@Component(...)\n * class MyComponent {\n *     constructor(@Attribute('title') title: string) { ... }\n * }\n * ```\n *
When instantiated with\n * ```\n * <my-component title="Hello"></my-component>\n * ```\n * \n * Then factory
method generated is:\n * ```\n * MyComponent.cmp = defineComponent({\n *     factory: () => new
MyComponent(injectAttribute('title'))\n *     ... \n * })\n * ```\n * \n * @publicApi\n * \n * @export function
injectAttributeImpl(tNode: TNode, attrNameToInject: string): string|null {\n    ngDevMode &&
assertTNodeType(tNode, TNodeType.AnyContainer | TNodeType.AnyRNode);\n    ngDevMode &&
assertDefined(tNode, 'expecting tNode');\n    if (attrNameToInject === 'class') {\n        return tNode.classes;\n    }\n    if
(attrNameToInject === 'style') {\n        return tNode.styles;\n    }\n\n    const attrs = tNode.attrs;\n    if (attrs) {\n        const
attrsLength = attrs.length;\n        let i = 0;\n
        while (i < attrsLength) {\n            const value = attrs[i];\n            // If we hit a `Bindings` or `Template` marker then we
are done.\n            if (isNameOnlyAttributeMarker(value)) break;\n\n            // Skip namespaced attributes\n            if (value
=== AttributeMarker.NamespaceURI) {\n                // we skip the next two values\n                // as namespaced attributes looks
like\n                // [..., AttributeMarker.NamespaceURI, 'http://someuri.com/test', 'test:exist',\n                // 'existValue', ...]\n                i = i + 2;\n            } else if (typeof value === 'number') {\n                // Skip to the first value of the marked attribute.\n                i++;\n                while (i < attrsLength && typeof attrs[i] === 'string') {\n                    i++;\n                }\n            } else if (value ===
attrNameToInject) {\n                return attrs[i + 1] as string;\n            } else {\n                i = i + 2;\n            }\n        }\n    }\n    return
null;\n}\n}\n\nfunction notFoundValueOrThrow<T>(\n    notFoundValue: T|null, token: ProviderToken<T>, flags:
InjectFlags): T|null
{\n    if ((flags & InjectFlags.Optional) || notFoundValue !== undefined) {\n        return notFoundValue;\n    } else {\n        throwProviderNotFoundError(token, 'NodeInjector');\n    }\n}\n\n/**\n * Returns the value associated to the given
token from the ModuleInjector or throws exception\n * \n * @param IView The `LView` that contains the `tNode`\n *
@param token The token to look for\n * @param flags Injection flags\n * @param notFoundValue The value to
return when the injection flags is `InjectFlags.Optional`\n * @returns the value from the injector or throws an
exception\n * \n * @function lookupTokenUsingModuleInjector<T>(\n    IView: LView, token: ProviderToken<T>,
flags: InjectFlags, notFoundValue?: any): T|null {\n    if ((flags & InjectFlags.Optional) && notFoundValue ===
undefined) {\n        // This must be set or the NullInjector will throw for optional deps\n        notFoundValue = null;\n    }\n\n    if ((flags & (InjectFlags.Self | InjectFlags.Host)) === 0) {\n        const moduleInjector = IView[INJECTOR];\n
        // switch to `injectInjectorOnly` implementation for module injector, since module injector\n        // should not have
access to Component/Directive DI scope (that may happen through\n        // `directiveInject` implementation)\n        const
previousInjectImplementation = setInjectImplementation(undefined);\n        try {\n            if (moduleInjector) {\n                return
moduleInjector.get(token, notFoundValue, flags & InjectFlags.Optional);\n            } else {\n                return
injectRootLimpMode(token, notFoundValue, flags & InjectFlags.Optional);\n            }\n        } finally {\n            setInjectImplementation(previousInjectImplementation);\n        }\n    }\n    return
notFoundValueOrThrow<T>(notFoundValue, token, flags);\n}\n}\n\n/**\n * Returns the value associated to the given
token from the NodeInjectors => ModuleInjector.\n * \n * Look for the injector providing the token by walking up
the node injector tree and then\n * the module injector tree.\n * \n * This function patches `token` with
`__NG_ELEMENT_ID__`

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which contains the id for the bloom\n * filter. `1` is reserved for injecting `Injector` (implemented by
`NodeInjector`)\n * @param tNode The Node where the search for the injector should start\n * @param IView
The `LView` that contains the `tNode`\n * @param token The token to look for\n * @param flags Injection flags\n *
@param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n * @returns the
value from the injector, `null` when not found, or `notFoundValue` if provided\n */\nexport function
getOrCreateInjectable<T>(\n  tNode: TDirectiveHostNode|null, IView: LView, token: ProviderToken<T>,\n  flags: InjectFlags = InjectFlags.Default, notFoundValue?: any): T|null {\n  if (tNode !== null) {\n    // If the view or
any of its ancestors have an embedded\n    // view injector, we have to look it up there first.\n    if (IView[FLAGS] &
LViewFlags.HasEmbeddedViewInjector) {\n      const embeddedInjectorValue =\n        lookupTokenUsingEmbeddedInjector(tNode,\n          IView, token, flags, NOT_FOUND);\n      if (embeddedInjectorValue !== NOT_FOUND) {\n        return
embeddedInjectorValue;\n      }\n    }\n    // Otherwise try the node injector.\n    const value =
lookupTokenUsingNodeInjector(tNode, IView, token, flags, NOT_FOUND);\n    if (value !== NOT_FOUND) {\n      return
value;\n    }\n  }\n  // Finally, fall back to the module injector.\n  return
lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n}\n\n/**\n * Returns the value
associated to the given token from the node injector.\n * @param tNode The Node where the search for the
injector should start\n * @param IView The `LView` that contains the `tNode`\n * @param token The token to look
for\n * @param flags Injection flags\n * @param notFoundValue The value to return when the injection flags is
`InjectFlags.Optional`\n * @returns the value from the injector, `null` when not found, or `notFoundValue` if
provided\n */\nfunction lookupTokenUsingNodeInjector<T>(\n  tNode: TDirectiveHostNode, IView: LView, token: ProviderToken<T>,\n  flags: InjectFlags,\n  notFoundValue?:
any) {\n  const bloomHash = bloomHashBitOrFactory(token);\n  // If the ID stored here is a function, this is a
special object like ElementRef or TemplateRef\n  // so just call the factory function to create it.\n  if (typeof
bloomHash === 'function') {\n    if (!enterDI(IView, tNode, flags)) {\n      // Failed to enter DI, try module injector
instead. If a token is injected with the @Host\n      // flag, the module injector is not searched for that token in Ivy.\n      return (flags & InjectFlags.Host) ?\n        notFoundValueOrThrow<T>(notFoundValue, token, flags) :\n        lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n    }\n    try {\n      const value =
bloomHash(flags);\n      if (value == null && !(flags & InjectFlags.Optional)) {\n        throwProviderNotFoundError(token);\n      } else {\n        return value;\n      }\n    }\n    finally {\n      leaveDI();\n    }\n  } else if (typeof bloomHash === 'number') {\n    // A reference to the previous
injector TView that was found while climbing the element\n    // injector tree. This is used to know if viewProviders
can be accessed on the current\n    // injector.\n    let previousTView: TView|null = null;\n    let injectorIndex =
getInjectorIndex(tNode, IView);\n    let parentLocation: RelativeInjectorLocation = NO_PARENT_INJECTOR;\n    let hostTElementNode: TNode|null =\n      flags & InjectFlags.Host ?\n        IView[DECLARATION_COMPONENT_VIEW][T_HOST] : null;\n    // If we should skip this injector, or if there
is no injector on this node, start by\n    // searching the parent injector.\n    if (injectorIndex === -1 || flags &
InjectFlags.SkipSelf) {\n      parentLocation = injectorIndex === -1 ? getParentInjectorLocation(tNode, IView) :\n        IView[injectorIndex + NodeInjectorOffset.PARENT];\n      if (parentLocation ===
NO_PARENT_INJECTOR || !shouldSearchParent(flags, false)) {\n        injectorIndex = -1;\n      } else {\n        previousTView = IView[TVIEW];\n        injectorIndex = getParentInjectorIndex(parentLocation);\n        IView =
getParentInjectorView(parentLocation, IView);\n      }\n    }\n    // Traverse up the injector tree until we find a
potential match or until we know there\n    // isn't* a match.\n    while (injectorIndex !== -1) {\n      ngDevMode
&& assertNodeInjector(IView, injectorIndex);\n      // Check the current injector. If it matches, see if it contains
token.\n      const tView = IView[TVIEW];\n      ngDevMode &&\n        assertTNodeForLView(tView.data[injectorIndex + NodeInjectorOffset.TNODE] as TNode, IView);\n      if
(bloomHasToken(bloomHash, injectorIndex, tView.data)) {\n        // At this point, we have an injector which *may*
contain the token, so we step through\n        // the providers and directives associated with the injector's
corresponding node to

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get\n    // the instance.\n    const instance: T|{}|null = searchTokensOnInjector<T>(\n        injectorIndex,\n        IView, token, previousTView, flags, hostTElementNode);\n    if (instance !== NOT_FOUND) {\n        return\n        instance;\n    }\n    }\n    parentLocation = IView[injectorIndex + NodeInjectorOffset.PARENT];\n    if\n    (parentLocation !== NO_PARENT_INJECTOR &&\n        shouldSearchParent(\n            flags,\n            IView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] === hostTElementNode) &&\n            bloomHasToken(bloomHash, injectorIndex, IView)) {\n        // The def wasn't found anywhere on this node, so it\n        was a false positive.\n        // Traverse up the tree and continue searching.\n        previousTView = tView;\n        injectorIndex = getParentInjectorIndex(parentLocation);\n        IView = getParentInjectorView(parentLocation,\n        IView);\n    } else {\n        // If we should not search parent OR If the ancestor bloom filter value\n        does not have the\n        // bit corresponding to the directive we can give up on traversing up to find the specific\n        // injector.\n        injectorIndex = -1;\n    }\n    }\n    }\n    }\n    return notFoundValue;\n}\n\nfunction\nsearchTokensOnInjector<T>(\n    injectorIndex: number, IView: LView, token: ProviderToken<T>,\n    previousTView: TView|null,\n    flags: InjectFlags, hostTElementNode: TNode|null) {\n    const currentTView =\n    IView[TVIEW];\n    const tNode = currentTView.data[injectorIndex + NodeInjectorOffset.TNODE] as TNode;\n    //\n    // First, we need to determine if view providers can be accessed by the starting element.\n    // There are two\n    // possibilities\n    const canAccessViewProviders = previousTView == null ?\n    // 1) This is the first invocation\n    // `previousTView == null` which means that we are at the\n    // `TNode` of where injector is starting to look. In\n    // such a case the only time we are allowed\n    // to look into the ViewProviders is if:\n    // - we are on a\n    // component\n    // - AND the injector set `includeViewProviders` to true (implying that the token can see\n    // ViewProviders\n    // because it is the Component or a Service which itself was declared in\n    // ViewProviders)\n    (isComponentHost(tNode) && includeViewProviders) :\n    // 2) `previousTView != null` which means that we are\n    // now walking across the parent nodes.\n    // In such a case we are only allowed to look into the ViewProviders if:\n    // - We just crossed from child View to Parent View `previousTView != currentTView`\n    // - AND the parent\n    // TNode is an Element.\n    // This means that we just came from the Component's View and therefore are allowed to\n    // see\n    // into the ViewProviders.\n    (previousTView != currentTView && ((tNode.type &\n    TNodeType.AnyRNode) !== 0));\n    // This special case happens when there is a @host on the inject and when we\n    // are searching\n    // on the host element node.\n    const isHostSpecialCase = (flags & InjectFlags.Host) &&\n    hostTElementNode\n    === tNode;\n    const injectableIdx = locateDirectiveOrProvider(\n        tNode, currentTView, token,\n        canAccessViewProviders, isHostSpecialCase);\n    if (injectableIdx !== null) {\n        return getNodeInjectable(IView,\n        currentTView, injectableIdx, tNode as TElementNode);\n    } else {\n        return NOT_FOUND;\n    }\n}\n\n/**\n * Searches for the given token among the node's directives and providers.\n * @param tNode TNode on which\n * directives are present.\n * @param tView The tView we are currently processing\n * @param token Provider token\n * or type of a directive to look for.\n * @param canAccessViewProviders Whether view providers should be\n * considered.\n * @param isHostSpecialCase Whether the host special case applies.\n * @returns Index of a found\n * directive or provider, or null when none found.\n */\n\nexport function locateDirectiveOrProvider<T>(\n    tNode:\n    TNode, tView: TView, token: ProviderToken<T>|string, canAccessViewProviders: boolean,\n    isHostSpecialCase:\n    boolean|number):\n    number|null {\n    const nodeProviderIndexes = tNode.providerIndexes;\n    const tInjectables = tView.data;\n    const\n    injectablesStart = nodeProviderIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n    const directivesStart\n    = tNode.directiveStart;\n    const directiveEnd = tNode.directiveEnd;\n    const cptViewProvidersCount =\n    nodeProviderIndexes >> TNodeProviderIndexes.CptViewProvidersCountShift;\n    const startingIndex =\n    canAccessViewProviders ? injectablesStart : injectablesStart + cptViewProvidersCount;\n    // When the host special\n    // case applies, only the viewProviders and the component are visible\n    const endIndex = isHostSpecialCase ?\n    injectablesStart + cptViewProvidersCount : directiveEnd;\n    for (let i = startingIndex; i < endIndex; i++) {\n        const\n        providerTokenOrDef = tInjectables[i] as ProviderToken<any>| DirectiveDef<any>| string;\n        if (i < directivesStart\n        && token === providerTokenOrDef ||\n            i >= directivesStart && (providerTokenOrDef as

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DirectiveDef<any>).type

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=== token) {\n  return i;\n } } \n if (isHostSpecialCase) {\n  const dirDef = tInjectables[directivesStart] as\n  DirectiveDef<any>;\n  if (dirDef && isComponentDef(dirDef) && dirDef.type === token) {\n    return\n    directivesStart;\n  } } \n return null;\n} \n\n/**\n * Retrieve or instantiate the injectable from the `LView` at\n * particular `index`.\n * This function checks to see if the value has already been instantiated and if so returns\n * the `cached` injectable`. Otherwise if it detects that the value is still a factory it\n * instantiates the `injectable` and caches the value.\n */\nexport function getNodeInjectable(\n  IView: LView, tView: TView, index: number,\n  tNode: TDirectiveHostNode): any {\n  let value = IView[index];\n  const tData = tView.data;\n  if (isFactory(value))\n  {\n    const factory: NodeInjectorFactory = value;\n    if (factory.resolving) {\n      throwCyclicDependencyError(stringifyForError(tData[index]));\n    }\n    const previousIncludeViewProviders\n    = setIncludeViewProviders(factory.canSeeViewProviders);\n    factory.resolving = true;\n    const\n    previousInjectImplementation =\n      factory.injectImpl ? setInjectImplementation(factory.injectImpl) : null;\n    const success = enterDI(IView, tNode, InjectFlags.Default);\n    ngDevMode &&\n      assertEquals(\n        success, true, \n        'Because flags do not contain `SkipSelf` we expect this to always succeed.);\n    try {\n      value = IView[index] = factory.factory(undefined, tData, IView, tNode);\n      // This code path is hit for both\n      directives and providers.\n      // For perf reasons, we want to avoid searching for hooks on providers.\n      // It does\n      no harm to try (the hooks just won't exist), but the extra\n      // checks are unnecessary and this is a hot path. So we\n      check to see\n      // if the index of the dependency is in the directive range for this\n      // tNode. If it's not, we know\n      it's a provider and skip hook\n      registration.\n      if (tView.firstCreatePass && index >= tNode.directiveStart) {\n        ngDevMode &&\n        assertDirectiveDef(tData[index]);\n        registerPreOrderHooks(index, tData[index] as DirectiveDef<any>,\n        tView);\n      } } finally {\n        previousInjectImplementation !== null &&\n        setInjectImplementation(previousInjectImplementation);\n        setIncludeViewProviders(previousIncludeViewProviders);\n        factory.resolving = false;\n        leaveDI();\n      } }\n    }\n  }\n  return value;\n} \n\n/**\n * Returns the bit in an injector's bloom filter that should be used to determine whether\n * or not\n * the directive might be provided by the injector.\n * When a directive is public, it is added to the bloom\n * filter and given a unique ID that can be\n * retrieved on the Type. When the directive isn't public or the token is not\n * a directive `null`\n * is returned as the node injector can not possibly provide that token.\n * @param token the\n * injection token\n * @returns the matching\n * bit to check in the bloom filter or `null` if the token is not known.\n * When the returned value is negative then it\n * represents special values such as `Injector`.\n */\nexport function bloomHashBitOrFactory(token:\n  ProviderToken<any>|string): number|Function|undefined {\n  ngDevMode && assertDefined(token, 'token must be\n  defined');\n  if (typeof token === 'string') {\n    return token.charCodeAt(0) || 0;\n  }\n  const tokenId:\n  number|undefined =\n    // First check with `hasOwnProperty` so we don't get an inherited ID.\n    token.hasOwnProperty(NG_ELEMENT_ID) ? (token as any)[NG_ELEMENT_ID] : undefined;\n  // Negative token\n  IDs are used for special objects such as `Injector`\n  if (typeof tokenId === 'number') {\n    if (tokenId >= 0) {\n      return tokenId & BLOOM_MASK;\n    } else {\n      ngDevMode &&\n        assertEquals(tokenId,\n        InjectorMarkers.Injector, 'Expecting to get Special Injector Id');\n      return createNodeInjector;\n    } } else {\n      return tokenId;\n    }\n  }\n}\n\nexport function bloomHasToken(bloomHash: number, injectorIndex: number, injectorView:\n  LView|TData) {\n  // Create a mask that targets the specific bit associated with the directive we're looking for.\n  // JS\n  bit operations are 32 bits, so this will be a number between 2^0 and 2^31, corresponding\n  // to bit positions 0 -\n  31 in a 32 bit integer.\n  const mask = 1 << bloomHash;\n  // Each bloom bucket in `injectorView` represents\n  `BLOOM_BUCKET_BITS` number of bits of\n  // `bloomHash`. Any bits in `bloomHash` beyond\n  `BLOOM_BUCKET_BITS` indicate the bucket offset\n  // that should be used.\n  const value =\n  injectorView[injectorIndex + (bloomHash >> BLOOM_BUCKET_BITS)];\n  // If the bloom filter value has the\n  bit corresponding to the directive's bloomBit flipped on,\n  // this injector is a potential match.\n  return !!(value &\n  mask);\n} \n\n/** Returns true if flags prevent parent injector from being searched for tokens */\nfunction
```

```

shouldSearchParent(flags: InjectFlags,
isFirstHostTNode: boolean): boolean|number {\n return !(flags & InjectFlags.Self) && !(flags & InjectFlags.Host
&& isFirstHostTNode);\n}\n\nexport class NodeInjector implements Injector {\n constructor(\n private _tNode:
TElementNode|TContainerNode|TElementContainerNode|null,\n private _lView: LView) {\n\n get(token: any,
notFoundValue?: any, flags?: InjectFlags): any {\n return getOrCreateInjectable(this._tNode, this._lView, token,
flags, notFoundValue);\n }\n}\n\n/** Creates a `NodeInjector` for the current node. */\nexport function
createNodeInjector(): Injector {\n return new NodeInjector(getCurrentTNode()! as TDirectiveHostNode,
getLView()) as any;\n}\n\n/**\n * @codeGenApi\n */\nexport function getInheritedFactory<T>(type: Type<any>):
(type: Type<T>) => T {\n return noSideEffects(() => {\n const ownConstructor = type.prototype.constructor;\n
const ownFactory = ownConstructor[NG_FACTORY_DEF] || getFactoryOf(ownConstructor);\n const
objectPrototype =
Object.prototype;\n let parent = Object.getPrototypeOf(type.prototype).constructor;\n\n // Go up the prototype
until we hit `Object`\n while (parent && parent !== objectPrototype) {\n const factory =
parent[NG_FACTORY_DEF] || getFactoryOf(parent);\n\n // If we hit something that has a factory and the
factory isn't the same as the type,\n // we've found the inherited factory. Note the check that the factory isn't the
type's\n // own factory is redundant in most cases, but if the user has custom decorators on the\n // class, this
lookup will start one level down in the prototype chain, causing us to\n // find the own factory first and
potentially triggering an infinite loop downstream.\n if (factory && factory !== ownFactory) {\n return
factory;\n }\n\n parent = Object.getPrototypeOf(parent);\n }\n\n // There is no factory defined. Either this
was improper usage of inheritance\n // (no Angular decorator on the superclass)
or there is no constructor at all\n // in the inheritance chain. Since the two cases cannot be distinguished, the\n //
latter has to be assumed.\n return t => new t();\n });\n}\n\nfunction getFactoryOf<T>(type: Type<any>): ((type?:
Type<T>) => T | null)|null {\n if (isForwardRef(type)) {\n return () => {\n const factory =
getFactoryOf<T>(resolveForwardRef(type));\n return factory && factory();\n };\n }\n return
getFactoryDef<T>(type);\n}\n\n/**\n * Returns a value from the closest embedded or node injector.\n *\n * @param tNode The Node where the search for the injector should start\n * @param lView The `LView` that
contains the `tNode`\n * @param token The token to look for\n * @param flags Injection flags\n * @param
notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n * @returns the value from
the injector, `null` when not found, or `notFoundValue` if provided\n */\nfunction
lookupTokenUsingEmbeddedInjector<T>(\n
tNode: TDirectiveHostNode, lView: LView, token: ProviderToken<T>, flags: InjectFlags,\n notFoundValue?:
any) {\n let currentTNode: TDirectiveHostNode|null = tNode;\n let currentLView: LView|null = lView;\n\n //
When an LView with an embedded view injector is inserted, it'll likely be interlaced with\n // nodes who may have
injectors (e.g. node injector -> embedded view injector -> node injector).\n // Since the bloom filters for the node
injectors have already been constructed and we don't\n // have a way of extracting the records from an injector, the
only way to maintain the correct\n // hierarchy when resolving the value is to walk it node-by-node while
attempting to resolve\n // the token at each level.\n while (currentTNode !== null && currentLView !== null &&\n
(currentLView[FLAGS] & LViewFlags.HasEmbeddedViewInjector) &&\n !(currentLView[FLAGS] &
LViewFlags.IsRoot)) {\n ngDevMode && assertTNodeForLView(currentTNode, currentLView);\n\n // Note
that
this lookup on the node injector is using the `Self` flag, because\n // we don't want the node injector to look at any
parent injectors since we\n // may hit the embedded view injector first.\n const nodeInjectorValue =
lookupTokenUsingNodeInjector(\n currentTNode, currentLView, token, flags | InjectFlags.Self,
NOT_FOUND);\n if (nodeInjectorValue !== NOT_FOUND) {\n return nodeInjectorValue;\n }\n\n // Has
an explicit type due to a TS bug: https://github.com/microsoft/TypeScript/issues/33191\n let parentTNode:
TElementNode|TContainerNode|null = currentTNode.parent;\n\n // `TNode.parent` includes the parent within the
current view only. If it doesn't exist,\n // it means that we've hit the view boundary and we need to go up to the
next view.\n if (!parentTNode) {\n // Before we go to the next LView, check if the token exists on the current

```

```

embedded injector.\n    const embeddedViewInjector = currentLView[EMBEDDED_VIEW_INJECTOR];\n
if (embeddedViewInjector) {\n    const embeddedViewInjectorValue =\n
embeddedViewInjector.get(token, NOT_FOUND as T | {}, flags);\n    if (embeddedViewInjectorValue !==\n
NOT_FOUND) {\n        return embeddedViewInjectorValue;\n    }\n}\n\n // Otherwise keep going up the
tree.\n    parentTNode = getTNodeFromLView(currentLView);\n    currentLView =\n
currentLView[DECLARATION_VIEW];\n}\n\n currentTNode = parentTNode;\n}\n\n return
notFoundValue;\n}\n\n/** Gets the TNode associated with an LView inside of the declaration view. */\nfunction
getTNodeFromLView(IView: LView): TElementNode|TElementContainerNode|null {\n    const tView =\n
IView[TVIEW];\n    const tViewType = tView.type;\n\n // The parent pointer differs based on `TView.type`.\n    if
(tViewType === TViewType.Embedded) {\n        ngDevMode && assertDefined(tView.declTNode, 'Embedded
TNodes should have declaration parents.);\n        return tView.declTNode as TElementContainerNode;\n    } else if
(tViewType\n
=== TViewType.Component) {\n        // Components don't have `TView.declTNode` because each instance of
component could be\n        // inserted in different location, hence `TView.declTNode` is meaningless.\n        return
IView[T_HOST] as TElementNode;\n    }\n\n    return null;\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {injectAttributeImpl} from './di';\nimport
{getCurrentTNode} from './state';\n\n/**\n * Facade for the attribute injection from DI.\n */\n * @codeGenApi\n */\nexport function injectAttribute(attrNameToInject: string): string|null {\n    return
injectAttributeImpl(getCurrentTNode()!, attrNameToInject);\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\n\nimport {Type} from './interface/type';\nimport {noSideEffects} from './closure';\n\n/**\n * An interface
implemented by all Angular type decorators, which allows them to be used as\n * decorators as well as Angular
syntax.\n */\n * @ng.Component({...})\n * class MyClass {...}\n * @publicApi\n */\nexport
interface TypeDecorator {\n    /**\n     * Invoke as decorator.\n     */\n    <T extends Type<any>>(type: T): T;\n\n //
Make TypeDecorator assignable to built-in ParameterDecorator type.\n // ParameterDecorator is declared in lib.d.ts
as a `declare type`\n // so we cannot declare this interface as a subtype.\n // see
https://github.com/angular/angular/issues/3379#issuecomment-126169417\n (target: Object, propertyKey?:
string|symbol, parameterIndex?: number): void;\n}\n\nexport const ANNOTATIONS = '__annotations__';\nexport
const PARAMETERS = '__parameters__';\nexport const PROP_METADATA = '__prop__metadata__';\n\n/**\n *
@suppress {globalThis}\n */\nexport function makeDecorator<T>(\n    name: string, props?: (...args: any[]) => any, parentClass?: any,\n
additionalProcessing?: (type: Type<T>) => void,\n    typeFn?: (type: Type<T>, ...args: any[]) => void):\n {new
(...args: any[]): any; (...args: any[]): any; (...args: any[]): (cls: any) => any;} {\n    return noSideEffects(() => {\n
const metaCtor = makeMetadataCtor(props);\n\n    function DecoratorFactory(\n        this: unknown|typeof
DecoratorFactory, ...args: any[]): (cls: Type<T>) => any {\n        if (this instanceof DecoratorFactory) {\n
metaCtor.call(this, ...args);\n        return this as typeof DecoratorFactory;\n    }\n\n    const annotationInstance =
new (DecoratorFactory as any)(...args);\n    return function TypeDecorator(cls: Type<T>) {\n        if (typeFn)\n
typeFn(cls, ...args);\n        // Use of Object.defineProperty is important since it creates non-enumerable property
which\n        // prevents the property is copied during subclassing.\n        const annotations = cls.hasOwnProperty(ANNOTATIONS) ?\n
(cls as any)[ANNOTATIONS] :\n
(Object.defineProperty(cls, ANNOTATIONS, {value: []}) as any)[ANNOTATIONS];\n
annotations.push(annotationInstance);\n\n        if (additionalProcessing) additionalProcessing(cls);\n\n        return
cls;\n    };\n\n    if (parentClass) {\n        DecoratorFactory.prototype = Object.create(parentClass.prototype);\n
}\n\n    DecoratorFactory.prototype.ngMetadataName = name;\n    (DecoratorFactory as any).annotationCls =
DecoratorFactory;\n    return DecoratorFactory as any;\n });\n}\n\nfunction makeMetadataCtor(props?: (...args:
any[]) => any): any {\n    return function ctor(this: any, ...args: any[]) {\n        if (props) {\n            const values =

```

```

props(...args);\n    for (const propName in values) {\n        this[propName] = values[propName];\n    }\n}\n};\n}\n\nexport function makeParamDecorator(\n    name: string, props?: (...args: any[]) => any, parentClass?:\n    any): any {\n    return noSideEffects(() => {\n        const metaCtor = makeMetadataCtor(props);\n        function\n        ParamDecoratorFactory(\n            this: unknown|typeof ParamDecoratorFactory, ...args: any[]): any {\n                if (this\n                instanceof ParamDecoratorFactory) {\n                    metaCtor.apply(this, args);\n                    return this;\n                }\n                const\n                annotationInstance = new (<any>ParamDecoratorFactory)(...args);\n                (<any>ParamDecorator).annotation =\n                annotationInstance;\n                return ParamDecorator;\n            }\n            function ParamDecorator(cls: any, unusedKey: any, index:\n            number): any {\n                // Use of Object.defineProperty is important since it creates non-enumerable property which\n                // prevents the property is copied during subclassing.\n                const parameters =\n                cls.hasOwnProperty(PARAMETERS) ?\n                (cls as any)[PARAMETERS] :\n                Object.defineProperty(cls,\n                PARAMETERS, {value: []})(PARAMETERS);\n                // there might be gaps if some in between parameters do not\n                have annotations.\n                // we pad with nulls.\n                while (parameters.length <= index) {\n                    parameters.push(null);\n                }\n                (parameters[index] = parameters[index] || []).push(annotationInstance);\n            }\n            return cls;\n        }\n    }\n    if (parentClass) {\n        ParamDecoratorFactory.prototype =\n        Object.create(parentClass.prototype);\n    }\n    ParamDecoratorFactory.prototype.ngMetadataName = name;\n    (<any>ParamDecoratorFactory).annotationCls = ParamDecoratorFactory;\n    return ParamDecoratorFactory;\n});\n}\n\nexport function makePropDecorator(\n    name: string, props?: (...args: any[]) => any, parentClass?: any,\n    additionalProcessing?: (target: any, name: string, ...args: any[]) => void): any {\n    return noSideEffects(() => {\n        const metaCtor = makeMetadataCtor(props);\n        function PropDecoratorFactory(this: unknown|typeof\n        PropDecoratorFactory, ...args: any[]): any {\n            if (this instanceof PropDecoratorFactory) {\n                metaCtor.apply(this,\n                args);\n                return this;\n            }\n            const decoratorInstance = new (<any>PropDecoratorFactory)(...args);\n            function PropDecorator(target: any, name: string) {\n                const constructor = target.constructor;\n                // Use of\n                Object.defineProperty is important because it creates a non-enumerable property\n                // which prevents the\n                property from being copied during subclassing.\n                const meta =\n                constructor.hasOwnProperty(PROP_METADATA) ?\n                (constructor as any)[PROP_METADATA] :\n                Object.defineProperty(constructor, PROP_METADATA, {value: {}})(PROP_METADATA);\n                meta[name] =\n                meta.hasOwnProperty(name) && meta[name] || [];\n                meta[name].unshift(decoratorInstance);\n            }\n            if\n            (additionalProcessing) additionalProcessing(target, name, ...args);\n        }\n        return PropDecorator;\n    }\n    if\n    (parentClass) {\n        PropDecoratorFactory.prototype = Object.create(parentClass.prototype);\n    }\n    PropDecoratorFactory.prototype.ngMetadataName\n    = name;\n    (<any>PropDecoratorFactory).annotationCls = PropDecoratorFactory;\n    return\n    PropDecoratorFactory;\n});\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use\n * of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\nimport {injectAttribute} from './render3/instructions/di_attr';\nimport\n * {makeParamDecorator} from './util/decorators';\n\n/**\n * Type of the Attribute decorator / constructor\n * function.\n *\n * @publicApi\n */\nexport interface AttributeDecorator {\n    /**\n     * Parameter decorator for a\n     * directive constructor that designates\n     * a host-element attribute whose value is injected as a constant string\n     * literal.\n     *\n     * @usageNotes\n     *\n     * Suppose we have an `` element and want to know its `type`.\n     *\n     * ```html\n     * <input type="text">\n     * ```\n     *\n     * The following example uses the decorator\n     * to inject the string literal `text` in a directive.\n     *\n     * { @example core/ts/metadata/metadata.ts\n     * region='attributeMetadata'}\n     *\n     * The following example uses the decorator in a component constructor.\n     *\n     * { @example core/ts/metadata/metadata.ts region='attributeFactory'}\n     *\n     * (name: string): any;\n     * new(name: string): Attribute;\n    }\n\n    /**\n     * Type of the Attribute metadata.\n     *\n     * @publicApi\n     */\n    export\n    interface Attribute {\n        /**\n         * The name of the attribute whose value can be injected.\n         *\n         * attributeName:\n         * string;\n    }\n\n    /**\n     * Attribute decorator and metadata.\n     *\n     * @Annotation\n     * @publicApi\n     */\n    export\n    const\n    Attribute: AttributeDecorator = makeParamDecorator(\n        'Attribute',\n        (attributeName?: string) =>\n        ({attributeName, __NG_ELEMENT_ID__: () => injectAttribute(attributeName!)}));\n\n"/**\n * @license\n *

```

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found in the LICENSE file at <https://angular.io/license>  
`import {Type} from './interface/type';  
import {assertLessThan} from './util/assert';  
import {defineInjectable} from './interface/defs';  
/**  
 * Creates a token that can be used in a DI Provider.  
 * Use an `InjectionToken` whenever the type you are injecting is not reified (does not have a runtime representation) such as when injecting an interface, callable type, array or parameterized type.  
 * `InjectionToken` is parameterized on `T` which is the type of object which will be returned by the `Injector`. This provides an additional level of type safety.  
 *  
 * interface MyInterface {...}  
 * const myInterface = injector.get(new InjectionToken<MyInterface>('SomeToken'));  
 * // myInterface is inferred to be MyInterface.  
 *  
 * When creating an `InjectionToken`, you can optionally specify a factory function which returns (possibly by creating) a default value of the`

parameterized type `T`. This sets up the `InjectionToken` using this factory as a provider as if it was defined explicitly in the application's root injector. If the factory function, which takes zero arguments, needs to inject dependencies, it can do so using the `inject` function. As you can see in the Tree-shakable InjectionToken example below. Additionally, if a `factory` is specified you can also specify the `providedIn` option, which overrides the above behavior and marks the token as belonging to a particular `@NgModule`. As mentioned above, `root` is the default value for `providedIn`.

```
##### Basic Examples  
##### Plain InjectionToken  
 * { @example core/di/ts/injector_spec.ts region='InjectionToken'}  
##### Tree-shakable InjectionToken  
 * { @example core/di/ts/injector_spec.ts region='ShakableInjectionToken'}  
 *  
 * @publicApi  
 *  
 * export class InjectionToken<T> {  
 *   /** @internal */  
 *   readonly ngMetadataName = 'InjectionToken';  
 *   readonly prov: unknown;  
 *   /**  
 *    * @param _desc Description for the token,  
 *    * used only for debugging purposes,  
 *    * it should but does not need to be unique  
 *    * @param options Options for the token's usage, as described above  
 *    * @param constructor(protected _desc: string, options?: {  
 *    *   providedIn?: Type<any>|'root'|'platform'|any|null, factory: () => T  
 *    * }) {  
 *    *   this.prov = undefined;  
 *    *   if (typeof options == 'number') {  
 *    *     (typeof ngDevMode === 'undefined' || ngDevMode) &&  
 *    *     assertLessThan(options, 0, 'Only negative numbers are supported here');  
 *    *     // This is a special hack to assign __NG_ELEMENT_ID__ to this instance.  
 *    *     // See `InjectorMarkers` (this as any).__NG_ELEMENT_ID__ = options;  
 *    *   } else if (options !== undefined) {  
 *    *     this.prov = defineInjectable({  
 *    *       token: this,  
 *    *       providedIn: options.providedIn || 'root',  
 *    *       factory: options.factory,  
 *    *     });  
 *    *   }  
 *    * }  
 *    *  
 *    * @internal  
 *    * @param get multi(): InjectionToken<Array<T>> {  
 *    *   return this as InjectionToken<Array<T>>;  
 *    * }  
 *    * toString(): string {  
 *    *   return `InjectionToken ${this._desc}`;  
 *    * }  
 *    * }  
 *    *  
 *    * export interface InjectableDefToken<T> extends InjectionToken<T> {  
 *    *   prov: unknown;  
 *    *   /**  
 *    *    * @license  
 *    *    * Copyright Google LLC All Rights Reserved.  
 *    *    * Use of this source code is governed by an MIT-style license that can be  
 *    *    * found in the LICENSE file at https://angular.io/license  
 *    *    *  
 *    *    * import {InjectionToken} from './di/injection_token';  
 *    *    * import {ProviderToken} from './di/provider_token';  
 *    *    * import {makePropDecorator} from './util/decorators';  
 *    *    *  
 *    *    * A DI token that you can use to create a virtual [provider](guide/glossary#provider) that will populate the `entryComponents` field of components and NgModules based on its `useValue` property value. All components that are referenced in the `useValue` value (either directly  
 *    *    * or in a nested array or map) are added to the `entryComponents` property.  
 *    *    *  
 *    *    * @usageNotes  
 *    *    * The following example shows how the router can populate the `entryComponents` field of an NgModule based on a router configuration that refers to components.  
 *    *    *  
 *    *    * typescript // helper function inside the router  
 *    *    * function provideRoutes(routes) {  
 *    *   return [  
 *    *     {provide: ROUTES, useValue: routes},  
 *    *     {provide: ANALYZE_FOR_ENTRY_COMPONENTS, useValue: routes, multi: true}  
 *    *   ];  
 *    * }  
 *    *  
 *    * // user code  
 *    * let routes = [  
 *    *   {path: '/root', component: RootComp},  
 *    *   {path: '/teams', component: TeamsComp}  
 *    * ];  
 *    *  
 *    * @NgModule({  
 *    *   providers: [provideRoutes(routes)]  
 *    * })  
 *    * class ModuleWithRoutes {  
 *    * }  
 *    *  
 *    * @publicApi  
 *    * @deprecated Since 9.0.0. With Ivy, this property is no longer necessary.  
 *    *  
 *    * export const ANALYZE_FOR_ENTRY_COMPONENTS = new
```

```

InjectionToken<any>('AnalyzeForEntryComponents');\n\n/**\n * Type of the `Attribute`
decorator / constructor function.\n *\n * @publicApi\n */\nexport interface AttributeDecorator {\n /**\n *
Specifies that a constant attribute value should be injected.\n *\n * The directive can inject constant string literals
of host element attributes.\n *\n * @usageNotes\n *\n * Suppose we have an `` element and want to
know its `type`.\n *\n * ```html\n * <input type="text">\n * ```\n *\n * A decorator can inject string literal
`text` as in the following example.\n *\n * {@example core/ts/metadata/metadata.ts region='attributeMetadata'}\n
*\n * @publicApi\n */\n (name: string): any;\n new(name: string): Attribute;\n}\n\n/**\n * Type of the
Attribute metadata.\n *\n * @publicApi\n */\nexport interface Attribute {\n /**\n * The name of the attribute to be
injected into the constructor.\n */\n attributeName?: string;\n}\n\n/**\n * Type of the Query metadata.\n *\n *
@publicApi\n */\nexport interface Query {\n descendants:
boolean;\n emitDistinctChangesOnly: boolean;\n first: boolean;\n read: any;\n isViewQuery: boolean;\n selector:
any;\n static?: boolean;\n}\n\n// Stores the default value of `emitDistinctChangesOnly` when the
`emitDistinctChangesOnly` is not\n// explicitly set.\nexport const emitDistinctChangesOnlyDefaultValue =
true;\n\n/**\n * Base class for query metadata.\n *\n * @see `ContentChildren`\n * @see `ContentChild`\n *
@see `ViewChildren`\n * @see `ViewChild`\n *\n * @publicApi\n */\nexport abstract class Query {\n\n/**\n * Type of the ContentChildren decorator / constructor function.\n *\n * @see `ContentChildren`\n * @publicApi\n
*/\nexport interface ContentChildrenDecorator {\n /**\n * @description\n * Property decorator that configures a
content query.\n *\n * Use to get the `QueryList` of elements or directives from the content DOM.\n * Any time
a child element is added, removed, or moved, the query list will be\n * updated, and the changes observable of the
query list will emit a new value.\n *\n * Content queries are set before the `ngAfterContentInit` callback is
called.\n *\n * Does not retrieve elements or directives that are in other components' templates,\n * since a
component's template is always a black box to its ancestors.\n *\n * ***Metadata Properties***:\n *\n *
***selector*** - The directive type or the name used for querying.\n * ***descendants*** - If `true` include all
descendants of the element. If `false` then only\n * query direct children of the element.\n *\n *
***emitDistinctChangesOnly*** - The `QueryList#changes` observable will emit new values only\n * if the
QueryList result has changed. When `false` the `changes` observable might emit even\n * if the QueryList has not
changed.\n * *** Note: *** This config option is ***deprecated***, it will be permanently set to `true` and\n *
removed in future versions of Angular.\n *\n * ***read*** - Used to read a different token from the queried
elements.\n *\n * The following selectors are supported.\n * * Any class with the `@Component` or
`@Directive` decorator\n * * A template reference variable as a string (e.g. query `<my-component #cmp></my-
component>`\n * with `@ContentChildren('cmp')`\n * * Any provider defined in the child component tree of
the current component (e.g.\n * `@ContentChildren(SomeService) someService: SomeService)`\n * * Any
provider defined through a string token (e.g. `@ContentChildren('someToken')\n * someTokenVal: any)`\n * *
A `TemplateRef` (e.g. query `<ng-template></ng-template>` with\n * `@ContentChildren(TemplateRef)
template;`\n *)\n * In addition, multiple string selectors can be separated with a comma (e.g.\n *
`@ContentChildren('cmp1,cmp2')`\n *)\n *\n * The following values are supported by `read`:\n * * Any class with
the `@Component` or `@Directive` decorator\n * * Any provider defined on the injector of the component that is
matched by
the `selector` of\n * this query\n * * Any provider defined through a string token (e.g. `{provide: 'token',
useValue: 'val'}`)\n * * `TemplateRef`, `ElementRef`, and `ViewContainerRef`\n *\n * @usageNotes\n *\n *
Here is a simple demonstration of how the `ContentChildren` decorator can be used.\n *\n * {@example
core/di/ts/contentChildren/content_children_howto.ts region='HowTo'}\n *\n * ### Tab-pane example\n *\n *
Here is a slightly more realistic example that shows how `ContentChildren` decorators\n * can be used to
implement a tab pane component.\n *\n * {@example core/di/ts/contentChildren/content_children_example.ts
region='Component'}\n *\n * @Annotation\n */\n (selector: ProviderToken<unknown>|Function|string, opts?:
{\n descendants?: boolean,\n emitDistinctChangesOnly?: boolean,\n read?: any,\n }): any;\n new(selector:
ProviderToken<unknown>|Function|string,\n opts?: {descendants?: boolean, emitDistinctChangesOnly?:

```



```

boolean, read?: any}): Query;
}
Type of the ContentChildren metadata.
@Annotation
@publicApi
export type ContentChildren = Query;
ContentChildren decorator and metadata.
@Annotation
@publicApi
export const ContentChildren: ContentChildrenDecorator =
makePropDecorator(
  'ContentChildren', (selector?: any, data: any = {}) => ({
    selector,
    first: false,
    isViewQuery: false,
    descendants: false,
    emitDistinctChangesOnly: emitDistinctChangesOnlyDefaultValue,
    ...data
  })),
Query);
Type of the ContentChild decorator / constructor function.
@publicApi
export interface ContentChildDecorator {
  /**
   * @description
   * Property decorator that configures a content
   * query.
   * Use to get the first element or the directive
   * matching the selector from the content DOM.
   * If the content DOM changes, and a new child matches the
   * selector, the property will be updated.
   * Content queries are set before the `ngAfterContentInit`
   * callback is called.
   * Does not retrieve elements or directives that are in other components' templates,
   * since a component's template is always a black box to its ancestors.
   * **Metadata Properties**
   * **selector** - The directive type or the name used for querying.
   * **descendants** - If `true` (default) include
   * all descendants of the element. If `false` then only query direct children of the element.
   * **read** - Used
   * to read a different token from the queried element.
   * **static** - True to resolve query results before change
   * detection runs, false to resolve after change detection. Defaults to false.
   * The following selectors are
   * supported.
   * Any class with the `@Component`
   * or `@Directive` decorator
   * A template reference variable as a string (e.g. query `<my-component
   * #cmp></my-component>` with `@ContentChild('cmp')`)
   * Any provider defined in the child component
   * tree of the current component (e.g. `@ContentChild(SomeService) someService: SomeService`)
   * Any
   * provider defined through a string token (e.g. `@ContentChild('someToken') someTokenVal: any`)
   * A
   * `TemplateRef` (e.g. query `<ng-template></ng-template>` with `@ContentChild(TemplateRef) template;`)
   * The following values are supported by `read`:
   * Any class with the `@Component` or `@Directive`
   * decorator
   * Any provider defined on the injector of the component that is matched by the `selector` of
   * this query
   * Any provider defined through a string token (e.g. `{provide: 'token', useValue: 'val'}`)
   * `TemplateRef`, `ElementRef`, and `ViewContainerRef`
   * @usageNotes
   * {
   *   @example
   *   core/di/ts/contentChild/content_child_howto.ts
   *   region='HowTo'}
   *   ### Example
   *   {
   *     @example core/di/ts/contentChild/content_child_example.ts
   *     region='Component'}
   *     @Annotation
   *     (selector: ProviderToken<unknown>|Function|string,
   *     opts?: {descendants?: boolean, read?: any, static?: boolean}): any;
   *     new(selector:
   *     ProviderToken<unknown>|Function|string,
   *     opts?: {descendants?: boolean, read?: any, static?: boolean}):
   *     ContentChild;
   *   }
   *   Type of the ContentChild metadata.
   *   @publicApi
   *   export type
   *   ContentChild = Query;
   *   ContentChild decorator and metadata.
   *   @Annotation
   *   @publicApi
   *   export const ContentChild: ContentChildDecorator = makePropDecorator(
   *     'ContentChild',
   *     (selector?: any, data: any = {}) =>
   *       ({selector, first: true, isViewQuery: false, descendants: true, ...data}),
   *     Query);
   *   Type of the ViewChildren decorator / constructor function.
   *   @see `ViewChildren`.
   *   @publicApi
   *   export interface ViewChildrenDecorator {
   *     /**
   *      * @description
   *      * Property
   *      * decorator that configures a view query.
   *      * Use to get the `QueryList` of elements or directives from the view
   *      * DOM.
   *      * Any time a child element is added, removed, or moved, the query list will be updated,
   *      * and the
   *      * changes observable of the query list will emit a new value.
   *      * View queries are set before the
   *      * `ngAfterViewInit` callback is called.
   *      * **Metadata Properties**
   *      * **selector** - The directive
   *      * type or the name used for querying.
   *      * **read** - Used to read a different token from the queried elements.
   *      * **emitDistinctChangesOnly** - The `QueryList#changes` observable will emit new values only
   *      * if the
   *      * QueryList result has changed. When `false` the `changes` observable might emit even
   *      * if the QueryList has not
   *      * changed.
   *      * Note: This config option is deprecated, it will be permanently
   *      * set to `true` and
   *      * removed in future versions of Angular.
   *      * The following selectors are supported.
   *      * Any class with the `@Component` or `@Directive` decorator
   *      * A template reference variable as a string

```

(e.g. query ``<my-component #cmp></my-component>``\n \* with ``@ViewChild('cmp')``)\n \* \* Any provider defined in the child component tree of the current component (e.g.\n \* ``@ViewChild(SomeService) someService!: SomeService``)\n \* \* Any provider defined through a string token (e.g. ``@ViewChild('someToken')`\n \* `someTokenVal!: any``)\n \* \* A ``TemplateRef`` (e.g. query ``<ng-template></ng-template>`` with ``@ViewChild(TemplateRef)`\n \* `template;``)\n \* In addition, multiple string selectors can be separated with a comma (e.g.\n \* ``@ViewChild('cmp1,cmp2')``)\n \* The following values are supported by ``read``:\n \* \* Any class with the ``@Component`` or ``@Directive`` decorator\n \* \* Any provider defined on the injector of the component that is matched by the ``selector`` of\n \* this query\n \* \* Any provider defined through a string token (e.g. `{provide: 'token', useValue: 'val'}`)\n \* \* ``TemplateRef``, ``ElementRef``, and ``ViewContainerRef``\n \* `@usageNotes`\n \* `{@example core/di/ts/viewChildren/view_children_howto.ts region='HowTo'}`\n \* `### Another example`\n \* `{@example core/di/ts/viewChildren/view_children_example.ts region='Component'}`\n \* `@Annotation`\n \* `(selector: ProviderToken<unknown>|Function|string,\n * opts?: {read?: any, emitDistinctChangesOnly?: boolean}): any;\n * new(selector: ProviderToken<unknown>|Function|string,\n * opts?: {read?: any, emitDistinctChangesOnly?: boolean}): ViewChildren;`\n \* Type of the ViewChildren metadata.\n \* `@publicApi`\n \* `export type ViewChildren = Query;`\n \* ViewChildren decorator and metadata.\n \* `@Annotation`\n \* `@publicApi`\n \* `export const ViewChildren: ViewChildrenDecorator = makePropDecorator(\n * 'ViewChildren', (selector?: any, data: any = {}) => ({\n * selector,\n * first: false,\n * isViewQuery: true,\n * descendants: true,\n * emitDistinctChangesOnly: emitDistinctChangesOnlyDefaultValue,\n * ...data\n * })),\n * Query);`\n \* Type of the ViewChild decorator / constructor function.\n \* `@see 'ViewChild'`\n \* `@publicApi`\n \* `export interface ViewChildDecorator {\n * /**\n * @description\n * Property decorator that configures a view query.\n * The change detector looks for the first element or the directive matching the selector\n * in the view DOM. If the view DOM changes, and a new child matches the selector,\n * the property is updated.\n * View queries are set before the ngAfterViewInit callback is called.\n * **Metadata Properties**:\n * selector - The directive type or the name used for querying.\n * read - Used to read a different token from the queried elements.\n * static - True to resolve query results before change detection runs,\n * false to resolve after change detection. Defaults to false.\n * The following selectors are supported.\n * * Any class with the `@Component` or `@Directive` decorator\n * * A template reference variable as a string (e.g. query `<my-component #cmp></my-component>`\n * with `@ViewChild('cmp')`)\n * * Any provider defined in the child component tree of the current component (e.g.\n * `@ViewChild(SomeService) someService: SomeService`)\n * * Any provider defined through a string token (e.g. `@ViewChild('someToken')\n * someTokenVal!: any`)\n * * A `TemplateRef` (e.g. query `<ng-template></ng-template>` with `@ViewChild(TemplateRef)\n * template;`)\n * The following values are supported by `read`:\n * * Any class with the `@Component` or `@Directive` decorator\n * * Any provider defined on the injector of the component that is matched by the `selector` of\n * this query\n * * Any provider defined through a string token (e.g. {provide: 'token', useValue: 'val'})\n * * `TemplateRef`, `ElementRef`, and `ViewContainerRef`\n * @usageNotes\n * {@example core/di/ts/viewChild/view_child_example.ts region='Component'}\n * ### Example 2\n * {@example core/di/ts/viewChild/view_child_howto.ts region='HowTo'}\n * @Annotation\n * (selector: ProviderToken<unknown>|Function|string, opts?: {read?: any, static?: boolean}): any;\n * new(selector: ProviderToken<unknown>|Function|string,\n * opts?: {read?: any, static?: boolean}): ViewChild;\n * Type of the ViewChild metadata.\n * @publicApi\n * export type ViewChild = Query;\n * ViewChild decorator and metadata.\n * @Annotation\n * @publicApi\n * export const ViewChild: ViewChildDecorator = makePropDecorator(\n * 'ViewChild',\n * (selector: any, data: any) => ({\n * selector, first: true, isViewQuery: true, descendants: true,\n * ...data\n * })),\n * Query);\n * "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this`

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A set of interfaces which are shared between `@angular/core` and `@angular/compiler` to allow for late binding of `@angular/compiler` for JIT purposes.

This file has two copies. Please ensure that they are in sync:

- packages/compiler/src/compiler\_facade\_interface.ts (main)
- packages/core/src/compiler/compiler\_facade\_interface.ts (replica)

Please ensure that the two files are in sync using this command:

```
cp packages/compiler/src/compiler_facade_interface.ts \
packages/core/src/compiler/compiler_facade_interface.ts
```

```
export interface ExportedCompilerFacade {
  compilerFacade: CompilerFacade;
}

export interface CompilerFacade {
  compilePipe(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3PipeMetadataFacade): any;
  compilePipeDeclaration(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, declaration: R3DeclarePipeFacade): any;
  compileInjectable(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3InjectableMetadataFacade): any;
  compileInjectableDeclaration(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3DeclareInjectableFacade): any;
  compileInjector(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3InjectorMetadataFacade): any;
  compileInjectorDeclaration(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, declaration: R3DeclareInjectorFacade): any;
  compileNgModule(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3NgModuleMetadataFacade): any;
  compileNgModuleDeclaration(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, declaration: R3DeclareNgModuleFacade): any;
  compileDirective(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3DirectiveMetadataFacade): any;
  compileDirectiveDeclaration(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, declaration: R3DeclareDirectiveFacade): any;
  compileComponent(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3ComponentMetadataFacade): any;
  compileComponentDeclaration(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, declaration: R3DeclareComponentFacade): any;
  compileFactory(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3FactoryDefMetadataFacade): any;
  compileFactoryDeclaration(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3DeclareFactoryFacade): any;
  createParseSourceSpan(kind: string, typeName: string, sourceUrl: string): ParseSourceSpan;

  FactoryTarget: typeof FactoryTarget;
  // Note that we do not use `new(): ResourceLoader` here because the resource loader class is abstract and not constructable.
  ResourceLoader: Function & { prototype: ResourceLoader };
}

export interface CoreEnvironment {
  [name: string]: Function;
}

export type ResourceLoader = {
  get(url: string): Promise<string> | string;
};

export type StringMap = {
  [key: string]: string;
};

export type StringMapWithRename = {
  [key: string]: string | [string, string];
};

export type Provider = unknown;
export type Type = Function;
export type OpaqueValue = unknown;

export enum FactoryTarget {
  Directive = 0,
  Component = 1,
  Injectable = 2,
  Pipe = 3,
  NgModule = 4,
}

export interface R3DependencyMetadataFacade {
  token: OpaqueValue;
  attribute: string | null;
  host: boolean;
  optional: boolean;
  self: boolean;
  skipSelf: boolean;
}

export interface R3DeclareDependencyMetadataFacade {
  token: OpaqueValue;
  attribute?: boolean;
  host?: boolean;
  optional?: boolean;
  self?: boolean;
  skipSelf?: boolean;
}

export interface R3PipeMetadataFacade {
  name: string;
  type: Type;
  pipeName: string;
  pure: boolean;
  isStandalone: boolean;
}

export interface R3InjectableMetadataFacade {
  name: string;
  type: Type;
  typeArgumentCount: number;
  providedIn?: Type | 'root' | 'platform' | 'any' | null;
  useClass?: OpaqueValue;
  useFactory?: OpaqueValue;
  useExisting?: OpaqueValue;
  useValue?: OpaqueValue;
  deps?: R3DependencyMetadataFacade[];
}

export interface R3NgModuleMetadataFacade {
  type: Type;
  bootstrap: Function[];
  declarations: Function[];
  imports: Function[];
  exports: Function[];
  schemas: {
    name: string;
  }[] | null;
  id: string | null;
}

export interface R3InjectorMetadataFacade {
  name: string;
  type: Type;
  providers: Provider[];
  imports: OpaqueValue[];
}

export interface R3DirectiveMetadataFacade {
  name: string;
  type: Type;
  typeSourceSpan: ParseSourceSpan;
  selector: string | null;
  queries: R3QueryMetadataFacade[];
  host: {
    [key: string]: string;
  };
  propMetadata: {
    [key: string]: OpaqueValue[];
  };
}
```

```

lifecycle: {usesOnChanges: boolean;};\n inputs: string[];\n outputs: string[];\n usesInheritance: boolean;\n
exportAs: string[]|null;\n providers: Provider[]|null;\n viewQueries: R3QueryMetadataFacade[];\n isStandalone:
boolean;\n}\n\nexport interface R3ComponentMetadataFacade extends R3DirectiveMetadataFacade {\n template:
string;\n preserveWhitespaces: boolean;\n animations: OpaqueValue[]|undefined;\n declarations:
R3TemplateDependencyFacade[];\n styles: string[];\n encapsulation: ViewEncapsulation;\n viewProviders:
Provider[]|null;\n interpolation?: [string, string];\n changeDetection?: ChangeDetectionStrategy;\n}\n\nexport
interface R3DeclareDirectiveFacade {\n selector?: string;\n type: Type;\n inputs?: {[classPropertyName: string]:
string|[string, string]};\n
  outputs?: {[classPropertyName: string]: string};\n host?: {\n   attributes?: {[key: string]: OpaqueValue};\n
  listeners?: {[key: string]: string};\n   properties?: {[key: string]: string};\n   classAttribute?: string;\n
  styleAttribute?: string;\n   }; \n   queries?: R3DeclareQueryMetadataFacade[];\n   viewQueries?:
R3DeclareQueryMetadataFacade[];\n   providers?: OpaqueValue;\n   exportAs?: string[];\n   usesInheritance?:
boolean;\n   usesOnChanges?: boolean;\n   isStandalone?: boolean;\n}\n\nexport interface
R3DeclareComponentFacade extends R3DeclareDirectiveFacade {\n template: string;\n isInline?: boolean;\n
styles?: string[];\n\n // Post-standalone libraries use a unified dependencies field.\n dependencies?:
R3DeclareTemplateDependencyFacade[];\n\n // Pre-standalone libraries have separate component/directive/pipe
fields;\n components?: R3DeclareDirectiveDependencyFacade[];\n directives?:
R3DeclareDirectiveDependencyFacade[];\n pipes?: {[pipeName: string]: OpaqueValue|((
  => OpaqueValue))};\n\n\n viewProviders?: OpaqueValue;\n animations?: OpaqueValue;\n changeDetection?:
ChangeDetectionStrategy;\n encapsulation?: ViewEncapsulation;\n interpolation?: [string, string];\n
preserveWhitespaces?: boolean;\n}\n\nexport type R3DeclareTemplateDependencyFacade = {\n kind:
string;\n}&(R3DeclareDirectiveDependencyFacade|R3DeclarePipeDependencyFacade|\n
R3DeclareNgModuleDependencyFacade);\n\nexport interface R3DeclareDirectiveDependencyFacade {\n kind?:
'directive'|'component';\n selector: string;\n type: OpaqueValue|(( => OpaqueValue));\n inputs?: string[];\n
outputs?: string[];\n exportAs?: string[];\n}\n\nexport interface R3DeclarePipeDependencyFacade {\n kind?:
'pipe';\n name: string;\n type: OpaqueValue|(( => OpaqueValue));\n}\n\nexport interface
R3DeclareNgModuleDependencyFacade {\n kind: 'ngmodule';\n type: OpaqueValue|(( =>
OpaqueValue));\n}\n\nexport enum R3TemplateDependencyKind {\n Directive = 0,\n Pipe = 1,\n NgModule =
2,\n}\n\nexport
interface R3TemplateDependencyFacade {\n kind: R3TemplateDependencyKind;\n type: OpaqueValue|(( =>
OpaqueValue));\n}\n\nexport interface R3FactoryDefMetadataFacade {\n name: string;\n type: Type;\n
typeArgumentCount: number;\n deps: R3DependencyMetadataFacade[]|null;\n target: FactoryTarget;\n}\n\nexport
interface R3DeclareFactoryFacade {\n type: Type;\n deps: R3DeclareDependencyMetadataFacade[]|'invalid'|null;\n
target: FactoryTarget;\n}\n\nexport interface R3DeclareInjectableFacade {\n type: Type;\n providedIn?:
Type|'root'|'platform'|'any'|null;\n useClass?: OpaqueValue;\n useFactory?: OpaqueValue;\n useExisting?:
OpaqueValue;\n useValue?: OpaqueValue;\n deps?: R3DeclareDependencyMetadataFacade[];\n}\n\nexport enum
ViewEncapsulation {\n Emulated = 0,\n // Historically the 1 value was for `Native` encapsulation which has been
removed as of v11.\n None = 2,\n ShadowDom = 3}\n\nexport type ChangeDetectionStrategy =
number;\n\nexport interface R3QueryMetadataFacade
  {\n propertyName: string;\n first: boolean;\n predicate: OpaqueValue|string[];\n descendants: boolean;\n
emitDistinctChangesOnly: boolean;\n read: OpaqueValue|null;\n static: boolean;\n}\n\nexport interface
R3DeclareQueryMetadataFacade {\n propertyName: string;\n first?: boolean;\n predicate: OpaqueValue|string[];\n
descendants?: boolean;\n read?: OpaqueValue;\n static?: boolean;\n emitDistinctChangesOnly?:
boolean;\n}\n\nexport interface R3DeclareInjectorFacade {\n type: Type;\n imports?: OpaqueValue[];\n
providers?: OpaqueValue[];\n}\n\nexport interface R3DeclareNgModuleFacade {\n type: Type;\n bootstrap?:
OpaqueValue[]|(( => OpaqueValue[]);\n declarations?: OpaqueValue[]|(( => OpaqueValue[]);\n imports?:
OpaqueValue[]|(( => OpaqueValue[]);\n exports?: OpaqueValue[]|(( => OpaqueValue[]);\n schemas?:
OpaqueValue[];\n id?: OpaqueValue;\n}\n\nexport interface R3DeclarePipeFacade {\n type: Type;\n name:

```

```

string;\n pure?: boolean;\n isStandalone?: boolean;\n}\n\nexport
interface ParseSourceSpan {\n start: any;\n end: any;\n details: any;\n fullStart: any;\n}\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { global } from
'./util/global';\nimport { CompilerFacade, ExportedCompilerFacade, Type } from
'./compiler_facade_interface';\nexport * from './compiler_facade_interface';\nexport const enum JitCompilerUsage
{\n Decorator,\n PartialDeclaration,\n}\n\ninterface JitCompilerUsageRequest {\n usage: JitCompilerUsage;\n
kind: 'directive'|'component'|'pipe'|'injectable'|'NgModule';\n type: Type;\n}\n\nexport function
getCompilerFacade(request: JitCompilerUsageRequest): CompilerFacade {\n const globalNg:
ExportedCompilerFacade = global['ng'];\n if (globalNg && globalNg.compilerFacade) {\n return
globalNg.compilerFacade;\n }\n\n if (typeof ngDevMode ===
'undefined' || ngDevMode) {\n // Log the type as an error so that a developer can easily navigate to the type from
the\n // console.\n console.error(`JIT compilation failed for ${request.kind}`, request.type);\n\n let message =
`The ${request.kind} `${request.type.name}` needs to be compiled using the JIT compiler, but
`@angular/compiler` is not available.\n\n`; \n if (request.usage === JitCompilerUsage.PartialDeclaration) {\n
message += `The ${request.kind} is part of a library that has been partially compiled.\n\n`; \n message +=\n
`However, the Angular Linker has not processed the library such that JIT compilation is used as fallback.\n\n`; \n
message += `\n\n`; \n message += `Ideally, the library is processed using the Angular Linker to become fully
AOT compiled.\n\n`; \n } else {\n message += `JIT compilation is discouraged for production use-cases!
Consider using AOT mode instead.\n\n`; \n }\n\n message += `Alternatively, the JIT compiler should be loaded by bootstrapping using
`@angular/platform-browser-dynamic` or `@angular/platform-server`,\n\n`; \n message += `or manually
provide the compiler with `import `@angular/compiler`` before bootstrapping.`;\n throw new Error(message);\n
} else {\n throw new Error(`JIT compiler unavailable`);\n }\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\n\n/**\n * Represents a type that a
Component or other object is instances of.\n * An example of a `Type` is `MyCustomComponent` class, which
in JavaScript is represented by\n * the `MyCustomComponent` constructor function.\n * @publicApi\n
*/\nexport const Type = Function;\nexport function isType(v: any): v is Type<any> {\n return typeof v ===
'function';\n}\n\n/**\n * @description\n * Represents an abstract class `T`, if applied to a concrete class it would stop being\n *
instantiable.\n * @publicApi\n */\nexport interface AbstractType<T> extends Function {\n prototype:
T;\n}\n\nexport interface Type<T> extends Function {\n new(...args: any[]): T;\n}\n\nexport type Mutable<T
extends {[x: string]: any}, K extends string> = {\n [P in K]: T[P];\n};\n\n/**\n * Returns a writable type version of
type.\n * USAGE:\n * Given:\n * ```\n * interface Person { readonly name: string }\n * ```\n * We would like
to get a read/write version of `Person`.\n * ```\n * const WritablePerson = Writable<Person>;\n * ```\n * The
result is that you can do:\n * ```\n * const readonlyPerson: Person = { name: 'Marry'};\n * readonlyPerson.name
= 'John'; // TypeError\n * (readonlyPerson as WritablePerson).name = 'John'; // OK\n * // Error: Correctly
detects that `Person` did not have `age` property.\n * (readonlyPerson as WritablePerson).age
= 30;\n * ```\n */\nexport type Writable<T> = {\n -readonly[K in keyof T]: T[K];\n};\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { assertEqual,
assertLessThanOrEqual } from './assert';\n\n/**\n * Equivalent to ES6 spread, add each item to an array.\n *
@param items The items to add\n * @param arr The array to which you want to add the items\n */\nexport function
addAllToArray(items: any[], arr: any[]) {\n for (let i = 0; i < items.length; i++) {\n arr.push(items[i]);\n
}\n}\n\n/**\n * Determines if the contents of two arrays is identical\n * @param a first array\n * @param b
second array\n * @param identityAccessor Optional function for extracting stable object identity from a value in\n *
the array.\n */\nexport function arrayEquals<T>(a: T[], b: T[], identityAccessor?: (value: T) => unknown):

```

```

boolean {\n if (a.length !== b.length) return false;\n for (let i = 0; i < a.length; i++) {\n let valueA = a[i];\n let
valueB = b[i];\n if (identityAccessor) {\n valueA = identityAccessor(valueA) as any;\n valueB =
identityAccessor(valueB) as any;\n }\n if (valueB !== valueA) {\n return false;\n }\n } return
true;}\n\n\n/**\n * Flattens an array.\n */\nexport function flatten(list: any[], dst?: any[]): any[] {\n if (dst ===
undefined) dst = list;\n for (let i = 0; i < list.length; i++) {\n let item = list[i];\n if (Array.isArray(item)) {\n //
we need to inline it.\n if (dst === list) {\n // Our assumption that the list was already flat was wrong and\n
// we need to clone flat since we need to write to it.\n dst = list.slice(0, i);\n }\n flatten(item, dst);\n }
else if (dst !== list) {\n dst.push(item);\n }\n }\n return dst;\n}\n\nexport function deepForEach<T>(input:
(T)any[])[], fn:
(value: T) => void): void {\n input.forEach(value => Array.isArray(value) ? deepForEach(value, fn) :
fn(value));}\n\nexport function addToArray(arr: any[], index: number, value: any): void {\n // perf: array.push is
faster than array.splice!\n if (index >= arr.length) {\n arr.push(value);\n } else {\n arr.splice(index, 0, value);\n
}\n}\n\nexport function removeFromArray(arr: any[], index: number): any {\n // perf: array.pop is faster than
array.splice!\n if (index >= arr.length - 1) {\n return arr.pop();\n } else {\n return arr.splice(index, 1)[0];\n
}\n}\n\nexport function newArray<T = any>(size: number): T[];\nexport function newArray<T>(size: number,
value: T): T[];\nexport function newArray<T>(size: number, value?: T): T[] {\n const list: T[] = [];\n for (let i = 0;
i < size; i++) {\n list.push(value!);\n }\n return list;\n}\n\n\n/**\n * Remove item from array (Same as
`Array.splice()` but faster.)\n */\n * `Array.splice()` is not as fast because it has
to allocate an array for the elements which were\n * removed. This causes memory pressure and slows down code
when most of the time we don't\n * care about the deleted items array.\n */\n * https://jsperf.com/fast-array-splice
(About 20x faster)\n */\n * @param array Array to splice\n * @param index Index of element in array to remove.\n *
@param count Number of items to remove.\n */\nexport function arraySplice(array: any[], index: number, count:
number): void {\n const length = array.length - count;\n while (index < length) {\n array[index] = array[index +
count];\n index++; }\n while (count-- > 0) {\n array.pop(); // shrink the array\n }\n}\n\n\n/**\n * Same as
`Array.splice(index, 0, value)` but faster.\n */\n * `Array.splice()` is not fast because it has to allocate an array for the
elements which were\n * removed. This causes memory pressure and slows down code when most of the time we
don't\n * care about the deleted items array.\n */\n * @param array Array to splice.\n * @param index Index in array where the `value` should be added.\n * @param value Value to add to array.\n
*/\nexport function arrayInsert(array: any[], index: number, value: any): void {\n ngDevMode &&
assertLessThanOrEqual(index, array.length, 'Can\\'t insert past array end.);\n let end = array.length;\n while (end >
index) {\n const previousEnd = end - 1;\n array[end] = array[previousEnd];\n end = previousEnd;\n }\n array[index] = value;\n}\n\n\n/**\n * Same as `Array.splice2(index, 0, value1, value2)` but faster.\n */\n *
`Array.splice()` is not fast because it has to allocate an array for the elements which were\n * removed. This causes
memory pressure and slows down code when most of the time we don't\n * care about the deleted items array.\n */\n *
@param array Array to splice.\n * @param index Index in array where the `value` should be added.\n * @param
value1 Value to add to array.\n * @param value2 Value to add to array.\n */\nexport function arrayInsert2(array:
any[], index: number, value1: any, value2: any): void {\n ngDevMode && assertLessThanOrEqual(index,
array.length, 'Can\\'t insert past array end.);\n let end = array.length;\n if (end === index) {\n // inserting at the
end.\n array.push(value1, value2);\n } else if (end === 1) {\n // corner case when we have less items in array
than we have items to insert.\n array.push(value2, array[0]);\n array[0] = value1;\n } else {\n end--;\n
array.push(array[end - 1], array[end]);\n while (end > index) {\n const previousEnd = end - 2;\n array[end] =
array[previousEnd];\n end--;\n }\n array[index] = value1;\n array[index + 1] = value2;\n }\n}\n\n\n\n/**\n *
Insert a `value` into an `array` so that the array remains sorted.\n */\n * NOTE:\n * - Duplicates are not allowed, and
are ignored.\n * - This uses binary search algorithm for fast inserts.\n */\n * @param array A sorted array to insert
into.\n * @param value The value to insert.\n * @returns index
of the inserted value.\n */\nexport function arrayInsertSorted(array: string[], value: string): number {\n let index =
array.indexOfSorted(array, value);\n if (index < 0) {\n // if we did not find it insert it.\n index = ~index;\n
arrayInsert(array, index, value);\n }\n return index;\n}\n\n\n\n/**\n * Remove `value` from a sorted `array`.\n */\n *

```

NOTE:\n \* - This uses binary search algorithm for fast removals.\n \*\n \* @param array A sorted array to remove from.\n \* @param value The value to remove.\n \* @returns index of the removed value.\n \* - positive index if value found and removed.\n \* - negative index if value not found. (^~index` to get the value where it should have been\n \* inserted)\n \*/\n\nexport function arrayRemoveSorted(array: string[], value: string): number {\n const index = arrayIndexOfSorted(array, value);\n if (index >= 0) {\n arraySplice(array, index, 1);\n }\n return index;\n}\n\n/\*\*\n \* Get an index of an `value` in a sorted `array`.\n \*\n \* NOTE:\n \* - This uses binary search algorithm for fast removals.\n \*\n \* @param array A sorted array to binary search.\n \* @param value The value to look for.\n \* @returns index of the value.\n \* - positive index if value found.\n \* - negative index if value not found. (^~index` to get the value where it should have been\n \* located)\n \*/\n\nexport function arrayIndexOfSorted(array: string[], value: string): number {\n return \_arrayIndexOfSorted(array, value, 0);\n}\n\n/\*\*\n \* `KeyValueArray` is an array where even positions contain keys and odd positions contain values.\n \*\n \* `KeyValueArray` provides a very efficient way of iterating over its contents. For small\n \* sets (~10) the cost of binary searching an `KeyValueArray` has about the same performance\n \* characteristics that of a `Map` with significantly better memory footprint.\n \*\n \* If used as a `Map` the keys are stored in alphabetical order so that they can be binary searched\n \* for retrieval.\n \*\n \* See: `keyValueArraySet`, `keyValueArrayGet`, `keyValueArrayIndexOf`, `keyValueArrayDelete`.\n \*/\n\nexport interface KeyValueArray<VALUE> extends Array<VALUE|string> {\n \_\_brand\_\_: 'array-map';\n}\n\n/\*\*\n \* Set a `value` for a `key`.\n \*\n \* @param keyValueArray to modify.\n \* @param key The key to locate or create.\n \* @param value The value to set for a `key`.\n \* @returns index (always even) of where the value was set.\n \*/\n\nexport function keyValueArraySet<V>(keyValueArray: KeyValueArray<V>, key: string, value: V): number {\n let index = keyValueArrayIndexOf(keyValueArray, key);\n if (index >= 0) {\n // if we found it set it.\n keyValueArray[index | 1] = value;\n } else {\n index = ~index;\n arrayInsert2(keyValueArray, index, key, value);\n }\n return index;\n}\n\n/\*\*\n \* Retrieve a `value` for a `key` (on `undefined` if not found.)\n \*\n \* @param keyValueArray to search.\n \* @param key The key to locate.\n \* @return The `value` stored at the `key` location or `undefined` if not found.\n \*/\n\nexport function keyValueArrayGet<V>(keyValueArray: KeyValueArray<V>, key: string): V|undefined {\n const index = keyValueArrayIndexOf(keyValueArray, key);\n if (index >= 0) {\n // if we found it retrieve it.\n return keyValueArray[index | 1] as V;\n }\n return undefined;\n}\n\n/\*\*\n \* Retrieve a `key` index value in the array or `-1` if not found.\n \*\n \* @param keyValueArray to search.\n \* @param key The key to locate.\n \* @returns index of where the key is (or should have been.)\n \* - positive (even) index if key found.\n \* - negative index if key not found. (^~index` (even) to get the index where it should have\n \* been inserted.)\n \*/\n\nexport function keyValueArrayIndexOf<V>(keyValueArray: KeyValueArray<V>, key: string): number {\n return \_arrayIndexOfSorted(keyValueArray as string[], key, 1);\n}\n\n/\*\*\n \* Delete a `key` (and `value`) from the `KeyValueArray`.\n \*\n \* @param keyValueArray to modify.\n \* @param key The key to locate or delete (if exist).\n \* @returns index of where the key was (or should have been.)\n \* - positive (even) index if key found and deleted.\n \* - negative index if key not found. (^~index` (even) to get the index where it should have\n \* been.)\n \*/\n\nexport function keyValueArrayDelete<V>(keyValueArray: KeyValueArray<V>, key: string): number {\n const index = keyValueArrayIndexOf(keyValueArray, key);\n if (index >= 0) {\n // if we found it remove it.\n arraySplice(keyValueArray, index, 2);\n }\n return index;\n}\n\n/\*\*\n \* INTERNAL: Get an index of an `value` in a sorted `array` by grouping search by `shift`.\n \*\n \* NOTE:\n \* - This uses binary search algorithm for fast removals.\n \*\n \* @param array A sorted array to binary search.\n \* @param value The value to look for.\n \* @param shift grouping shift.\n \* - `0` means look at every location\n \* - `1` means only look at every other (even) location (the odd locations are to be ignored as\n \* they are values.)\n \*\n \* @returns index of the value.\n \* - positive index if value found.\n \* - negative index if value not found. (^~index` to get the value where it should have been\n \* inserted)\n \*/\n\nfunction \_arrayIndexOfSorted(array: string[], value: string, shift: number): number {\n ngDevMode && assertEqual(Array.isArray(array), true, 'Expecting an array');\n let start = 0;\n let end = array.length >> shift;\n while (end !== start) {\n const middle =





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only have function.length as metadata.\n // In that case, to detect whether a child class declared an own constructor
or not,\n // we need to look inside of that constructor to check whether it is\n // just calling the parent.\n // This
also helps to work around for https://github.com/Microsoft/TypeScript/issues/12439\n // that sets
'design:paramtypes' to []\n // if a class inherits from another class but has no ctor declared itself.\n if
(isDelegateCtor(typeStr)) {\n return null;\n }\n\n // Prefer the direct API.\n if ((<any>type).parameters &&
(<any>type).parameters !== parentCtor.parameters) {\n return (<any>type).parameters;\n
}\n\n // API of tsickle for lowering decorators to properties on the class.\n const tsickleCtorParams =
(<any>type).ctorParameters;\n if (tsickleCtorParams && tsickleCtorParams !== parentCtor.ctorParameters) {\n
// Newer tsickle uses a function closure\n // Retain the non-function case for compatibility with older tsickle\n
const ctorParameters =\n   typeof tsickleCtorParams === 'function' ? tsickleCtorParams() : tsickleCtorParams;\n
const paramTypes = ctorParameters.map((ctorParam: any) => ctorParam && ctorParam.type);\n const
paramAnnotations = ctorParameters.map(\n   (ctorParam: any) =>\n     ctorParam &&
convertTsickleDecoratorIntoMetadata(ctorParam.decorators));\n return
this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n }\n\n // API for metadata created by
invoking the decorators.\n const paramAnnotations = type.hasOwnProperty(PARAMETERS) && (type as
any)[PARAMETERS];\n const
paramTypes = this._reflect && this._reflect.getOwnMetadata &&\n
this._reflect.getOwnMetadata('design:paramtypes', type);\n if (paramTypes || paramAnnotations) {\n return
this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n }\n\n // If a class has no decorators, at least
create metadata\n // based on function.length.\n // Note: We know that this is a real constructor as we checked\n
// the content of the constructor above.\n return newArray<any[]>(type.length);\n }\n\n parameters(type:
Type<any>): any[][] {\n // Note: only report metadata if we have at least one class decorator\n // to stay in sync
with the static reflector.\n if (!isType(type)) {\n return [];\n }\n const parentCtor = getParentCtor(type);\n
let parameters = this._ownParameters(type, parentCtor);\n if (!parameters && parentCtor !== Object) {\n
parameters = this.parameters(parentCtor);\n }\n return parameters || [];\n }\n\n private
_ownAnnotations(typeOrFunc:
Type<any>, parentCtor: any): any[]|null {\n // Prefer the direct API.\n if ((<any>typeOrFunc).annotations &&
(<any>typeOrFunc).annotations !== parentCtor.annotations) {\n let annotations =
(<any>typeOrFunc).annotations;\n if (typeof annotations === 'function' && annotations.annotations) {\n
annotations = annotations.annotations;\n }\n return annotations;\n }\n\n // API of tsickle for lowering
decorators to properties on the class.\n if ((<any>typeOrFunc).decorators && (<any>typeOrFunc).decorators !==
parentCtor.decorators) {\n return convertTsickleDecoratorIntoMetadata((<any>typeOrFunc).decorators);\n
}\n\n // API for metadata created by invoking the decorators.\n if
(typeOrFunc.hasOwnProperty(ANNOTATIONS)) {\n return (typeOrFunc as any)[ANNOTATIONS];\n }\n
return null;\n }\n\n annotations(typeOrFunc: Type<any>): any[] {\n if (!isType(typeOrFunc)) {\n return [];\n
}\n const parentCtor
= getParentCtor(typeOrFunc);\n const ownAnnotations = this._ownAnnotations(typeOrFunc, parentCtor) || [];\n
const parentAnnotations = parentCtor !== Object ? this.annotations(parentCtor) : [];\n return
parentAnnotations.concat(ownAnnotations);\n }\n\n private _ownPropMetadata(typeOrFunc: any, parentCtor:
any): {[key: string]: any[]}|null {\n // Prefer the direct API.\n if ((<any>typeOrFunc).propMetadata &&\n
(<any>typeOrFunc).propMetadata !== parentCtor.propMetadata) {\n let propMetadata =
(<any>typeOrFunc).propMetadata;\n if (typeof propMetadata === 'function' && propMetadata.propMetadata)
{\n propMetadata = propMetadata.propMetadata;\n }\n return propMetadata;\n }\n\n // API of tsickle
for lowering decorators to properties on the class.\n if ((<any>typeOrFunc).propDecorators &&\n
(<any>typeOrFunc).propDecorators !== parentCtor.propDecorators) {\n const propDecorators =
(<any>typeOrFunc).propDecorators;\n
const propMetadata = <{[key: string]: any[]}>{};\n Object.keys(propDecorators).forEach(prop => {\n
propMetadata[prop] = convertTsickleDecoratorIntoMetadata(propDecorators[prop]);\n });\n return

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propMetadata;\n  }\n\n  // API for metadata created by invoking the decorators.\n  if
(typeOrFunc.hasOwnProperty(PROP_METADATA)) {\n    return (typeOrFunc as any)[PROP_METADATA];\n
}\n  return null;\n }\n\n propMetadata(typeOrFunc: any): {[key: string]: any[]} {\n  if (!isType(typeOrFunc)) {\n
  return {};\n }\n  const parentCtor = getParentCtor(typeOrFunc);\n  const propMetadata: {[key: string]: any[]}
= {};\n  if (parentCtor !== Object) {\n    const parentPropMetadata = this.propMetadata(parentCtor);\n
Object.keys(parentPropMetadata).forEach((propName) => {\n    propMetadata[propName] =
parentPropMetadata[propName];\n  });\n }\n  const ownPropMetadata = this._ownPropMetadata(typeOrFunc,
parentCtor);\n  if (ownPropMetadata)
{\n    Object.keys(ownPropMetadata).forEach((propName) => {\n    const decorators: any[] = [];\n    if
(propMetadata.hasOwnProperty(propName)) {\n    decorators.push(...propMetadata[propName]);\n    }\n
decorators.push(...ownPropMetadata[propName]);\n    propMetadata[propName] = decorators;\n  });\n }\n
return propMetadata;\n }\n\n ownPropMetadata(typeOrFunc: any): {[key: string]: any[]} {\n  if
(!isType(typeOrFunc)) {\n    return {};\n }\n  return this._ownPropMetadata(typeOrFunc,
getParentCtor(typeOrFunc)) || {};\n }\n\n hasLifecycleHook(type: any, lcProperty: string): boolean {\n  return
type instanceof Type && lcProperty in type.prototype;\n }\n\n\nfunction
convertTsickleDecoratorIntoMetadata(decoratorInvocations: any[]): any[] {\n  if (!decoratorInvocations) {\n
return [];\n }\n  return decoratorInvocations.map(decoratorInvocation => {\n    const decoratorType =
decoratorInvocation.type;\n    const annotationCls = decoratorType.annotationCls;\n
const annotationArgs = decoratorInvocation.args ? decoratorInvocation.args : [];\n    return new
annotationCls(...annotationArgs);\n  });\n }\n\nfunction getParentCtor(ctor: Function): Type<any> {\n  const
parentProto = ctor.prototype ? Object.getPrototypeOf(ctor.prototype) : null;\n  const parentCtor = parentProto ?
parentProto.constructor : null;\n  // Note: We always use `Object` as the null value\n  // to simplify checking later
on.\n  return parentCtor || Object;\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport './util/ng_dev_mode';\nimport {RuntimeError, RuntimeErrorCode} from
'./errors';\nimport {Type} from './interface/type';\nimport {stringify} from './util/stringify';\nimport
{resolveForwardRef} from './forward_ref';\nimport {getInjectImplementation, injectRootLimpMode}
from './inject_switch';\nimport {Injector} from './injector';\nimport {DecoratorFlags, InjectFlags,
InternalInjectFlags} from './interface/injector';\nimport {ProviderToken} from './provider_token';\n\nconst
_THROW_IF_NOT_FOUND = {};\nexport const THROW_IF_NOT_FOUND =
_THROW_IF_NOT_FOUND;\n\n/**\n * Name of a property (that we patch onto DI decorator), which is used as an
annotation of which\n * InjectFlag this decorator represents. This allows to avoid direct references to the DI
decorators\n * in the code, thus making them tree-shakable.\n *\nconst DI_DECORATOR_FLAG =
'__NG_DI_FLAG__';\nexport const NG_TEMP_TOKEN_PATH = 'ngTempTokenPath';\nconst
NG_TOKEN_PATH = 'ngTokenPath';\nconst NEW_LINE = /\n/gm;\nconst NO_NEW_LINE = "";\nexport const
SOURCE = '__source';\n\n/**\n * Current injector value used by `inject`.\n * - `undefined`: it is an error to call
`inject`\n * - `null`: `inject` can be called but there is no injector (limp-mode).\n * - Injector instance: Use the
injector
for resolution.\n *\nlet _currentInjector: Injector|undefined|null = undefined;\nexport function
setCurrentInjector(injector: Injector|null|undefined): Injector|undefined|null {\n  const former = _currentInjector;\n
_currentInjector = injector;\n  return former;\n }\n\nexport function injectInjectorOnly<T>(token:
ProviderToken<T>): T;\nexport function injectInjectorOnly<T>(token: ProviderToken<T>, flags?: InjectFlags):
T|null;\nexport function injectInjectorOnly<T>(token: ProviderToken<T>, flags = InjectFlags.Default): T|\n  null
{\n  if (_currentInjector === undefined) {\n    throw new RuntimeError(\n
RuntimeErrorCode.MISSING_INJECTION_CONTEXT,\n    ngDevMode &&\n    `inject() must be called
from an injection context such as a constructor, a factory function, a field initializer, or a function used with
\`EnvironmentInjector#runInContext\`);\n  } else if (_currentInjector === null) {\n    return
injectRootLimpMode(token, undefined, flags);\n  } else {\n

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return _currentInjector.get(token, flags & InjectFlags.Optional ? null : undefined, flags);\n } }\n\n/**\n *
Generated instruction: injects a token from the currently active injector.\n *\n * (Additional documentation moved to
`inject`, as it is the public API, and an alias for this\n *\n * instruction)\n *\n * @see inject\n *\n * @codeGenApi\n *\n * @publicApi This instruction has been emitted by ViewEngine for some time and is deployed to npm.\n *\n * \nexport
function inject<T>(token: ProviderToken<T>): T;\nexport function inject<T>(token: ProviderToken<T>, flags?:
InjectFlags): T|null;\nexport function inject<T>(token: ProviderToken<T>, flags = InjectFlags.Default): T|null {\n
return (getInjectImplementation() || injectInjectorOnly)(resolveForwardRef(token), flags);\n }\n\n/**\n * Throws an
error indicating that a factory function could not be generated by the compiler for a\n *\n * particular class.\n *\n * The
name of the class is not mentioned here, but will be in the generated factory
function name\n *\n * and thus in the stack trace.\n *\n * @codeGenApi\n *\n * \nexport function
invalidFactoryDep(index: number): never {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_FACTORY_DEPENDENCY,\n ngDevMode &&\n `This constructor is not
compatible with Angular Dependency Injection because its dependency at index ${\n index} of the
parameter list is invalid.\n This can happen if the dependency type is a primitive like a string or if an ancestor of this
class is missing an Angular decorator.\n \nPlease check that 1) the type for the parameter at index ${\n
index} is correct and 2) the correct Angular decorators are defined for this class and its ancestors.`);\n }\n\n/**\n *
Type of the options argument to `inject`.\n *\n * @publicApi\n *\n * \nexport interface InjectOptions {\n /**\n * Use
optional injection, and return `null` if the requested token is not found.\n *\n * optional?: boolean;\n\n /**\n *
Start injection at the parent
of the current injector.\n *\n * skipSelf?: boolean;\n\n /**\n * Only query the current injector for the token, and
don't fall back to the parent injector if\n *\n * it's not found.\n *\n * self?: boolean;\n\n /**\n * Stop injection at the
host component's injector. Only relevant when injecting from an element\n *\n * injector, and a no-op for environment
injectors.\n *\n * host?: boolean;\n }\n\n/**\n * @param token A token that represents a dependency that should be
injected.\n *\n * @returns the injected value if operation is successful, `null` otherwise.\n *\n * @throws if called outside of
a supported context.\n *\n * @publicApi\n *\n * \nexport function inject<T>(token: ProviderToken<T>): T;\n\n/**\n *
@param token A token that represents a dependency that should be injected.\n *\n * @param flags Control how
injection is executed. The flags correspond to injection strategies that\n *\n * can be specified with parameter
decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.\n *\n * @returns
the injected value if operation is successful, `null` otherwise.\n *\n * @throws if called outside of a supported
context.\n\n *\n * @publicApi\n *\n * @deprecated prefer an options object instead of `InjectFlags`\n *\n * \nexport function
inject<T>(token: ProviderToken<T>, flags?: InjectFlags): T|null;\n\n/**\n * @param token A token that represents a
dependency that should be injected.\n *\n * @param options Control how injection is executed. Options correspond to
injection strategies\n *\n * that can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and\n *\n *
`@Optional`.\n *\n * @returns the injected value if operation is successful.\n *\n * @throws if called outside of a supported
context, or if the token is not found.\n *\n * @publicApi\n *\n * \nexport function inject<T>(token: ProviderToken<T>,
options: InjectOptions&{ optional?: false}): T;\n\n/**\n * @param token A token that represents a dependency that
should be injected.\n *\n * @param options Control how injection is executed. Options correspond
to injection strategies\n *\n * that can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and\n
*\n * `@Optional`.\n *\n * @returns the injected value if operation is successful, `null` if the token is not\n *\n * found
and optional injection has been requested.\n *\n * @throws if called outside of a supported context, or if the token is not
found and optional\n *\n * injection was not requested.\n *\n * @publicApi\n *\n * \nexport function inject<T>(token:
ProviderToken<T>, options: InjectOptions): T|null;\n\n/**\n * Injects a token from the currently active injector.\n *\n *
`inject` is only supported during instantiation of a dependency by the DI system. It can be used\n *\n * during:\n *\n * -
Construction (via the `constructor`) of a class being instantiated by the DI system, such\n *\n * as an `@Injectable` or
`@Component`.\n *\n * - In the initializer for fields of such classes.\n *\n * - In the factory function specified for
`useFactory` of a `Provider` or an `@Injectable`.\n *\n * - In
the `factory` function specified for an `InjectionToken`.\n *\n * @param token A token that represents a
dependency that should be injected.\n *\n * @param flags Optional flags that control how injection is executed.\n *\n * The

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flags correspond to injection strategies that can be specified with
`@Host`, `@Self`, `@SkipSelf`, and `@Optional`.
`@returns` the injected value if operation is successful, `null` otherwise.
`@throws` if called outside of a supported context.
In practice the `inject()` calls are allowed in a constructor, a constructor parameter and a field initializer:
typescript
@Injectable({providedIn: 'root'})
export class Car {
  radio: Radio; // OK: field initializer
  spareTyre = inject(Tyre); // OK: constructor body
  constructor() {
    // OK: constructor body
    this.radio = inject(Radio);
  }
}
It is also legal to call `inject` from a provider's factory:
typescript
providers: [
  {provide: Car, useFactory: () => {
    // OK: a class factory
    const engine = inject(Engine);
    return new Car(engine);
  }}
]
Calls to the `inject()` function outside of the class creation context will result in error. Most notably, calls to `inject()` are disallowed after a class instance was created, in methods (including lifecycle hooks):
typescript
@Component({ ... })
export class CarComponent {
  ngOnInit() {
    // ERROR: too late, the component instance was already created
    const engine = inject(Engine);
    engine.start();
  }
}
typescript
@publicApi
export function inject<T>(
  token: ProviderToken<T>, flags: InjectFlags|InjectOptions = InjectFlags.Default): T|null {
  if (typeof flags !== 'number') {
    // While TypeScript doesn't accept it without a cast, bitwise OR with false-y values in JavaScript is a no-op. We can use that for a very codesize-efficient conversion from `InjectOptions` to `InjectFlags`.
    flags = (InternalInjectFlags.Default | // comment to force a line break in the formatter
      ((flags.optional && InternalInjectFlags.Optional) as number) |
      ((flags.host && InternalInjectFlags.Host) as number) |
      ((flags.self && InternalInjectFlags.Self) as number) |
      ((flags.skipSelf && InternalInjectFlags.SkipSelf) as number)) as InjectFlags;
  }
  return inject(token, flags);
}
export function injectArgs(types: ProviderToken<any>|any[]): any[] {
  const args: any[] = [];
  for (let i = 0; i < types.length; i++) {
    const arg = resolveForwardRef(types[i]);
    if (Array.isArray(arg)) {
      if (arg.length === 0) {
        throw new RuntimeError(
          RuntimeErrorCode.INVALID_DIFFER_INPUT,
          ngDevMode && 'Arguments array must have arguments.');
```

```

'object') {\n  let parts = <string[]>;\n  for (let key in obj) {\n    if (obj.hasOwnProperty(key)) {\n      let value =\n      obj[key];\n      parts.push(\n        key + ':' + (typeof value === 'string' ? JSON.stringify(value) :\n      stringify(value));\n    }\n  }\n  context = `${parts.join(', ')}';\n  }\n  return `${injectorErrorName}${source ?\n  '(' + source + ')' : ''}[${context}]: ${\n    text.replace(NEW_LINE, '\\n ')}';\n  }\n  }",`/**\n * @license\n * Copyright\n * Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n\n *^\n\nimport {makeParamDecorator} from './util/decorators';\nimport {attachInjectFlag} from\n './injector_compatibility';\nimport {DecoratorFlags, InternalInjectFlags} from './interface/injector';\n\n/**\n * Type of the Inject decorator / constructor function.\n * @publicApi\n *^\n\nexport interface InjectDecorator {\n\n /**\n * Parameter decorator on a dependency parameter of a class constructor\n * that specifies a custom provider\n of the dependency.\n * @usageNotes\n * The following example shows a class constructor that specifies a\n * custom provider of a dependency using the parameter decorator.\n * When `@Inject()` is not present, the\n injector uses the type annotation of the\n * parameter as the provider.\n * <code-example\n path=\"core/di/ts/metadata_spec.ts\" region=\"InjectWithoutDecorator\">\n * </code-example>\n * @see\n [\"Dependency Injection Guide\"](guide/dependency-injection)\n *^\n *^\n (token: any): any;\n\n new(token: any): Inject;\n}\n\n/**\n * Type of the Inject metadata.\n * @publicApi\n *^\n\nexport interface\n Inject {\n\n /**\n * A [DI token](guide/glossary#di-token) that maps to the dependency to be injected.\n *^\n *^\n token: any;\n}\n\n/**\n * Inject decorator and metadata.\n * @Annotation\n * @publicApi\n *^\n\nexport const\n Inject: InjectDecorator = attachInjectFlag(\n // Disable tslint because `DecoratorFlags` is a const enum which gets\n inlined.\n // tslint:disable-next-line: no-toplevel-property-access\n makeParamDecorator('Inject', (token: any) =>\n ({token})), DecoratorFlags.Inject);\n\n/**\n * Type of the Optional decorator / constructor function.\n *^\n *^\n *^\n @publicApi\n *^\n\nexport interface OptionalDecorator {\n\n /**\n * Parameter decorator to be used on constructor\n parameters,\n * which marks the parameter as being an optional dependency.\n * The DI framework provides\n `null` if the dependency is not found.\n * Can be used together with other parameter\n decorators\n * that modify how dependency injection operates.\n * @usageNotes\n * The following\n code allows the possibility of a `null` result:\n * <code-example path=\"core/di/ts/metadata_spec.ts\"\n region=\"Optional\">\n * </code-example>\n * @see [\"Dependency Injection Guide\"](guide/dependency-\n injection).\n *^\n *^\n (): any;\n new(): Optional;\n}\n\n/**\n * Type of the Optional metadata.\n * @publicApi\n *^\n *^\n\nexport interface Optional {\n}\n\n/**\n * Optional decorator and metadata.\n * @Annotation\n *^\n *^\n *^\n @publicApi\n *^\n\nexport const Optional: OptionalDecorator =\n // Disable tslint because `InternalInjectFlags` is a\n const enum which gets inlined.\n // tslint:disable-next-line: no-toplevel-property-access\n attachInjectFlag(makeParamDecorator('Optional'), InternalInjectFlags.Optional);\n\n/**\n * Type of the Self\n decorator / constructor function.\n *^\n *^\n *^\n @publicApi\n *^\n\nexport interface SelfDecorator {\n\n /**\n * Parameter\n decorator\n to be used on constructor parameters,\n * which tells the DI framework to start dependency resolution from the\n local injector.\n * Resolution works upward through the injector hierarchy, so the children\n * of this class\n must configure their own providers or be prepared for a `null` result.\n * @usageNotes\n * In the\n following example, the dependency can be resolved\n * by the local injector when instantiating the class itself, but\n not\n * when instantiating a child.\n * <code-example path=\"core/di/ts/metadata_spec.ts\"\n region=\"Self\">\n * </code-example>\n * @see `SkipSelf`\n * @see `Optional`\n *^\n *^\n *^\n (): any;\n new(): Self;\n}\n\n/**\n * Type of the Self metadata.\n * @publicApi\n *^\n *^\n\nexport interface Self {\n}\n\n/**\n * Self decorator and metadata.\n * @Annotation\n * @publicApi\n *^\n *^\n\nexport const Self: SelfDecorator =\n //\n Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.\n\n // tslint:disable-next-line: no-toplevel-property-access\n attachInjectFlag(makeParamDecorator('Self'),\n InternalInjectFlags.Self);\n\n/**\n * Type of the `SkipSelf` decorator / constructor function.\n *^\n *^\n *^\n @publicApi\n *^\n\nexport interface SkipSelfDecorator {\n\n /**\n * Parameter decorator to be used on constructor parameters,\n * which tells the DI framework to start dependency resolution from the parent injector.\n * Resolution works upward\n through the injector hierarchy, so the local injector\n * is not checked for a provider.\n * @usageNotes\n
```

```

*\n * In the following example, the dependency can be resolved when\n * instantiating a child, but not when
instantiating the class itself.\n *\n * <code-example path="core/di/ts/metadata_spec.ts" region="SkipSelf">\n
* </code-example>\n *\n * @see [Dependency Injection guide](guide/dependency-injection-in-action#skip).\n *
@see `Self`\n * @see `Optional`\n *\n */\n * (\n * any;\n * new(): SkipSelf;\n *)\n */\n
* Type of the `SkipSelf` metadata.\n *\n * @publicApi\n * ^\n * export interface SkipSelf {\n * }\n */\n * `SkipSelf`
decorator and metadata.\n *\n * @Annotation\n * @publicApi\n * ^\n * export const SkipSelf: SkipSelfDecorator =\n
// Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.\n // tslint:disable-next-line: no-
toplevel-property-access\n attachInjectFlag(makeParamDecorator('SkipSelf'),
InternalInjectFlags.SkipSelf);\n */\n *\n * Type of the `Host` decorator / constructor function.\n *\n * @publicApi\n
* ^\n * export interface HostDecorator {\n * }\n */\n * Parameter decorator on a view-provider parameter of a class
constructor\n * that tells the DI framework to resolve the view by checking injectors of child\n * elements, and
stop when reaching the host element of the current component.\n *\n * @usageNotes\n *\n * The following
shows use with the `@Optional` decorator, and allows for a `null` result.\n *\n * <code-example
path="core/di/ts/metadata_spec.ts"
region="Host">\n * </code-example>\n *\n * For an extended example, see [\"Dependency Injection\n *
Guide\"](guide/dependency-injection-in-action#optional).\n * ^\n * (\n * any;\n * new(): Host;\n *)\n */\n
* Type of the
Host metadata.\n *\n * @publicApi\n * ^\n * export interface Host {\n * }\n */\n * Host decorator and metadata.\n *\n *
@Annotation\n * @publicApi\n * ^\n * export const Host: HostDecorator =\n // Disable tslint because
`InternalInjectFlags` is a const enum which gets inlined.\n // tslint:disable-next-line: no-toplevel-property-access\n
attachInjectFlag(makeParamDecorator('Host'), InternalInjectFlags.Host);\n *", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport { R3DependencyMetadataFacade } from
'./../compiler/compiler_facade';\nimport { RuntimeError, RuntimeErrorCode }
from './../errors';\nimport { Type } from './../interface/type';\nimport { ReflectionCapabilities } from
'./../reflection/reflection_capabilities';\nimport { Host, Inject, Optional, Self, SkipSelf } from './metadata';\nimport
{ Attribute } from './metadata_attr';\n\nlet _reflect: ReflectionCapabilities|null = null;\n\nexport function
getReflect(): ReflectionCapabilities {\n return (_reflect = _reflect || new ReflectionCapabilities());\n}\n\nexport
function reflectDependencies(type: Type<any>): R3DependencyMetadataFacade[] {\n return
convertDependencies(getReflect().parameters(type));\n}\n\nexport function convertDependencies(deps: any[]):
R3DependencyMetadataFacade[] {\n return deps.map(dep => reflectDependency(dep));\n}\n\nfunction
reflectDependency(dep: any|any[]): R3DependencyMetadataFacade {\n const meta: R3DependencyMetadataFacade
= {\n token: null,\n attribute: null,\n host: false,\n optional: false,\n self: false,\n skipSelf: false,\n };\n\n
if (Array.isArray(dep)
&& dep.length > 0) {\n for (let j = 0; j < dep.length; j++) {\n const param = dep[j];\n if (param ===
undefined) {\n // param may be undefined if type of dep is not set by ngts\n continue;\n }\n\n const
proto = Object.getPrototypeOf(param);\n\n if (param instanceof Optional || proto.ngMetadataName ===
'Optional') {\n meta.optional = true;\n } else if (param instanceof SkipSelf || proto.ngMetadataName ===
'SkipSelf') {\n meta.skipSelf = true;\n } else if (param instanceof Self || proto.ngMetadataName === 'Self')
{\n meta.self = true;\n } else if (param instanceof Host || proto.ngMetadataName === 'Host') {\n
meta.host = true;\n } else if (param instanceof Inject) {\n meta.token = param.token;\n } else if (param
instanceof Attribute) {\n if (param.attributeName === undefined) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n
ngDevMode && `Attribute name must be defined.`);\n } }\n meta.attribute =
param.attributeName;\n } else {\n meta.token = param;\n }\n }\n } else if (dep === undefined ||
(Array.isArray(dep) && dep.length === 0)) {\n meta.token = null;\n } else {\n meta.token = dep;\n }\n\n return
meta;\n}\n *", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport { Type } from './interface/type';\nimport { Component } from './directives';\n */\n *\n * Used to resolve

```

```

resource URLs on `@Component` when used with JIT compilation.\n * Example:\n * ```\n * @Component({\n * selector: 'my-comp',\n * templateUrl: 'my-comp.html', // This requires asynchronous resolution\n * })\n * class\n * MyComponent{\n * }\n * // Calling `renderComponent` will fail because `renderComponent` is a synchronous\n * process\n * // and `MyComponent`'s `@Component.templateUrl` needs to be resolved asynchronously.\n * // Calling `resolveComponentResources()` will resolve `@Component.templateUrl` into\n * `@Component.template`, which allows `renderComponent` to proceed in a synchronous manner.\n * // Use\n * browser's `fetch()` function as the default resource resolution strategy.\n * resolveComponentResources(fetch).then(() => {\n * // After resolution all URLs have been converted into\n * `template` strings.\n * renderComponent(MyComponent);\n * });\n * NOTE: In AOT the resolution\n * happens during compilation, and so there should be no need\n * to call this method outside JIT mode.\n * @param resourceResolver a function which is responsible for returning a `Promise` to the\n * contents of the\n * resolved URL. Browser's `fetch()` method is a good default implementation.\n * ^\n * export function\n * resolveComponentResources(\n * resourceResolver: (url: string) => (Promise<string|{text():\n * Promise<string>}>): Promise<void> {\n * // Store all promises which are fetching the resources.\n * const\n * componentResolved: Promise<void>[] = [];\n * // Cache so that we don't fetch the same resource more than once.\n * const urlMap = new Map<string, Promise<string>>();\n * function cachedResourceResolve(url: string):\n * Promise<string> {\n * let promise = urlMap.get(url);\n * if (!promise) {\n * const resp = resourceResolver(url);\n * urlMap.set(url, promise = resp.then(unwrapResponse));\n * }\n * return promise;\n * }\n * componentResourceResolutionQueue.forEach((component: Component, type: Type<any>) => {\n * const promises:\n * Promise<void>[] = [];\n * if (component.templateUrl) {\n * promises.push(cachedResourceResolve(component.templateUrl).then((template) => {\n * component.template =\n * template;\n * }));\n * }\n * const styleUrls = component.styleUrls;\n * const styles = component.styles ||\n * (component.styles = []);\n * const styleOffset = component.styles.length;\n * styleUrls && styleUrls.forEach((styleUrl, index) => {\n * styles.push(""); // pre-allocate array.\n * promises.push(cachedResourceResolve(styleUrl).then((style) => {\n * styles[styleOffset + index] = style;\n * styleUrls.splice(styleUrls.indexOf(styleUrl), 1);\n * if (styleUrls.length == 0) {\n * component.styleUrls =\n * undefined;\n * } }));\n * });\n * const fullyResolved = Promise.all(promises).then(() =>\n * componentDefResolved(type));\n * componentResolved.push(fullyResolved);\n * });\n * clearResolutionOfComponentResourcesQueue();\n * return Promise.all(componentResolved).then(() =>\n * undefined);\n * }\n * let componentResourceResolutionQueue = new Map<Type<any>, Component>();\n * // Track\n * when existing cmp for a Type is waiting on resources.\n * const componentDefPendingResolution = new\n * Set<Type<any>>();\n * export function maybeQueueResolutionOfComponentResources(type: Type<any>,\n * metadata: Component) {\n * if (componentNeedsResolution(metadata))\n * {\n * componentResourceResolutionQueue.set(type, metadata);\n * componentDefPendingResolution.add(type);\n * }\n * }\n * export function isComponentDefPendingResolution(type: Type<any>): boolean {\n * return\n * componentDefPendingResolution.has(type);\n * }\n * export function componentNeedsResolution(component:\n * Component): boolean {\n * return !!(\n * (component.templateUrl && !component.hasOwnProperty('template')) ||\n * component.styleUrls && component.styleUrls.length);\n * }\n * export function\n * clearResolutionOfComponentResourcesQueue(): Map<Type<any>, Component> {\n * const old =\n * componentResourceResolutionQueue;\n * componentResourceResolutionQueue = new Map();\n * return\n * old;\n * }\n * export function restoreComponentResolutionQueue(queue: Map<Type<any>, Component>): void {\n * componentDefPendingResolution.clear();\n * queue.forEach( (_, type) =>\n * componentDefPendingResolution.add(type));\n * componentResourceResolutionQueue = queue;\n * }\n * export\n * function isComponentResourceResolutionQueueEmpty()\n * {\n * return componentResourceResolutionQueue.size === 0;\n * }\n * function unwrapResponse(response:\n * string|{text(): Promise<string>}): string|Promise<string> {\n * return typeof response == 'string' ? response :\n * response.text();\n * }\n * function componentDefResolved(type: Type<any>): void {\n * componentDefPendingResolution.delete(type);\n * }\n * "/*\n * @license\n * Copyright Google LLC All Rights

```

```

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LICENSE file at https://angular.io/license

import {Type} from './interface/type';
import {NgModuleType} from './metadata/ng_module_def';
import {getNgModuleDef} from './render3/definition';
import {stringify} from './util/stringify';

Map of module-id to the corresponding NgModule.

const modules = new Map<string, NgModuleType>();

Whether to check for duplicate NgModule registrations.

This can be disabled for testing.

let checkForDuplicateNgModules = true;

function assertSameOrNotExisting(id: string, type: Type<any>|null, incoming: Type<any>): void {
  if (type && type !== incoming && checkForDuplicateNgModules) {
    throw new Error(`Duplicate module registered for ${id} - ${stringify(type)} vs ${stringify(type.name)}`);
  }
}

Adds the given NgModule type to Angular's NgModule registry.

This is generated as a side-effect of NgModule compilation. Note that the `id` is passed in explicitly and not read from the NgModule definition. This is for two reasons: it avoids a megamorphic read, and in JIT there's a chicken-and-egg problem where the NgModule may not be fully resolved when it's registered.

@codeGenApi
export function registerNgModuleType(ngModuleType: NgModuleType, id: string): void {
  const existing = modules.get(id) || null;
  assertSameOrNotExisting(id, existing, ngModuleType);
  modules.set(id, ngModuleType);
}

export function clearModulesForTest(): void {
  modules.clear();
}

export function getRegisteredNgModuleType(id: string): NgModuleType|undefined {
  return modules.get(id);
}

Control whether the NgModule registration system enforces that each NgModule type registered has a unique id.

This is useful for testing as the NgModule registry cannot be properly reset between tests with Angular's current API.

export function setAllowDuplicateNgModuleIdsForTest(allowDuplicates: boolean): void {
  checkForDuplicateNgModules = !allowDuplicates;
}

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A schema definition associated with an NgModule.

@param name The name of a defined schema.

@publicApi
export interface SchemaMetadata {
  name: string;
}

Defines a schema that allows an NgModule to contain the following:
- Non-Angular elements named with dash case (-).
- Element properties named with dash case (-).
Dash case is the naming convention for custom elements.

@publicApi
export const CUSTOM_ELEMENTS_SCHEMA: SchemaMetadata = {
  name: 'custom-elements'
};

Defines a schema that allows any property on any element.

This schema allows you to ignore the errors related to any unknown elements or properties in a template. The usage of this schema is generally discouraged because it prevents useful validation and may hide real errors in your template. Consider using the `CUSTOM_ELEMENTS_SCHEMA` instead.

@publicApi
export const NO_ERRORS_SCHEMA: SchemaMetadata = {
  name: 'no-errors-schema'
};

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import {formatRuntimeError, RuntimeError, RuntimeErrorCode} from './../errors';
import {Type} from './../interface/type';
import {CUSTOM_ELEMENTS_SCHEMA, NO_ERRORS_SCHEMA, SchemaMetadata} from './../metadata/schema';
import {throwError} from './../util/assert';
import {getComponentDef} from './../definition';
import {ComponentDef} from './../interfaces/definition';
import {TNodeType} from './../interfaces/node';
import {RComment, RElement} from './../interfaces/renderer_dom';
import {CONTEXT, DECLARATION_COMPONENT_VIEW, LView} from './../interfaces/view';
import {isAnimationProp} from './util/attrs_utils';

let shouldThrowErrorOnUnknownElement = false;

Sets a strict mode for JIT-compiled components to throw an error on unknown elements, instead of just logging the error. (for AOT-compiled ones this check happens at build time).

export function setUnknownElementStrictMode(shouldThrow: boolean) {
  shouldThrowErrorOnUnknownElement = shouldThrow;
}

Gets the current value of the strict mode.

export function getUnknownElementStrictMode() {
  return

```



```

shouldThrowErrorOnUnknownElement;\n}\n\nlet shouldThrowErrorOnUnknownProperty = false;\n\n/**\n * Sets a
strict mode for JIT-compiled components to throw an error on unknown properties,\n * instead of just logging the
error.\n * (for AOT-compiled ones this check happens at build time).\n */\nexport function
setUnknownPropertyStrictMode(shouldThrow: boolean) {\n  shouldThrowErrorOnUnknownProperty =
shouldThrow;\n}\n\n/**\n * Gets the current value of the strict mode.\n */\nexport function
getUnknownPropertyStrictMode() {\n  return shouldThrowErrorOnUnknownProperty;\n}\n\n/**\n * Validates that
the element is known at runtime and produces\n * an error if it's not the case.\n * This check is relevant for JIT-
compiled components (for AOT-compiled\n * ones this check happens at build time).\n */\n
* The element is considered known if either:\n * - it's a known HTML element\n * - it's a known custom element\n
* - the element matches any directive\n * - the element is allowed by one of the schemas\n */\n * @param element
Element to validate\n * @param lView An `LView` that represents a current component that is being rendered\n *
@param tagName Name of the tag to check\n * @param schemas Array of schemas\n * @param hasDirectives
Boolean indicating that the element matches any directive\n */\nexport function validateElementIsKnown(\n
element: RElement, lView: LView, tagName: string|null, schemas: SchemaMetadata[]|null,\n  hasDirectives:
boolean): void {\n  // If `schemas` is set to `null`, that's an indication that this Component was compiled in AOT\n //
mode where this check happens at compile time. In JIT mode, `schemas` is always present and\n // defined as an
array (as an empty array in case `schemas` field is not defined) and we should\n // execute the check below.\n
  if (schemas === null) return;\n  // If the element matches any directive, it's considered as valid.\n  if
(!hasDirectives && tagName !== null) {\n    // The element is unknown if it's an instance of
HTMLUnknownElement, or it isn't registered\n    // as a custom element. Note that unknown elements with a dash in
their name won't be instances\n    // of HTMLUnknownElement in browsers that support web components.\n    const
isUnknown =\n      // Note that we can't check for `typeof HTMLUnknownElement === 'function`,\n      //
because while most browsers return 'function', IE returns 'object'.\n      (typeof HTMLUnknownElement !==
'undefined' && HTMLUnknownElement &&\n        element instanceof HTMLUnknownElement) ||\n      (typeof
customElements !== 'undefined' && tagName.indexOf('-') > -1 &&\n        !customElements.get(tagName));\n\n    if
(isUnknown && !matchingSchemas(schemas, tagName)) {\n      const isHostStandalone =
isHostComponentStandalone(lView);\n      const templateLocation
= getTemplateLocationDetails(lView);\n      const schemas = `${isHostStandalone ? '@Component' :
'@NgModule'}.schemas`;\n\n      let message = `${tagName} is not a known element${templateLocation}:\n`;\n
message += `1. If ${tagName} is an Angular component, then verify that it is ${\n        isHostStandalone ?
'included in the \\`@Component.imports\\` of this component' :\n        'a part of an @NgModule where
this component is declared'}`;\n\n      if (tagName && tagName.indexOf('-') > -1) {\n        message +=\n          `2.
If '${tagName}' is a Web Component then add 'CUSTOM_ELEMENTS_SCHEMA' to the ${\n          schemas }
of this component to suppress this message.`;\n      } else {\n        message +=\n          `2. To allow any element add
'NO_ERRORS_SCHEMA' to the ${schemas} of this component.`;\n      }\n      if
(shouldThrowErrorOnUnknownElement) {\n        throw new
RuntimeError(RuntimeErrorCode.UNKNOWN_ELEMENT, message);\n      }
else {\n        console.error(formatRuntimeError(RuntimeErrorCode.UNKNOWN_ELEMENT, message));\n      }\n    }\n  }\n}\n\n/**\n * Validates that the property of the element is known at runtime and returns\n * false if it's
not the case.\n * This check is relevant for JIT-compiled components (for AOT-compiled\n * ones this check
happens at build time).\n */\n * The property is considered known if either:\n * - it's a known property of the
element\n * - the element is allowed by one of the schemas\n * - the property is used for animations\n */\n * @param
element Element to validate\n * @param propName Name of the property to check\n * @param tagName Name of
the tag hosting the property\n * @param schemas Array of schemas\n */\nexport function isPropertyValid(\n
element: RElement|RComment, propName: string, tagName: string|null,\n  schemas: SchemaMetadata[]|null):
boolean {\n  // If `schemas` is set to `null`, that's an indication that this Component was compiled in AOT\n //
mode where this check happens at compile time. In JIT mode, `schemas` is always present and\n // defined as an
array (as an empty array in case `schemas` field is not defined) and we should\n // execute the check below.\n  if

```

```

(schemas === null) return true;\n\n // The property is considered valid if the element matches the schema, it exists
on the element,\n // or it is synthetic, and we are in a browser context (web worker nodes should be skipped).\n if
(matchingSchemas(schemas, tagName) || propName in element || isAnimationProp(propName)) {\n  return true;\n
}\n\n // Note: `typeof Node` returns 'function' in most browsers, but on IE it is 'object' so we\n // need to account
for both here, while being careful with `typeof null` also returning 'object'.\n  return typeof Node === 'undefined' ||
Node === null || !(element instanceof Node);\n}\n\n/**\n * Logs or throws an error that a property is not supported
on an element.\n * @param propName Name of the invalid property\n * @param tagName Name of the tag hosting the property\n * @param nodeType Type of the node hosting the
property\n * @param IView An `LView` that represents a current component\n */\nexport function
handleUnknownPropertyError(\n  propName: string, tagName: string|null, nodeType: TNodeType, IView: LView):
void {\n  // Special-case a situation when a structural directive is applied to\n // an `` element, for
example: `

```

```

: null;\n}\n\n/**\n * WARNING: this is a **dev-mode only** function (thus should always be guarded by the
`ngDevMode`)\n * and must **not** be used in production bundles. The function makes megamorphic reads, which
might\n * be too slow for production mode.\n *\n * Checks if the current component is declared inside of a
standalone component template.\n *\n * @param IView An `LView` that represents a current component that is
being rendered.\n *\n\nexport function isHostComponentStandalone(IView: LView): boolean {\n  !ngDevMode &&
throwError('Must never be called in production mode');\n\n  const componentDef =
getDeclarationComponentDef(IView);\n  // Treat host component as non-standalone if we can't obtain the def.\n
return !!componentDef?.standalone;\n}\n\n/**\n * WARNING: this is a **dev-mode only** function (thus should
always be guarded by the `ngDevMode`)\n * and must **not** be used in production bundles. The function makes
megamorphic reads, which might\n * be too
slow for production mode.\n *\n * Constructs a string describing the location of the host component template. The
function is used\n * in dev mode to produce error messages.\n *\n * @param IView An `LView` that represents a
current component that is being rendered.\n *\n\nexport function getTemplateLocationDetails(IView: LView): string
{\n  !ngDevMode && throwError('Must never be called in production mode');\n\n  const hostComponentDef =
getDeclarationComponentDef(IView);\n  const componentName = hostComponentDef?.type?.name;\n  return
componentClassName ? ` (used in the '${componentClassName}' component template)` : '';\n}\n\n/**\n * The set of
known control flow directives and their corresponding imports.\n * We use this set to produce a more precise error
message with a note\n * that the `CommonModule` should also be included.\n *\n\nexport const
KNOWN_CONTROL_FLOW_DIRECTIVES = new Map([\n  ['ngIf', 'NgIf'], ['ngFor', 'NgFor'], ['ngSwitchCase',
'NgSwitchCase'],\n  ['ngSwitchDefault',
'NgSwitchDefault']\n]);\n\n/**\n * Returns true if the tag name is allowed by specified schemas.\n * @param
schemas Array of schemas\n * @param tagName Name of the tag\n *\n\nexport function matchingSchemas(schemas:
SchemaMetadata[], tagName: string|null): boolean {\n  if (schemas !== null) {\n    for (let i = 0; i <
schemas.length; i++) {\n      const schema = schemas[i];\n      if (schema === NO_ERRORS_SCHEMA ||\n
schema === CUSTOM_ELEMENTS_SCHEMA && tagName && tagName.indexOf('-') > -1) {\n        return
true;\n      }\n    }\n  }\n  return false;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {ViewEncapsulation} from './metadata/view';\n\n/**\n * Used by
`RendererFactory2` to associate custom rendering data and styles\n * with a rendering implementation.\n *\n
@publicApi\n *\n\nexport interface
RendererType2 {\n  /**\n   * A unique identifying string for the new renderer, used when creating\n   * unique
styles for encapsulation.\n   *\n   id: string;\n   /**\n   * The view encapsulation type, which determines how styles
are applied to\n   * DOM elements. One of\n   * - `Emulated` (default): Emulate native scoping of styles.\n   * -
`Native`: Use the native encapsulation mechanism of the renderer.\n   * - `ShadowDom`: Use modern [Shadow\n   *
DOM](https://w3c.github.io/webcomponents/spec/shadow/) and\n   * create a ShadowRoot for component's host
element.\n   * - `None`: Do not provide any template or style encapsulation.\n   *\n   encapsulation:
ViewEncapsulation;\n   /**\n   * Defines CSS styles to be stored on a renderer instance.\n   *\n   styles:
(string|any[])[];\n   /**\n   * Defines arbitrary developer-defined data to be stored on a renderer instance.\n   * This is
useful for renderers that delegate to other renderers.\n   *\n   data: {[kind: string]: any};\n}\n\n\n/**\n *
Flags for renderer-specific style modifiers.\n * @publicApi\n *\n\nexport enum RendererStyleFlags2 {\n  //
TODO(misko): This needs to be refactored into a separate file so that it can be imported from\n //
`node_manipulation.ts` Currently doing the import cause resolution order to change and fails\n // the tests. The
work around is to have hard coded value in `node_manipulation.ts` for now.\n   /**\n   * Marks a style as
important.\n   *\n   Important = 1 << 0,\n   /**\n   * Marks a style as using dash case naming (this-is-dash-case).\n
*\n   DashCase = 1 << 1\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n/**\n * Disallowed strings in the comment.\n *\n * see:
https://html.spec.whatwg.org/multipage/syntax.html#comments\n */\nconst COMMENT_DISALLOWED = />|^-

```



```

nodeIndex: number;\n\n  /**\n   * The instance of the DOM node that is attached to the INode.\n   */\n  public native: RNode) {}}\n\n", "/*\n * @license\n * Copyright\n * Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport './util/ng_dev_mode';\nimport\n{assertDefined, assertDomNode} from './util/assert';\nimport {EMPTY_ARRAY} from './util/empty';\nimport\n{assertLView} from './assert';\nimport {LContext} from './interfaces/context';\nimport {getLViewById,\nregisterLView} from './interfaces/lview_tracking';\nimport {TNode, TNodeFlags} from './interfaces/node';\nimport\n{RElement, RNode} from './interfaces/renderer_dom';\nimport {isLView} from './interfaces/type_checks';\nimport\n{CONTEXT, HEADER_OFFSET, HOST, ID, LView, TVIEW} from './interfaces/view';\nimport\n{getComponentLViewByIndex, unwrapRNode} from './util/view_utils';\n\n/**\n * Returns the matching\n * `LContext` data for a given DOM node, directive or component instance.\n * This function will examine the\n * provided DOM element, component, or directive\n * instance's\n * monkey-patched property to derive the `LContext` data. Once called then the monkey-patched\n * value will be that of the newly created `LContext`.\n * If the monkey-patched value is the `LView` instance then\n * the context value for that\n * target will be created and the monkey-patch reference will be updated. Therefore when\n * this\n * function is called it may mutate the provided element's, component's or any of the associated\n * directive's\n * monkey-patch values.\n * If the monkey-patch value is not detected then the code will walk up the\n * DOM until an element\n * is found which contains a monkey-patch reference. When that occurs then the provided\n * element\n * will be updated with a new context (which is then returned). If the monkey-patch value is not\n * detected for a component/directive instance then it will throw an error (all components and\n * directives should be\n * automatically monkey-patched by ivy).\n * @param target Component, Directive or DOM Node.\n */\nexport function getLContext(target: any): LContext|null {\n  let mpValue = readPatchedData(target);\n  if\n  (mpValue) {\n    // only when it's an array is it considered an LView instance\n    // ... otherwise it's an already\n    constructed LContext instance\n    if (isLView(mpValue)) {\n      const IView: LView = mpValue!;\n      let\n      nodeIndex: number;\n      let component: any = undefined;\n      let directives: any[]|null|undefined = undefined;\n      if (isComponentInstance(target)) {\n        nodeIndex = findViaComponent(IView, target);\n        if (nodeIndex === -\n        1) {\n          throw new Error('The provided component was not found in the application');\n        }\n        component\n        = target;\n      } else if (isDirectiveInstance(target)) {\n        nodeIndex = findViaDirective(IView, target);\n        if\n        (nodeIndex === -1) {\n          throw new Error('The provided directive was not found in the application');\n        }\n        directives\n        = getDirectivesAtNodeIndex(nodeIndex,\n        IView, false);\n      } else {\n        nodeIndex = findViaNativeElement(IView, target as RElement);\n        if\n        (nodeIndex === -1) {\n          return null;\n        }\n      }\n      // the goal is not to fill the entire context full of data\n      because the lookups\n      // are expensive. Instead, only the target data (the element, component, container, ICU\n      // expression or directive details) are filled into the context. If called multiple times\n      // with different target\n      values then the missing target data will be filled in.\n      const native = unwrapRNode(IView[nodeIndex]);\n      const existingCtx = readPatchedData(native);\n      const context: LContext = (existingCtx &&\n      !Array.isArray(existingCtx)) ?\n      existingCtx :\n      createLContext(IView, nodeIndex, native);\n      // only\n      when the component has been discovered then update the monkey-patch\n      if (component && context.component\n      === undefined) {\n        context.component = component;\n        attachPatchData(context.component, context);\n      }\n      // only when the directives have been discovered\n      then update the monkey-patch\n      if (directives && context.directives === undefined) {\n        context.directives =\n        directives;\n        for (let i = 0; i < directives.length; i++) {\n          attachPatchData(directives[i], context);\n        }\n      }\n      attachPatchData(context.native, context);\n      mpValue = context;\n    } else {\n      const rElement =\n      target as RElement;\n      ngDevMode && assertDomNode(rElement);\n      // if the context is not found then we\n      need to traverse upwards up the DOM\n      // to find the nearest element that has already been monkey patched with\n      data\n      let parent = rElement as any;\n      while (parent = parent.parentNode) {\n        const parentContext =\n        readPatchedData(parent);\n        if (parentContext) {\n          const IView = Array.isArray(parentContext) ?\n          parentContext as LView : parentContext.IView;\n          // the edge

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of the app was also reached here through another means\n    // (maybe because the DOM was changed
manually).\n    if (!IView) {\n        return null;\n    }\n\n    const index = findViaNativeElement(IView,
rElement);\n    if (index >= 0) {\n        const native = unwrapRNode(IView[index]);\n        const context =
createLContext(IView, index, native);\n        attachPatchData(native, context);\n        mpValue = context;\n        break;\n    }\n    }\n    }\n    }\n    return (mpValue as LContext) || null;\n}\n\n/**\n * Creates an empty instance of a
`LContext` context\n */\nfunction createLContext(IView: LView, nodeIndex: number, native: RNode): LContext
{\n    return new LContext(IView[ID], nodeIndex, native);\n}\n\n/**\n * Takes a component instance and returns the
view for that component.\n */\n * @param componentInstance\n * @returns The component's view\n */\nexport
function getViewByInstance(componentInstance: {}): LView {\n    let patchedData
= readPatchedData(componentInstance);\n    let IView: LView;\n\n    if (isLView(patchedData)) {\n        const
contextLView: LView = patchedData;\n        const nodeIndex = findViaComponent(contextLView,
componentInstance);\n        IView = getComponentLViewByIndex(nodeIndex, contextLView);\n        const context =
createLContext(contextLView, nodeIndex, IView[HOST] as RElement);\n        context.component =
componentInstance;\n        attachPatchData(componentInstance, context);\n        attachPatchData(context.native,
context);\n    } else {\n        const context = patchedData as unknown as LContext;\n        const contextLView =
context.IView!;\n        ngDevMode && assertLView(contextLView);\n        IView =
getComponentLViewByIndex(context.nodeIndex, contextLView);\n    }\n    return IView;\n}\n\n/**\n * This property
will be monkey-patched on elements, components and directives.\n */\nconst MONKEY_PATCH_KEY_NAME =
'__ngContext__';\n\n/**\n * Assigns the given data to the given target (which could be a component,\n * directive
or DOM node instance) using monkey-patching.\n */\nexport function attachPatchData(target: any, data:
LView|LContext) {\n    ngDevMode && assertDefined(target, 'Target expected');\n    // Only attach the ID of the view
in order to avoid memory leaks (see #41047). We only do this\n    // for `LView`, because we have control over when
an `LView` is created and destroyed, whereas\n    // we can't know when to remove an `LContext`.\n    if
(isLView(data)) {\n        target[MONKEY_PATCH_KEY_NAME] = data[ID];\n        registerLView(data);\n    } else {\n
target[MONKEY_PATCH_KEY_NAME] = data;\n    }\n}\n\n/**\n * Returns the monkey-patch value data present
on the target (which could be\n * a component, directive or a DOM node).\n */\nexport function
readPatchedData(target: any): LView|LContext|null {\n    ngDevMode && assertDefined(target, 'Target expected');\n
const data = target[MONKEY_PATCH_KEY_NAME];\n    return (typeof data === 'number') ? getLViewById(data)
: data || null;\n}\n\nexport function readPatchedLView<T>(target:
any): LView<T>|null {\n    const value = readPatchedData(target);\n    if (value) {\n        return (isLView(value) ? value :
value.IView) as LView<T>;\n    }\n    return null;\n}\n\nexport function isComponentInstance(instance: any): boolean
{\n    return instance && instance.constructor && instance.constructor.cmp;\n}\n\nexport function
isDirectiveInstance(instance: any): boolean {\n    return instance && instance.constructor &&
instance.constructor.dir;\n}\n\n/**\n * Locates the element within the given LView and returns the matching index\n
*/\nfunction findViaNativeElement(IView: LView, target: RElement): number {\n    const tView = IView[TVIEW];\n
for (let i = HEADER_OFFSET; i < tView.bindingStartIndex; i++) {\n        if (unwrapRNode(IView[i]) === target) {\n
            return i;\n        }\n    }\n    return -1;\n}\n\n/**\n * Locates the next tNode (child, sibling or parent).\n
*/\nfunction
traverseNextElement(tNode: TNode): TNode|null {\n    if (tNode.child) {\n        return tNode.child;\n    } else
if (tNode.next) {\n        return tNode.next;\n    } else {\n        // Let's take the following template:
<div><span>text</span></div><component/>\n        // After checking the text node, we need to find the next parent
that has a `next` TNode,\n        // in this case the parent `div`, so that we can find the component.\n        while
(tNode.parent && !tNode.parent.next) {\n            tNode = tNode.parent;\n        }\n        return tNode.parent &&
tNode.parent.next;\n    }\n}\n\n/**\n * Locates the component within the given LView and returns the matching
index\n */\nfunction findViaComponent(IView: LView, componentInstance: {}): number {\n    const
componentIndices = IView[TVIEW].components;\n    if (componentIndices) {\n        for (let i = 0; i <
componentIndices.length; i++) {\n            const elementComponentIndex = componentIndices[i];\n            const
componentView = getComponentLViewByIndex(elementComponentIndex, IView);\n            if
(componentView[CONTEXT] === componentInstance) {\n                return elementComponentIndex;\n            }\n        }\n    }\n}\n

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    }
  } else {
    const rootView = getComponentLViewByIndex(HEADER_OFFSET, IView);
    const rootComponent = rootView[CONTEXT];
    if (rootComponent === componentInstance) {
      // we are dealing with the root element here therefore we know that the
      // element is the very first element after the HEADER data in the IView
      return HEADER_OFFSET;
    }
    return -1;
  }
}

/**
 * Locates the directive within the given LView and returns the matching index
 */
function findViaDirective(IView: LView, directiveInstance: {}): number {
  // if a directive is monkey patched then it will (by default)
  // have a reference to the LView of the current view. The
  // element bound to the directive being search lives somewhere
  // in the view data. We loop through the nodes and check their
  // list of directives for the instance.
  let tNode = IView[TVIEW].firstChild;
  while (tNode) {
    const directiveIndexStart = tNode.directiveStart;
    const directiveIndexEnd = tNode.directiveEnd;
    for (let i = directiveIndexStart; i < directiveIndexEnd; i++) {
      if (IView[i] === directiveInstance) {
        return tNode.index;
      }
      tNode = traverseNextElement(tNode);
    }
    return -1;
  }
}

/**
 * Returns a list of directives extracted from the given view based on the
 * provided list of directive index values.
 */
@param nodeIndex The node index
@param IView The target view data
@param includeComponents Whether or not to include components in returned directives
 */
export function getDirectivesAtNodeIndex(
  nodeIndex: number, IView: LView, includeComponents: boolean): any[] | null {
  const tNode = IView[TVIEW].data[nodeIndex] as TNode;
  let directiveStartIndex = tNode.directiveStart;
  if (directiveStartIndex === 0) return EMPTY_ARRAY;
  const directiveEndIndex = tNode.directiveEnd;
  if (!includeComponents && tNode.flags & TNodeFlags.isComponentHost) directiveStartIndex++;
  return IView.slice(directiveStartIndex, directiveEndIndex);
}

export function getComponentAtNodeIndex(
  nodeIndex: number, IView: LView): {} | null {
  const tNode = IView[TVIEW].data[nodeIndex] as TNode;
  let directiveStartIndex = tNode.directiveStart;
  return tNode.flags & TNodeFlags.isComponentHost ? IView[directiveStartIndex] : null;
}

/**
 * Returns a map of local references (local reference name => element or directive instance) that
 * exist on a given element.
 */
export function discoverLocalRefs(IView: LView, nodeIndex: number): {[key: string]: any} | null {
  const tNode = IView[TVIEW].data[nodeIndex] as TNode;
  if (tNode && tNode.localNames) {
    const result: {[key: string]: any} = {};
    let localIndex = tNode.index + 1;
    for (let i = 0; i < tNode.localNames.length; i += 2) {
      result[tNode.localNames[i]] = IView[localIndex];
      localIndex++;
    }
    return result;
  }
  return null;
}

/**
 * @license
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 * found in the LICENSE file at https://angular.io/license
 */
@fileoverview
 * This file provides mechanism by which code relevant to the `TicuContainerNode` is only loaded if
 * ICU is present in the template.
 */
import {TicuContainerNode} from '../interfaces/node';
import {RNode} from '../interfaces/renderer_dom';
import {LView} from '../interfaces/view';
let _icuContainerIterate: (TicuContainerNode: TicuContainerNode, IView: LView) => () => RNode | null;
/**
 * Iterator which provides ability to visit all of the `TicuContainerNode` root `RNode`s.
 */
export function icuContainerIterate(
  TicuContainerNode: TicuContainerNode, IView: LView): () => RNode | null {
  return _icuContainerIterate(TicuContainerNode, IView);
}

/**
 * Ensures that `IcuContainerVisitor`'s implementation is present.
 */
 * This function is invoked when i18n instruction comes across an ICU. The purpose is to allow the
 * bundler to tree shake ICU logic and only load it if ICU instruction is executed.
 */
export function ensureIcuContainerVisitorLoaded(
  loader: () => ((TicuContainerNode: TicuContainerNode, IView: LView) => () => RNode | null)) {
  if (_icuContainerIterate === undefined) {
    // Do not inline this function. We want to keep `ensureIcuContainerVisitorLoaded` light, so
    // it can be inlined into call-site.
    _icuContainerIterate = loader();
  }
}

/**
 * @license
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 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
 * Expresses a single CSS Selector.
 * Beginning of array
 * - First index: element name
 * - Subsequent odd indices: attr keys
 * - Subsequent even indices: attr values
 * After SelectorFlags.CLASS flag
 * - Class name values

```

```

*\n * SelectorFlags.NOT flag\n * - Changes the mode to NOT\n * - Can be combined with other flags to set the
element / attr / class mode\n *\n * e.g. SelectorFlags.NOT | SelectorFlags.ELEMENT\n *\n * Example:\n *
Original: `div.foo.bar[attr1=val1][attr2]`\n * Parsed: ['div', 'attr1', 'val1', 'attr2', '', SelectorFlags.CLASS, 'foo', 'bar']\n
*\n * Original: 'div[attr1]:not(.foo[attr2])\n * Parsed: [\n * 'div', 'attr1', '',\n * SelectorFlags.NOT |
SelectorFlags.ATTRIBUTE 'attr2', '', SelectorFlags.CLASS, 'foo'\n * ]\n *\n * See more examples in
node_selector_matcher_spec.ts\n *\nexport type CssSelector = (string|SelectorFlags)[];\n\n/**\n * A list of
CssSelectors.\n *\n * A directive or component can have multiple selectors. This type is used for\n * directive defs
so any of the selectors in the list will match that directive.\n *\n * Original: 'form, [ngForm]`\n * Parsed: [['form'], ['
'ngForm', '']]`\n *\nexport type CssSelectorList = CssSelector[];\n\n/**\n * List of slots for
a projection. A slot can be either based on a parsed CSS selector\n * which will be used to determine nodes which
are projected into that slot.\n *\n * When set to `\"*\n * \"`, the slot is reserved and can be used for multi-slot projection\n
* using { @link ViewContainerRef#createComponent}. The last slot that specifies the\n * wildcard selector will
retrieve all projectable nodes which do not match any selector.\n *\nexport type ProjectionSlots =
(CssSelectorList|\"*\n * \")[];\n\n/**\n * Flags used to build up CssSelectors\n *\nexport const enum SelectorFlags {\n /**
Indicates this is the beginning of a new negative selector\n * NOT = 0b0001,\n\n /** Mode for matching attributes
*\n * ATTRIBUTE = 0b0010,\n\n /** Mode for matching tag names\n * ELEMENT = 0b0100,\n\n /** Mode for
matching class names\n * CLASS = 0b1000,\n\n}\n\n// Note: This hack is necessary so we don't erroneously get a
circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n\n\"/>\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport
{RendererStyleFlags2, RendererType2} from './../render/api_flags';\nimport {TrustedHTML, TrustedScript,
TrustedScriptURL} from './../util/security/trusted_type_defs';\nimport {RComment, RElement, RNode, RText}
from './renderer_dom';\n\n/**\n * The goal here is to make sure that the browser DOM API is the Renderer.\n * We
do this by defining a subset of DOM API to be the renderer and then\n * use that at runtime for rendering.\n *\n * At
runtime we can then use the DOM api directly, in server or web-worker\n * it will be easy to implement such API.\n
*\nexport type GlobalTargetName = 'document'|'window'|'body';\nexport type GlobalTargetResolver =
(element: any) => EventTarget;\n\n/**\n * Procedural style of API needed to create elements and text nodes.\n *\n
In non-native
browser environments (e.g. platforms such as web-workers), this is the\n * facade that enables element
manipulation. In practice, this is implemented by `Renderer2`.\n *\nexport interface Renderer {\n destroy(): void;\n
createComment(value: string): RComment;\n createElement(name: string, namespace?: string|null): RElement;\n
createText(value: string): RText;\n /**\n * This property is allowed to be null / undefined,\n * in which case the
view engine won't call it.\n * This is used as a performance optimization for production mode.\n *\n
destroyNode?: ((node: RNode) => void)|null;\n appendChild(parent: RElement, newChild: RNode): void;\n
insertBefore(parent: RNode, newChild: RNode, refChild: RNode|null, isMove?: boolean): void;\n
removeChild(parent: RElement, oldChild: RNode, isHostElement?: boolean): void;\n
selectRootElement(selectorOrNode: string|any, preserveContent?: boolean): RElement;\n\n parentNode(node:
RNode): RElement|null;\n nextSibling(node: RNode):
RNode|null;\n\n setAttribute(\n   el: RElement, name: string, value:
string|TrustedHTML|TrustedScript|TrustedScriptURL,\n   namespace?: string|null): void;\n removeAttribute(el:
RElement, name: string, namespace?: string|null): void;\n addClass(el: RElement, name: string): void;\n
removeClass(el: RElement, name: string): void;\n setStyle(el: RElement, style: string, value: any, flags?:
RendererStyleFlags2): void;\n removeStyle(el: RElement, style: string, flags?: RendererStyleFlags2): void;\n
setProperty(el: RElement, name: string, value: any): void;\n setValue(node: RText|RComment, value: string):
void;\n\n // TODO(misko): Deprecate in favor of addEventListener/removeEventListener\n listen(\n   target:
GlobalTargetName|RNode, eventName: string,\n   callback: (event: any) => boolean | void): () =>
void;\n}\n\nexport interface RendererFactory {\n createRenderer(hostElement: RElement|null, rendererType:
RendererType2|null): Renderer;\n begin?(): void;\n end?():

```



```
void;\n}\n\n// Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {assertDefined} from '../util/assert';\nimport {assertLView} from '../assert';\nimport {readPatchedLView} from '../context_discovery';\nimport {LContainer} from '../interfaces/container';\nimport {isLContainer, isLView} from '../interfaces/type_checks';\nimport {CHILD_HEAD, CONTEXT, FLAGS, LView, LViewFlags, NEXT, PARENT} from '../interfaces/view';\n\n/**\n * Gets the parent LView of the passed LView, if the PARENT is an LContainer, will get the parent of\n * that LContainer, which is an LView\n * @param lView the LView whose parent to get\n */\nexport function getLViewParent(lView: LView):
```

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LView|null {\n  ngDevMode && assertLView(lView);\n  const parent = lView[PARENT];\n  return isLContainer(parent) ? parent[PARENT]! : parent;\n}\n\n/**\n * Retrieve the root view from any component or `LView` by walking the parent `LView` until\n * reaching the root `LView`. \n * @param componentOrLView any component or `LView`\n */\nexport function getRootView<T>(componentOrLView: LView|{}): LView<T> {\n  ngDevMode && assertDefined(componentOrLView, 'component');\n  let lView = isLView(componentOrLView) ? componentOrLView : readPatchedLView(componentOrLView)!;\n  while (lView && !(lView[FLAGS] & LViewFlags.IsRoot)) {\n    lView = getLViewParent(lView)!;\n  }\n  ngDevMode && assertLView(lView);\n  return lView as LView<T>;\n}\n\n/**\n * Returns the context information associated with the application where the target is situated. It\n * does this by walking the parent views until it gets to the root view, then getting the context\n * off of that.\n * @param viewOrComponent the `LView`
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or component to get the root context for.\n */\nexport function getRootContext<T>(viewOrComponent: LView<T>|{}): T {\n  const rootView = getRootView(viewOrComponent);\n  ngDevMode && assertDefined(rootView[CONTEXT], 'Root view has no context. Perhaps it is disconnected?');\n  return rootView[CONTEXT] as T;\n}\n\n/**\n * Gets the first `LContainer` in the LView or `null` if none exists.\n */\nexport function getFirstLContainer(lView: LView): LContainer|null {\n  return getNearestLContainer(lView[CHILD_HEAD]);\n}\n\n/**\n * Gets the next `LContainer` that is a sibling of the given container.\n */\nexport function getNextLContainer(container: LContainer): LContainer|null {\n  return getNearestLContainer(container[NEXT]);\n}\n\nfunction getNearestLContainer(viewOrContainer: LContainer|LView|null) {\n  while (viewOrContainer !== null && !isLContainer(viewOrContainer)) {\n    viewOrContainer = viewOrContainer[NEXT];\n  }\n  return viewOrContainer as LContainer | null;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
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MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {ViewEncapsulation} from '../metadata/view';\nimport {RendererStyleFlags2} from '../render/api_flags';\nimport {addToArray, removeFromArray} from '../util/array_utils';\nimport {assertDefined, assertEqual, assertFunction, assertString} from '../util/assert';\nimport {escapeCommentText} from '../util/dom';\nimport {assertLContainer, assertLView, assertParentView, assertProjectionSlots, assertTNodeForLView} from '../assert';\nimport {attachPatchData} from '../context_discovery';\nimport {IcuContainerIterate} from './i18n/i18n_tree_shaking';\nimport {CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS, NATIVE, unusedValueExportToPlacateAjd as unused1} from '../interfaces/container';\nimport {ComponentDef} from '../interfaces/definition';\nimport {NodeInjectorFactory} from '../interfaces/injector';\nimport {unregisterLView} from '../interfaces/lview_tracking';\nimport {TElementNode, TIcuContainerNode, TNode, TNodeFlags, TNodeType, TProjectionNode, unusedValueExportToPlacateAjd as unused2} from '../interfaces/node';\nimport {unusedValueExportToPlacateAjd as unused3} from '../interfaces/projection';\nimport {Renderer, unusedValueExportToPlacateAjd as unused4} from '../interfaces/renderer';\nimport {RComment, RElement, RNode, RTemplate, RText} from '../interfaces/renderer_dom';\nimport {isLContainer, isLView} from '../interfaces/type_checks';\nimport {CHILD_HEAD, CLEANUP, DECLARATION_COMPONENT_VIEW, DECLARATION_LCONTAINER, DestroyHookData, FLAGS, HookData, HookFn, HOST, LView, LViewFlags, NEXT, PARENT, QUERIES,
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RENDERER, T_HOST, TVIEW, TView, TViewType, unusedValueExportToPlacateAjd as unused5} from
'./interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {profiler, ProfilerEvent} from
'./profiler';\nimport {getLViewParent} from
'./util/view_traversal_utils';\nimport {getNativeByTNode, unwrapRNode, updateTransplantedViewCount} from
'./util/view_utils';\n\nconst unusedValueToPlacateAjd = unused1 + unused2 + unused3 + unused4 +
unused5;\nconst enum WalkTNodeTreeAction {\n  /** node create in the native environment. Run on initial
creation. */\n  Create = 0,\n  /**\n   * node insert in the native environment.\n   * Run when existing node has been
detached and needs to be re-attached.\n   */\n  Insert = 1,\n  /** node detach from the native environment */\n  Detach = 2,\n  /** node destruction using the renderer's API */\n  Destroy = 3,\n}\n\n/**\n * NOTE: for
performance reasons, the possible actions are inlined within the function instead of\n * being passed as an
argument.\n */\nfunction applyToElementOrContainer(\n  action: WalkTNodeTreeAction, renderer: Renderer,
parent: RElement|null,\n  INodeToHandle: RNode|LContainer|LView, beforeNode?: RNode|null) {\n  // If this slot
was allocated for
  a text node dynamically created by i18n, the text node itself\n  // won't be created until i18nApply() in the update
block, so this node should be skipped.\n  // For more info, see \"ICU expressions should work inside an
ngTemplateOutlet inside an ngFor\"\n  // in `i18n_spec.ts`.\n  if (INodeToHandle !== null) {\n    let lContainer:
LContainer|undefined;\n    let isComponent = false;\n    // We are expecting an RNode, but in the case of a
component or LContainer the `RNode` is\n    // wrapped in an array which needs to be unwrapped. We need to know
if it is a component and if\n    // it has LContainer so that we can process all of those cases appropriately.\n    if
(isLContainer(INodeToHandle)) {\n      lContainer = INodeToHandle;\n    } else if (isLView(INodeToHandle)) {\n
      isComponent = true;\n      ngDevMode && assertDefined(INodeToHandle[HOST], 'HOST must be defined for a
component LView');\n      INodeToHandle = INodeToHandle[HOST];\n    }\n    const rNode: RNode =
unwrapRNode(INodeToHandle);\n\n    if (action === WalkTNodeTreeAction.Create && parent !== null) {\n      if (beforeNode === null) {\n
      nativeAppendChild(renderer, parent, rNode);\n      } else {\n        nativeInsertBefore(renderer, parent, rNode,
beforeNode || null, true);\n      }\n    } else if (action === WalkTNodeTreeAction.Insert && parent !== null) {\n
      nativeInsertBefore(renderer, parent, rNode, beforeNode || null, true);\n    } else if (action ===
WalkTNodeTreeAction.Detach) {\n      nativeRemoveNode(renderer, rNode, isComponent);\n    } else if (action
=== WalkTNodeTreeAction.Destroy) {\n      ngDevMode && ngDevMode.rendererDestroyNode++;\n      renderer.destroyNode!(rNode);\n    }\n    if (lContainer !== null) {\n      applyContainer(renderer, action, lContainer,
parent, beforeNode);\n    }\n  }\n}\n\nexport function createTextNode(renderer: Renderer, value: string): RText {\n
ngDevMode && ngDevMode.rendererCreateTextNode++;\n  ngDevMode && ngDevMode.rendererSetText++;\n  return
renderer.createText(value);\n}\n\nexport function updateTextNode(renderer: Renderer, rNode: RText, value:
string): void {\n  ngDevMode && ngDevMode.rendererSetText++;\n  renderer.setValue(rNode,
value);\n}\n\nexport function createCommentNode(renderer: Renderer, value: string): RComment {\n  ngDevMode
&& ngDevMode.rendererCreateComment++;\n  return
renderer.createComment(escapeCommentText(value));\n}\n\n/**\n * Creates a native element from a tag name,
using a renderer.\n * @param renderer A renderer to use\n * @param name the tag name\n * @param namespace
Optional namespace for element.\n * @returns the element created\n */\nexport function createElement(\n
renderer: Renderer, name: string, namespace: string|null): RElement {\n  ngDevMode &&
ngDevMode.rendererCreateElement++;\n  return renderer.createElement(name, namespace);\n}\n\n/**\n *
Removes all DOM elements associated with a view.\n * @param\n * Because some root nodes of the view may be
containers, we sometimes need\n
* to propagate deeply into the nested containers to remove all elements in the\n * views beneath it.\n * @param
tView The `TView` of the `LView` from which elements should be added or removed\n * @param IView The view
from which elements should be added or removed\n */\nexport function removeViewFromContainer(tView: TView,
IView: LView): void {\n  const renderer = IView[RENDERER];\n  applyView(tView, IView, renderer,

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WalkTreeNodeTreeAction.Detach, null, null);\n IView[HOST] = null;\n IView[T\_HOST] = null;\n}\n\n/\*\*\n \* Adds all DOM elements associated with a view.\n \* Because some root nodes of the view may be containers, we sometimes need\n \* to propagate deeply into the nested containers to add all elements in the\n \* views beneath it.\n \* @param tView The `TView` of the `LView` from which elements should be added or removed\n \* @param parentTNode The `TNode` where the `LView` should be attached to.\n \* @param renderer Current renderer to use for DOM manipulations.\n \* @param

IView The view from which elements should be added or removed\n \* @param parentNativeNode The parent `RElement` where it should be inserted into.\n \* @param beforeNode The node before which elements should be added, if insert mode\n \*/\nexport function addViewToContainer(\n tView: TView, parentTNode: TNode, renderer: Renderer, IView: LView, parentNativeNode: RElement,\n beforeNode: RNode|null): void {\n IView[HOST] = parentNativeNode;\n IView[T\_HOST] = parentTNode;\n applyView(tView, IView, renderer, WalkTreeNodeTreeAction.Insert, parentNativeNode, beforeNode);\n}\n\n\n/\*\*\n \* Detach a `LView` from the DOM by detaching its nodes.\n \* @param tView The `TView` of the `LView` to be detached\n \* @param IView the `LView` to be detached.\n \*/\nexport function renderDetachView(tView: TView, IView: LView) {\n applyView(tView, IView, IView[RENDERER], WalkTreeNodeTreeAction.Detach, null, null);\n}\n\n\n/\*\*\n \* Traverses down and up the tree of views and containers to remove listeners and\n

\* call onDestroy callbacks.\n \*/\n \* Notes:\n \* - Because it's used for onDestroy calls, it needs to be bottom-up.\n \* - Must process containers instead of their views to avoid splicing\n \* when views are destroyed and re-added.\n \* - Using a while loop because it's faster than recursion\n \* - Destroy only called on movement to sibling or movement to parent (laterally or up)\n \* @param rootView The view to destroy\n \*/\nexport function

destroyViewTree(rootView: LView): void {\n // If the view has no children, we can clean it up and return early.\n let IViewOrLContainer = rootView[CHILD\_HEAD];\n if (!IViewOrLContainer) {\n return\n }\n cleanUpView(rootView[TVIEW], rootView);\n }\n\n while (IViewOrLContainer) {\n let next: LView|LContainer|null = null;\n if (isLView(IViewOrLContainer)) {\n // If LView, traverse down to child.\n next = IViewOrLContainer[CHILD\_HEAD];\n } else {\n ngDevMode && assertLContainer(IViewOrLContainer);\n // If container,

traverse down to its first LView.\n const firstView: LView|undefined = IViewOrLContainer[CONTAINER\_HEADER\_OFFSET];\n if (firstView) next = firstView;\n }\n\n if (!next) {\n // Only clean up view when moving to the side or up, as destroy hooks\n // should be called in order from the bottom up.\n while (IViewOrLContainer && !IViewOrLContainer![NEXT] && IViewOrLContainer !== rootView) {\n if (isLView(IViewOrLContainer)) {\n cleanUpView(IViewOrLContainer[TVIEW], IViewOrLContainer);\n }\n IViewOrLContainer = IViewOrLContainer[PARENT];\n }\n\n if (IViewOrLContainer === null) IViewOrLContainer = rootView;\n if (isLView(IViewOrLContainer)) {\n cleanUpView(IViewOrLContainer[TVIEW], IViewOrLContainer);\n }\n next = IViewOrLContainer && IViewOrLContainer![NEXT];\n }\n\n IViewOrLContainer = next;\n }\n}\n\n\n/\*\*\n \* Inserts a view into a container.\n \* This adds the view to the container's array

of active views in the correct\n \* position. It also adds the view's elements to the DOM if the container isn't a\n \* root node of another view (in that case, the view's elements will be added when\n \* the container's parent view is added later).\n \* @param tView The `TView` of the `LView` to insert\n \* @param IView The view to insert\n \* @param IContainer The container into which the view should be inserted\n \* @param index Which index in the container to insert the child view into\n \*/\nexport function

insertView(tView: TView, IView: LView, IContainer: LContainer, index: number) {\n ngDevMode && assertLView(IView);\n ngDevMode && assertLContainer(IContainer);\n const indexInContainer = CONTAINER\_HEADER\_OFFSET + index;\n const containerLength = IContainer.length;\n\n if (index > 0) {\n // This is a new view, we need to add it to the children.\n IContainer[indexInContainer - 1][NEXT] = IView;\n }\n\n if (index < containerLength - CONTAINER\_HEADER\_OFFSET) {\n IView[NEXT]

= IContainer[indexInContainer];\n addToArray(IContainer, CONTAINER\_HEADER\_OFFSET + index, IView);\n } else {\n IContainer.push(IView);\n IView[NEXT] = null;\n }\n\n IView[PARENT] =

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IContainer;\n\n // track views where declaration and insertion points are different\n const declarationLContainer =
IView[DECLARATION_LCONTAINER];\n if (declarationLContainer !== null && IContainer !==
declarationLContainer) {\n trackMovedView(declarationLContainer, IView);\n }\n\n // notify query that a new
view has been added\n const IQueries = IView[QUERIES];\n if (IQueries !== null) {\n
IQueries.insertView(tView);\n }\n\n // Sets the attached flag\n IView[FLAGS] |=
LViewFlags.Attached;\n}\n\n/**\n * Track views created from the declaration container (TemplateRef) and inserted
into a\n * different LContainer.\n */\nfunction trackMovedView(declarationContainer: LContainer, IView: LView)
{\n ngDevMode && assertDefined(IView, 'LView required');\n ngDevMode &&
assertLContainer(declarationContainer);\n
const movedViews = declarationContainer[MOVED_VIEWS];\n const insertedLContainer = IView[PARENT] as
LContainer;\n ngDevMode && assertLContainer(insertedLContainer);\n const insertedComponentLView =
insertedLContainer[PARENT]![DECLARATION_COMPONENT_VIEW];\n ngDevMode &&
assertDefined(insertedComponentLView, 'Missing insertedComponentLView');\n const declaredComponentLView
= IView[DECLARATION_COMPONENT_VIEW];\n ngDevMode && assertDefined(declaredComponentLView,
'Missing declaredComponentLView');\n if (declaredComponentLView !== insertedComponentLView) {\n // At
this point the declaration-component is not same as insertion-component; this means that\n // this is a transplanted
view. Mark the declared IView as having transplanted views so that\n // those views can participate in CD.\n
declarationContainer[HAS_TRANSPLANTED_VIEWS] = true;\n }\n if (movedViews === null) {\n
declarationContainer[MOVED_VIEWS] = [IView];\n } else {\n movedViews.push(IView);\n
}\n}\n\nfunction detachMovedView(declarationContainer: LContainer, IView: LView) {\n ngDevMode &&
assertLContainer(declarationContainer);\n ngDevMode &&\n assertDefined(\n
declarationContainer[MOVED_VIEWS],\n 'A projected view should belong to a non-empty projected views
collection');\n const movedViews = declarationContainer[MOVED_VIEWS]!;\n const declarationViewIndex =
movedViews.indexOf(IView);\n const insertionLContainer = IView[PARENT] as LContainer;\n ngDevMode &&
assertLContainer(insertionLContainer);\n\n // If the view was marked for refresh but then detached before it was
checked (where the flag\n // would be cleared and the counter decremented), we need to decrement the view counter
here\n // instead.\n if (IView[FLAGS] & LViewFlags.RefreshTransplantedView) {\n IView[FLAGS] &=
~LViewFlags.RefreshTransplantedView;\n updateTransplantedViewCount(insertionLContainer, -1);\n }\n\n
movedViews.splice(declarationViewIndex,
1);\n}\n\n/**\n * Detaches a view from a container.\n */\n * This method removes the view from the container's
array of active views. It also\n * removes the view's elements from the DOM.\n */\n * @param IContainer The
container from which to detach a view\n * @param removeIndex The index of the view to detach\n * @returns
Detached LView instance.\n */\n\nexport function detachView(IContainer: LContainer, removeIndex: number):
LView|undefined {\n if (IContainer.length <= CONTAINER_HEADER_OFFSET) return;\n\n const
indexInContainer = CONTAINER_HEADER_OFFSET + removeIndex;\n const viewToDetach =
IContainer[indexInContainer];\n\n if (viewToDetach) {\n const declarationLContainer =
viewToDetach[DECLARATION_LCONTAINER];\n if (declarationLContainer !== null &&
declarationLContainer !== IContainer) {\n detachMovedView(declarationLContainer, viewToDetach);\n
}\n\n if (removeIndex > 0) {\n IContainer[indexInContainer - 1][NEXT] = viewToDetach[NEXT] as
LView;\n }\n const
removedLView = removeFromArray(IContainer, CONTAINER_HEADER_OFFSET + removeIndex);\n
removeViewFromContainer(viewToDetach[TVIEW], viewToDetach);\n\n // notify query that a view has been
removed\n const IQueries = removedLView[QUERIES];\n if (IQueries !== null) {\n
IQueries.detachView(removedLView[TVIEW]);\n }\n\n viewToDetach[PARENT] = null;\n
viewToDetach[NEXT] = null;\n // Unsets the attached flag\n viewToDetach[FLAGS] &=
~LViewFlags.Attached;\n }\n\n return viewToDetach;\n}\n\n/**\n * A standalone function which destroys an
LView,\n * conducting clean up (e.g. removing listeners, calling onDestroy).\n */\n * @param tView The `TView`
of the `LView` to be destroyed\n * @param IView The view to be destroyed.\n */\n\nexport function

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destroyLView(tView: TView, IView: LView) {\n if (!(IView[FLAGS] & LViewFlags.Destroyed)) {\n  const
renderer = IView[RENDERER];\n  if (renderer.destroyNode) {\n    applyView(tView, IView, renderer,
WalkTreeNodeTreeAction.Destroy,
    null, null);\n  }\n  destroyViewTree(IView);\n  }\n}\n\n/**\n * Calls onDestroys hooks for all directives and
pipes in a given view and then removes all\n * listeners. Listeners are removed as the last step so events delivered in
the onDestroys hooks\n * can be propagated to @Output listeners.\n * @param tView `TView` for the `LView`
to clean up.\n * @param IView The LView to clean up\n */\nfunction cleanUpView(tView: TView, IView: LView):
void {\n if (!(IView[FLAGS] & LViewFlags.Destroyed)) {\n  // Usually the Attached flag is removed when the
view is detached from its parent, however\n  // if it's a root view, the flag won't be unset hence why we're also
removing on destroy.\n  IView[FLAGS] &= ~LViewFlags.Attached;\n  // Mark the LView as destroyed
*before* executing the onDestroy hooks. An onDestroy hook\n  // runs arbitrary user code, which could include its
own `viewRef.destroy()` (or similar). If\n  // We don't flag the view as destroyed before
the hooks, this could lead to an infinite loop.\n  // This also aligns with the ViewEngine behavior. It also means
that the onDestroy hook is\n  // really more of an "afterDestroy" hook if you think about it.\n  IView[FLAGS] |=
LViewFlags.Destroyed;\n  executeOnDestroys(tView, IView);\n  processCleanups(tView, IView);\n  // For
component views only, the local renderer is destroyed at clean up time.\n  if (IView[TVIEW].type ===
TViewType.Component) {\n    ngDevMode && ngDevMode.rendererDestroy++;\n    IView[RENDERER].destroy();\n  }\n  const declarationContainer =
IView[DECLARATION_LCONTAINER];\n  // we are dealing with an embedded view that is still inserted into a
container\n  if (declarationContainer !== null && isLContainer(IView[PARENT])) {\n    // and this is a projected
view\n    if (declarationContainer !== IView[PARENT]) {\n      detachMovedView(declarationContainer,
IView);\n    }\n    // For embedded views still attached to a container:\n    remove query result from this view.\n    const IQueries = IView[QUERIES];\n    if (IQueries !== null) {\n      IQueries.detachView(tView);\n    }\n    // Unregister the view once everything else has been cleaned up.\n    unregisterLView(IView);\n  }\n}\n\n/** Removes listeners and unsubscribes from output subscriptions */\nfunction
processCleanups(tView: TView, IView: LView): void {\n  const tCleanup = tView.cleanup;\n  const ICleanup =
IView[CLEANUP];\n  // `LCleanup` contains both share information with `TCleanup` as well as instance specific\n
// information appended at the end. We need to know where the end of the `TCleanup` information\n
// is, and we track this with `lastLCleanupIndex`.\n  let lastLCleanupIndex = -1;\n  if (tCleanup !== null) {\n    for (let i = 0; i <
tCleanup.length - 1; i += 2) {\n      if (typeof tCleanup[i] === 'string') {\n        // This is a native DOM listener\n
const idxOrTargetGetter = tCleanup[i + 1];\n        const target
= typeof idxOrTargetGetter === 'function' ?\n          idxOrTargetGetter(IView) :\n          unwrapRNode(IView[idxOrTargetGetter]);\n        const listener = ICleanup[lastLCleanupIndex = tCleanup[i + 2]];\n
const useCaptureOrSubIdx = tCleanup[i + 3];\n        if (typeof useCaptureOrSubIdx === 'boolean') {\n          //
native DOM listener registered with Renderer3\n          target.removeEventListener(tCleanup[i], listener,
useCaptureOrSubIdx);\n        } else {\n          if (useCaptureOrSubIdx >= 0) {\n            // unregister\n
ICleanup[lastLCleanupIndex = useCaptureOrSubIdx]();\n          } else {\n            // Subscription\n
ICleanup[lastLCleanupIndex = -useCaptureOrSubIdx].unsubscribe();\n          }\n        }\n        i += 2;\n      } else {\n
// This is a cleanup function that is grouped with the index of its context\n        const context =
ICleanup[lastLCleanupIndex = tCleanup[i + 1]];\n        tCleanup[i].call(context);\n      }\n    }\n  }\n  if (ICleanup !== null) {\n    for (let i = lastLCleanupIndex + 1; i < ICleanup.length; i++) {\n      const
instanceCleanupFn = ICleanup[i];\n      ngDevMode && assertFunction(instanceCleanupFn, 'Expecting instance
cleanup function.);\n      instanceCleanupFn();\n    }\n    IView[CLEANUP] = null;\n  }\n}\n\n/** Calls onDestroy
hooks for this view */\nfunction executeOnDestroys(tView: TView, IView: LView): void {\n  let destroyHooks:
DestroyHookData|null;\n  if (tView != null && (destroyHooks = tView.destroyHooks) != null) {\n    for (let i = 0;
i < destroyHooks.length; i += 2) {\n      const context = IView[destroyHooks[i] as number];\n      // Only call the
destroy hook if the context has been requested.\n      if (!(context instanceof NodeInjectorFactory)) {\n        const
toCall = destroyHooks[i + 1] as HookFn | HookData;\n        if (Array.isArray(toCall)) {\n          for (let j = 0; j <

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toCall.length; j += 2) {\n      const callContext = context[toCall[j]\n      as number];\n      const hook = toCall[j + 1] as HookFn;\n      profiler(ProfilerEvent.LifecycleHookStart,\n      callContext, hook);\n      try {\n        hook.call(callContext);\n      } finally {\n        profiler(ProfilerEvent.LifecycleHookEnd, callContext, hook);\n      }\n    } else {\n      profiler(ProfilerEvent.LifecycleHookStart, context, toCall);\n      try {\n        toCall.call(context);\n      }\n      finally {\n        profiler(ProfilerEvent.LifecycleHookEnd, context, toCall);\n      }\n    }\n  }\n}\n\n/**\n * Returns a native element if a node can be inserted into the given parent.\n * There are two reasons why we may not be able to insert a element immediately.\n * - Projection: When creating a child content element of a component, we have to skip the\n * insertion because the content of a component will be projected.\n * `<component><content>delayed due to projection</content></component>`\n * - Parent container is disconnected: This can happen when we are inserting a view into\n * parent container, which itself is disconnected. For example the parent container is part\n * of a View which has not be inserted or is made for projection but has not been inserted\n * into destination.\n * @param tView: Current `TView`\n * @param tNode: `TNode` for which we wish to retrieve render parent.\n * @param IView: Current `LView`\n */\nexport function getParentRElement(tView: TView, tNode: TNode, IView: LView): RElement|null {\n  return\n  getClosestRElement(tView, tNode.parent, IView);\n}\n\n/**\n * Get closest `RElement` or `null` if it can't be found.\n * If `TNode` is `TNodeType.Element` => return `RElement` at `LView[tNode.index]` location.\n * If `TNode` is `TNodeType.ElementContainer|IcuContain` => return the parent (recursively).\n * If `TNode` is `null` then return host `RElement`:\n * - return `null` if projection\n * - return `null`\n * if parent container is disconnected (we have no parent.)\n * @param tView: Current `TView`\n * @param tNode: `TNode` for which we wish to retrieve `RElement` (or `null` if host element is\n * needed).\n * @param IView: Current `LView`\n * @returns `null` if the `RElement` can't be determined at this time (no parent / projection)\n */\nexport function getClosestRElement(tView: TView, tNode: TNode|null, IView: LView): RElement|null {\n  let parentTNode: TNode|null = tNode;\n  // Skip over element and ICU containers as those are represented by a comment node and\n  // can't be used as a render parent.\n  while (parentTNode !== null &&\n  (parentTNode.type & (TNodeType.ElementContainer | TNodeType.Icu))) {\n    tNode = parentTNode;\n    parentTNode = tNode.parent;\n  }\n  // If the parent tNode is null, then we are inserting across views: either into an\n  embedded view\n  // or a component view.\n  if (parentTNode === null) {\n    // We are inserting a root element of the\n    component view into the component host element and\n    // it should always be eager.\n    return IView[HOST];\n  } else {\n    ngDevMode && assertTNodeType(parentTNode, TNodeType.AnyRNode | TNodeType.Container);\n    if (parentTNode.flags & TNodeFlags.isComponentHost) {\n      ngDevMode &&\n      assertTNodeForLView(parentTNode, IView);\n      const encapsulation =\n      (tView.data[parentTNode.directiveStart] as ComponentDef<unknown>).encapsulation;\n      // We've got a parent which is an element in the current view. We just need to verify if the\n      // parent element is not a component. Component's content nodes are not inserted immediately\n      // because they will be projected, and so doing insert at this point would be wasteful.\n      // Since the projection would then move it to its final destination. Note that we\n      can't\n      // make this assumption when using the Shadow DOM, because the native projection placeholders\n      // (<content> or <slot>) have to be in place\n      as elements are being inserted.\n      if (encapsulation === ViewEncapsulation.None ||\n      encapsulation === ViewEncapsulation.Emulated) {\n        return null;\n      }\n      return getNativeByTNode(parentTNode, IView) as RElement;\n    }\n  }\n\n  /**\n * Inserts a native node before another native node for a given parent.\n * This is a utility function that can be used when native nodes were determined.\n */\nexport function nativeInsertBefore(\n  renderer: Renderer, parent: RElement, child: RNode, beforeNode: RNode|null,\n  isMove: boolean): void {\n  ngDevMode && ngDevMode.rendererInsertBefore++;\n  renderer.insertBefore(parent, child, beforeNode, isMove);\n}\n\nfunction nativeAppendChild(renderer: Renderer, parent: RElement, child: RNode): void {\n  ngDevMode && ngDevMode.rendererAppendChild++;\n  ngDevMode && assertDefined(parent, 'parent node must be defined');\n  renderer.appendChild(parent, child);\n}\n\nfunction nativeAppendOrInsertBefore(\n  renderer:

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Renderer,

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parent: RElement, child: RNode, beforeNode: RNode|null, isMove: boolean) {\n  if (beforeNode !== null) {\n    nativeInsertBefore(renderer, parent, child, beforeNode, isMove);\n  } else {\n    nativeAppendChild(renderer, parent, child);\n  }\n}\n\n/** Removes a node from the DOM given its native parent. */\nfunction nativeRemoveChild(\n  renderer: Renderer, parent: RElement, child: RNode, isHostElement?: boolean): void {\n  renderer.removeChild(parent, child, isHostElement);\n}\n\n/** Checks if an element is a `` node. */\nfunction isTemplateNode(node: RElement): node is RTemplate {\n  return node.tagName === 'TEMPLATE' && (node as RTemplate).content !== undefined;\n}\n\n/** Returns a native parent of a given native node. */\nexport function nativeParentNode(renderer: Renderer, node: RNode): RElement|null {\n  return renderer.parentNode(node);\n}\n\n/** Returns a native sibling of a given native node. */\nexport function nativeNextSibling(renderer: Renderer, node: RNode): RNode|null {\n  return renderer.nextSibling(node);\n}\n\n/** Find a node in front of which `currentTNode` should be inserted. */\n/** This method determines the `RNode` in front of which we should insert the `currentRNode`. This takes `TNode.insertBeforeIndex` into account if i18n code has been invoked. */\n/** @param parentTNode parent `TNode` */\n/** @param currentTNode current `TNode` (The node which we would like to insert into the DOM) */\n/** @param IView current `LView` */\nfunction getInsertInFrontOfRNode(parentTNode: TNode, currentTNode: TNode, IView: LView): RNode|null {\n  return _getInsertInFrontOfRNodeWithI18n(parentTNode, currentTNode, IView);\n}\n\n/** Find a node in front of which `currentTNode` should be inserted. (Does not take i18n into account) */\n/** This method determines the `RNode` in front of which we should insert the `currentRNode`. This does not take `TNode.insertBeforeIndex` into account. */\n/** @param parentTNode parent `TNode` */\n/** @param currentTNode current `TNode` (The node which we would like to insert into the DOM) */\n/** @param IView current `LView` */\nexport function getInsertInFrontOfRNodeWithNoI18n(\n  parentTNode: TNode, currentTNode: TNode, IView: LView): RNode|null {\n  if (parentTNode.type & (TNodeType.ElementContainer | TNodeType.Icu)) {\n    return getNativeByTNode(parentTNode, IView);\n  }\n  return null;\n}\n\n/** Tree shakable boundary for `getInsertInFrontOfRNodeWithI18n` function. */\n/** This function will only be set if i18n code runs. */\nlet _getInsertInFrontOfRNodeWithI18n: (parentTNode: TNode, currentTNode: TNode, IView: LView) => RNode | null = getInsertInFrontOfRNodeWithNoI18n;\n\n/** Tree shakable boundary for `processI18nInsertBefore` function. */\n/** This function will only be set if i18n code runs. */\nlet _processI18nInsertBefore: (\n  renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[],\n  parentRElement: RElement|null)\n=> void;\n\nexport function setI18nHandling(\n  getInsertInFrontOfRNodeWithI18n: (parentTNode: TNode, currentTNode: TNode, IView: LView) => RNode | null,\n  processI18nInsertBefore: (\n    renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[],\n    parentRElement: RElement|null)\n=> void) {\n  _getInsertInFrontOfRNodeWithI18n = getInsertInFrontOfRNodeWithI18n;\n  _processI18nInsertBefore = processI18nInsertBefore;\n}\n\n/** Appends the `child` native node (or a collection of nodes) to the `parent`. */\n/** @param tView The `TView` to be appended */\n/** @param IView The current LView */\n/** @param childRNode The native child (or children) that should be appended */\n/** @param childTNode The TNode of the child element */\nexport function appendChild(\n  tView: TView, IView: LView, childRNode: RNode|RNode[], childTNode: TNode): void {\n  const parentRNode = getParentRElement(tView, childTNode, IView);\n  const renderer = IView[RENDERER];\n\n  const parentTNode: TNode = childTNode.parent || IView[T_HOST]!;\n  const anchorNode = getInsertInFrontOfRNode(parentTNode, childTNode, IView);\n  if (parentRNode != null) {\n    if (Array.isArray(childRNode))\n      for (let i = 0; i < childRNode.length; i++) {\n        nativeAppendOrInsertBefore(renderer, parentRNode, childRNode[i], anchorNode, false);\n      }\n    } else {\n    nativeAppendOrInsertBefore(renderer, parentRNode, childRNode, anchorNode, false);\n  }\n}\n\n_processI18nInsertBefore !== undefined &&\n  _processI18nInsertBefore(renderer, childTNode, IView, childRNode, parentRNode);\n}\n\n/** Returns the first native node for a given LView, starting from the
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provided TNode.\n *\n * Native nodes are returned in the order in which those appear in the native tree (DOM).\n
*\nfunction getFirstNativeNode(IView: LView, tNode: TNode|null): RNode|null {\n if (tNode !== null) {\n
ngDevMode &&\n    assertTNodeType(\n        tNode,\n        TNodeType.AnyRNode
| TNodeType.AnyContainer | TNodeType.Icu | TNodeType.Projection);\n\n    const tNodeType = tNode.type;\n    if
(tNodeType & TNodeType.AnyRNode) {\n        return getNativeByTNode(tNode, IView);\n    } else if (tNodeType
& TNodeType.Container) {\n        return getBeforeNodeForView(-1, IView[tNode.index]);\n    } else if (tNodeType
& TNodeType.ElementContainer) {\n        const elIcuContainerChild = tNode.child;\n        if (elIcuContainerChild !==
null) {\n            return getFirstNativeNode(IView, elIcuContainerChild);\n        } else {\n            const rNodeOrLContainer
= IView[tNode.index];\n            if (isLContainer(rNodeOrLContainer)) {\n                return getBeforeNodeForView(-1,
rNodeOrLContainer);\n            } else {\n                return unwrapRNode(rNodeOrLContainer);\n            }\n        } else if
(tNodeType & TNodeType.Icu) {\n            let nextRNode = icuContainerIterate(tNode as TIcuContainerNode,
IView);\n            let rNode: RNode|null = nextRNode();\n            // If the ICU container has no
nodes, then we use the ICU anchor as the node.\n            return rNode || unwrapRNode(IView[tNode.index]);\n        } else
{\n            const projectionNodes = getProjectionNodes(IView, tNode);\n            if (projectionNodes !== null) {\n                if
(Array.isArray(projectionNodes)) {\n                    return projectionNodes[0];\n                }\n                const parentView =
getLViewParent(IView[DECLARATION_COMPONENT_VIEW]);\n                ngDevMode &&
assertParentView(parentView);\n                return getFirstNativeNode(parentView!, projectionNodes);\n            } else {\n                return getFirstNativeNode(IView, tNode.next);\n            }\n        }\n    }\n\n    return null;\n}\n\nexport function
getProjectionNodes(IView: LView, tNode: TNode|null): TNode|RNode[]|null {\n if (tNode !== null) {\n    const
componentView = IView[DECLARATION_COMPONENT_VIEW];\n    const componentHost =
componentView[T_HOST] as TElementNode;\n    const slotIdx = tNode.projection as number;\n    ngDevMode &&
assertProjectionSlots(IView);\n    return componentHost.projection![slotIdx];\n
}\n\n    return null;\n}\n\nexport function getBeforeNodeForView(viewIndexInContainer: number, IContainer:
LContainer): RNode|null {\n    const nextViewIndex = CONTAINER_HEADER_OFFSET +
viewIndexInContainer + 1;\n    if (nextViewIndex < IContainer.length) {\n        const IView =
IContainer[nextViewIndex] as LView;\n        const firstTNodeOfView = IView[TVIEW].firstChild;\n        if
(firstTNodeOfView !== null) {\n            return getFirstNativeNode(IView, firstTNodeOfView);\n        }\n    }\n\n    return
IContainer[NATIVE];\n}\n\n/**\n * Removes a native node itself using a given renderer. To remove the node we
are looking up its\n * parent from the native tree as not all platforms / browsers support the equivalent of\n *
node.remove().\n *\n * @param renderer A renderer to be used\n * @param rNode The native node that should be
removed\n * @param isHostElement A flag indicating if a node to be removed is a host of a component.\n
*\n */\nexport function nativeRemoveNode(renderer: Renderer,
rNode: RNode, isHostElement?: boolean): void {\n    ngDevMode && ngDevMode.rendererRemoveNode++;\n    const nativeParent = nativeParentNode(renderer, rNode);\n    if (nativeParent) {\n        nativeRemoveChild(renderer,
nativeParent, rNode, isHostElement);\n    }\n}\n\n/**\n * Performs the operation of `action` on the node. Typically
this involves inserting or removing\n * nodes on the LView or projection boundary.\n */\nfunction applyNodes(\n
renderer: Renderer, action: WalkTNodeTreeAction, tNode: TNode|null, IView: LView,\n parentRElement:
RElement|null, beforeNode: RNode|null, isProjection: boolean) {\n    while (tNode != null) {\n        ngDevMode &&
assertTNodeForLView(tNode, IView);\n        ngDevMode &&\n        assertTNodeType(\n            tNode,\n            TNodeType.AnyRNode | TNodeType.AnyContainer | TNodeType.Projection | TNodeType.Icu);\n        const
rawSlotValue = IView[tNode.index];\n        const tNodeType = tNode.type;\n        if (isProjection) {\n            if (action ===
WalkTNodeTreeAction.Create)\n                {\n                    rawSlotValue && attachPatchData(unwrapRNode(rawSlotValue), IView);\n                    tNode.flags |=
TNodeFlags.isProjected;\n                }\n            }\n            if ((tNode.flags & TNodeFlags.isDetached) !== TNodeFlags.isDetached)\n                {\n                    if (tNodeType & TNodeType.ElementContainer) {\n                        applyNodes(renderer, action, tNode.child, IView,
parentRElement, beforeNode, false);\n                    }\n                    applyToElementOrContainer(action, renderer, parentRElement,
rawSlotValue, beforeNode);\n                } else if (tNodeType & TNodeType.Icu) {\n                    const nextRNode =
icuContainerIterate(tNode as TIcuContainerNode, IView);\n                    let rNode: RNode|null;\n                    while (rNode =

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nextRNode()) {\n      applyToElementOrContainer(action, renderer, parentRElement, rNode, beforeNode);\n    }\n    applyToElementOrContainer(action, renderer, parentRElement, rawSlotValue, beforeNode);\n  } else if\n  (tNodeType & TNodeType.Projection) {\n    applyProjectionRecursive(\n      renderer, action, IView, tNode\n      as TProjectionNode, parentRElement, beforeNode);\n    } else {\n      ngDevMode && assertTNodeType(tNode,\n      TNodeType.AnyRNode | TNodeType.Container);\n      applyToElementOrContainer(action, renderer,\n      parentRElement, rawSlotValue, beforeNode);\n    }\n  }\n  tNode = isProjection ? tNode.projectionNext :\n  tNode.next;\n}\n}\n\n/**\n * `applyView` performs operation on the view as specified in `action` (insert, detach,\n  destroy)\n * Inserting a view without projection or containers at top level is simple. Just iterate over the\n * root\n  nodes of the View, and for each node perform the `action`.\n * Things get more complicated with containers and\n  projections. That is because coming across:\n * - Container: implies that we have to insert/remove/destroy the views\n  of that container as well\n * which in turn can have their own Containers at the View roots.\n * - Projection:\n  implies that we have to insert/remove/destroy the nodes of the projection. The\n * complication is that the nodes we are projecting can themselves have Containers\n * or other\n  Projections.\n * As you can see this is a very recursive problem. Yes recursion is not most efficient but the\n * code is complicated enough that trying to implemented with recursion becomes unmaintainable.\n * @param\n  tView The `TView` which needs to be inserted, detached, destroyed\n * @param IView The LView which needs to\n  be inserted, detached, destroyed.\n * @param renderer Renderer to use\n * @param action action to perform (insert,\n  detach, destroy)\n * @param parentRElement parent DOM element for insertion (Removal does not need it).\n * @param beforeNode Before which node the insertions should happen.\n */\nfunction applyView(\n  tView:\n  TView, IView: LView, renderer: Renderer, action: WalkTNodeTreeAction.Destroy,\n  parentRElement: null,\n  beforeNode: null): void;\nfunction applyView(\n  tView: TView, IView: LView, renderer: Renderer, action:\n  WalkTNodeTreeAction,\n  parentRElement: RElement|null, beforeNode: RNode|null): void;\nfunction applyView(\n  tView: TView,\n  IView: LView, renderer: Renderer, action: WalkTNodeTreeAction,\n  parentRElement: RElement|null,\n  beforeNode: RNode|null): void {\n  applyNodes(renderer, action, tView.firstChild, IView, parentRElement,\n  beforeNode, false);\n}\n\n/**\n * `applyProjection` performs operation on the projection.\n * Inserting a\n  projection requires us to locate the projected nodes from the parent component. The\n * complication is that those\n  nodes themselves could be re-projected from their parent component.\n * @param tView The `TView` of\n  `LView` which needs to be inserted, detached, destroyed\n * @param IView The `LView` which needs to be\n  inserted, detached, destroyed.\n * @param tProjectionNode node to project\n */\nexport function\n  applyProjection(tView: TView, IView: LView, tProjectionNode: TProjectionNode) {\n  const renderer =\n  IView[RENDERER];\n  const parentRNode = getParentRElement(tView,\n  tProjectionNode, IView);\n  const parentTNode = tProjectionNode.parent || IView[T_HOST]!;\n  let beforeNode =\n  getInsertInFrontOfRNode(parentTNode, tProjectionNode, IView);\n  applyProjectionRecursive(\n    renderer,\n    WalkTNodeTreeAction.Create, IView, tProjectionNode, parentRNode, beforeNode);\n}\n\n/**\n * `applyProjectionRecursive` performs operation on the projection specified by `action` (insert,\n * detach, destroy)\n * Inserting a projection requires us to locate the projected nodes from the parent component. The\n * complication is that those nodes themselves could be re-projected from their parent component.\n * @param\n  renderer Render to use\n * @param action action to perform (insert, detach, destroy)\n * @param IView The LView\n  which needs to be inserted, detached, destroyed.\n * @param tProjectionNode node to project\n * @param\n  parentRElement parent DOM element for insertion/removal.\n * @param beforeNode Before which node the\n  insertions should happen.\n */\nfunction applyProjectionRecursive(\n  renderer: Renderer, action: WalkTNodeTreeAction, IView: LView,\n  tProjectionNode: TProjectionNode,\n  parentRElement: RElement|null, beforeNode: RNode|null) {\n  const\n  componentLView = IView[DECLARATION_COMPONENT_VIEW];\n  const componentNode =\n  componentLView[T_HOST] as TelementNode;\n  ngDevMode &&\n  assertEqual(typeof\n  tProjectionNode.projection, 'number', 'expecting projection index');\n  const nodeToProjectOrRNodes =\n  componentNode.projection![tProjectionNode.projection]!;\n  if (Array.isArray(nodeToProjectOrRNodes)) {\n    //

```

This should not exist, it is a bit of a hack. When we bootstrap a top level node and we need to support passing projectable nodes, so we cheat and put them in the TNode of the Host TView. (Yes we put instance info at the T Level). We can get away with it because we know that that TView is not shared and therefore it will not be a problem. This should be refactored and cleaned up.

```
for (let i = 0; i < nodeToProjectOrRNodes.length; i++) {
  const rNode = nodeToProjectOrRNodes[i];
  applyToElementOrContainer(action, renderer, parentRElement, rNode, beforeNode);
} else {
  let nodeToProject: TNode|null = nodeToProjectOrRNodes;
  const projectedComponentLView = componentLView[PARENT] as LView;
  applyNodes(renderer, action, nodeToProject, projectedComponentLView, parentRElement, beforeNode, true);
}

/** `applyContainer` performs an operation on the container and its views as specified by `action` (insert, detach, destroy)
 * Inserting a Container is complicated by the fact that the container may have Views which themselves have containers or projections.
 * @param renderer Renderer to use
 * @param action action to perform (insert, detach, destroy)
 * @param IContainer The LContainer which needs to be inserted, detached, destroyed.
 * @param parentRElement parent DOM element for insertion/removal.
```

```
* @param beforeNode Before which node the insertions should happen.
*/
function applyContainer(renderer: Renderer, action: WalkTNodeTreeAction, IContainer: LContainer, parentRElement: RElement|null, beforeNode: RNode|null|undefined) {
  ngDevMode && assertLContainer(IContainer);
  const anchor = IContainer[NATIVE]; // LContainer has its own before node.
  const native = unwrapRNode(IContainer); // An LContainer can be created dynamically on any node by injecting ViewContainerRef.
  // Asking for a ViewContainerRef on an element will result in a creation of a separate anchor
  // node (comment in the DOM) that will be different from the LContainer's host node. In this particular case we need to execute action on 2 nodes:
  // - container's host node (this is done in the executeActionOnElementOrContainer)
  // - container's host node (this is done here)
  if (anchor !== native) {
    // This is very strange to me (Misko). I would expect that the native is same as anchor.
    // don't see a reason why they should be different, but they are.
    // If they are we need to process the second anchor as well.
    applyToElementOrContainer(action, renderer, parentRElement, anchor, beforeNode);
  }
  for (let i = CONTAINER_HEADER_OFFSET; i < IContainer.length; i++) {
    const IView = IContainer[i] as LView;
    applyView(IView[TVIEW], IView, renderer, action, parentRElement, anchor);
  }

  /** Writes class/style to element.
   * @param renderer Renderer to use.
   * @param isClassBased `true` if it should be written to `class` (`false` to write to `style`)
   * @param rNode The Node to write to.
   * @param prop Property to write to. This would be the class/style name.
   * @param value Value to write. If `null`/`undefined`/`false` this is considered a remove (set/add otherwise).
   */
  export function applyStyling(renderer: Renderer, isClassBased: boolean, rNode: RElement, prop: string, value: any) {
    if (isClassBased) {
      // We actually want JS true/false here because any truthy value should add the class
      if (!value) {
        ngDevMode && ngDevMode.rendererRemoveClass++;
        renderer.removeClass(rNode, prop);
      } else {
        ngDevMode && ngDevMode.rendererAddClass++;
        renderer.addClass(rNode, prop);
      }
    } else {
      let flags = prop.indexOf('-') === -1 ? undefined : RendererStyleFlags2.DashCase as number;
      if (value === null /** || value === undefined */) {
        ngDevMode && ngDevMode.rendererRemoveStyle++;
        renderer.removeStyle(rNode, prop, flags);
      } else {
        // A value is important if it ends with `!important`. The style parser strips any semicolons at the end of the value.
        const isImportant = typeof value === 'string' ? value.endsWith('!important') : false;
        if (isImportant) {
          // !important has to be stripped from the value for it to be valid.
          value = value.slice(0, -10);
        }
        flags! |= RendererStyleFlags2.Important;
      }
      ngDevMode && ngDevMode.rendererSetStyle++;
      renderer.setStyle(rNode, prop, value, flags);
    }
  }

  /** Write `cssText` to `RElement`.
   * This function does direct write without any reconciliation. Used for writing initial values, so that static styling values do not pull in the style parser.
   * @param renderer Renderer to use
   * @param element The element which needs to be updated.
   * @param newValue The new class list to write.
   */
  export function writeDirectStyle(renderer: Renderer, element: RElement, newValue: string) {
    ngDevMode &&
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assertString(newValue, '\\newValue\\' should be a string');\n renderer.setAttribute(element, 'style', newValue);\n ngDevMode && ngDevMode.renderer.setStyle++;}\n\n/**\n * Write `className` to `RElement`.\n *\n * This function does direct write without any reconciliation. Used for writing initial values, so\n * that static styling values do not
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```
pull in the style parser.\n *\n * @param renderer Renderer to use\n *\n * @param element The element which needs to be updated.\n *\n * @param newValue The new class list to write.\n *\n * @export function writeDirectClass(renderer: Renderer, element: RElement, newValue: string) {\n  ngDevMode && assertString(newValue, '\\newValue\\' should be a string');\n  if (newValue === '') {\n    // There are tests in `google3` which expect `element.getAttribute('class')` to be `null`.\n    renderer.removeAttribute(element, 'class');\n  } else {\n    renderer.setAttribute(element, 'class', newValue);\n  }\n  ngDevMode && ngDevMode.renderer.setClassName++;}\n\n"/**\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n *\n * @fileoverview\n * A module to facilitate use of a Trusted Types policy internally within\n * Angular. It lazily constructs the Trusted
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```
Types policy, providing helper\n * utilities for promoting strings to Trusted Types. When Trusted Types are not\n * available, strings are used as a fallback.\n *\n * @security All use of this module is security-sensitive and should go through\n * security review.\n *\n * @import {global} from './global';\n * @import {TrustedHTML, TrustedScript, TrustedScriptURL, TrustedTypePolicy, TrustedTypePolicyFactory} from './trusted_type_defs';\n *\n * The Trusted Types policy, or null if Trusted Types are not\n * enabled/supported, or undefined if the policy has not been created yet.\n *\n * @let policy: TrustedTypePolicy|null|undefined;\n *\n * Returns the Trusted Types policy, or null if Trusted Types are not\n * enabled/supported. The first call to this function will create the policy.\n *\n * @function\n * @returns TrustedTypePolicy|null\n *\n * if (policy === undefined) {\n  policy = null;\n  if (global.trustedTypes) {\n    try {\n      policy = (global.trustedTypes as TrustedTypePolicyFactory).createPolicy('angular',\n        {\n          createHTML: (s: string) => s,\n          createScript: (s: string) => s,\n          createScriptURL: (s: string) => s,\n        });\n    } catch {\n      // trustedTypes.createPolicy throws if called with a name that is\n      // already registered, even in report-only mode. Until the API changes,\n      // catch the error not to break the applications functionally. In such\n      // cases, the code will fall back to using strings.\n    }\n  }\n  return policy;\n}\n\n/**\n * Unsafely promote a string to a TrustedHTML, falling back to strings when\n * Trusted Types are not available.\n *\n * @security This is a security-sensitive function; any use of this function\n * must go through security review. In particular, it must be assured that the\n * provided string will never cause an XSS vulnerability if used in a context\n * that will be interpreted as HTML by a browser, e.g. when assigning to\n * element.innerHTML.\n *\n * @export
```

```
function trustedHTMLFromString(html: string): TrustedHTML|string {\n  return getPolicy()?.createHTML(html) || html;\n}\n\n/**\n * Unsafely promote a string to a TrustedScript, falling back to strings when\n * Trusted Types are not available.\n *\n * @security In particular, it must be assured that the provided string will\n * never cause an XSS vulnerability if used in a context that will be\n * interpreted and executed as a script by a browser, e.g. when calling eval.\n *\n * @export function trustedScriptFromString(script: string): TrustedScript|string {\n  return getPolicy()?.createScript(script) || script;\n}\n\n/**\n * Unsafely promote a string to a TrustedScriptURL, falling back to strings\n * when Trusted Types are not available.\n *\n * @security This is a security-sensitive function; any use of this function\n * must go through security review. In particular, it must be assured that the\n * provided string will never cause an XSS vulnerability if used in a context\n * that will cause a
```

```
browser to load and execute a resource, e.g. when\n * assigning to script.src.\n *\n * @export function trustedScriptURLFromString(url: string): TrustedScriptURL|string {\n  return getPolicy()?.createScriptURL(url) || url;\n}\n\n/**\n * Unsafely call the Function constructor with the given string arguments. It\n * is only available in development mode, and should be stripped out of\n * production code.\n *\n * @security This is a security-sensitive function; any use of this function\n * must go through security review. In particular, it must be assured that it\n * is only called from development code, as use in production code can lead to\n * XSS vulnerabilities.\n *\n * @export function newTrustedFunctionForDev(...args: string[]): Function {\n  if (typeof ngDevMode === 'undefined') {\n
```

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throw new Error('newTrustedFunctionForDev should never be called in production');\n } \n if
(!global.trustedTypes) {\n // In environments that don't support Trusted Types, fall back to the most\n //
straightforward
implementation:\n return new Function(...args);\n }\n\n // Chrome currently does not support passing
TrustedScript to the Function\n // constructor. The following implements the workaround proposed on the page\n //
below, where the Chromium bug is also referenced:\n // https://github.com/w3c/webappsec-trusted-
types/wiki/Trusted-Types-for-function-constructor\n const fnArgs = args.slice(0, -1).join(',');\n const fnBody =
args[args.length - 1];\n const body = `(function anonymous(${fnArgs})\n { ${fnBody}}\n)`;\n\n // Using eval
directly confuses the compiler and prevents this module from\n // being stripped out of JS binaries even if not used.
The global['eval']\n // indirection fixes that.\n const fn = global['eval'](trustedScriptFromString(body) as string) as
Function;\n if (fn.bind === undefined) {\n // Workaround for a browser bug that only exists in Chrome 83, where
passing\n // a TrustedScript to eval just returns the TrustedScript back without\n
// evaluating it. In that case, fall back to the most straightforward\n // implementation:\n return new
Function(...args);\n }\n\n // To completely mimic the behavior of calling `new Function`, two more\n // things
need to happen:\n // 1. Stringifying the resulting function should return its source code\n fn.toString = () =>
body;\n // 2. When calling the resulting function, `this` should refer to `global`\n return fn.bind(global);\n\n //
When Trusted Types support in Function constructors is widely available,\n // the implementation of this function
can be simplified to:\n // return new Function(...args.map(a => trustedScriptFromString(a)));\n }\n\n", "/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { RuntimeError,
RuntimeErrorCode } from './errors';\nimport { getTemplateLocationDetails } from
'./render3/instructions/element_validation';\nimport
{ TNodeType } from './render3/interfaces/node';\nimport { RComment, RElement } from
'./render3/interfaces/renderer_dom';\nimport { RENDERER } from './render3/interfaces/view';\nimport
{ nativeRemoveNode } from './render3/node_manipulation';\nimport { getLView, getSelectedTNode } from
'./render3/state';\nimport { getNativeByTNode } from './render3/util/view_utils';\nimport
{ trustedHTMLFromString } from './util/security/trusted_types';\n\n\n/**\n * Validation function invoked at runtime
for each binding that might potentially\n * represent a security-sensitive attribute of an <iframe>.\n * See
`IFRAME_SECURITY_SENSITIVE_ATTRS` in the\n * `packages/compiler/src/schema/dom_security_schema.ts`\n script for the full list\n * of such attributes.\n * \n * @codeGenApi\n */\nexport function
validateIframeAttribute(attrValue: any, tagName: string, attrName: string) {\n const IView = getLView();\n const
tNode = getSelectedTNode(!);\n const element = getNativeByTNode(tNode,\n
IView) as RElement | RComment;\n\n // Restrict any dynamic bindings of security-sensitive attributes/properties\n
// on an <iframe> for security reasons.\n if (tNode.type === TNodeType.Element && tagName.toLowerCase() ===
'iframe') {\n const iframe = element as HTMLIFrameElement;\n\n // Unset previously applied `src` and `srcdoc`
if we come across a situation when\n // a security-sensitive attribute is set later via an attribute/property binding.\n
iframe.src = '';\n iframe.srcdoc = trustedHTMLFromString('') as unknown as string;\n\n // Also remove the
<iframe> from the document.\n nativeRemoveNode(IView[RENDERER], iframe);\n\n const errorMessage =
ngDevMode &&\n `Angular has detected that the `\\`${attrName}` was applied `+\n ` as a binding to an
<iframe>${getTemplateLocationDetails(IView)}. `+\n ` For security reasons, the `\\`${attrName}` can be set
on an <iframe> `+\n ` as a static attribute only.\n\n `+\n ` To fix this, switch the `\\`${attrName}` binding to a static attribute `+\n ` in a template or in
host bindings section.`;\n throw new RuntimeError(RuntimeErrorCode.UNSAFE_IFRAME_ATTRS,\n
errorMessage);\n }\n return attrValue;\n }\n\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n\n/**\n * Most of the use of `document` in Angular is from within the DI system so it
is possible to simply\n * inject the `DOCUMENT` token and are done.\n * \n * Ivy is special because it does not rely
upon the DI and must get hold of the document some other\n * way.\n * \n * The solution is to define

```

```

`getDocument()` and `setDocument()` top-level functions for ivy.\n * Wherever ivy needs the global document, it
calls `getDocument()` instead.\n * When running ivy outside of a browser environment, it is necessary
to call `setDocument()` to\n * tell ivy what the global `document` is.\n * Angular does this for us in each of the
standard platforms (`Browser`, `Server`, and `WebWorker`)\n * by calling `setDocument()` when providing the
`DOCUMENT` token.\n * \nlet DOCUMENT: Document|undefined = undefined;\n\n/**\n * Tell ivy what the
`document` is for this platform.\n * It is only necessary to call this if the current platform is not a browser.\n *
@param document The object representing the global `document` in this environment.\n */\nexport function
setDocument(document: Document|undefined): void {\n  DOCUMENT = document;\n}\n\n/**\n * Access the
object that represents the `document` for this platform.\n * Ivy calls this whenever it needs to access the
`document` object.\n * For example to create the renderer or to do sanitization.\n */\nexport function
getDocument(): Document {\n  if (DOCUMENT !== undefined) {\n    return DOCUMENT;\n  } else if (typeof
document !== 'undefined') {\n

```

```

    return document;\n  }\n  // No `document` can be found. This should only happen if we are running ivy outside
Angular and\n  // the current platform is not a browser. Since this is not a supported scenario at the moment\n  // this
should not happen in Angular apps.\n  // Once we support running ivy outside of Angular we will need to publish
`setDocument()` as a\n  // public API. Meanwhile we just return `undefined` and let the application fail.\n  return
undefined!;\n}\n", "*/\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n

```

```

*/\n\n * @fileoverview\n * A module to facilitate use of a Trusted Types policy internally within\n * Angular
specifically for bypassSecurityTrust* and custom sanitizers. It\n * lazily constructs the Trusted Types policy,
providing helper utilities for\n * promoting strings to Trusted Types. When Trusted

```

```

Types are not available,\n * strings are used as a fallback.\n * @security All use of this module is security-sensitive
and should go through\n * security review.\n */\n\nimport {global} from './global';\nimport {TrustedHTML,
TrustedScript, TrustedScriptURL, TrustedTypePolicy, TrustedTypePolicyFactory} from

```

```

'./trusted_type_defs';\n\n/**\n * The Trusted Types policy, or null if Trusted Types are not\n * enabled/supported, or
undefined if the policy has not been created yet.\n */\nlet policy: TrustedTypePolicy|null|undefined;\n\n/**\n *
Returns the Trusted Types policy, or null if Trusted Types are not\n * enabled/supported. The first call to this
function will create the policy.\n */\nfunction getPolicy(): TrustedTypePolicy|null {\n  if (policy === undefined) {\n

```

```

    policy = null;\n    if (global.trustedTypes) {\n      try {\n        policy = (global.trustedTypes as
TrustedTypePolicyFactory)\n          .createPolicy('angular#unsafe-bypass', {\n

```

```

            createHTML:
(s: string) => s,\n            createScript: (s: string) => s,\n            createScriptURL: (s: string) => s,\n
          });\n      } catch {\n        // trustedTypes.createPolicy throws if called with a name that is\n        // already
registered, even in report-only mode. Until the API changes,\n        // catch the error not to break the applications
functionally. In such\n        // cases, the code will fall back to using strings.\n      }\n    }\n  }\n  return

```

```

policy;\n}\n\n/**\n * Unsafely promote a string to a TrustedHTML, falling back to strings when\n * Trusted Types
are not available.\n * @security This is a security-sensitive function; any use of this function\n * must go through
security review. In particular, it must be assured that it\n * is only passed strings that come directly from custom
sanitizers or the\n * bypassSecurityTrust* functions.\n */\nexport function trustedHTMLFromStringBypass(html:
string): TrustedHTML|string {\n  return

```

```

    getPolicy()?.createHTML(html) || html;\n}\n\n/**\n * Unsafely promote a string to a TrustedScript, falling back to
strings when\n * Trusted Types are not available.\n * @security This is a security-sensitive function; any use of this
function\n * must go through security review. In particular, it must be assured that it\n * is only passed strings that
come directly from custom sanitizers or the\n * bypassSecurityTrust* functions.\n */\nexport function

```

```

trustedScriptFromStringBypass(script: string): TrustedScript|string {\n  return getPolicy()?.createScript(script) ||
script;\n}\n\n/**\n * Unsafely promote a string to a TrustedScriptURL, falling back to strings\n * when Trusted
Types are not available.\n * @security This is a security-sensitive function; any use of this function\n * must go
through security review. In particular, it must be assured that it\n * is only passed strings that come directly from
custom sanitizers or the\n * bypassSecurityTrust* functions.\n */\nexport function

```

```

trustedScriptURLFromStringBypass(script: string): TrustedScriptURL|string {\n  return getPolicy()?.createScriptURL(
script) || script;\n}\n\n/**\n * Unsafely promote a string to a TrustedScriptURL, falling back to strings\n * when
Trusted Types are not available.\n * @security This is a security-sensitive function; any use of this function\n *
must go through security review. In particular, it must be assured that it\n * is only passed strings that come
directly from custom sanitizers or the\n * bypassSecurityTrust* functions.\n */\nexport function

```

```

trustedScriptURLFromStringBypass(script: string): TrustedScriptURL|string {\n  return getPolicy()?.createScriptURL(
script) || script;\n}\n\n/**\n * Unsafely promote a string to a TrustedScriptURL, falling back to strings\n * when
Trusted Types are not available.\n * @security This is a security-sensitive function; any use of this function\n *
must go through security review. In particular, it must be assured that it\n * is only passed strings that come
directly from custom sanitizers or the\n * bypassSecurityTrust* functions.\n */\nexport function

```

```

trustedScriptURLFromStringBypass(script: string): TrustedScriptURL|string {\n  return getPolicy()?.createScriptURL(
script) || script;\n}\n\n/**\n * Unsafely promote a string to a TrustedScriptURL, falling back to strings\n * when
Trusted Types are not available.\n * @security This is a security-sensitive function; any use of this function\n *
must go through security review. In particular, it must be assured that it\n * is only passed strings that come
directly from custom sanitizers or the\n * bypassSecurityTrust* functions.\n */\nexport function

```

```

trustedScriptURLFromStringBypass(url: string): TrustedScriptURL|string {\n return
getPolicy()?.createScriptURL(url) || url;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nexport const enum BypassType {\n Url = 'URL',\n Html = 'HTML',\n
ResourceUrl = 'ResourceURL',\n Script = 'Script',\n Style = 'Style',\n}\n\n/**\n * Marker interface for a value that's
safe to use in a particular context.\n *\n * @publicApi\n */\nexport interface SafeValue {} \n\n/**\n * Marker
interface for a value that's safe to use as HTML.\n *\n * @publicApi\n */\nexport interface SafeHtml extends
SafeValue {} \n\n/**\n * Marker interface for a value that's safe to use as style (CSS).\n *\n * @publicApi\n
*/\nexport interface SafeStyle extends SafeValue {} \n\n/**\n * Marker interface for a value that's safe to use as
JavaScript.\n *\n
* @publicApi\n */\nexport interface SafeScript extends SafeValue {} \n\n/**\n * Marker interface for a value that's
safe to use as a URL linking to a document.\n *\n * @publicApi\n */\nexport interface SafeUrl extends SafeValue
{} \n\n/**\n * Marker interface for a value that's safe to use as a URL to load executable code from.\n *\n *
@publicApi\n */\nexport interface SafeResourceUrl extends SafeValue {} \n\nabstract class SafeValueImpl
implements SafeValue {\n constructor(public changingThisBreaksApplicationSecurity: string) {} \n\n abstract
getTypeName(): string;\n\n toString() {\n return `SafeValue must use [property]=binding:
${this.changingThisBreaksApplicationSecurity}` +\n      ` (see https://g.co/ng/security#xss)`;\n }\n}\n\nclass
SafeHtmlImpl extends SafeValueImpl implements SafeHtml {\n override getTypeName() {\n return
BypassType.Html;\n }\n}\n\nclass SafeStyleImpl extends SafeValueImpl implements SafeStyle {\n override
getTypeName() {\n return BypassType.Style;\n
}\n}\n\nclass SafeScriptImpl extends SafeValueImpl implements SafeScript {\n override getTypeName() {\n
return BypassType.Script;\n }\n}\n\nclass SafeUrlImpl extends SafeValueImpl implements SafeUrl {\n override
getTypeName() {\n return BypassType.Url;\n }\n}\n\nclass SafeResourceUrlImpl extends SafeValueImpl
implements SafeResourceUrl {\n override getTypeName() {\n return BypassType.ResourceUrl;\n }\n}\n\nexport
function unwrapSafeValue(value: SafeValue): string;\nexport function unwrapSafeValue<T>(value: T): T;\nexport
function unwrapSafeValue<T>(value: T|SafeValue): T {\n return value instanceof SafeValueImpl ?
value.changingThisBreaksApplicationSecurity as any as T : \n      value as any as
T;\n}\n\nexport function allowSanitizationBypassAndThrow(\n value: any, type: BypassType.Html): value is
SafeHtml;\nexport function allowSanitizationBypassAndThrow(\n value: any, type: BypassType.ResourceUrl):
value is SafeResourceUrl;\nexport
function allowSanitizationBypassAndThrow(\n value: any, type: BypassType.Script): value is SafeScript;\nexport
function allowSanitizationBypassAndThrow(\n value: any, type: BypassType.Style): value is SafeStyle;\nexport
function allowSanitizationBypassAndThrow(value: any, type: BypassType.Url): value is SafeUrl;\nexport function
allowSanitizationBypassAndThrow(value: any, type: BypassType): boolean;\nexport function
allowSanitizationBypassAndThrow(value: any, type: BypassType): boolean {\n const actualType =
getSanitizationBypassType(value);\n if (actualType !== null && actualType !== type) {\n // Allow ResourceURLs
in URL contexts, they are strictly more trusted.\n if (actualType === BypassType.ResourceUrl && type ===
BypassType.Url) return true;\n throw new Error(\n `Required a safe ${type}, got a ${actualType}` (see
https://g.co/ng/security#xss)`);\n }\n return actualType === type;\n}\n\nexport function
getSanitizationBypassType(value: any): BypassType|null
{\n return value instanceof SafeValueImpl && value.getTypeName() as BypassType || null;\n}\n\n/**\n * Mark
`html` string as trusted.\n *\n * This function wraps the trusted string in `String` and brands it in a way which makes
it\n * recognizable to {@link htmlSanitizer} to be trusted implicitly.\n *\n * @param trustedHtml `html` string
which needs to be implicitly trusted.\n *\n * @returns a `html` which has been branded to be implicitly trusted.\n
*\n */\nexport function bypassSanitizationTrustHtml(trustedHtml: string): SafeHtml {\n return new
SafeHtmlImpl(trustedHtml);\n}\n\n/**\n * Mark `style` string as trusted.\n *\n * This function wraps the trusted string
in `String` and brands it in a way which makes it\n * recognizable to {@link styleSanitizer} to be trusted
implicitly.\n *\n * @param trustedStyle `style` string which needs to be implicitly trusted.\n *\n * @returns a `style`

```

```

hich has been branded to be implicitly trusted.\n */\nexport function bypassSanitizationTrustStyle(trustedStyle:
  string): SafeStyle {\n  return new SafeStyleImpl(trustedStyle);\n}\n/**\n * Mark `script` string as trusted.\n *\n * This function wraps the trusted string in `String` and brands it in a way which makes it recognizable to {@link
  scriptSanitizer} to be trusted implicitly.\n *\n * @param trustedScript `script` string which needs to be implicitly
  trusted.\n * @returns a `script` which has been branded to be implicitly trusted.\n */\nexport function
  bypassSanitizationTrustScript(trustedScript: string): SafeScript {\n  return new
  SafeScriptImpl(trustedScript);\n}\n/**\n * Mark `url` string as trusted.\n *\n * This function wraps the trusted string
  in `String` and brands it in a way which makes it recognizable to {@link urlSanitizer} to be trusted implicitly.\n
  *\n * @param trustedUrl `url` string which needs to be implicitly trusted.\n * @returns a `url` which has been
  branded to be implicitly trusted.\n */\nexport function bypassSanitizationTrustUrl(trustedUrl: string): SafeUrl
  {\n  return new SafeUrlImpl(trustedUrl);\n}\n/**\n * Mark `url` string as trusted.\n *\n * This function wraps the
  trusted string in `String` and brands it in a way which makes it recognizable to {@link resourceUrlSanitizer} to
  be trusted implicitly.\n *\n * @param trustedResourceUrl `url` string which needs to be implicitly trusted.\n *
  @returns a `url` which has been branded to be implicitly trusted.\n */\nexport function
  bypassSanitizationTrustResourceUrl(trustedResourceUrl: string): SafeResourceUrl {\n  return new
  SafeResourceUrlImpl(trustedResourceUrl);\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
  Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be found in the
  LICENSE file at https://angular.io/license\n */\n\nimport { trustedHTMLFromString } from
  './util/security/trusted_types';\n\n/**\n * This helper is used to get hold of an inert tree of DOM elements containing
  dirty HTML that needs sanitizing. Depending
  upon browser support we use one of two strategies for doing this. Default: DOMParser strategy Fallback:
  InertDocument strategy\n */\nexport function getInertBodyHelper(defaultDoc: Document): InertBodyHelper {\n
  const inertDocumentHelper = new InertDocumentHelper(defaultDoc);\n  return isDOMParserAvailable() ? new
  DOMParserHelper(inertDocumentHelper) : inertDocumentHelper;\n}\n\nexport interface InertBodyHelper {\n
  /**\n * Get an inert DOM element containing DOM created from the dirty HTML string provided.\n *\n
  getInertBodyElement: (html: string) => HTMLElement | null;\n}\n\n/**\n * Uses DOMParser to create and fill an
  inert body element. This is the default strategy used in browsers that support it.\n *\n\nclass DOMParserHelper
  implements InertBodyHelper {\n  constructor(private inertDocumentHelper: InertBodyHelper) {}\n\n  getInertBodyElement(html: string): HTMLElement | null {\n    // We add these extra elements to ensure that the rest
    of the content is parsed as expected\n\n    // e.g. leading whitespace is maintained and tags like `<meta>` do not get hoisted to the `<head>` tag. Note
    that the `<body>` tag is closed implicitly to prevent unclosed tags\n    // in `html` from consuming the otherwise
    explicit `</body>` tag.\n    html = '<body><remove></remove>' + html;\n    try {\n      const body = new
      window.DOMParser().parseFromString(trustedHTMLFromString(html) as string, 'text/html')\n      .body as HTMLBodyElement;\n      if (body === null) {\n        // In some browsers (e.g. Mozilla/5.0 iPad
        AppleWebKit Mobile) the `body` property only becomes available in the following tick of the JS engine. In
        that case we fall back to the `inertDocumentHelper` instead.\n        return
        this.inertDocumentHelper.getInertBodyElement(html);\n      }\n      body.removeChild(body.firstChild!);\n      return
      body;\n    } catch {\n      return null;\n    }\n  }\n\n  /**\n * Use an HTML5 `template`
  element, if supported, or an inert body element created via `createHtmlDocument` to create and fill an inert
  DOM element. This is the fallback strategy if the browser does not support DOMParser.\n *\n\nclass
  InertDocumentHelper implements InertBodyHelper {\n  private inertDocument: Document;\n\n  constructor(private
  defaultDoc: Document) {\n    this.inertDocument =
    this.defaultDoc.implementation.createHTMLDocument('sanitization-inert');\n\n    if (this.inertDocument.body ==
    null) {\n      // usually there should be only one body element in the document, but IE doesn't have any, so we
      need to create one.\n      const inertHtml = this.inertDocument.createElement('html');\n      this.inertDocument.appendChild(inertHtml);\n      const inertBodyElement =
      this.inertDocument.createElement('body');\n      inertHtml.appendChild(inertBodyElement);\n    }\n  }\n}

```

```

getInertBodyElement(html: string): HTMLElement|null {\n // Prefer using <template> element if supported.\n
  const templateEl = this.inertDocument.createElement('template');\n  if ('content' in templateEl) {\n
    templateEl.innerHTML = trustedHTMLFromString(html) as string;\n    return templateEl;\n  }\n\n // Note that
previously we used to do something like `this.inertDocument.body.innerHTML = html`\n // and we returned the
inert `body` node. This was changed, because IE seems to treat setting\n // `innerHTML` on an inserted element
differently, compared to one that hasn't been inserted\n // yet. In particular, IE appears to split some of the text into
multiple text nodes rather\n // than keeping them in a single one which ends up messing with Ivy's i18n parsing
further\n // down the line. This has been worked around by creating a new inert `body` and using it as\n // the
root node in which we insert the HTML.\n  const inertBody = this.inertDocument.createElement('body');\n
inertBody.innerHTML = trustedHTMLFromString(html) as string;\n\n // Support:
IE 11 only\n // strip custom-namespaced attributes on IE<=11\n  if ((this.defaultDoc as any).documentMode) {\n
  this.stripCustomNsAttrs(inertBody);\n  }\n\n  return inertBody;\n }\n\n /**\n * When IE11 comes across an
unknown namespaced attribute e.g. 'xlink:foo' it adds 'xmlns:ns1'\n * attribute to declare ns1 namespace and
prefixes the attribute with 'ns1' (e.g.\n * 'ns1:xlink:foo').\n * This is undesirable since we don't want to allow
any of these custom attributes. This method\n * strips them all.\n */\n private stripCustomNsAttrs(el: Element)
{\n  const elAttrs = el.attributes;\n  // loop backwards so that we can support removals.\n  for (let i =
elAttrs.length - 1; 0 < i; i--) {\n    const attrib = elAttrs.item(i);\n    const attrName = attrib!.name;\n    if
(attrName === 'xmlns:ns1' || attrName.indexOf('ns1:') === 0) {\n      el.removeAttribute(attrName);\n    }\n  }\n
  let childNode = el.firstChild as Node | null;\n  while
  (childNode) {\n    if (childNode.nodeType === Node.ELEMENT_NODE) this.stripCustomNsAttrs(childNode as
Element);\n    childNode = childNode.nextSibling;\n  }\n}\n\n/**\n * We need to determine whether the
DOMParser exists in the global context and\n * supports parsing HTML; HTML parsing support is not as wide as
other formats, see\n * https://developer.mozilla.org/en-US/docs/Web/API/DOMParser#Browser_compatibility.\n
*\n * @suppress {uselessCode}\n */\n export function isDOMParserAvailable() {\n  try {\n    return !!new
window.DOMParser().parseFromString(\n    trustedHTMLFromString("") as string, 'text/html');\n  } catch {\n
return false;\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n*\n */\n * A pattern that recognizes a commonly useful subset of URLs that are safe.\n *\n * This regular
expression
  matches a subset of URLs that will not cause script\n * execution if used in URL context within a HTML
document. Specifically, this\n * regular expression matches if (comment from here on and regex copied from\n *
Soy's EscapingConventions):\n * (1) Either an allowed protocol (http, https, mailto or ftp).\n * (2) or no protocol. A
protocol must be followed by a colon. The below\n * allows that by allowing colons only after one of the
characters [/?#].\n * A colon after a hash (#) must be in the fragment.\n * Otherwise, a colon after a (?) must be
in a query.\n * Otherwise, a colon after a single solidus (/) must be in a path.\n * Otherwise, a colon after a
double solidus (//) must be in the authority\n * (before port).\n *\n * The pattern disallows &, used in HTML
entity declarations before\n * one of the characters in [/?#]. This disallows HTML entities used in the\n * protocol
name, which should never happen, e.g. \"h&#116;tp\" for \"http\".\n * It also disallows
HTML entities in the first path part of a relative path,\n * e.g. \"foo&lt;bar/baz\". Our existing escaping functions
should not produce\n * that. More importantly, it disallows masking of a colon,\n * e.g. \"javascript&#58;...\".\n
*\n * This regular expression was taken from the Closure sanitization library.\n */\n const SAFE_URL_PATTERN =
/^(?:(?:https?|mailto|data|ftp|tel|file|sms):|^&:[/?#]*(?:[/?#]?$))/gi;\n\nexport function _sanitizeUrl(url: string): string
{\n  url = String(url);\n  if (url.match(SAFE_URL_PATTERN)) return url;\n  if (typeof ngDevMode ===
'undefined' || ngDevMode) {\n    console.warn(`WARNING: sanitizing unsafe URL value ${url}` (see
https://g.co/ng/security#xss`));\n  }\n  return 'unsafe:' + url;\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\n\nimport { TrustedHTML } from
'./util/security/trusted_type_defs';\nimport

```



```

{trustedHTMLFromString} from './util/security/trusted_types';\n\nimport {getInertBodyHelper, InertBodyHelper}
from './inert_body';\nimport {_sanitizeUrl} from './url_sanitizer';\n\nfunction tagSet(tags: string): {[k: string]:
boolean} {\n  const res: {[k: string]: boolean} = {};\n  for (const t of tags.split(',')) res[t] = true;\n  return
res;\n}\n\nfunction merge(...sets: {[k: string]: boolean}[]): {[k: string]: boolean} {\n  const res: {[k: string]:
boolean} = {};\n  for (const s of sets) {\n    for (const v in s) {\n      if (s.hasOwnProperty(v)) res[v] = true;\n    }\n  }\n  return res;\n}\n\n// Good source of info about elements and attributes\n//
https://html.spec.whatwg.org/#semantics\n// https://simon.html5.org/html-elements\n\n// Safe Void Elements -
HTML5\n// https://html.spec.whatwg.org/#void-elements\nconst VOID_ELEMENTS =
tagSet('area,br,col,hr,img,wbr');\n\n// Elements that you can, intentionally, leave open (and which close
themselves)\n//
https://html.spec.whatwg.org/#optional-tags\nconst OPTIONAL_END_TAG_BLOCK_ELEMENTS =
tagSet('colgroup,dd,dt,li,p,tbody,td,tfoot,th,thead,tr');\nconst OPTIONAL_END_TAG_INLINE_ELEMENTS =
tagSet('rp,rt');\nconst OPTIONAL_END_TAG_ELEMENTS =\nmerge(OPTIONAL_END_TAG_INLINE_ELEMENTS, OPTIONAL_END_TAG_BLOCK_ELEMENTS);\n\n// Safe Block Elements - HTML5\nconst BLOCK_ELEMENTS = merge(\n
OPTIONAL_END_TAG_BLOCK_ELEMENTS,\n  tagSet(\n    'address,article,' +\n
'aside,blockquote,caption,center,del,details,dialog,dir,div,dl,figure,figcaption,footer,h1,h2,h3,h4,h5,' +\n
'h6,header,hgroup,hr,ins,main,map,menu,nav,ol,pre,section,summary,table,ul');\n\n// Inline Elements -
HTML5\nconst INLINE_ELEMENTS = merge(\n  OPTIONAL_END_TAG_INLINE_ELEMENTS,\n  tagSet(\n
    'a,abbr,acronym,audio,b,' +\n
'bdi,bdo,big,br,cite,code,del,dfn,em,font,i,img,ins,kbd,label,map,mark,picture,q,ruby,rp,rt,s,' +\n
'samp,small,source,span,strike,strong,sub,sup,time,track,tt,u,var,video');\n\nexport
const VALID_ELEMENTS =\n  merge(VOID_ELEMENTS, BLOCK_ELEMENTS, INLINE_ELEMENTS,
OPTIONAL_END_TAG_ELEMENTS);\n\n// Attributes that have href and hence need to be sanitized\nexport const
URI_ATTRS = tagSet('background,cite,href,itemtype,longdesc,poster,src,xlink:href');\n\nconst HTML_ATTRS =
tagSet(\n
'abbr,accesskey,align,alt,autoplay,axis,bgcolor,border,cellpadding,cellspacing,class,clear,color,cols,colspan,' +\n
'compact,controls,coords,datetime,default,dir,download,face,headers,height,hidden,hreflang,hspace,' +\n
'ismap,itemscope,itemprop,kind,label,lang,language,loop,media,muted,nohref,nowrap,open,preload,rel,rev,role,rows
,rowspan,rules,' +\n
'scope,scrolling,shape,size,sizes,span,srclang,srcset,start,summary,tabindex,target,title,translate,type,usemap,' +\n
'valign,value,vspace,width');\n\n// Accessibility attributes as per WAI-ARIA 1.1 (W3C Working Draft 14 December
2018)\nconst ARIA_ATTRS = tagSet(\n  'aria-activedescendant,aria-atomic,aria-autocomplete,aria-busy,aria-
checked,aria-colcount,aria-colindex,'
+\n  'aria-colspan,aria-controls,aria-current,aria-describedby,aria-details,aria-disabled,aria-dropeffect,' +\n
'aria-errormessage,aria-expanded,aria-flowto,aria-grabbed,aria-haspopup,aria-hidden,aria-invalid,' +\n
'aria-keyshortcuts,aria-label,aria-labelledby,aria-level,aria-live,aria-modal,aria-multiline,' +\n
'aria-multiselectable,aria-orientation,aria-owns,aria-placeholder,aria-posinset,aria-pressed,aria-readonly,' +\n
'aria-relevant,aria-required,aria-roledescription,aria-rowcount,aria-rowindex,aria-rowspan,aria-selected,' +\n
'aria-setsize,aria-sort,aria-valuemax,aria-valuemin,aria-valuenow,aria-valuetext');\n\n// NB: This currently consciously doesn't
support SVG. SVG sanitization has had several security\n// issues in the past, so it seems safer to leave it out if
possible. If support for binding SVG via\n// innerHTML is required, SVG attributes should be added here.\n\n// NB:
Sanitization does
not allow <form> elements or other active elements (<button> etc). Those\n// can be sanitized, but they increase
security surface area without a legitimate use case, so they\n// are left out here.\n\nexport const VALID_ATTRS =
merge(URI_ATTRS, HTML_ATTRS, ARIA_ATTRS);\n\n// Elements whose content should not be
traversed/preserved, if the elements themselves are invalid.\n\n// Typically, `

```

```

some elements, though, we don't want to preserve the content, if the elements themselves are going to be
removed.
const SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS =
tagSet('script,style,template');
/**
 * SanitizingHtmlSerializer serializes a DOM fragment, stripping out any
 unsafe elements and unsafe attributes.
 */
class SanitizingHtmlSerializer {
 // Explicitly track if something
 was stripped, to avoid accidentally warning of sanitization
 just
 // because characters were re-encoded.
 public sanitizedSomething = false;
 private buf: string[] = [];

 sanitizeChildren(el: Element): string {
 // This cannot use a TreeWalker, as it has to run on Angular's various
 DOM adapters.
 // However this code never accesses properties off of `document` before deleting its contents
 // again, so it shouldn't be vulnerable to DOM clobbering.
 let current: Node = el.firstChild!;
 let
 traverseContent = true;
 while (current) {
 if (current.nodeType === Node.ELEMENT_NODE) {
 traverseContent = this.startElement(current as Element);
 } else if (current.nodeType === Node.TEXT_NODE) {
 this.chars(current.nodeValue!);
 } else {
 // Strip non-element, non-text nodes.
 this.sanitizedSomething = true;
 }
 if (traverseContent && current.firstChild) {
 current =
 current.firstChild!;
 continue;
 }
 while (current) {
 // Leaving the element. Walk up and to the right, closing tags as we go.
 if (current.nodeType ===
 Node.ELEMENT_NODE) {
 this.endElement(current as Element);
 }
 let next =
 this.checkClobberedElement(current, current.nextSibling!);
 if (next) {
 current = next;
 break;
 }
 current = this.checkClobberedElement(current, current.parentNode!);
 }
 return
 this.buf.join("");
 }
 /**
 * Sanitizes an opening element tag (if valid) and returns whether the element's
 contents should
 * be traversed. Element content must always be traversed (even if the element itself is not
 * valid/safe), unless the element is one of `SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS`.
 *
 * @param element The element to sanitize.
 * @return True if the element's contents should be traversed.
 */
 private startElement(element: Element): boolean {
 const tagName = element.nodeName.toLowerCase();
 if (!VALID_ELEMENTS.hasOwnProperty(tagName)) {
 this.sanitizedSomething = true;
 return
 !SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS.hasOwnProperty(tagName);
 }
 this.buf.push('<');
 this.buf.push(tagName);
 const elAttrs = element.attributes;
 for (let i = 0; i <
 elAttrs.length; i++) {
 const elAttr = elAttrs.item(i);
 const attrName = elAttr!.name;
 const lower =
 attrName.toLowerCase();
 if (!VALID_ATTRS.hasOwnProperty(lower)) {
 this.sanitizedSomething =
 true;
 continue;
 }
 let value = elAttr!.value;
 // TODO(martinprobst): Special case image URIs for
 data:image/...
 if (URI_ATTRS[lower]) value = _sanitizeUrl(value);
 this.buf.push(' ', attrName, '=',
 encodeEntities(value), '"');
 }
 this.buf.push('>');
 return true;
 }
 private endElement(current:
 Element) {
 const tagName = current.nodeName.toLowerCase();
 if
 (VALID_ELEMENTS.hasOwnProperty(tagName)
 && !VOID_ELEMENTS.hasOwnProperty(tagName)) {
 this.buf.push('</');
 this.buf.push(tagName);
 this.buf.push('>');
 }
 }
 private chars(chars: string) {
 this.buf.push(encodeEntities(chars));
 }
 checkClobberedElement(node: Node, nextNode: Node): Node {
 if (nextNode &&
 (node.compareDocumentPosition(nextNode) &
 Node.DOCUMENT_POSITION_CONTAINED_BY)
 === Node.DOCUMENT_POSITION_CONTAINED_BY) {
 throw new Error(`Failed to sanitize html because
 the element is clobbered: ${
 (node as Element).outerHTML}`);
 }
 return nextNode;
 }
}
//
Regular Expressions for parsing tags and attributes
const SURROGATE_PAIR_REGEXP = /[\uD800-
\uDBFF][\uDC00-\uDFFF]/g;
// ! to ~ is the ASCII range.
const NON_ALPHANUMERIC_REGEXP = /([^\#\#-
~!])/g;
/**
 * Escapes all potentially dangerous characters, so that the
 * resulting string can be safely inserted
 into attribute or
 * element text.
 */
@param
value
 */
function encodeEntities(value: string) {
return value.replace(/&/g, '&amp;')
.replace(\n
SURROGATE_PAIR_REGEXP,
function(match: string) {
const hi = match.charCodeAt(0);
const low = match.charCodeAt(1);
return '&#x' + (((hi - 0xD800) * 0x400) + (low - 0xDC00) + 0x10000) +
';';
})
.replace(\n
NON_ALPHANUMERIC_REGEXP,
function(match: string) {
return '&#x' + match.charCodeAt(0) + ';';
})
.replace(/</g, '&lt;');
.replace(/>/g, '&gt;');
}
}

```

```

inertBodyHelper: InertBodyHelper;\n\n/**\n * Sanitizes the given unsafe, untrusted HTML fragment, and returns
HTML text that is safe to add to\n * the DOM in a browser environment.\n */\nexport function
_sanitizeHtml(defaultDoc: any, unsafeHtmlInput: string): TrustedHTML|string {\n  let inertBodyElement:
HTMLElement|null = null;\n  try {\n    inertBodyHelper = inertBodyHelper || getInertBodyHelper(defaultDoc);\n
    // Make sure unsafeHtml is actually a string (TypeScript types are not enforced at runtime).\n    let unsafeHtml =
unsafeHtmlInput ? String(unsafeHtmlInput) : '';\n    inertBodyElement =
inertBodyHelper.getInertBodyElement(unsafeHtml);\n\n    // mXSS protection. Repeatedly parse the document to
make sure it stabilizes, so that a browser\n    // trying to auto-correct incorrect HTML cannot cause formerly inert
HTML to become dangerous.\n    let mXSSAttempts = 5;\n    let parsedHtml = unsafeHtml;\n\n    do {\n      if
(mXSSAttempts === 0) {\n        throw new Error('Failed to sanitize html because the input is unstable');\n      }\n
mXSSAttempts--;\n      unsafeHtml = parsedHtml;\n      parsedHtml = inertBodyElement!.innerHTML;\n      inertBodyElement = inertBodyHelper.getInertBodyElement(unsafeHtml);\n    } while (unsafeHtml !==
parsedHtml);\n\n    const sanitizer = new SanitizingHtmlSerializer();\n    const safeHtml =
sanitizer.sanitizeChildren(\n      getTemplateContent(inertBodyElement!)
as Element | InertBodyElement);\n    if ((typeof ngDevMode === 'undefined' || ngDevMode) &&
sanitizer.sanitizedSomething) {\n      console.warn(\n        'WARNING: sanitizing HTML stripped some content,
see https://g.co/ng/security#xss');\n    }\n\n    return trustedHTMLFromString(safeHtml);\n  } finally {\n    // In case
anything goes wrong, clear out inertElement to reset the entire DOM structure.\n    if (inertBodyElement) {\n
const parent = getTemplateContent(inertBodyElement) | InertBodyElement;\n    while (parent.firstChild) {\n
parent.removeChild(parent.firstChild);\n    }\n  }\n}\n}\n\nexport function getTemplateContent(el: Node):
Node|null {\n  return 'content' in (el as any /** Microsoft/TypeScript#21517 */) && isTemplateElement(el) ?\n
el.content :\n  null;\n}\n\nfunction isTemplateElement(el: Node): el is HTMLTemplateElement {\n  return
el.nodeType === Node.ELEMENT_NODE && el.nodeName === 'TEMPLATE';\n}\n\n", /***\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\n/**\n * A
SecurityContext marks a location that has dangerous security implications, e.g. a DOM property\n * like
`innerHTML` that could cause Cross Site Scripting (XSS) security bugs when improperly\n * handled.\n * \n * See
DomSanitizer for more details on security in Angular applications.\n * \n * @publicApi\n */\nexport enum
SecurityContext {\n  NONE = 0,\n  HTML = 1,\n  STYLE = 2,\n  SCRIPT = 3,\n  URL = 4,\n  RESOURCE_URL =
5,\n}\n\n", /***\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *
\n\nimport { RuntimeError, RuntimeErrorCode } from './errors';\nimport { getDocument } from
'./render3/interfaces/document';\nimport { SANITIZER }
from './render3/interfaces/view';\nimport { getLView } from './render3/state';\nimport { renderStringify } from
'./render3/util/stringify_utils';\nimport { TrustedHTML, TrustedScript, TrustedScriptURL } from
'./util/security/trusted_type_defs';\nimport { trustedHTMLFromString, trustedScriptURLFromString } from
'./util/security/trusted_types';\nimport { trustedHTMLFromStringBypass, trustedScriptFromStringBypass,
trustedScriptURLFromStringBypass } from './util/security/trusted_types_bypass';\nimport
{ allowSanitizationBypassAndThrow, BypassType, unwrapSafeValue } from './bypass';\nimport { _sanitizeHtml as
_sanitizeHtml } from './html_sanitizer';\nimport { Sanitizer } from './sanitizer';\nimport { SecurityContext } from
'./security';\nimport { _sanitizeUrl as _sanitizeUrl } from './url_sanitizer';\n\n\n/**\n * An `html` sanitizer which
converts untrusted `html` **string** into trusted string by removing\n * dangerous content.\n * \n * This method
parses the `html` and locates potentially dangerous
content (such as urls and\n * javascript) and removes it.\n * \n * It is possible to mark a string as trusted by calling
{@link bypassSanitizationTrustHtml}.\n * \n * @param unsafeHtml untrusted `html`, typically from the user.\n *
@returns `html` string which is safe to display to user, because all of the dangerous javascript\n * and urls have been
removed.\n * \n * @codeGenApi\n */\nexport function sanitizeHtml(unsafeHtml: any): TrustedHTML|string {\n
const sanitizer = getSanitizer();\n  if (sanitizer) {\n    return

```

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trustedHTMLFromStringBypass(sanitizer.sanitize(SecurityContext.HTML, unsafeHtml) || "");\n }\n if
(allowSanitizationBypassAndThrow(unsafeHtml, BypassType.Html)) {\n return
trustedHTMLFromStringBypass(unwrapSafeValue(unsafeHtml));\n }\n return _sanitizeHtml(getDocument(),
renderStringify(unsafeHtml));\n}\n\n/**\n * A `style` sanitizer which converts untrusted `style` **string** into
trusted string by removing\n * dangerous content.\n *\n * It is possible to mark a
string as trusted by calling { @link bypassSanitizationTrustStyle}.\n *\n * @param unsafeStyle untrusted `style`,
typically from the user.\n * @returns `style` string which is safe to bind to the `style` properties.\n *\n *
@codeGenApi\n * ^\nexport function sanitizeStyle(unsafeStyle: any): string {\n const sanitizer = getSanitizer();\n if
(sanitizer) {\n return sanitizer.sanitize(SecurityContext.STYLE, unsafeStyle) || "";}\n }\n if
(allowSanitizationBypassAndThrow(unsafeStyle, BypassType.Style)) {\n return unwrapSafeValue(unsafeStyle);\n
}\n return renderStringify(unsafeStyle);\n}\n\n/**\n * A `url` sanitizer which converts untrusted `url` **string**
into trusted string by removing\n * dangerous\n * content.\n *\n * This method parses the `url` and locates
potentially dangerous content (such as javascript) and\n * removes it.\n *\n * It is possible to mark a string as trusted
by calling { @link bypassSanitizationTrustUrl}.\n *\n * @param unsafeUrl untrusted `url`, typically
from the user.\n * @returns `url` string which is safe to bind to the `src` properties such as `

```

```
with a `raw` property that is also an array. The associated\n // template literal has no interpolation if and only if the
length of the\n // TemplateStringsArray is 1.\n if (ngDevMode && (!Array.isArray(html) ||
!Array.isArray(html.raw) || html.length !== 1)) {\n   throw new Error(`Unexpected interpolation in trusted HTML
constant: ${html.join('?')}`);\n } \n return trustedHTMLFromString(html[0]);\n}\n\n/**\n * A template tag function
for promoting the associated constant literal to a\n * TrustedScriptURL. Interpolation is explicitly not allowed.\n
*\n * @param url constant template literal containing a trusted script URL.\n * @returns TrustedScriptURL
wrapping `url`. \n *\n * @security This is a security-sensitive function and should only be used to\n * convert
constant values of attributes and properties found in\n * application-provided Angular templates to
TrustedScriptURL.\n *\n * @codeGenApi\n */\n\nexport function trustConstantResourceUrl(url:
TemplateStringsArray): TrustedScriptURL|string {\n // The following runtime check ensures that the function was
called as a\n // template tag (e.g. trustConstantResourceUrl`content`), without any\n // interpolation (e.g. not
trustConstantResourceUrl`content ${variable}`). A\n // TemplateStringsArray is an array with a `raw` property that
is also an\n // array. The associated template literal has no interpolation if and only if\n // the length of the
TemplateStringsArray is 1.\n if (ngDevMode && (!Array.isArray(url) || !Array.isArray(url.raw) || url.length !== 1))
{\n
  throw new Error(`Unexpected interpolation in trusted URL constant: ${url.join('?')}`);\n } \n return
trustedScriptURLFromString(url[0]);\n}\n\n/**\n * Detects which sanitizer to use for URL property, based on tag
name and prop name.\n *\n * The rules are based on the RESOURCE_URL context config from\n *
`packages/compiler/src/schema/dom_security_schema.ts`. \n * If tag and prop names don't match Resource URL
schema, use URL sanitizer.\n */\n\nexport function getUrlSanitizer(tag: string, prop: string) {\n if ((prop === 'src'
&&\n   (tag === 'embed' || tag === 'frame' || tag === 'iframe' || tag === 'media' ||\n   tag === 'script')) ||\n (prop === 'href' && (tag === 'base' || tag === 'link'))) {\n   return sanitizeResourceUrl;\n } \n return
sanitizeUrl;\n}\n\n/**\n * Sanitizes URL, selecting sanitizer function based on tag and property names.\n *\n * This
function is used in case we can't define security context at compile time, when only prop\n * name is available.
This happens when we generate host bindings for Directives/Components. The\n * host element is unknown at
compile time, so we defer calculation of specific sanitizer to\n * runtime.\n *\n * @param unsafeUrl untrusted `url`,
typically from the user.\n * @param tag target element tag name.\n * @param prop name of the property that
contains the value.\n * @returns `url` string which is safe to bind.\n *\n * @codeGenApi\n */\n\nexport function
sanitizeUrlOrResourceUrl(unsafeUrl: any, tag: string, prop: string): any {\n return getUrlSanitizer(tag,
prop)(unsafeUrl);\n}\n\nexport function validateAgainstEventProperties(name: string) {\n if
(name.toLowerCase().startsWith('on')) {\n   const errorMessage =\n     `Binding to event property '${name}' is
disallowed for security reasons,`\n     +\n     `please use (${name.slice(2)})=...`;\n   +\n     `\\nIf '${name}' is a directive
input, make sure the directive is imported by the`\n     +\n     `current module.`;\n   throw new
RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING,\n     errorMessage);\n } \n}\n\nexport function validateAgainstEventAttributes(name: string) {\n if
(name.toLowerCase().startsWith('on')) {\n   const errorMessage =\n     `Binding to event attribute '${name}' is
disallowed for security reasons,`\n     +\n     `please use (${name.slice(2)})=...`;\n   throw new
RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING, errorMessage);\n } \n}\n\nfunction
getSanitizer(): Sanitizer|null {\n const IVIEW = getLView();\n return IVIEW && IVIEW[SAITIZER];\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {InjectionToken}
from './injection_token';\n\n/**\n * A multi-provider token for initialization functions that will run upon construction
of an\n * environment injector.\n *\n * @publicApi\n */\n\nexport const ENVIRONMENT_INITIALIZER = new
InjectionToken<()\n  => void>('ENVIRONMENT_INITIALIZER');\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {InjectionToken} from './injection_token';\nimport
{Injector} from './injector';\nimport {InjectorMarkers} from './injector_marker';\n\n\n/**\n * An InjectionToken
```

```

that gets the current `Injector` for `createInjector()`-style injectors.\n *\n * Requesting this token instead of `Injector`
allows `StaticInjector` to be tree-shaken from a\n *\n * project.\n *\n * @publicApi\n */\nexport const INJECTOR =
new InjectionToken<Injector>(\n  'INJECTOR',\n  // Disable tslint because this is const enum which gets inlined
not top level prop access.\n  // tslint:disable-next-line: no-toplevel-property-access\n  InjectorMarkers.Injector as
any, // Special value used by Ivy to identify `Injector`.\n);\n"/**\n *\n * @license\n *\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n *\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Type} from
'./interface/type';\n\nimport {InjectionToken} from './injection_token';\n\nexport const INJECTOR_DEF_TYPES =
new InjectionToken<Type<unknown>>('INJECTOR_DEF_TYPES');\n"/**\n *\n * @license\n *\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n *\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {stringify} from './util/stringify';\n\nimport {Injector}
from './injector';\n\nimport {THROW_IF_NOT_FOUND} from './injector_compatibility';\n\nexport class NullInjector
implements Injector {\n  get(token: any, notFoundValue: any = THROW_IF_NOT_FOUND): any {\n    if
(notFoundValue === THROW_IF_NOT_FOUND) {\n      const error = new Error(`NullInjectorError: No provider
for ${stringify(token)}!`);\n      error.name = 'NullInjectorError';\n      throw error;\n    }\n    return notFoundValue;\n  }\n}\n"/**\n *\n * @license\n *\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n *\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport {EMPTY_ARRAY} from
'./util/empty';\n"/**\n *\n * @license\n *\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n *\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {RuntimeError, RuntimeErrorCode} from './errors';\n\nimport {Type} from './interface/type';\n\nimport
{getComponentDef} from './render3/definition';\n\nimport {getFactoryDef} from
'./render3/definition_factory';\n\nimport {throwCyclicDependencyError, throwInvalidProviderError} from
'./render3/errors_di';\n\nimport {stringifyForError} from './render3/util/stringify_utils';\n\nimport {deepForEach} from
'./util/array_utils';\n\nimport
{getClosureSafeProperty} from './util/property';\n\nimport {stringify} from './util/stringify';\n\nimport
{EMPTY_ARRAY} from './view';\n\nimport {resolveForwardRef} from './forward_ref';\n\nimport
{ENVIRONMENT_INITIALIZER} from './initializer_token';\n\nimport {inject as inject} from
'./injector_compatibility';\n\nimport {getInjectorDef, InjectorType, InjectorTypeWithProviders} from
'./interface/defs';\n\nimport {ClassProvider, ConstructorProvider, ExistingProvider, FactoryProvider,
ImportedNgModuleProviders, ModuleWithProviders, Provider, StaticClassProvider, TypeProvider, ValueProvider}
from './interface/provider';\n\nimport {INJECTOR_DEF_TYPES} from './internal_tokens';\n\n/**\n *\n * A source of
providers for the `importProvidersFrom` function.\n *\n * @developerPreview\n *\n * @publicApi\n */\nexport type
ImportProvidersSource =\n\nType<unknown>|ModuleWithProviders<unknown>|Array<ImportProvidersSource>;\n\n/**\n *\n * Collects providers
from all NgModules and standalone components, including
transitively imported\n *\n * ones.\n *\n * Providers extracted via `importProvidersFrom` are only usable in an
application injector or\n *\n * another environment injector (such as a route injector). They should not be used in
component\n *\n * providers.\n *\n * More information about standalone components can be found in [this\n *\n * guide](guide/standalone-components).\n *\n * @usageNotes\n *\n * The results of the `importProvidersFrom` call can
be used in the `bootstrapApplication` call:\n *\n * ```typescript\n * await bootstrapApplication(RootComponent, {\n
*\n * providers: [\n *\n * importProvidersFrom(NgModuleOne, NgModuleTwo)\n *\n * ],\n *\n * });\n *\n * ```\n *\n * You can
also use the `importProvidersFrom` results in the `providers` field of a route, when a\n *\n * standalone component is
used:\n *\n * ```typescript\n * export const ROUTES: Route[] = [\n *\n * {\n *\n * path: 'foo',\n *\n * providers: [\n *\n
importProvidersFrom(NgModuleOne, NgModuleTwo)\n *\n * ],\n *\n * component: YourStandaloneComponent\n
*\n * }\n *\n * ];\n *\n * ```\n *\n * @returns Collected providers from the specified list of types.\n *\n * @publicApi\n *\n * @developerPreview\n */\nexport function importProvidersFrom(...sources: ImportProvidersSource[]):\n\nImportedNgModuleProviders {\n  return {providers: internalImportProvidersFrom(true, sources)};\n}\n\nexport

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function internalImportProvidersFrom(\n  checkForStandaloneCmp: boolean, ...sources: ImportProvidersSource[]):
Provider[] {\n  const providersOut: SingleProvider[] = [];\n  const dedup = new Set<Type<unknown>>(); // already
seen types\n  let injectorTypesWithProviders: InjectorTypeWithProviders<unknown>[]|undefined;\n
deepForEach(sources, source => {\n  if ((typeof ngDevMode === 'undefined' || ngDevMode) &&
checkForStandaloneCmp) {\n  const cmpDef = getComponentDef(source);\n  if (cmpDef?.standalone) {\n
throw new RuntimeError(\n    RuntimeErrorCode.IMPORT_PROVIDERS_FROM_STANDALONE,\n
`Importing providers supports NgModule or
ModuleWithProviders but got a standalone component "${\n    stringifyForError(source)}");\n  }\n
}\n\n  // Narrow `source` to access the internal type analogue for `ModuleWithProviders`.\n  const internalSource
= source as Type<unknown>| InjectorTypeWithProviders<unknown>;\n  if (walkProviderTree(internalSource,
providersOut, [], dedup)) {\n  injectorTypesWithProviders ||= [];\n
injectorTypesWithProviders.push(internalSource);\n  }\n  });\n  // Collect all providers from
`ModuleWithProviders` types.\n  if (injectorTypesWithProviders !== undefined) {\n
processInjectorTypesWithProviders(injectorTypesWithProviders, providersOut);\n  }\n\n  return
providersOut;\n}\n\n/**\n * Collects all providers from the list of `ModuleWithProviders` and appends them to the
provided\n * array.\n */\nfunction processInjectorTypesWithProviders(\n  typesWithProviders:
InjectorTypeWithProviders<unknown>[], providersOut: Provider[]): void {\n  for (let i = 0; i <
typesWithProviders.length;
i++) {\n  const {ngModule, providers} = typesWithProviders[i];\n  deepForEach(providers!, provider => {\n
ngDevMode && validateProvider(provider, providers || EMPTY_ARRAY, ngModule);\n
providersOut.push(provider);\n  });\n  }\n}\n\n/**\n * Internal type for a single provider in a deep provider array.\n
*/\nexport type SingleProvider = TypeProvider|ValueProvider|ClassProvider|ConstructorProvider|\n
ExistingProvider|FactoryProvider|StaticClassProvider;\n\n/**\n * The logic visits an `InjectorType`, an
`InjectorTypeWithProviders`, or a standalone\n * `ComponentType`, and all of its transitive providers and collects
providers.\n * If an `InjectorTypeWithProviders` that declares providers besides the type is specified,\n * the
function will return "true" to indicate that the providers of the type definition need\n * to be processed. This allows
us to process providers of injector types after all imports of\n * an injector definition are processed.
(following View Engine semantics: see FW-1349)\n */\nexport function walkProviderTree(\n  container:
Type<unknown>|InjectorTypeWithProviders<unknown>, providersOut: SingleProvider[],\n  parents:
Type<unknown>[],\n  dedup: Set<Type<unknown>>): container is InjectorTypeWithProviders<unknown> {\n
container = resolveForwardRef(container);\n  if (!container) return false;\n\n  // The actual type which had the
definition. Usually `container`, but may be an unwrapped type\n  // from `InjectorTypeWithProviders`.\n  let
defType: Type<unknown>|null = null;\n\n  let injDef = getInjectorDef(container);\n  const cmpDef = !injDef &&
getComponentDef(container);\n  if (!injDef && !cmpDef) {\n  // `container` is not an injector type or a component
type. It might be:\n  // * An `InjectorTypeWithProviders` that wraps an injector type.\n  // * A standalone
directive or pipe that got pulled in from a standalone component's\n  // dependencies.\n  // Try to unwrap it as an
`InjectorTypeWithProviders`
first.\n  const ngModule: Type<unknown>|undefined =\n    (container as
InjectorTypeWithProviders<any>).ngModule as Type<unknown>|undefined;\n  injDef =
getInjectorDef(ngModule);\n  if (injDef) {\n  defType = ngModule!;\n  } else {\n  // Not a component or
injector type, so ignore it.\n  return false;\n  }\n  } else if (cmpDef && !cmpDef.standalone) {\n  return false;\n
} else {\n  defType = container as Type<unknown>;\n  }\n\n  // Check for circular dependencies.\n  if (ngDevMode
&& parents.indexOf(defType) !== -1) {\n  const defName = stringify(defType);\n  const path =
parents.map(stringify);\n  throwCyclicDependencyError(defName, path);\n  }\n\n  // Check for multiple imports of
the same module\n  const isDuplicate = dedup.has(defType);\n  if (cmpDef) {\n  if (isDuplicate) {\n  // This
component definition has already been processed.\n  return false;\n  }\n  dedup.add(defType);\n  if
(cmpDef.dependencies)

```

```

{\n  const deps =\n    typeof cmpDef.dependencies === 'function' ? cmpDef.dependencies() :
cmpDef.dependencies;\n  for (const dep of deps) {\n    walkProviderTree(dep, providersOut, parents, dedup);\n  }\n } else if (injDef) {\n  // First, include providers from any imports.\n  if (injDef.imports != null &&
!isDuplicate) {\n    // Before processing defType's imports, add it to the set of parents. This way, if it ends\n    //
up deeply importing itself, this can be detected.\n    ngDevMode && parents.push(defType);\n    // Add it to the
set of dedups. This way we can detect multiple imports of the same module\n    dedup.add(defType);\n\n    let
importTypesWithProviders: (InjectorTypeWithProviders<any>[])|undefined;\n    try {\n
deepForEach(injDef.imports, imported => {\n    if (walkProviderTree(imported, providersOut, parents, dedup))
{\n      importTypesWithProviders ||= [];\n      // If the processed import is
an injector type with providers, we store it in the\n      // list of import types with providers, so that we can
process those afterwards.\n      importTypesWithProviders.push(imported);\n    }\n  });\n } finally {\n
  // Remove it from the parents set when finished.\n  ngDevMode && parents.pop();\n }\n\n // Imports
which are declared with providers (TypeWithProviders) need to be processed\n // after all imported modules are
processed. This is similar to how View Engine\n // processes/merges module imports in the metadata resolver.
See: FW-1349.\n  if (importTypesWithProviders !== undefined) {\n
processInjectorTypesWithProviders(importTypesWithProviders, providersOut);\n  }\n }\n\n if (!isDuplicate)
{\n  // Track the InjectorType and add a provider for it.\n  // It's important that this is done after the def's
imports.\n  const factory = getFactoryDef(defType) || (() => new defType!());\n\n  // Append extra providers to make more info available for consumers (to retrieve an injector\n  // type), as well
as internally (to calculate an injection scope correctly and eagerly\n  // instantiate a `defType` when an injector is
created).\n  providersOut.push(\n    // Provider to create `defType` using its factory.\n    {provide:
defType, useFactory: factory, deps: EMPTY_ARRAY},\n\n    // Make this `defType` available to an internal
logic that calculates injector scope.\n    {provide: INJECTOR_DEF_TYPES, useValue: defType, multi:
true},\n\n    // Provider to eagerly instantiate `defType` via `ENVIRONMENT_INITIALIZER`.\n
{provide: ENVIRONMENT_INITIALIZER, useValue: () => inject(defType!), multi: true} //\n  );\n }\n\n //
Next, include providers listed on the definition itself.\n  const defProviders = injDef.providers;\n  if (defProviders
!= null && !isDuplicate) {\n    const injectorType = container as InjectorType<any>;\n
    deepForEach(defProviders, provider => {\n      ngDevMode && validateProvider(provider, defProviders as
SingleProvider[], injectorType);\n      providersOut.push(provider);\n    });\n  }\n } else {\n  // Should not
happen, but just in case.\n  return false;\n }\n\n return (\n  defType !== container &&\n  (container as
InjectorTypeWithProviders<any>).providers !== undefined);\n}\n\nfunction validateProvider(\n  provider:
SingleProvider, providers: SingleProvider[], containerType: Type<unknown>): void {\n  if
(isTypeProvider(provider) || isValueProvider(provider) || isFactoryProvider(provider) ||\n
isExistingProvider(provider)) {\n    return;\n  }\n\n  // Here we expect the provider to be a `useClass` provider (by
elimination).\n  const classRef = resolveForwardRef(\n    provider && ((provider as StaticClassProvider |
ClassProvider).useClass || provider.provide));\n  if (!classRef) {\n    throwInvalidProviderError(containerType,
providers,
provider);\n  }\n}\n\nexport const USE_VALUE =\n  getClosureSafeProperty<ValueProvider>({provide: String,
useValue: getClosureSafeProperty});\n\nexport function isValueProvider(value: SingleProvider): value is
ValueProvider {\n  return value !== null && typeof value === 'object' && USE_VALUE in value;\n}\n\nexport
function isExistingProvider(value: SingleProvider): value is ExistingProvider {\n  return !!(value && (value as
ExistingProvider).useExisting);\n}\n\nexport function isFactoryProvider(value: SingleProvider): value is
FactoryProvider {\n  return !!(value && (value as FactoryProvider).useFactory);\n}\n\nexport function
isTypeProvider(value: SingleProvider): value is TypeProvider {\n  return typeof value === 'function';\n}\n\nexport
function isClassProvider(value: SingleProvider): value is ClassProvider {\n  return !!(value as StaticClassProvider |
ClassProvider).useClass;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of
this source code is governed

```



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```

import { InjectionToken } from './injection_token';
export type InjectorScope = 'root'|'platform'|'environment';
An internal token whose presence in an injector indicates that the injector should treat itself as a root scoped injector when processing requests for unknown tokens which may indicate they are provided in the root scope.
export const INJECTOR_SCOPE = new InjectionToken<InjectorScope|null>('Set Injector scope.');
```

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```

import { RuntimeError, RuntimeErrorCode } from './errors';
import { OnDestroy } from './interface/lifecycle_hooks';
import { Type } from './interface/type';
import { GetComponentDef } from './render3/definition';
import { FactoryFn, getFactoryDef } from './render3/definition_factory';
import { throwCyclicDependencyError, throwInvalidProviderError, throwMixedMultiProviderError } from './render3/errors_di';
import { newArray } from './util/array_utils';
import { EMPTY_ARRAY } from './util/empty';
import { stringify } from './util/stringify';
import { resolveForwardRef } from './forward_ref';
import { ENVIRONMENT_INITIALIZER } from './initializer_token';
import { setInjectImplementation } from './inject_switch';
import { InjectionToken } from './injection_token';
import { Injector } from './injector';
import { catchInjectorError, injectArgs, NG_TEMP_TOKEN_PATH, setCurrentInjector, THROW_IF_NOT_FOUND, inject } from './injector_compatibility';
import { INJECTOR } from './injector_token';
import { getInheritedInjectableDef, getInjectableDef, InjectorType, InjectableDeclaration } from './interface/defs';
import { InjectFlags } from './interface/injector';
import { ClassProvider, ConstructorProvider, ImportedNgModuleProviders, Provider, StaticClassProvider } from './interface/provider';
import { INJECTOR_DEF_TYPES } from './internal_tokens';
import { NullInjector } from './null_injector';
import { importProvidersFrom, isExistingProvider, isFactoryProvider, isTypeProvider, isValueProvider, SingleProvider } from './provider_collection';
import { ProviderToken } from './provider_token';
import { INJECTOR_SCOPE, InjectorScope } from './scope';
```

Marker which indicates that a value has not yet been created from the factory function.

```
const NOT_YET = {};
```

Marker which indicates that the factory function for a token is in the process of being called.

If the injector is asked to inject a token with its value set to CIRCULAR, that indicates injection of a dependency has recursively attempted to inject the original token, and there is a circular dependency among the providers.

```
const CIRCULAR = {};
```

A lazily initialized

```
NullInjector.
let NULL_INJECTOR: Injector|undefined = undefined;
export function getNullInjector(): Injector {
  if (NULL_INJECTOR === undefined) {
    NULL_INJECTOR = new NullInjector();
  }
  return NULL_INJECTOR;
}
```

An entry in the injector which tracks information about the given token, including a possible current value.

```
interface Record<T> {
  factory: (() => T)|undefined;
  value: T|{};
  multi: any[]|undefined;
}
```

An `Injector` that's part of the environment injector hierarchy, which exists outside of the component tree.

```
@developerPreview
export abstract class EnvironmentInjector implements Injector {
  /**
   * Retrieves an instance from the injector based on the provided token.
   * @returns The instance from the injector if defined, otherwise the `notFoundValue`.
   * @throws When the `notFoundValue` is `undefined` or `Injector.THROW_IF_NOT_FOUND`.
   */
  abstract get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T;
  /**
   * @deprecated from v4.0.0 use ProviderToken<T>
   * @suppress {duplicate}
   */
  abstract get(token: any, notFoundValue?: any): any;
  /**
   * Runs the given function in the context of this `EnvironmentInjector`.
   * Within the function's stack frame, `inject` can be used to inject dependencies from this injector. Note that `inject` is only usable synchronously, and cannot be used in any asynchronous callbacks or after any `await` points.
   * @param fn the closure to be run in the context of this injector
   * @returns the return value of the function, if any
   */
  abstract runInContext<ReturnT>(fn: () => ReturnT): ReturnT;
  abstract destroy(): void;
  /**
   * @internal
   */
  abstract onDestroy(callback: () => void): void;
}
```

```
export class R3Injector extends EnvironmentInjector {
  /**
   * Map of tokens to records which contain the instances of those tokens.
   * - `null` value

```

```

implies that we don't have the record. Used by tree-shakable injectors\n * to prevent further searches.\n *\nprivate records = new Map<ProviderToken<any>, Record<any>|null>();\n\n /**\n * Set of values instantiated by\n this injector which contain `ngOnDestroy` lifecycle hooks.\n *\n private _ngOnDestroyHooks = new\n Set<OnDestroy>();\n\n private _onDestroyHooks: Array<() => void> = [];\n\n /**\n * Flag indicating that this\n injector was previously destroyed.\n *\n get destroyed(): boolean {\n return this._destroyed;\n }\n\n private\n _destroyed = false;\n\n private injectorDefTypes: Set<Type<unknown>>;\n\n constructor(\n providers:\n Array<Provider|ImportedNgModuleProviders>, readonly parent: Injector,\n readonly source: string|null, readonly\n scopes: Set<InjectorScope>) {\n super();\n // Start off by creating Records for every provider.\n\n forEachSingleProvider(providers, provider => this.processProvider(provider));\n\n // Make sure the INJECTOR\n token provides this injector.\n this.records.set(INJECTOR, makeRecord(undefined, this));\n\n // And\n `EnvironmentInjector` if the current injector is supposed to be env-scoped.\n if (scopes.has('environment')) {\n this.records.set(EnvironmentInjector, makeRecord(undefined, this));\n }\n\n // Detect whether this injector has\n the APP_ROOT_SCOPE token and thus should provide\n // any injectable scoped to APP_ROOT_SCOPE.\n\n const record = this.records.get(INJECTOR_SCOPE) as Record<InjectorScope|null>;\n\n if (record != null &&\n typeof record.value === 'string') {\n this.scopes.add(record.value as InjectorScope);\n }\n\n this.injectorDefTypes =\n new Set(this.get(INJECTOR_DEF_TYPES.multi, EMPTY_ARRAY,\n InjectFlags.Self));\n\n /**\n * Destroy the injector and release references to every instance or provider\n associated with it.\n *\n * Also calls the `OnDestroy` lifecycle hooks of every instance that was created for which\n a\n * hook was\n found.\n *\n override destroy(): void {\n this.assertNotDestroyed();\n\n // Set destroyed = true first, in case\n lifecycle hooks re-enter destroy().\n this._destroyed = true;\n\n try {\n // Call all the lifecycle hooks.\n\n for\n (const service of this._ngOnDestroyHooks) {\n service.ngOnDestroy();\n }\n\n for (const hook of\n this._onDestroyHooks) {\n hook();\n }\n\n } finally {\n // Release all references.\n\n this.records.clear();\n this._ngOnDestroyHooks.clear();\n this.injectorDefTypes.clear();\n\n this._onDestroyHooks.length = 0;\n }\n\n\n override onDestroy(callback: () => void): void {\n this._onDestroyHooks.push(callback);\n }\n\n\n override runInContext<ReturnT>(fn: () => ReturnT): ReturnT {\n this.assertNotDestroyed();\n\n const previousInjector = setCurrentInjector(this);\n const\n previousInjectImplementation = setInjectImplementation(undefined);\n\n try {\n return fn();\n }\n finally\n {\n setCurrentInjector(previousInjector);\n setInjectImplementation(previousInjectImplementation);\n }\n\n\n override get<T>(\n token: ProviderToken<T>, notFoundValue: any = THROW_IF_NOT_FOUND,\n flags = InjectFlags.Default): T {\n this.assertNotDestroyed();\n // Set the injection context.\n\n const\n previousInjector = setCurrentInjector(this);\n const previousInjectImplementation =\n setInjectImplementation(undefined);\n\n try {\n // Check for the SkipSelf flag.\n\n if (!(flags &\n InjectFlags.SkipSelf)) {\n // SkipSelf isn't set, check if the record belongs to this injector.\n\n let record:\n Record<T>|undefined|null = this.records.get(token);\n\n if (record === undefined) {\n // No record, but\n maybe the token is scoped to this injector. Look for an injectable\n // def with a scope matching this injector.\n\n const def = couldBeInjectableType(token) && getInjectableDef(token);\n\n if (def &&\n this.injectableDefInScope(def))\n\n // Found an injectable def and it's scoped to this injector. Pretend as if it was here\n // all along.\n\n record = makeRecord(injectableDefOrInjectorDefFactory(token), NOT_YET);\n\n } else {\n record =\n null;\n }\n\n this.records.set(token, record);\n }\n\n // If a record was found, get the instance for it\n and return it.\n\n if (record != null /* NOT null || undefined */) {\n return this.hydrate(token, record);\n }\n\n }\n\n // Select the next injector based on the Self flag - if self is set, the next injector is\n // the\n NullInjector, otherwise it's the parent.\n\n const nextInjector = !(flags & InjectFlags.Self) ? this.parent :\n getNullInjector();\n\n // Set the notFoundValue based on the Optional flag - if optional is set and notFoundValue\n // is\n undefined, the value is null, otherwise it's the notFoundValue.\n\n notFoundValue =\n (flags & InjectFlags.Optional) && notFoundValue === THROW_IF_NOT_FOUND ?\n null :\n notFoundValue;\n\n return nextInjector.get(token, notFoundValue);\n } catch (e: any) {\n if (e.name ===

```

```

'NullInjectorError') {\n    const path: any[] = e[NG_TEMP_TOKEN_PATH] = e[NG_TEMP_TOKEN_PATH] ||
[];\n    path.unshift(stringify(token));\n    if (previousInjector) {\n        // We still have a parent injector, keep
throwing\n        throw e;\n    } else {\n        // Format & throw the final error message when we don't have any
previous injector\n        return catchInjectorError(e, token, 'R3InjectorError', this.source);\n    }\n    } else {\n
throw e;\n    }\n    } finally {\n        // Lastly, restore the previous injection context.\n
setInjectImplementation(previousInjectImplementation);\n    setCurrentInjector(previousInjector);\n    }\n    }\n\n
/** @internal */\n    resolveInjectorInitializers() {\n    const previousInjector
= setCurrentInjector(this);\n    const previousInjectImplementation = setInjectImplementation(undefined);\n    try
{\n    const initializers = this.get(ENVIRONMENT_INITIALIZER.multi, EMPTY_ARRAY, InjectFlags.Self);\n
if (ngDevMode && !Array.isArray(initializers)) {\n        throw new RuntimeError(\n
RuntimeErrorCode.INVALID_MULTI_PROVIDER,\n            'Unexpected type of the
`ENVIRONMENT_INITIALIZER` token value ' +\n                `(expected an array, but got ${typeof initializers}).`
+\n                'Please check that the `ENVIRONMENT_INITIALIZER` token is configured as a '+\n
`multi: true` provider.);\n    }\n    for (const initializer of initializers) {\n        initializer();\n    }\n    } finally {\n
setCurrentInjector(previousInjector);\n    setInjectImplementation(previousInjectImplementation);\n    }\n    }\n\n
override toString() {\n    const tokens: string[] = [];\n    const records = this.records;\n    for (const token
of records.keys()) {\n        tokens.push(stringify(token));\n    }\n    return `R3Injector[${tokens.join(', ')}];\n    }\n\n
private assertNotDestroyed(): void {\n    if (this._destroyed) {\n        throw new RuntimeError(\n
RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,\n            ngDevMode && 'Injector has already been
destroyed.);\n    }\n    }\n\n    /**\n     * Process a `SingleProvider` and add it.\n     */\n    private processProvider(provider:
SingleProvider): void {\n    // Determine the token from the provider. Either it's its own token, or has a {provide:
...}\n    // property.\n    provider = resolveForwardRef(provider);\n    let token: any =\n        isTypeProvider(provider)
? provider : resolveForwardRef(provider && provider.provide);\n    // Construct a `Record` for the provider.\n
const record = providerToRecord(provider);\n\n    if (!isTypeProvider(provider) && provider.multi === true) {\n
// If the provider indicates that it's a multi-provider, process it specially.\n
        // First check whether it's been defined already.\n        let multiRecord = this.records.get(token);\n        if
(multiRecord) {\n            // It has. Throw a nice error if\n            if (ngDevMode && multiRecord.multi === undefined)
{\n                throwMixedMultiProviderError();\n            }\n            } else {\n                multiRecord = makeRecord(undefined,
NOT_YET, true);\n                multiRecord.factory = () => injectArgs(multiRecord!.multi!);\n                this.records.set(token,
multiRecord);\n            }\n            token = provider;\n            multiRecord.multi!.push(provider);\n        } else {\n            const existing
= this.records.get(token);\n            if (ngDevMode && existing && existing.multi !== undefined) {\n
throwMixedMultiProviderError();\n            }\n            }\n            this.records.set(token, record);\n        }\n\n        private
hydrate<T>(token: ProviderToken<T>, record: Record<T>): T {\n        if (ngDevMode && record.value ===
CIRCULAR) {\n            throwCyclicDependencyError(stringify(token));\n        } else if (record.value
=== NOT_YET) {\n            record.value = CIRCULAR;\n            record.value = record.factory!();\n        }\n        if (typeof
record.value === 'object' && record.value && hasOnDestroy(record.value)) {\n
this._ngOnDestroyHooks.add(record.value);\n        }\n        return record.value as T;\n    }\n\n    private
injectableDefInScope(def: InjectableDeclaration<any>): boolean {\n    if (!def.providedIn) {\n        return false;\n
}\n    const providedIn = resolveForwardRef(def.providedIn);\n    if (typeof providedIn === 'string') {\n        return
providedIn === 'any' || (this.scopes.has(providedIn));\n    } else {\n        return
this.injectorDefTypes.has(providedIn);\n    }\n    }\n\n    function injectableDefOrInjectorDefFactory(token:
ProviderToken<any>): FactoryFn<any> {\n    // Most tokens will have an injectable def directly on them, which
specifies a factory directly.\n    const injectableDef = getInjectableDef(token);\n    const factory = injectableDef !==
null ? injectableDef.factory : getFactoryDef(token);\n\n    if (factory !== null) {\n        return factory;\n    }\n\n    // InjectionTokens should have an injectable def (prov) and thus
should be handled above.\n    // If it's missing that, it's an error.\n    if (token instanceof InjectionToken) {\n        throw
new RuntimeError(\n            RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n            ngDevMode && `Token
${stringify(token)} is missing a prov definition.`);\n    }\n\n    // Undecorated types can sometimes be created if they

```

```

have no constructor arguments.\n if (token instanceof Function) {\n  return
getUndecoratedInjectableFactory(token);\n }\n\n // There was no way to resolve a factory for this token.\n throw
new RuntimeError(RuntimeErrorCode.INVALID_INJECTION_TOKEN, ngDevMode &&
'unreachable');\n}\n\nfunction getUndecoratedInjectableFactory(token: Function) {\n // If the token has parameters
then it has dependencies that we cannot resolve implicitly.\n  const paramLength = token.length;\n  if (paramLength
> 0) {\n    const args: string[] = newArray(paramLength,
'');\n    throw new RuntimeError(\n      RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n      ngDevMode
&& `Can't resolve all parameters for ${stringify(token)}: (${args.join(', ')}.`);\n    }\n  }\n\n // The constructor function
appears to have no parameters.\n // This might be because it inherits from a super-class. In which case, use an
injectable\n // def from an ancestor if there is one.\n // Otherwise this really is a simple class with no dependencies,
so return a factory that\n // just instantiates the zero-arg constructor.\n  const inheritedInjectableDef =
getInheritedInjectableDef(token);\n  if (inheritedInjectableDef !== null) {\n    return () =>
inheritedInjectableDef.factory(token as Type<any>);\n  } else {\n    return () => new (token as Type<any>)();\n  }\n}\n\nfunction providerToRecord(provider: SingleProvider): Record<any> {\n  if (isValueProvider(provider)) {\n    return makeRecord(undefined, provider.useValue);\n  } else {\n    const factory: (() =>
any)|undefined = providerToFactory(provider);\n    return makeRecord(factory, NOT_YET);\n  }\n}\n\n/**\n *
Converts a `SingleProvider` into a factory function.\n * @param provider provider to convert to factory\n *
*\nexport function providerToFactory(\n  provider: SingleProvider, ngModuleType?: InjectorType<any>,
providers?: any[]): () => any {\n  let factory: (() => any)|undefined = undefined;\n  if (ngDevMode &&
isImportedNgModuleProviders(provider)) {\n    throwInvalidProviderError(undefined, providers, provider);\n  }\n\n  if (isTypeProvider(provider)) {\n    const unwrappedProvider = resolveForwardRef(provider);\n    return
getFactoryDef(unwrappedProvider) || injectableDefOrInjectorDefFactory(unwrappedProvider);\n  } else {\n    if
(isValueProvider(provider)) {\n      factory = () => resolveForwardRef(provider.useValue);\n    } else if
(isFactoryProvider(provider)) {\n      factory = () => provider.useFactory(...injectArgs(provider.deps || []));\n    } else
if (isExistingProvider(provider))\n      {\n        factory = () => inject(resolveForwardRef(provider.useExisting));\n      } else {\n        const classRef =
resolveForwardRef(\n          provider &&\n          ((provider as StaticClassProvider | ClassProvider).useClass ||
provider.provider));\n        if (ngDevMode && !classRef) {\n          throwInvalidProviderError(ngModuleType,
providers, provider);\n        }\n        if (hasDeps(provider)) {\n          factory = () => new
(classRef)(...injectArgs(provider.deps));\n        } else {\n          return getFactoryDef(classRef) ||
injectableDefOrInjectorDefFactory(classRef);\n        }\n      }\n    }\n  }\n  return factory;\n}\n\nfunction makeRecord<T>(\n  factory: (() => T)|undefined, value: T){}, multi: boolean = false): Record<T> {\n  return {\n    factory: factory,\n    value: value,\n    multi: multi ? [] : undefined,\n  };}\n\nfunction hasDeps(value:
ClassProvider|ConstructorProvider|\n  StaticClassProvider): value is ClassProvider&{deps: any[]} {\n  return
!!(value
as any).deps;\n}\n\nfunction hasOnDestroy(value: any): value is OnDestroy {\n  return value !== null && typeof
value === 'object' &&\n  typeof (value as OnDestroy).ngOnDestroy === 'function';\n}\n\nfunction
couldBeInjectableType(value: any): value is ProviderToken<any> {\n  return (typeof value === 'function') ||\n
(typeof value === 'object' && value instanceof InjectionToken);\n}\n\nfunction
isImportedNgModuleProviders(provider: Provider|ImportedNgModuleProviders):\n  provider is
ImportedNgModuleProviders {\n  return !(provider as ImportedNgModuleProviders).providers;\n}\n\nfunction
forEachSingleProvider(\n  providers: Array<Provider|ImportedNgModuleProviders>,\n  fn: (provider:
SingleProvider) => void): void {\n  for (const provider of providers) {\n    if (Array.isArray(provider)) {\n
forEachSingleProvider(provider, fn);\n    } else if (isImportedNgModuleProviders(provider)) {\n
forEachSingleProvider(provider.providers, fn);\n    } else {\n      fn(provider);\n    }\n  }\n}\n}\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\nimport {ChangeDetectorRef} from './change_detection/change_detection';\nimport {Injector} from

```

```

./di/injector';\nimport {EnvironmentInjector} from './di/r3_injector';\nimport {Type} from
./interface/type';\n\nimport {ElementRef} from './element_ref';\nimport {NgModuleRef} from
./ng_module_factory';\nimport {ViewRef} from './view_ref';\n\n/**\n * Represents a component created by a
`ComponentFactory`.\n * Provides access to the component instance and related objects,\n * and provides the means
of destroying the instance.\n *\n * @publicApi\n */\nexport abstract class ComponentRef<C> {\n /**\n * Updates
a specified input name to a new value. Using this method will properly mark for check\n * component using the
`OnPush` change detection strategy.

```

```

It will also assure that the\n * `OnChanges` lifecycle hook runs when a dynamically created component is change-
detected.\n *\n * @param name The name of an input.\n * @param value The new value of an input.\n */\n
abstract setInput(name: string, value: unknown): void;\n\n /**\n * The host or anchor

```

```

[element](guide/glossary#element) for this component instance.\n */\n abstract getLocation(): ElementRef;\n\n
/**\n * The [dependency injector](guide/glossary#injector) for this component instance.\n */\n abstract get
injector(): Injector;\n\n /**\n * This component instance.\n */\n abstract getInstance(): C;\n\n /**\n * The [host
view](guide/glossary#view-tree) defined by the template\n * for this component instance.\n */\n abstract get
hostView(): ViewRef;\n\n /**\n * The change detector for this component instance.\n */\n abstract get
changeDetectorRef(): ChangeDetectorRef;\n\n /**\n * The type of this component (as created by a
`ComponentFactory`

```

```

class).\n */\n abstract get componentType(): Type<any>;\n\n /**\n * Destroys the component instance and all of
the data structures associated with it.\n */\n abstract destroy(): void;\n\n /**\n * A lifecycle hook that provides
additional developer-defined cleanup\n * functionality for the component.\n * @param callback A handler
function that cleans up developer-defined data\n * associated with this component. Called when the `destroy()`
method is invoked.\n */\n abstract onDestroy(callback: Function): void;\n\n\n /**\n * Base class for a factory that
can create a component dynamically.\n * Instantiate a factory for a given type of component with
`resolveComponentFactory`.\n * Use the resulting `ComponentFactory.create()` method to create a component of
that type.\n *\n * @see [Dynamic Components](guide/dynamic-component-loader)\n *\n * @publicApi\n *\n *
@deprecated Angular no longer requires Component factories. Please use other APIs where\n *

```

```

Component class can be used directly.\n */\nexport abstract class ComponentFactory<C> {\n /**\n * The
component's HTML selector.\n */\n abstract get selector(): string;\n\n /**\n * The type of component the factory
will create.\n */\n abstract get componentType(): Type<any>;\n\n /**\n * Selector for all <ng-content> elements in
the component.\n */\n abstract get ngContentSelectors(): string[];\n\n /**\n * The inputs of the component.\n */\n
\n abstract get inputs(): {propName: string, templateName: string}[];\n\n /**\n * The outputs of the component.\n */\n
\n abstract get outputs(): {propName: string, templateName: string}[];\n\n /**\n * Creates a new component.\n */\n
\n abstract create(\n   injector: Injector, projectableNodes?: any[][], rootSelectorOrNode?: string|any,\n
   environmentInjector?: EnvironmentInjector|NgModuleRef<any>): ComponentRef<C>;\n\n\n /**\n * @license\n *
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```

```

by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{Type} from './interface/type';\nimport {stringify} from './util/stringify';\n\nimport {ComponentFactory} from
./component_factory';\n\nexport function noComponentFactoryError(component: Function) {\n const error = =
Error(`No component factory found for ${\n   stringify(component)}. Did you add it to
@NgModule.entryComponents?`);\n (error as any)[ERROR_COMPONENT] = component;\n return
error;\n}\n\nconst ERROR_COMPONENT = 'ngComponent';\n\nexport function getComponent(error: Error):
Type<any> {\n return (error as any)[ERROR_COMPONENT];\n}\n\n\nclass _NullComponentFactoryResolver
implements ComponentFactoryResolver {\n resolveComponentFactory<T>(component: {new(...args: any[]): T}):
ComponentFactory<T> {\n   throw noComponentFactoryError(component);\n }\n}\n\n\n /**\n * A simple registry
that maps `Components` to generated `ComponentFactory` classes\n * that can be
used to create instances of components.\n * Use to obtain the factory for a given component type,\n * then use the
factory's `create()` method to create a component of that type.\n *\n * Note: since v13, dynamic component creation
via\n * [ViewContainerRef.createComponent](api/core/ViewContainerRef#createComponent)\n * does **not**

```

require resolving component factory: component class can be used directly.

`@publicApi`

`@deprecated` Angular no longer requires Component factories. Please use other APIs where Component class can be used directly.

```

export abstract class ComponentFactoryResolver {
  static NULL: ComponentFactoryResolver = /* @__PURE__ */ new _NullComponentFactoryResolver();
  /**
   * Retrieves the factory object that creates a component of the given type.
   * @param component The component type.
   */
  abstract resolveComponentFactory<T>(component: Type<T>): ComponentFactory<T>;
}

```

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```

import { TNode } from './render3/interfaces/node';
import { RElement } from './render3/interfaces/renderer_dom';
import { LView } from './render3/interfaces/view';
import { getCurrentTNode, getLView } from './render3/state';
import { getNativeByTNode } from './render3/util/view_utils';
/**
 * Creates an ElementRef from the most recent node.
 */
@returns The ElementRef instance to use
export function injectElementRef(): ElementRef {
  return createElementRef(getCurrentTNode(), getLView());
}
/**
 * Creates an ElementRef given a node.
 */
@param tNode The node for which you'd like an ElementRef
@param lView The view to which the node belongs
@returns The ElementRef instance to use
export function createElementRef(tNode: TNode, lView: LView): ElementRef {
  return new ElementRef(getNativeByTNode(tNode, lView) as RElement);
}
/**
 * A wrapper around a native element inside of a View.
 */
An `ElementRef` is backed by a render-specific element. In the browser, this is usually a DOM element.
@security Permitting direct access to the DOM can make your application more vulnerable to XSS attacks. Carefully review any use of `ElementRef` in your code. For more detail, see the [Security Guide](https://g.co/ng/security).
@publicApi
// Note: We don't expose things like `Injector`, `ViewContainer`, ... here, i.e. users have to ask for what they need. With that, we can build better analysis tools and could do better codegen in the future.
export class ElementRef<T = any> {
  /**
   * The underlying native element or `null` if direct access to native elements is not supported (e.g. when the application runs in a web worker).
   */
  <div class="callout is-critical">
    <header>Use with caution</header>
    <p>
      Use this API as the last resort when direct access to DOM is needed. Use templating and data-binding provided by Angular instead. Alternatively you can take a look at {@link Renderer2} which provides API that can safely be used even when direct access to native elements is not supported.
    </p>
    Relying on direct DOM access creates tight coupling between your application and rendering layers which will make it impossible to separate the two and deploy your application into a web worker.
    </div>
  nativeElement: T;
  constructor(nativeElement: T) {
    this.nativeElement = nativeElement;
  }
  /**
   * @internal
   * @nocollapse
   */
  static __NG_ELEMENT_ID__: () => ElementRef = injectElementRef;
  /**
   * Unwraps `ElementRef` and return the `nativeElement`.
   */
  @param value value to unwrap
  @returns `nativeElement` if `ElementRef` otherwise returns value as is.
  export function unwrapElementRef<T, R>(value: T)ElementRef<R>: T|R {
    return value instanceof ElementRef ? value.nativeElement : value;
  }
}

```

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```

import { InjectionToken } from './di/injection_token';
import { isLView } from './render3/interfaces/type_checks';
import { RENDERER } from './render3/interfaces/view';
import { getCurrentTNode, getLView } from './render3/state';
import { getComponentLViewByIndex } from './render3/util/view_utils';
import { RendererStyleFlags2, RendererType2 } from './api_flags';
export const Renderer2Interceptor = new InjectionToken<Renderer2[]>('Renderer2Interceptor');
/**
 * Creates and initializes a custom renderer that implements the `Renderer2` base class.
 */
@publicApi
export abstract class RendererFactory2 {
  /**
   * Creates and initializes a custom renderer for a host DOM element.
   */
  @param hostElement The element to render.
  @param type The base class to implement.
  @returns The new custom renderer instance.
  abstract createRenderer(hostElement: any, type: RendererType2|null): Renderer2;
}

```

callback invoked when rendering has begun.  
`abstract begin?(): void;`  
 \* A callback invoked when rendering has completed.  
`abstract end?(): void;`  
 \* Use with animations test-only mode. Notifies the test when rendering has completed.  
 \* @returns The asynchronous result of the developer-defined function.  
`abstract whenRenderingDone?(): Promise<any>;`  
 \* Extend this base class to implement custom rendering. By default, Angular renders a template into DOM. You can use custom rendering to intercept rendering calls, or to render to something other than DOM.  
 \* Create your custom renderer using `RendererFactory2`.  
 \* Use a custom renderer to bypass Angular's templating and make custom UI changes that can't be expressed declaratively.  
 \* For example if you need to set a property or an attribute whose name is not statically known, use the `setProperty()` or `setAttribute()` method.  
 \* @publicApi  
`export abstract class Renderer2 {`  
 \* Use to store arbitrary developer-defined data on a renderer instance, as an object containing key-value pairs.  
 \* This is useful for renderers that delegate to other renderers.  
`abstract get data(): {[key: string]: any};`  
 \* Implement this callback to destroy the renderer or the host element.  
`abstract destroy(): void;`  
 \* Implement this callback to create an instance of the host element.  
 \* @param name An identifying name for the new element, unique within the namespace.  
 \* @param namespace The namespace for the new element.  
 \* @returns The new element.  
`abstract createElement(name: string, namespace?: string|null): any;`  
 \* Implement this callback to add a comment to the DOM of the host element.  
 \* @param value The comment text.  
 \* @returns The modified element.  
`abstract createComment(value: string): any;`  
 \* Implement this callback to add text to the DOM of the host element.  
 \* @param value The text string.  
 \* @returns The modified element.  
`abstract createText(value: string): any;`  
 \* If null or undefined, the view engine won't call it.  
 \* This is used as a performance optimization for production mode.  
 \* // TODO(issue/24571): remove '!'.  
`destroyNode!: ((node: any) => void)|null;`  
 \* Appends a child to a given parent node in the host element DOM.  
 \* @param parent The parent node.  
 \* @param newChild The new child node.  
`abstract appendChild(parent: any, newChild: any): void;`  
 \* Implement this callback to insert a child node at a given position in a parent node in the host element DOM.  
 \* @param parent The parent node.  
 \* @param newChild The new child nodes.  
 \* @param refChild The existing child node before which `newChild` is inserted.  
 \* @param isMove Optional argument which signifies if the current `insertBefore` is a result of a `move`. Animation uses this information to trigger move animations. In the past the Animation would always assume that any `insertBefore` is a move. This is not strictly true because with runtime `i18n` it is possible to invoke `insertBefore` as a result of `i18n` and it should not trigger an animation move.  
`abstract insertBefore(parent: any, newChild: any, refChild: any, isMove?: boolean): void;`  
 \* Implement this callback to remove a child node from the host element's DOM.  
 \* @param parent The parent node.  
 \* @param oldChild The child node to remove.  
 \* @param isHostElement Optionally signal to the renderer whether this element is a host element or not.  
`abstract removeChild(parent: any, oldChild: any, isHostElement?: boolean): void;`  
 \* Implement this callback to prepare an element to be bootstrapped as a root element, and return the element instance.  
 \* @param selectorOrNode The DOM element.  
 \* @param preserveContent Whether the contents of the root element should be preserved, or cleared upon bootstrap (default behavior).  
 \* Use with `ViewEncapsulation.ShadowDom` to allow simple native content projection via `<slot>` elements.  
 \* @returns The root element.  
`abstract selectRootElement(selectorOrNode: string|any, preserveContent?: boolean): any;`  
 \* Implement this callback to get the parent of a given node in the host element's DOM.  
 \* @param node The child node to query.  
 \* @returns The parent node, or null if there is no parent.  
 \* For WebWorkers, always returns true.  
 \* This is because the check is synchronous, and the caller can't rely on checking for null.  
`abstract parentNode(node: any): any;`  
 \* Implement this callback to get the next sibling node of a given node in the host element's DOM.  
 \* @returns The sibling node, or null if there is no sibling.  
 \* For WebWorkers, always returns a value.  
 \* This is because the check is synchronous, and the caller can't rely on checking for null.  
`abstract nextSibling(node: any): any;`  
 \* Implement this callback to set an attribute value for

```

an element in the DOM.\n * @param el The element.\n * @param name The attribute name.\n * @param value
The new value.\n * @param namespace The namespace.\n */\n abstract setAttribute(el: any, name: string, value:
string, namespace?: string|null): void;\n\n /**\n * Implement this callback to remove an attribute from an element
in the DOM.\n * @param el The element.\n * @param name The attribute
name.\n * @param namespace The namespace.\n */\n abstract removeAttribute(el: any, name: string,
namespace?: string|null): void;\n\n /**\n * Implement this callback to add a class to an element in the DOM.\n *
@param el The element.\n * @param name The class name.\n */\n abstract addClass(el: any, name: string):
void;\n\n /**\n * Implement this callback to remove a class from an element in the DOM.\n * @param el The
element.\n * @param name The class name.\n */\n abstract removeClass(el: any, name: string): void;\n\n /**\n
* Implement this callback to set a CSS style for an element in the DOM.\n * @param el The element.\n *
@param style The name of the style.\n * @param value The new value.\n * @param flags Flags for style
variations. No flags are set by default.\n */\n abstract setStyle(el: any, style: string, value: any, flags?:
RendererStyleFlags2): void;\n\n /**\n * Implement this callback to remove the value from a CSS style for an
element in
the DOM.\n * @param el The element.\n * @param style The name of the style.\n * @param flags Flags for
style variations to remove, if set. ???\n */\n abstract removeStyle(el: any, style: string, flags?:
RendererStyleFlags2): void;\n\n /**\n * Implement this callback to set the value of a property of an element in the
DOM.\n * @param el The element.\n * @param name The property name.\n * @param value The new value.\n
*/\n abstract setProperty(el: any, name: string, value: any): void;\n\n /**\n * Implement this callback to set the
value of a node in the host element.\n * @param node The node.\n * @param value The new value.\n */\n
abstract setValue(node: any, value: string): void;\n\n /**\n * Implement this callback to start an event listener.\n
* @param target The context in which to listen for events. Can be\n * the entire window or document, the body of
the document, or a specific\n * DOM element.\n * @param eventName The event to listen for.\n
* @param callback A handler function to invoke when the event occurs.\n * @returns An "unlisten" function
for disposing of this handler.\n */\n abstract listen(\n   target: 'window'|'document'|'body'|any, eventName:
string,\n   callback: (event: any) => boolean | void): () => void;\n\n /**\n * @internal\n * @nocollapse\n */\n
static __NG_ELEMENT_ID__: () => Renderer2 = () => injectRenderer2();\n\n\n/** Injects a Renderer2 for the
current component. */\nexport function injectRenderer2(): Renderer2 {\n // We need the Renderer to be based on
the component that it's being injected into, however since\n // DI happens before we've entered its view, `getLView`
will return the parent view instead.\n const IView = getLView();\n const tNode = getCurrentTNode();\n const
nodeAtIndex = getComponentLViewByIndex(tNode.index, IView);\n return (isLView(nodeAtIndex) ?
nodeAtIndex : IView)[RENDERER] as Renderer2;\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {defineInjectable} from './di/interface/defs';\nimport
{SecurityContext} from './security';\n\n/**\n * Sanitizer is used by the views to sanitize potentially dangerous
values.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nexport abstract class Sanitizer {\n   abstract sanitize(context: SecurityContext,
value: {}|string|null): string|null;\n\n   /** @nocollapse */\n   static prov = /** @pureOrBreakMyCode */\n   defineInjectable({\n     token: Sanitizer,\n     providedIn: 'root',\n     factory: () => null,\n   });\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * @description Represents the
version of Angular\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nexport class Version {\n   public readonly major:
string;\n   public readonly minor: string;\n   public readonly patch: string;\n\n   constructor(public full: string) {\n
this.major = full.split('.')[0];\n   this.minor = full.split('.')[1];\n   this.patch = full.split('.').slice(2).join('.');\n
}\n\n", /**\n * @publicApi\n */\n\nexport const VERSION = new Version('14.3.0');\n\n", /**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n// This default value is when checking
the hierarchy for a token.\n\n// It means both:\n\n// - the token is not provided by the current injector,\n\n// - only the
element injectors should be checked (ie do not check module injectors)\n\n    mod1\n\n    /\n\n    el1

```



```

mod2\n//    \ \ \n//    el2\n/\n// When requesting el2.injector.get(token), we should check in the following
order and return the\n// first found value:\n//
- el2.injector.get(token, default)\n// - el1.injector.get(token,
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR) -> do not check the module\n// -
mod2.injector.get(token, default)\nexport const NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR =
{};\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nexport const ERROR_ORIGINAL_ERROR = 'ngOriginalError';\n\nexport function wrappedError(message:
string, originalError: any): Error {\n  const msg = `${message} caused by: ${\n    originalError instanceof Error ?
originalError.message : originalError}`;\n  const error = Error(msg);\n  (error as
any)[ERROR_ORIGINAL_ERROR] = originalError;\n  return error;\n}\n\nexport function getOriginalError(error:
Error): Error {\n  return (error as any)[ERROR_ORIGINAL_ERROR];\n}\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport {getOriginalError} from './util/errors';\n\n/**\n * Provides a hook for
centralized exception handling.\n * \n * The default implementation of `ErrorHandler` prints error messages to the
`console`. To\n * intercept error handling, write a custom exception handler that replaces this default as\n *
appropriate for your app.\n * \n * @usageNotes\n * ### Example\n * \n * ```\n * class MyErrorHandler implements
ErrorHandler {\n *   handleError(error) {\n *     // do something with the exception\n *   }\n * }\n * \n *
@NgModule({\n *   providers: [{provide: ErrorHandler, useClass: MyErrorHandler}]\n * })\n * class MyModule
{\n *   ```\n * \n * @publicApi\n *\nexport class ErrorHandler {\n  /**\n   * @internal\n   * \n _console: Console =
console;\n\n  handleError(error: any): void {\n    const originalError = this._findOriginalError(error);\n\n    this._console.error('ERROR',
error);\n    if (originalError) {\n      this._console.error('ORIGINAL ERROR', originalError);\n    }\n  }\n\n  /**
   * @internal\n   * \n _findOriginalError(error: any): Error|null {\n    let e = error && getOriginalError(error);\n    while (e
&& getOriginalError(e)) {\n      e = getOriginalError(e);\n    }\n    return e || null;\n  }\n}\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nexport function
normalizeDebugBindingName(name: string) {\n  // Attribute names with ` $` (eg `x-y$`) are valid per spec, but
unsupported by some browsers\n  name = camelCaseToDashCase(name.replace(/[$@]/g, '_'));\n  return `ng-reflect-
${name}`;\n}\n\nconst CAMEL_CASE_REGEXP = /[A-Z]/g;\n\nfunction camelCaseToDashCase(input: string):
string {\n  return input.replace(CAMEL_CASE_REGEXP, (...m: any[]) => '-' + m[1].toLowerCase());\n}\n\nexport
function normalizeDebugBindingValue(value: any): string {\n  try {\n    // Limit the size of the value as otherwise
the DOM just gets polluted.\n    return value != null ? value.toString().slice(0, 30) : value;\n  } catch (e) {\n    return
'[ERROR] Exception while trying to serialize the value';\n  }\n}\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n *\n\nimport {RElement} from
'./interfaces/renderer_dom';\n\n/**\n * \n * @codeGenApi\n *\nexport function resolveWindow(element:
RElement & {ownerDocument: Document}) {\n  return element.ownerDocument.defaultView;\n}\n\n/**\n * \n *
@codeGenApi\n *\nexport function resolveDocument(element: RElement & {ownerDocument: Document}) {\n  return
element.ownerDocument;\n}\n\n/**\n * \n * @codeGenApi\n *\nexport function resolveBody(element:
RElement & {ownerDocument: Document})
{\n  return element.ownerDocument.body;\n}\n\n/**\n * The special delimiter we use to separate property names,
prefixes, and suffixes\n * in property binding metadata. See storeBindingMetadata().\n * \n * We intentionally use
the Unicode "REPLACEMENT CHARACTER" (U+FFFD) as a delimiter\n * because it is a very uncommon
character that is unlikely to be part of a user's\n * property names or interpolation strings. If it is in fact used in a
property\n * binding, DebugElement.properties will not return the correct value for that\n * binding. However, there
should be no runtime effect for real applications.\n * \n * This character is typically rendered as a question mark

```

```

inside of a diamond.\n * See https://en.wikipedia.org/wiki/Specials_(Unicode_block)\n *\nexport const
INTERPOLATION_DELIMITER = `;\n\n/**\n * Unwrap a value which might be behind a closure (for forward
declaration reasons).\n *\nexport function maybeUnwrapFn<T>(value: T|(() => T)): T {\n  if (value instanceof
Function) {\n    return value();\n  } else {\n    return value;\n  }\n}\n\n", "\n\n" * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\n\nimport { RuntimeError, RuntimeErrorCode } from
'./errors';\nimport { Type } from './interface/type';\nimport { GetComponentDef } from './definition';\nimport
{TNode} from './interfaces/node';\nimport { LView, TVIEW } from './interfaces/view';\nimport
{INTERPOLATION_DELIMITER} from './util/misc_utils';\nimport { stringifyForError } from
'./util/stringify_utils';\n\n/** Verifies that a given type is a Standalone Component. *\nexport function
assertStandaloneComponentType(type: Type<unknown>) {\n  assertComponentDef(type);\n  const componentDef =
GetComponentDef(type);\n  if (!componentDef.standalone) {\n    throw new RuntimeError(\n
RuntimeErrorCode.TYPE_IS_NOT_STANDALONE,\n      `The ${stringifyForError(type)}
component is not marked as standalone, ` +\n        `but Angular expects to have a standalone component here.`
+\n        `Please make sure the ${stringifyForError(type)} component has ` +\n        `the `standalone: true`
flag in the decorator.`);\n  }\n}\n\n/** Verifies whether a given type is a component *\nexport function
assertComponentDef(type: Type<unknown>) {\n  if (!GetComponentDef(type)) {\n    throw new RuntimeError(\n
RuntimeErrorCode.MISSING_GENERATED_DEF,\n      `The ${stringifyForError(type)} is not an Angular
component, ` +\n        `make sure it has the `@Component` decorator.`);\n  }\n}\n\n/** Called when there are
multiple component selectors that match a given node *\nexport function throwMultipleComponentError(\n
tNode: TNode, first: Type<unknown>, second: Type<unknown>): never {\n  throw new RuntimeError(\n
RuntimeErrorCode.MULTIPLE_COMPONENTS_MATCH,\n    `Multiple components match node with tagname
${tNode.value}`;\n  +\n    `${stringifyForError(first)} and ` +\n    `${stringifyForError(second)}`);\n}\n\n/** Throws an
ExpressionChangedAfterChecked error if checkNoChanges mode is on. *\nexport function
throwErrorIfNoChangesMode(\n  creationMode: boolean, oldValue: any, currValue: any, propName?: string):
never {\n  const field = propName ? ` for '${propName}'` : `;\n  let msg =\n
`ExpressionChangedAfterItHasBeenCheckedError: Expression has changed after it was checked. Previous
value${\n    field}: '${oldValue}'. Current value: '${currValue}'.`; \n  if (creationMode) {\n    msg +=\n    ` It
seems like the view has been created after its parent and its children have been dirty checked.` +\n    ` Has it been
created in a change detection hook?`; \n  }\n  throw new
RuntimeError(RuntimeErrorCode.EXPRESSION_CHANGED_AFTER_CHECKED, msg);\n}\n\nfunction
constructDetailsForInterpolation(\n  lView: LView, rootIndex: number, expressionIndex: number, meta: string,
changedValue:
any) {\n  const [propName, prefix, ...chunks] = meta.split(INTERPOLATION_DELIMITER);\n  let oldValue =
prefix, newValue = prefix;\n  for (let i = 0; i < chunks.length; i++) {\n    const slotIdx = rootIndex + i;\n    oldValue
+= `${lView[slotIdx]}${chunks[i]}`;\n    newValue += `${slotIdx === expressionIndex ? changedValue :
lView[slotIdx]}${chunks[i]}`;\n  }\n  return { propName, oldValue, newValue};\n}\n\n/**\n * Constructs an object
that contains details for the ExpressionChangedAfterItHasBeenCheckedError:\n * - property name (for property
bindings or interpolations)\n * - old and new values, enriched using information from metadata\n * - More
information on the metadata storage format can be found in `storePropertyBindingMetadata`\n * function
description.\n *\nexport function getExpressionChangedErrorDetails(\n  lView: LView, bindingIndex: number,
oldValue: any,\n  newValue: any): { propName?: string, oldValue: any, newValue: any } {\n  const tData =
lView[TVIEW].data;\n  const metadata = tData[bindingIndex];\n\n  if (typeof metadata === 'string') {\n    // metadata for property
interpolation\n    if (metadata.indexOf(INTERPOLATION_DELIMITER) > -1) {\n      return
constructDetailsForInterpolation(\n        lView, bindingIndex, bindingIndex, metadata, newValue);\n    }\n    //
metadata for property binding\n    return { propName: metadata, oldValue, newValue};\n  }\n\n  // metadata is not

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available for this expression, check if this expression is a part of the\n // property interpolation by going from the
current binding index left and look for a string that\n // contains INTERPOLATION_DELIMITER, the layout in
tView.data for this case will look like this:\n // [..., 'idPrefix and suffix', null, null, null, ...]\n if (metadata ===
null) {\n let idx = bindingIndex - 1;\n while (typeof tData[idx] !== 'string' && tData[idx + 1] === null) {\n
idx--;\n }\n const meta = tData[idx];\n if (typeof meta === 'string') {\n const
matches = meta.match(new RegExp(INTERPOLATION_DELIMITER, 'g'));\n // first interpolation delimiter
separates property name from interpolation parts (in case of\n // property interpolations), so we subtract one from
total number of found delimiters\n if (matches && (matches.length - 1) > bindingIndex - idx) {\n return
constructDetailsForInterpolation(IView, idx, bindingIndex, meta, newValue);\n }\n }\n }\n return {propName:
undefined, oldValue, newValue};\n }\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {assertNotEqual} from './util/assert';\nimport {CharCode} from
'./util/char_code';\n\n/**\n * Returns an index of `classToSearch` in `className` taking token boundaries into
account.\n *\n * `classIndexof('AB A', 'A', 0)` will be 3 (not 0 since `AB!==A`)\n *\n * @param
className A string containing classes (whitespace separated)\n * @param classToSearch A class name to locate\n
* @param startIndex Starting location of search\n * @returns an index of the located class (or -1 if not found)\n
*\n\nexport function classIndexof(\n className: string, classToSearch: string, startIndex: number): number {\n
ngDevMode && assertNotEqual(classToSearch, ", 'can not look for \"" string.);\n let end = className.length;\n
while (true) {\n const foundIndex = className.indexOf(classToSearch, startIndex);\n if (foundIndex === -1)\n return foundIndex;\n if (foundIndex === 0 || className.charCodeAt(foundIndex - 1) <= CharCode.SPACE) {\n
// Ensure that it has leading whitespace\n const length = classToSearch.length;\n if (foundIndex + length ===
end ||\n className.charCodeAt(foundIndex + length) <= CharCode.SPACE) {\n // Ensure that it has
trailing whitespace\n return foundIndex;\n }\n }\n // False positive,
keep searching from where we left off.\n startIndex = foundIndex + 1;\n }\n }\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
'./util/ng_dev_mode';\nimport {assertDefined, assertEqual, assertNotEqual} from './util/assert';\nimport
{AttributeMarker, TAttributes, TNode, TNodeType, unusedValueExportToPlacateAjd as unused1} from
'./interfaces/node';\nimport {CssSelector, CssSelectorList, SelectorFlags, unusedValueExportToPlacateAjd as
unused2} from './interfaces/projection';\nimport {classIndexof} from './styling/class_differ';\nimport
{isNameOnlyAttributeMarker} from './util/attrs_utils';\n\nconst unusedValueToPlacateAjd = unused1 +
unused2;\n\nconst NG_TEMPLATE_SELECTOR = 'ng-template';\n\n/**\n * Search the `TAttributes` to see if it
contains `cssClassToMatch` (case insensitive)\n *\n * @param attrs
`TAttributes` to search through.\n * @param cssClassToMatch class to match (lowercase)\n * @param
isProjectionMode Whether or not class matching should look into the attribute `class` in\n * addition to the
`AttributeMarker.Classes`.\n *\n\nfunction isCssClassMatching(\n attrs: TAttributes, cssClassToMatch: string,
isProjectionMode: boolean): boolean {\n // TODO(misko): The fact that this function needs to know about
`isProjectionMode` seems suspect.\n // It is strange to me that sometimes the class information comes in form of
`class` attribute\n // and sometimes in form of `AttributeMarker.Classes`. Some investigation is needed to
determine\n // if that is the right behavior.\n ngDevMode &&\n assertEqual(\n cssClassToMatch,
cssClassToMatch.toLowerCase(), 'Class name expected to be lowercase.);\n let i = 0;\n while (i < attrs.length) {\n
let item = attrs[i++];\n if (isProjectionMode && item === 'class') {\n item = attrs[i] as string;\n if
(classIndexof(item.toLowerCase(), cssClassToMatch, 0) !== -1) {\n return true;\n }\n } else if (item ===
AttributeMarker.Classes) {\n // We found the classes section. Start searching for the class.\n while (i <
attrs.length && typeof (item = attrs[i++]) === 'string') {\n // while we have strings\n if (item.toLowerCase()
=== cssClassToMatch) return true;\n }\n return false;\n }\n }\n return false;\n }\n\n\n/**\n * Checks whether
the `tNode` represents an inline template (e.g. `*ngFor`).\n *\n * @param tNode current TNode\n *\n\nexport
function isInlineTemplate(tNode: TNode): boolean {\n return tNode.type === TNodeType.Container &&

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tNode.value !== NG_TEMPLATE_SELECTOR;\n}\n\n/**\n * Function that checks whether a given tNode
matches tag-based selector and has a valid type.\n *\n * Matching can be performed in 2 modes: projection mode
(when we project nodes) and regular\n * directive matching mode:\n * - in the \"directive matching\" mode
we do _not_ take TContainer's tagName into account if it is\n * different from NG_TEMPLATE_SELECTOR
(value different from NG_TEMPLATE_SELECTOR indicates that a\n * tag name was extracted from * syntax so
we would match the same directive twice);\n * - in the \"projection\" mode, we use a tag name potentially extracted
from the * syntax processing\n * (applicable to TNodeType.Container only).\n */\nfunction
hasTagAndTypeMatch(\n  tNode: TNode, currentSelector: string, isProjectionMode: boolean): boolean {\n  const
tagNameToCompare =\n    tNode.type === TNodeType.Container && !isProjectionMode ?
NG_TEMPLATE_SELECTOR : tNode.value;\n  return currentSelector === tagNameToCompare;\n}\n\n/**\n * A
utility function to match an Ivy node static data against a simple CSS selector\n *\n * @param node static data of the
node to match\n * @param selector The selector to try matching against the node.\n * @param isProjectionMode if
`true` we are matching for content projection, otherwise we are
doing\n * directive matching.\n * @returns true if node matches the selector.\n */\nexport function
isNodeMatchingSelector(\n  tNode: TNode, selector: CssSelector, isProjectionMode: boolean): boolean {\n  const
ngDevMode && assertDefined(selector[0], 'Selector should have a tag name');\n  let mode: SelectorFlags =
SelectorFlags.ELEMENT;\n  const nodeAttrs = tNode.attrs || [];\n  // Find the index of first attribute that has no
value, only a name.\n  const nameOnlyMarkerIdx = getNameOnlyMarkerIndex(nodeAttrs);\n  // When processing
\":not\" selectors, we skip to the next \":not\" if the\n  // current one doesn't match\n  let skipToNextSelector =
false;\n  for (let i = 0; i < selector.length; i++) {\n    const current = selector[i];\n    if (typeof current === 'number')
{\n      // If we finish processing a :not selector and it hasn't failed, return false\n      if (!skipToNextSelector &&
!isPositive(mode) && !isPositive(current)) {\n        return false;\n      }\n      // If we are
skipping to the next :not() and this mode flag is positive,\n      // it's a part of the current :not() selector, and we
should keep skipping\n      if (skipToNextSelector && isPositive(current)) continue;\n      skipToNextSelector =
false;\n      mode = (current as number) | (mode & SelectorFlags.NOT);\n      continue;\n    }\n    if
(skipToNextSelector) continue;\n    if (mode & SelectorFlags.ELEMENT) {\n      mode =
SelectorFlags.ATTRIBUTE | mode & SelectorFlags.NOT;\n      if (current !== \" && !hasTagAndTypeMatch(tNode,
current, isProjectionMode) ||\n        current === \" && selector.length === 1) {\n        if (isPositive(mode)) return
false;\n        skipToNextSelector = true;\n      }\n    } else {\n      const selectorAttrValue = mode &
SelectorFlags.CLASS ? current : selector[++i];\n      // special case for matching against classes when a tNode has
been instantiated with\n      // class and style values as separate attribute values (e.g. ['title', CLASS, 'foo'])\n      if ((mode & SelectorFlags.CLASS) && tNode.attrs !== null) {\n        if (!isCssClassMatching(tNode.attrs,
selectorAttrValue as string, isProjectionMode)) {\n          if (isPositive(mode)) return false;\n          skipToNextSelector = true;\n        }\n        continue;\n      }\n      const attrName = (mode & SelectorFlags.CLASS)
? 'class' : current;\n      const attrIndexInNode =\n        findAttrIndexInNode(attrName, nodeAttrs,
isInlineTemplate(tNode), isProjectionMode);\n      if (attrIndexInNode === -1) {\n        if (isPositive(mode)) return
false;\n        skipToNextSelector = true;\n        continue;\n      }\n      if (selectorAttrValue !== \") {\n        let
nodeAttrValue: string;\n        if (attrIndexInNode > nameOnlyMarkerIdx) {\n          nodeAttrValue = \";\n        } else
{\n          ngDevMode &&\n            assertNotEqual(\n              nodeAttrs[attrIndexInNode],
AttributeMarker.NamespaceURI,\n              'We do not match directives on namespaced
attributes');\n          // we lowercase the attribute value to be able to match\n          // selectors without case-
sensitivity\n          // (selectors are already in lowercase when generated)\n          nodeAttrValue =
(nodeAttrs[attrIndexInNode + 1] as string).toLowerCase();\n        }\n        const compareAgainstClassName =
mode & SelectorFlags.CLASS ? nodeAttrValue : null;\n        if (compareAgainstClassName &&\n          classIndexOf(compareAgainstClassName, selectorAttrValue as string, 0) !== -1 ||\n          mode &
SelectorFlags.ATTRIBUTE && selectorAttrValue !== nodeAttrValue) {\n          if (isPositive(mode)) return false;\n          skipToNextSelector = true;\n        }\n      }\n    }\n  }\n  return isPositive(mode) ||
skipToNextSelector;\n}\n\nfunction isPositive(mode: SelectorFlags): boolean {\n  return (mode &

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SelectorFlags.NOT) === 0;\n}\n\n/\*\*\n \* Examines the attribute's definition array for a node to find the index of the\n \* attribute that matches

the given `name`.\n \*\n \* NOTE: This will not match namespaced attributes.\n \*\n \* Attribute matching depends upon `isInlineTemplate` and `isProjectionMode`.\n \* The following table summarizes which types of attributes we attempt to match:\n \*\n \*

		Modes		Normal Attributes		Bindings Attributes		Template Attributes	
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Directive		Non-inline + Projection		Non-inline + Projection		Non-inline + Projection		Non-inline + Directive	

=====\n \*\n \* @param name the name of the attribute to find\n \* @param attrs the attribute array to examine\n \* @param isInlineTemplate true if the node being matched is an inline template (e.g. `\*ngFor`)\n \* rather than a manually expanded template node (e.g. `<ng-template>`).\n \* @param isProjectionMode true if we are matching against content projection otherwise we are\n \* matching against directives.\n \*/\nfunction findAttrIndexInNode(\n name: string, attrs: TAttributes|null, isInlineTemplate: boolean,\n isProjectionMode: boolean): number {\n if (attrs === null)

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return -1;\n let i = 0;\n if (isProjectionMode || !isInlineTemplate) {\n let bindingsMode = false;\n while (i < attrs.length) {\n const maybeAttrName = attrs[i];\n if (maybeAttrName === name) {\n return i;\n } else if (\n maybeAttrName === AttributeMarker.Bindings || maybeAttrName === AttributeMarker.I18n) {\n bindingsMode = true;\n } else if (\n maybeAttrName === AttributeMarker.Classes || maybeAttrName === AttributeMarker.Styles) {\n let value = attrs[++i];\n // We should skip classes here because we have a separate mechanism for\n // matching classes in projection mode.\n while (typeof value === 'string') {\n value = attrs[++i];\n } continue;\n } else if (maybeAttrName === AttributeMarker.Template) {\n // We do not care about Template attributes in this scenario.\n break;\n } else if (maybeAttrName === AttributeMarker.NamespaceURI) {\n //
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Skip the whole namespaced attribute and value. This is by design.\n i += 4;\n continue;\n }\n // In binding mode there are only names, rather than name-value pairs.\n i += bindingsMode ? 1 : 2;\n }\n // We did not match the attribute\n return -1;\n } else {\n return matchTemplateAttribute(attrs, name);\n }\n}\n\nexport function isNodeMatchingSelectorList(\n tNode: TNode, selector: CssSelectorList, isProjectionMode: boolean = false): boolean {\n for (let i = 0; i < selector.length; i++) {\n if (isNodeMatchingSelector(tNode, selector[i], isProjectionMode)) {\n return true;\n }\n }\n\n return false;\n}\n\nexport function getProjectAsAttrValue(tNode: TNode): CssSelector|null {\n const nodeAttrs = tNode.attrs;\n if (nodeAttrs != null) {\n const ngProjectAsAttrIdx = nodeAttrs.indexOf(AttributeMarker.ProjectAs);\n // only check for ngProjectAs in attribute names, don't accidentally match attribute's value\n // (attribute

names are stored at even indexes)\n if ((ngProjectAsAttrIdx & 1) === 0) {\n return nodeAttrs[ngProjectAsAttrIdx + 1] as CssSelector;\n }\n\n return null;\n}\n\nfunction getNameOnlyMarkerIndex(nodeAttrs: TAttributes) {\n for (let i = 0; i < nodeAttrs.length; i++) {\n const nodeAttr = nodeAttrs[i];\n if (isNameOnlyAttributeMarker(nodeAttr)) {\n return i;\n }\n }\n\n return nodeAttrs.length;\n}\n\nfunction matchTemplateAttribute(attrs: TAttributes, name: string): number {\n let i = attrs.indexOf(AttributeMarker.Template);\n if (i > -1) {\n i++;\n while (i < attrs.length) {\n const attr =

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attrs[i];\n // Return in case we checked all template attrs and are switching to the next section in the\n // attrs
array (that starts with a number that represents an attribute marker).\n if (typeof attr === 'number') return -1;\n
if (attr === name) return i;\n i++;\n }\n }\n return -1;\n}\n\n/**\n * Checks whether a selector is inside
a CssSelectorList\n * @param selector Selector to be checked.\n * @param list List in which to look for the
selector.\n */\nexport function isSelectorInSelectorList(selector: CssSelector, list: CssSelectorList): boolean {\n
selectorListLoop: for (let i = 0; i < list.length; i++) {\n const currentSelectorInList = list[i];\n if (selector.length
!== currentSelectorInList.length) {\n continue;\n }\n for (let j = 0; j < selector.length; j++) {\n if
(selector[j] !== currentSelectorInList[j]) {\n continue selectorListLoop;\n }\n }\n return true;\n }\n
return false;\n}\n\nfunction maybeWrapInNotSelector(isNegativeMode: boolean, chunk: string): string {\n return
isNegativeMode ? ':not(' + chunk.trim() + ')' : chunk;\n}\n\nfunction stringifyCSSSelector(selector: CssSelector):
string {\n let result = selector[0] as string;\n let i = 1;\n let mode = SelectorFlags.ATTRIBUTE;\n let
currentChunk = ";\n let isNegativeMode = false;\n while (i < selector.length)
{\n let valueOrMarker = selector[i];\n if (typeof valueOrMarker === 'string') {\n if (mode &
SelectorFlags.ATTRIBUTE) {\n const attrValue = selector[++i] as string;\n currentChunk +=\n '[' +
valueOrMarker + (attrValue.length > 0 ? '=' + attrValue + '"' : ') + '];\n } else if (mode &
SelectorFlags.CLASS) {\n currentChunk += '.' + valueOrMarker;\n } else if (mode &
SelectorFlags.ELEMENT) {\n currentChunk += ' ' + valueOrMarker;\n }\n } else {\n // Append
current chunk to the final result in case we come across SelectorFlag, which\n // indicates that the previous
section of a selector is over. We need to accumulate content\n // between flags to make sure we wrap the chunk
later in :not() selector if needed, e.g.\n // ''\n // ['', Flags.CLASS, '.classA', Flags.CLASS | Flags.NOT,
'classB', '.classC']\n // ''\n // should be transformed to `.classA :not(.classB
.classC)`.\n // Note: for negative selector part, we accumulate content between flags until we find the\n
// next negative flag. This is needed to support a case where `:not()` rule contains more than\n // one chunk, e.g.
the following selector:\n // ''\n // ['', Flags.ELEMENT | Flags.NOT, 'p', Flags.CLASS, 'foo', Flags.CLASS |
Flags.NOT, 'bar']\n // ''\n // should be stringified to `:not(p.foo) :not(.bar)`\n // if (currentChunk !== ''
&& !isPositive(valueOrMarker)) {\n result += maybeWrapInNotSelector(isNegativeMode, currentChunk);\n
currentChunk = ";\n }\n mode = valueOrMarker;\n // According to CssSelector spec, once we come across
`SelectorFlags.NOT` flag, the negative\n // mode is maintained for remaining chunks of a selector.\n
isNegativeMode = isNegativeMode || !isPositive(mode);\n }\n i++;\n }\n if (currentChunk !== '') {\n result +=
maybeWrapInNotSelector(isNegativeMode,
currentChunk);\n }\n return result;\n}\n\n/**\n * Generates string representation of CSS selector in parsed form.\n
*\n * ComponentDef and DirectiveDef are generated with the selector in parsed form to avoid doing\n * additional
parsing at runtime (for example, for directive matching). However in some cases (for\n * example, while
bootstrapping a component), a string version of the selector is required to query\n * for the host element on the page.
This function takes the parsed form of a selector and returns\n * its string representation.\n */\n * @param
selectorList selector in parsed form\n * @returns string representation of a given selector\n */\nexport function
stringifyCSSSelectorList(selectorList: CssSelectorList): string {\n return
selectorList.map(stringifyCSSSelector).join(',');\n}\n\n/**\n * Extracts attributes and classes information from a
given CSS selector.\n */\n * This function is used while creating a component dynamically. In this case, the host
element\n *
(that is created dynamically) should contain attributes and classes specified in component's CSS\n * selector.\n */\n
* @param selector CSS selector in parsed form (in a form of array)\n * @returns object with `attrs` and `classes`
fields that contain extracted information\n */\nexport function extractAttrsAndClassesFromSelector(selector:
CssSelector):\n { attrs: string[], classes: string[] } {\n const attrs: string[] = [];\n const classes: string[] = [];\n let i
= 1;\n let mode = SelectorFlags.ATTRIBUTE;\n while (i < selector.length) {\n let valueOrMarker = selector[i];\n
if (typeof valueOrMarker === 'string') {\n if (mode === SelectorFlags.ATTRIBUTE) {\n if
(valueOrMarker !== '=') {\n attrs.push(valueOrMarker, selector[++i] as string);\n }\n } else if (mode
=== SelectorFlags.CLASS) {\n classes.push(valueOrMarker);\n }\n } else {\n // According to

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CssSelector spec, once we come across `SelectorFlags.NOT` flag, the negative\n
    // mode is maintained for remaining chunks of a selector. Since attributes and classes are\n    // extracted only
for \"positive\" part of the selector, we can stop here.\n    if (!isPositive(mode)) break;\n    mode =
valueOrMarker;\n    }\n    i++;\n    }\n    return {attrs, classes};\n}\n\n\", \"**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n * \n\nexport interface NO_CHANGE {\n    // This is a brand that ensures
that this type can never match anything else\n    __brand__: 'NO_CHANGE';\n}\n\n\"**\n * A special value which
designates that a value has not changed. *\n\nexport const NO_CHANGE: NO_CHANGE =\n    (typeof ngDevMode
=== 'undefined' || ngDevMode) ? {__brand__: 'NO_CHANGE'} : ({} as NO_CHANGE);\n\n\", \"**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\nimport {assertGreaterThan} from
'./../util/assert';\nimport {assertIndexInDeclRange} from './assert';\nimport {executeCheckHooks,
executeInitAndCheckHooks} from './hooks';\nimport {FLAGS, InitPhaseState, LView, LViewFlags, TView} from
'./interfaces/view';\nimport {getLView, getSelectedIndex, getTView, isInCheckNoChangesMode,
setSelectedIndex} from './state';\n\n\"**\n * Advances to an element for later binding instructions.\n * Used in
conjunction with instructions like {@link property} to act on elements with specified\n * indices, for example those
created with {@link element} or {@link elementStart}.\n * \n\n * ``ts\n * (rf: RenderFlags, ctx: any) => {\n *     if (rf
& 1) {\n *         text(0, 'Hello');\n *         text(1, 'Goodbye')\n *         element(2, 'div');\n *     }\n *     if (rf & 2) {\n *
advance(2); // Advance twice to the <div>.\n *         property('title', 'test');\n *     }\n *     }\n *     ``\n * @param delta
Number of elements to advance forwards by.\n * \n\n * @codeGenApi\n *\n\nexport function advance(delta: number):
void {\n    ngDevMode && assertGreaterThan(delta, 0, 'Can only advance forward');\n    selectIndexInternal(\n
getTView(), getLView(), getSelectedIndex() + delta, !!ngDevMode &&
isInCheckNoChangesMode());\n}\n\n\nexport function selectIndexInternal(\n    tView: TView, lView: LView, index:
number, checkNoChangesMode: boolean) {\n    ngDevMode && assertIndexInDeclRange(lView, index);\n\n    //
Flush the initial hooks for elements in the view that have been added up to this point.\n    // PERF WARNING: do
NOT extract this to a separate function without running benchmarks\n    if (!checkNoChangesMode) {\n        const
hooksInitPhaseCompleted =\n            (lView[FLAGS] & LViewFlags.InitPhaseStateMask) ===
InitPhaseState.InitPhaseCompleted;\n        if (hooksInitPhaseCompleted) {\n            const preOrderCheckHooks =
tView.preOrderCheckHooks;\n            if (preOrderCheckHooks !== null) {\n                executeCheckHooks(lView,
preOrderCheckHooks, index);\n            }\n        } else {\n            const preOrderHooks = tView.preOrderHooks;\n            if
(preOrderHooks !== null) {\n                executeInitAndCheckHooks(lView, preOrderHooks,
InitPhaseState.OnInitHooksToBeRun, index);\n            }\n        }\n    }\n\n    // We must set the selected index *after*
running the hooks, because hooks may have side-effects\n    // that cause other template functions to run, thus
updating the selected index, which is global\n    // state. If we run `setSelectedIndex` *before* we run the hooks, in
some cases the selected index\n    // will be altered by the time we leave the `advance` instruction.\n
setSelectedIndex(index);\n}\n\n\", \"**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n\nimport {resolveForwardRef} from './forward_ref';\nimport {inject,
invalidFactoryDep} from './injector_compatibility';\nimport
{defineInjectable, defineInjector} from './interface/defs';\n\n\"**\n * A mapping of the @angular/core API surface
used in generated expressions to the actual symbols.\n * \n\n * This should be kept up to date with the public exports of
@angular/core.\n *\n\nexport const angularCoreDiEnv: {[name: string]: Function} = {\n    'defineInjectable':
defineInjectable,\n    'defineInjector': defineInjector,\n    'inject': inject,\n    'invalidFactoryDep': invalidFactoryDep,\n
'resolveForwardRef': resolveForwardRef,\n};\n\n\", \"**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n * \n\nimport {getCompilerFacade, JitCompilerUsage,
R3InjectableMetadataFacade} from './../compiler/compiler_facade';\nimport {Type} from
'./../interface/type';\nimport {NG_FACTORY_DEF} from './../render3/fields';\nimport {getClosureSafeProperty}

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from '../util/property';\nimport {resolveForwardRef} from './forward_ref';\nimport {Injectable} from
'./injectable';\nimport {NG_PROV_DEF} from './interface/defs';\nimport {ClassSansProvider,
ExistingSansProvider, FactorySansProvider, ValueProvider, ValueSansProvider} from
'./interface/provider';\n\nimport {angularCoreDiEnv} from './environment';\nimport {convertDependencies,
reflectDependencies} from './util';\n\n\n\n**\n * Compile an Angular injectable according to its `Injectable`
metadata, and patch the resulting\n * injectable def (`prov`) onto the injectable type.\n *^\nexport function
compileInjectable(type: Type<any>, meta?: Injectable): void {\n let ngInjectableDef: any = null;\n let
ngFactoryDef: any = null;\n\n // if NG_PROV_DEF is already defined on this class then don't overwrite it\n if
(!type.hasOwnProperty(NG_PROV_DEF)) {\n Object.defineProperty(type, NG_PROV_DEF, {\n get: () =>
{\n if (ngInjectableDef === null) {\n const
compiler =\n getCompilerFacade({usage: JitCompilerUsage.Decorator, kind: 'injectable', type});\n
ngInjectableDef = compiler.compileInjectable(\n angularCoreDiEnv, `ng://${type.name}/prov.js`,
getInjectableMetadata(type, meta));\n } return ngInjectableDef;\n },\n });\n }\n\n // if
NG_FACTORY_DEF is already defined on this class then don't overwrite it\n if
(!type.hasOwnProperty(NG_FACTORY_DEF)) {\n Object.defineProperty(type, NG_FACTORY_DEF, {\n
get: () => {\n if (ngFactoryDef === null) {\n const compiler =\n getCompilerFacade({usage:
JitCompilerUsage.Decorator, kind: 'injectable', type});\n ngFactoryDef =
compiler.compileFactory(angularCoreDiEnv, `ng://${type.name}/fac.js`, {\n name: type.name,\n
type,\n typeArgumentCount: 0, // In JIT mode types are not available nor used.\n deps:
reflectDependencies(type),\n target: compiler.FactoryTarget.Injectable\n
});\n } return ngFactoryDef;\n },\n } // Leave this configurable so that the factories from
directives or pipes can take precedence.\n configurable: true\n });\n }\n}\n\nntype useClassProvider =
Injectable&ClassSansProvider&{deps?: any[]};\n\nconst USE_VALUE =\n getClosureSafeProperty<ValueProvider>({provide: String, useValue: getClosureSafeProperty});\n\nfunction
isUseClassProvider(meta: Injectable): meta is UseClassProvider {\n return (meta as UseClassProvider).useClass
!== undefined;\n}\n\nfunction isUseValueProvider(meta: Injectable): meta is Injectable&ValueSansProvider {\n
return USE_VALUE in meta;\n}\n\nfunction isUseFactoryProvider(meta: Injectable): meta is
Injectable&FactorySansProvider {\n return (meta as FactorySansProvider).useFactory !==
undefined;\n}\n\nfunction isUseExistingProvider(meta: Injectable): meta is Injectable&ExistingSansProvider {\n
return (meta as ExistingSansProvider).useExisting
!== undefined;\n}\n\nfunction getInjectableMetadata(type: Type<any>, srcMeta?: Injectable):
R3InjectableMetadataFacade {\n // Allow the compilation of a class with a `@Injectable` decorator without
parameters\n const meta: Injectable = srcMeta || {providedIn: null};\n const compilerMeta:
R3InjectableMetadataFacade = {\n name: type.name,\n type: type,\n typeArgumentCount: 0,\n providedIn:
meta.providedIn,\n }; \n if ((isUseClassProvider(meta) || isUseFactoryProvider(meta)) && meta.deps !==
undefined) {\n compilerMeta.deps = convertDependencies(meta.deps);\n } \n // Check to see if the user explicitly
provided a `useXxxx` property.\n if (isUseClassProvider(meta)) {\n compilerMeta.useClass = meta.useClass;\n }
else if (isUseValueProvider(meta)) {\n compilerMeta.useValue = meta.useValue;\n } else if
(isUseFactoryProvider(meta)) {\n compilerMeta.useFactory = meta.useFactory;\n } else if
(isUseExistingProvider(meta)) {\n compilerMeta.useExisting = meta.useExisting;\n
}\n return compilerMeta;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {Type} from './interface/type';\nimport {makeDecorator, TypeDecorator}
from './util/decorators';\n\nimport {ClassSansProvider, ConstructorSansProvider, ExistingSansProvider,
FactorySansProvider, StaticClassSansProvider, ValueSansProvider} from './interface/provider';\nimport
{compileInjectable} from './jit/injectable';\n\nexport {compileInjectable};\n\n/**\n * Injectable providers used in
`@Injectable` decorator.\n *\n * @publicApi\n */\nexport type InjectableProvider =
ValueSansProvider|ExistingSansProvider|StaticClassSansProvider|\n

```



ConstructorSansProvider|FactorySansProvider|ClassSansProvider;\n\n/\*\*\n \* Type of the Injectable decorator / constructor function.\n \* \n \* @publicApi\n \* ^\nexport interface InjectableDecorator

```
{\n /**\n * Decorator that marks a class as available to be\n * provided and injected as a dependency.\n * \n * @see [Introduction to Services and DI](guide/architecture-services)\n * @see [Dependency Injection Guide](guide/dependency-injection)\n * \n * @usageNotes\n * \n * Marking a class with `@Injectable` ensures that the compiler\n * will generate the necessary metadata to create the class's\n * dependencies when the class is injected.\n * \n * The following example shows how a service class is properly\n * marked so that a supporting service can be injected upon creation.\n * \n * <code-example path="core/di/ts/metadata_spec.ts" region="Injectable"></code-example>\n * \n * \n (): TypeDecorator;\n (options?: { providedIn: Type<any>|'root'|'platform'|'any'|null}&\n InjectableProvider): TypeDecorator;\n new(): Injectable;\n new(options?: { providedIn: Type<any>|'root'|'platform'|'any'|null}&\n InjectableProvider): Injectable;\n }\n\n/**\n * Type of the Injectable metadata.\n * \n * @publicApi\n * ^\nexport interface Injectable {\n /**\n * Determines which injectors will provide the injectable.\n * \n * - `Type<any>` - associates the injectable with an `@NgModule` or other `InjectorType`,\n * - 'null' : Equivalent to `undefined`. The injectable is not provided in any scope automatically\n * and must be added to a `providers` array of an
```

```
@NgModule](api/core/NgModule#providers),\n * [@Component](api/core/Directive#providers) or [Directive](api/core/Directive#providers).\n * \n * The following options specify that this injectable should be provided in one of the following\n * injectors:\n * - 'root' : The application-level injector in most apps.\n * - 'platform' : A special singleton platform injector shared by all\n * applications on the page.\n * - 'any' : Provides a unique instance in each lazy loaded module while all eagerly loaded\n * modules share one instance.\n * \n * \n ^\n providedIn?:
```

```
Type<any>|'root'|'platform'|'any'|null;\n }\n\n/**\n * Injectable decorator and metadata.\n * \n * @Annotation\n * @publicApi\n * ^\nexport const Injectable: InjectableDecorator = makeDecorator(\n 'Injectable', undefined, undefined, undefined,\n (type: Type<any>, meta: Injectable) => compileInjectable(type as any, meta));\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport {flatten} from './util/array_utils';\nimport {EMPTY_ARRAY} from './util/empty';\nimport {stringify} from './util/stringify';\nimport {Injector} from './injector';\nimport {StaticProvider} from './interface/provider';\nimport {importProvidersFrom} from './provider_collection';\nimport {getNullInjector, R3Injector} from './r3_injector';\nimport {InjectorScope} from './scope';\n\n/**\n * Create a new `Injector` which is configured using a `defType` of `InjectorType<any>`.\n * \n * @publicApi\n * ^\nexport function createInjector(\n defType: /* InjectorType<any> */ any, parent: Injector|null = null,\n additionalProviders: StaticProvider[]|null = null, name?: string): Injector {\n const injector =\n createInjectorWithoutInjectorInstances(defType, parent, additionalProviders, name);\n injector.resolveInjectorInitializers();\n return injector;\n }\n\n/**\n * Creates a new injector without eagerly resolving its injector types. Can be used in places\n * where resolving the injector types immediately can lead to an infinite loop. The injector types\n * should be resolved at a later point by calling `_resolveInjectorDefTypes`.\n * \n * ^\nexport function createInjectorWithoutInjectorInstances(\n defType: /* InjectorType<any> */ any, parent: Injector|null = null,\n additionalProviders: StaticProvider[]|null = null, name?: string,\n scopes = new Set<InjectorScope>()): R3Injector {\n const providers = [\n additionalProviders || EMPTY_ARRAY,\n importProvidersFrom(defType),\n ];\n name = name || (typeof defType === 'object' ? undefined : stringify(defType));\n\n return new R3Injector(providers, parent || getNullInjector(), name || null, scopes);\n }\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport {createInjector} from './create_injector';\nimport {THROW_IF_NOT_FOUND, inject} from './injector_compatibility';\nimport {InjectorMarkers} from './injector_marker';\nimport {INJECTOR} from './injector_token';\nimport {defineInjectable} from './interface/defs';\nimport {InjectFlags} from './interface/injector';\nimport {StaticProvider} from './interface/provider';\nimport {NullInjector} from './null_injector';\nimport {ProviderToken} from './provider_token';\n\n/**\n * Concrete injectors implement this
```

interface. Injectors

are configured with [providers](guide/glossary#provider) that associate dependencies of various types with [injection tokens](guide/glossary#di-token).  
@see [DI Providers](guide/dependency-injection-providers).  
@see `StaticProvider`  
@usageNotes  
The following example creates a service injector instance.  
@example core/di/ts/provider\_spec.ts region='ConstructorProvider'  
### Usage  
example  
@example core/di/ts/injector\_spec.ts region='Injector'  
`Injector` returns itself when given `Injector` as a token:  
@example core/di/ts/injector\_spec.ts region='injectInjector'  
@publicApi  
export abstract class Injector {  
 static THROW\_IF\_NOT\_FOUND = THROW\_IF\_NOT\_FOUND;  
 static NULL: Injector = (/\* \_\_PURE\_\_ \*/ new NullInjector());  
 /\*\*  
 \* Retrieves an instance from the injector based on the provided token.  
 \* @returns The instance from the injector if defined, otherwise the `notFoundValue`.  
 \* @throws When the `notFoundValue` is `undefined` or `Injector.THROW\_IF\_NOT\_FOUND`.  
 \*/  
 abstract get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T;  
 /\*\*  
 \* @deprecated from v4.0.0 use ProviderToken<T>  
 \* @suppress {duplicate}  
 \*/  
 abstract get(token: any, notFoundValue?: any): any;  
 /\*\*  
 \* @deprecated from v5 use the new signature Injector.create(options)  
 \*/  
 static create(providers: StaticProvider[], parent?: Injector): Injector;  
 /\*\*  
 \* Creates a new injector instance that provides one or more dependencies, according to a given type or types of `StaticProvider`.  
 \* @param options An object with the following properties:  
 \* \* `providers`: An array of providers of the [StaticProvider type](api/core/StaticProvider).  
 \* \* `parent`: (optional) A parent injector.  
 \* \* `name`: (optional) A developer-defined identifying name for the new injector.  
 \* @returns The new injector instance.  
 \*/  
 static create(options: { providers: StaticProvider[], parent?: Injector, name?: string }): Injector;  
 static create(options: StaticProvider[] | { providers: StaticProvider[], parent?: Injector, name?: string }, parent?: Injector): Injector {  
 if (Array.isArray(options)) {  
 return createInjector({ name: "", parent, options, "" });  
 } else {  
 const name = options.name ?? "";  
 return createInjector({ name, options.parent, options.providers, name });  
 }  
 }  
 /\*\*  
 \* @nocollapse  
 \*/  
 static prov = /\* @pureOrBreakMyCode \*/ defineInjectable({  
 token: Injector,  
 providedIn: 'any',  
 factory: () => inject(INJECTOR),  
 });  
 /\*\*  
 \* @internal  
 \* @nocollapse  
 \*/  
 static \_\_NG\_ELEMENT\_ID\_\_ = InjectorMarkers.Injector;  
}  
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```
import {Type} from '../interface/type';
import {ERROR_ORIGINAL_ERROR, wrappedError} from '../util/errors';
import {stringify} from '../util/stringify';
import {ReflectiveInjector} from './reflective_injector';
import {ReflectiveKey} from './reflective_key';
function findFirstClosedCycle(keys: any[]): any[] {
  const res: any[] = [];
  for (let i = 0; i < keys.length; ++i) {
    if (res.indexOf(keys[i]) > -1) {
      res.push(keys[i]);
      return res;
    }
    res.push(keys[i]);
  }
  return res;
}
function constructResolvingPath(keys: any[]): string {
  if (keys.length > 1) {
    const reversed = findFirstClosedCycle(keys.slice().reverse());
    const tokenStrs = reversed.map(k => stringify(k.token));
    return '(' + tokenStrs.join(' -> ') + ')';
  }
  return "";
}
export interface InjectionError extends Error {
  keys: ReflectiveKey[];
  injectors: ReflectiveInjector[];
  constructResolvingMessage: (keys: ReflectiveKey[]) => string;
  addKey(injector: ReflectiveInjector, key: ReflectiveKey): void;
}
function injectionError(
  injector: ReflectiveInjector, key: ReflectiveKey,
  constructResolvingMessage: (keys: ReflectiveKey[]) => string,
  originalError?: Error): InjectionError {
  const keys = [key];
  const errMsg = constructResolvingMessage(keys);
  const error = (originalError ? wrappedError(errMsg, originalError) : Error(errMsg)) as InjectionError;
  error.addKey = addKey;
  error.keys = keys;
  error.injectors = [injector];
  error.constructResolvingMessage = constructResolvingMessage;
  (error as any)[ERROR_ORIGINAL_ERROR] = originalError;
  return error;
}
function addKey(this: InjectionError, injector: ReflectiveInjector, key: ReflectiveKey): void {
  this.injectors.push(injector);
  this.keys.push(key);
  // Note: This updated message won't be reflected in the `stack` property
  this.message = this.constructResolvingMessage(this.keys);
}
/**
 * Thrown when
```

```

trying to retrieve a dependency by key from { @link Injector}, but the
 * { @link Injector} does not have a { @link
Provider} for the given key.
 * @usageNotes
 * ### Example
 * ```typescript
 * class A {
 *   constructor(b:B) {}
 * }
 * expect(() => Injector.resolveAndCreate([A])).toThrowError();
 * ```
 * \nexport
function noProviderError(injector: ReflectiveInjector, key: ReflectiveKey): InjectionError {
 * return
 * injectionError(injector, key, function(keys: ReflectiveKey[]) {
 *   const first = stringify(keys[0].token);
 *   return
 *   `No provider for ${first}!${constructResolvingPath(keys)}`;
 * });
 * }
 * \n\n/**
 * Thrown when dependencies form a
cycle.
 * @usageNotes
 * ### Example
 * ```typescript
 * var injector = Injector.resolveAndCreate([
 *   { provide: 'one', useFactory: (two) => 'two', deps: [[new Inject('two')]] },
 *   { provide: 'two', useFactory:
(one) => 'one', deps: [[new Inject('one')]] }
 * ]);
 * expect(() => injector.get('one')).toThrowError();
 * ```
 * \n * Retrieving `A` or `B` throws a `CyclicDependencyError` as the graph above cannot be constructed.
 * \nexport
function cyclicDependencyError(injector: ReflectiveInjector, key: ReflectiveKey): InjectionError {
 * return
 * injectionError(injector, key, function(keys: ReflectiveKey[]) {
 *   return `Cannot instantiate cyclic
dependency!${constructResolvingPath(keys)}`;
 * });
 * }
 * \n\n/**
 * Thrown when a constructing type returns with
an Error.
 * \n * The `InstantiationError` class contains the original error plus the dependency graph which caused
 * this object to be instantiated.
 * @usageNotes
 * ### Example
 * ```typescript
 * class A {
 *   constructor() {
 *     throw new Error('message');
 *   }
 * }
 * var injector =
Injector.resolveAndCreate([A]);
 * try {
 *   injector.get(A);
 * } catch (e) {
 *   expect(e instanceof
InstantiationError).toBe(true);
 *   expect(e.originalException.message).toEqual('message');
 *   expect(e.originalStack).toBeDefined();
 * }
 * ```
 * \nexport
function instantiationError(injector:
ReflectiveInjector, originalException: any, originalStack: any,
 * key: ReflectiveKey): InjectionError {
 * return
 * injectionError(injector, key, function(keys: ReflectiveKey[]) {
 *   const first = stringify(keys[0].token);
 *   return
 *   `${originalException.message}: Error during instantiation of ${first}!${
 *   constructResolvingPath(keys)}`;
 * }, originalException);
 * }
 * \n\n/**
 * Thrown when an object other than { @link Provider} (or `Type`) is passed to
{ @link Injector}
 * creation.
 * @usageNotes
 * ### Example
 * ```typescript
 * expect(() =>
Injector.resolveAndCreate(['not a type'])).toThrowError();
 * ```
 * \nexport
function
invalidProviderError(provider: any) {
 * return
 * Error(`Invalid provider - only instances of Provider and Type
are allowed, got: ${provider}`);
 * }
 * \n\n/**
 * Thrown when the class has no annotation information.
 * \n * Lack of annotation information prevents the { @link Injector} from determining which dependencies
 * need
to be injected into the constructor.
 * @usageNotes
 * ### Example
 * ```typescript
 * class A {
 *   constructor(b) {}
 * }
 * expect(() => Injector.resolveAndCreate([A])).toThrowError();
 * ```
 * \n * This
error is also thrown when the class not marked with { @link Injectable} has parameter types.
 * ```typescript
 * class B {}
 * class A {
 *   constructor(b:B) {} // no information about the parameter types of A is available at
runtime.
 * }
 * expect(() => Injector.resolveAndCreate([A,B])).toThrowError();
 * ```
 * \nexport
function noAnnotationError(typeOrFunc: Type<any>|Function, params: any[][]): Error {
 * const signature: string[]
= [];
 * for (let i = 0, ii = params.length; i < ii; i++) {
 *   const parameter = params[i];
 *   if (!parameter ||
parameter.length == 0) {
 *     signature.push('?');
 *   } else {
 *     signature.push(parameter.map(stringify).join(' '));
 *   }
 * }
 * return
 * Error(`Cannot resolve all parameters
for ` + stringify(typeOrFunc) + `(` +
signature.join(', ') + `). ` +
 * `Make sure that all the parameters are
decorated with Inject or have valid type annotations and that ` +
stringify(typeOrFunc) + ` is decorated with
Injectable.`);
 * }
 * \n\n/**
 * Thrown when getting an object by index.
 * @usageNotes
 * ### Example
 * ```typescript
 * class A {
 * }
 * var injector = Injector.resolveAndCreate([A]);
 * expect(() =>
injector.getAt(100)).toThrowError();
 * ```
 * \nexport
function outOfBoundsError(index: number) {
 * return
 * Error(`Index ${index} is out-of-bounds.`);
 * }
 * \n\n// TODO: add a working example after alpha38 is released
 * \n/**
 * Thrown when a multi provider and a regular provider are bound to the same token.
 * @usageNotes
 * ###
Example
 * ```typescript
 * expect(() => Injector.resolveAndCreate([
 *   { provide: 'Strings', useValue: 'string1', multi: true },
 *   { provide: 'Strings', useValue: 'string2',
multi: false }
 * ])).toThrowError();
 * ```
 * \nexport
function
mixingMultiProvidersWithRegularProvidersError(provider1: any, provider2: any): Error {
 * return

```

```

Error(`Cannot mix multi providers and regular providers, got: ${provider1} ${provider2}`);
\n\n"/**\n *
 @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
 style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport { RuntimeError,
 RuntimeErrorCode } from './errors';\nimport { stringify } from './util/stringify';\n\nimport { resolveForwardRef } from
 './forward_ref';\n\n/**\n * A unique object used for retrieving items from the { @link ReflectiveInjector}.\n *\n *
 Keys have:\n * - a system-wide unique `id`\n * - a `token`\n * - a `Key` is used internally by { @link
 ReflectiveInjector } because its
 system-wide unique `id` allows\n * the\n * injector to store created objects in a more efficient way.\n *\n * `Key`
 should not be created directly. { @link ReflectiveInjector } creates keys automatically when\n * resolving\n *
 providers.\n *\n * @deprecated No replacement\n * @publicApi\n */\nexport class ReflectiveKey {\n public
 readonly displayName: string;\n /**\n * Private\n */\n constructor(public token: Object, public id: number) {\n
 if (!token) {\n throw new RuntimeError(\n RuntimeErrorCode.MISSING_INJECTION_TOKEN,
 ngDevMode && 'Token must be defined!');\n }
 this.displayName = stringify(this.token);\n }\n /**\n *
 Retrieves a `Key` for a token.\n */\n static get(token: Object): ReflectiveKey {\n return
 _globalKeyRegistry.get(resolveForwardRef(token));\n }\n /**\n * @returns the number of keys registered in the
 system.\n */\n static get numberOfKeys(): number {\n return _globalKeyRegistry.numberOfKeys;\n
 }\n\n}\n\nexport class
 KeyRegistry {\n private _allKeys = new Map<Object, ReflectiveKey>();\n\n get(token: Object): ReflectiveKey
 {\n if (token instanceof ReflectiveKey) return token;\n if (this._allKeys.has(token)) {\n return
 this._allKeys.get(token)!;\n }\n\n const newKey = new ReflectiveKey(token, ReflectiveKey.numberOfKeys);\n
 this._allKeys.set(token, newKey);\n return newKey;\n }\n\n get numberOfKeys(): number {\n return
 this._allKeys.size;\n }\n}\n\nconst _globalKeyRegistry = new KeyRegistry();\n"/**\n * @license\n * Copyright
 Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
 * found in the LICENSE file at https://angular.io/license\n *\n\nimport { Type } from './interface/type';\n\nimport
 { resolveForwardRef } from './forward_ref';\nimport { InjectionToken } from './injection_token';\nimport
 { ClassProvider, ExistingProvider, FactoryProvider, Provider, TypeProvider, ValueProvider } from
 './interface/provider';\nimport
 { getReflect } from './jit/util';\nimport { Inject, Optional, Self, SkipSelf } from './metadata';\nimport
 { invalidProviderError, mixingMultiProvidersWithRegularProvidersError, noAnnotationError } from
 './reflective_errors';\nimport { ReflectiveKey } from './reflective_key';\n\ninterface NormalizedProvider extends
 TypeProvider, ValueProvider, ClassProvider, ExistingProvider,\n FactoryProvider
 {\n\n/**\n * `Dependency` is used by the framework\n to extend DI.\n * This is internal to Angular and should not be
 used directly.\n */\nexport class ReflectiveDependency {\n constructor(\n public key: ReflectiveKey, public
 optional: boolean, public visibility: Self|SkipSelf|null) {\n\n static fromKey(key: ReflectiveKey):
 ReflectiveDependency {\n return new ReflectiveDependency(key, false, null);\n }\n}\n\nconst _EMPTY_LIST:
 any[] = [];\n"/**\n * An internal resolved representation of a `Provider` used by the `Injector`.\n *\n *
 @usageNotes\n *
 This is usually created automatically by `Injector.resolveAndCreate`.\n *\n * It can be created manually, as
 follows:\n *\n * #### Example\n *\n * ```typescript\n * var resolvedProviders = Injector.resolve({ provide:
 'message', useValue: 'Hello' });\n * var injector = Injector.fromResolvedProviders(resolvedProviders);\n *\n *
 expect(injector.get('message')).toEqual('Hello');\n * ```\n *\n * @publicApi\n */\nexport interface
 ResolvedReflectiveProvider {\n /**\n * A key, usually a `Type<any>`\n */\n key: ReflectiveKey;\n /**\n *
 Factory function which can return an instance of an object represented by a key.\n */\n resolvedFactories:
 ResolvedReflectiveFactory[];\n /**\n * Indicates if the provider is a multi-provider or a regular provider.\n */\n
 multiProvider: boolean;\n\n}\n\nexport class ResolvedReflectiveProvider_ implements ResolvedReflectiveProvider
 {\n readonly resolvedFactory: ResolvedReflectiveFactory;\n\n constructor(\n public key: ReflectiveKey, public
 resolvedFactories: ResolvedReflectiveFactory[],\n public multiProvider: boolean) {\n this.resolvedFactory =
 this.resolvedFactories[0];\n }\n}\n\n/**\n * An internal resolved representation of a factory function created by

```

```

resolving `Provider`.n * @publicApi\n *^nexport class ResolvedReflectiveFactory {\n  constructor(\n    /**\n    * Factory function which can return an instance of an object represented by a key.\n    */\n    public factory:\n    Function,\n    /**\n    * Arguments (dependencies) to the `factory` function.\n    */\n    public dependencies:\n    ReflectiveDependency[]\n  ) {\n\n    /**\n    * Resolve a single provider.\n    */\n    function\n    resolveReflectiveFactory(provider: NormalizedProvider): ResolvedReflectiveFactory {\n      let factoryFn: Function;\n      let resolvedDeps: ReflectiveDependency[];\n      if (provider.useClass) {\n        const useClass =\n        resolveForwardRef(provider.useClass);\n        factoryFn = getReflect().factory(useClass);\n        resolvedDeps =\n        _dependenciesFor(useClass);\n      }\n      else if (provider.useExisting) {\n        factoryFn = (aliasInstance: any) => aliasInstance;\n        resolvedDeps =\n        [ReflectiveDependency.fromKey(ReflectiveKey.get(provider.useExisting))];\n      }\n      else if (provider.useFactory) {\n        factoryFn = provider.useFactory;\n        resolvedDeps = constructDependencies(provider.useFactory, provider.deps);\n      }\n      else {\n        factoryFn = () => provider.useValue;\n        resolvedDeps = _EMPTY_LIST;\n      }\n      return new\n      ResolvedReflectiveFactory(factoryFn, resolvedDeps);\n    }\n\n    /**\n    * Converts the `Provider` into\n    * `ResolvedProvider`.n * `Injector` internally only uses `ResolvedProvider`, `Provider` contains convenience\n    * provider.n * syntax.\n    */\n    function resolveReflectiveProvider(provider: NormalizedProvider):\n    ResolvedReflectiveProvider {\n      return new ResolvedReflectiveProvider_(\n        ReflectiveKey.get(provider.provide), [resolveReflectiveFactory(provider)],\n        provider.multi || false);\n    }\n\n    /**\n    * Resolve a list of Providers.\n    */\n\n    /**\n    *^nexport function resolveReflectiveProviders(providers: Provider[]): ResolvedReflectiveProvider[] {\n      const\n      normalized = _normalizeProviders(providers, []);\n      const resolved = normalized.map(resolveReflectiveProvider);\n      const resolvedProviderMap = mergeResolvedReflectiveProviders(resolved, new Map());\n      return\n      Array.from(resolvedProviderMap.values());\n    }\n\n    /**\n    * Merges a list of ResolvedProviders into a list where each\n    * key is contained exactly once and\n    * multi providers have been merged.\n    */\n\n    /**\n    *^nexport function\n    mergeResolvedReflectiveProviders(\n      providers: ResolvedReflectiveProvider[],\n      normalizedProvidersMap:\n      Map<number, ResolvedReflectiveProvider>:\n      Map<number, ResolvedReflectiveProvider> {\n      for (let i = 0; i <\n      providers.length; i++) {\n        const provider = providers[i];\n        const existing =\n        normalizedProvidersMap.get(provider.key.id);\n        if (existing) {\n          if (provider.multiProvider !==\n          existing.multiProvider) {\n            throw mixingMultiProvidersWithRegularProvidersError(existing,\n            provider);\n          }\n          if (provider.multiProvider) {\n            for (let j = 0; j < provider.resolvedFactories.length; j++)\n            {\n              existing.resolvedFactories.push(provider.resolvedFactories[j]);\n            }\n          }\n        }\n        else {\n          normalizedProvidersMap.set(provider.key.id, provider);\n        }\n      }\n      else {\n        let resolvedProvider:\n        ResolvedReflectiveProvider;\n        if (provider.multiProvider) {\n          resolvedProvider = new\n          ResolvedReflectiveProvider_(\n            provider.key, provider.resolvedFactories.slice(), provider.multiProvider);\n        }\n        else {\n          resolvedProvider = provider;\n        }\n        normalizedProvidersMap.set(provider.key.id,\n        resolvedProvider);\n      }\n      return normalizedProvidersMap;\n    }\n\n    function _normalizeProviders(\n      providers:\n      Provider[], res: NormalizedProvider[]): NormalizedProvider[] {\n      providers.forEach(b => {\n        if (b instanceof\n        Type) {\n          res.push({provide: b, useClass: b} as NormalizedProvider);\n        }\n        else if (b && typeof b == 'object' && (b as any).provide !== undefined) {\n          res.push(b as\n          NormalizedProvider);\n        }\n        else if (Array.isArray(b)) {\n          _normalizeProviders(b, res);\n        }\n        else {\n          throw\n          invalidProviderError(b);\n        }\n      });\n      return res;\n    }\n\n    /**\n    *^nexport function constructDependencies(\n      typeOrFunc:\n      any, dependencies?: any[]): ReflectiveDependency[] {\n      if (!dependencies) {\n        return\n        _dependenciesFor(typeOrFunc);\n      }\n      else {\n        const params = dependencies.map(t => [t]);\n        return\n        dependencies.map(t => _extractToken(typeOrFunc, t, params));\n      }\n    }\n\n    function _dependenciesFor(typeOrFunc:\n    any): ReflectiveDependency[] {\n      const params = getReflect().parameters(typeOrFunc);\n      if (!params) return\n      [];\n      if (params.some(p => p == null)) {\n        throw noAnnotationError(typeOrFunc, params);\n      }\n      return\n      params.map(p => _extractToken(typeOrFunc, p, params));\n    }\n\n    function _extractToken(\n      typeOrFunc: any,\n      metadata:

```

```

any[]|any, params: any[][]): ReflectiveDependency {\n let token: any = null;\n let optional = false;\n\n if
(!Array.isArray(metadata)) {\n if (metadata instanceof Inject) {\n return _createDependency(metadata.token,
optional, null);\n } else {\n return _createDependency(metadata, optional, null);\n }\n }\n\n let visibility:
Self|SkipSelf|null = null;\n\n for (let i = 0; i < metadata.length; ++i) {\n const paramMetadata = metadata[i];\n\n
if (paramMetadata instanceof Type) {\n token = paramMetadata;\n\n } else if (paramMetadata instanceof
Inject) {\n token = paramMetadata.token;\n\n } else if (paramMetadata instanceof Optional) {\n optional =
true;\n\n } else if (paramMetadata instanceof Self || paramMetadata instanceof SkipSelf) {\n visibility =
paramMetadata;\n } else if (paramMetadata instanceof InjectionToken) {\n token = paramMetadata;\n }\n
}\n\n token = resolveForwardRef(token);\n\n if (token != null) {\n
return _createDependency(token, optional, visibility);\n } else {\n throw noAnnotationError(typeOrFunc,
params);\n }\n}\n\nfunction _createDependency(\n token: any, optional: boolean, visibility: Self|SkipSelf|null):
ReflectiveDependency {\n return new ReflectiveDependency(ReflectiveKey.get(token), optional,
visibility);\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {Injector} from './injector';\nimport {THROW_IF_NOT_FOUND} from
'./injector_compatibility';\nimport {Provider} from './interface/provider';\nimport {Self, SkipSelf} from
'./metadata';\nimport {cyclicDependencyError, instantiationError, noProviderError, outOfBoundsError} from
'./reflective_errors';\nimport {ReflectiveKey} from './reflective_key';\nimport {ReflectiveDependency,
ResolvedReflectiveFactory, ResolvedReflectiveProvider, resolveReflectiveProviders}
from './reflective_provider';\n\n\n// Threshold for the dynamic version\nconst UNDEFINED = {};\n\n/**\n * A
ReflectiveDependency injection container used for instantiating objects and resolving\n * dependencies.\n * An
`Injector` is a replacement for a `new` operator, which can automatically resolve the\n * constructor dependencies.\n
*\n * In typical use, application code asks for the dependencies in the constructor and they are\n * resolved by the
`Injector`.\n *\n * @usageNotes\n * ### Example\n *\n * The following example creates an `Injector` configured to
create `Engine` and `Car`.\n *\n * ```typescript\n * @Injectable()\n * class Engine {\n * }\n *\n * @Injectable()\n *
class Car {\n * constructor(public engine:Engine) {\n * }\n *\n * var injector =
ReflectiveInjector.resolveAndCreate([Car, Engine]);\n * var car = injector.get(Car);\n * expect(car instanceof
Car).toBe(true);\n * expect(car.engine instanceof Engine).toBe(true);\n * ```\n *\n * Notice,
we don't use the `new` operator because we explicitly want to have the `Injector`\n * resolve all of the object's
dependencies automatically.\n *\n * TODO: delete in v14.\n *\n * @deprecated from v5 - slow and brings in a lot of
code, Use `Injector.create` instead.\n *\n * @publicApi\n */\n\nexport abstract class ReflectiveInjector implements
Injector {\n /**\n * Turns an array of provider definitions into an array of resolved providers.\n *\n * A
resolution is a process of flattening multiple nested arrays and converting individual\n * providers into an array of
`ResolvedReflectiveProvider`s.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n *
@Injectable()\n * class Engine {\n * }\n *\n * @Injectable()\n * class Car {\n * constructor(public
engine:Engine) {\n * }\n *\n * var providers = ReflectiveInjector.resolve([Car, [[Engine]]]);\n *\n *
expect(providers.length).toEqual(2);\n *\n * expect(providers[0] instanceof
ResolvedReflectiveProvider).toBe(true);\n *\n * expect(providers[0].key.displayName).toBe("Car");\n *\n
expect(providers[0].dependencies.length).toEqual(1);\n *\n * expect(providers[0].factory).toBeDefined();\n *\n *
expect(providers[1].key.displayName).toBe("Engine");\n * };\n * ```\n *\n */\n\n static resolve(providers:
Provider[]): ResolvedReflectiveProvider[] {\n return resolveReflectiveProviders(providers);\n }\n\n /**\n *
Resolves an array of providers and creates an injector from those providers.\n *\n * The passed-in providers can
be an array of `Type`, `Provider`,\n * or a recursive array of more providers.\n *\n * @usageNotes\n * ###
Example\n *\n * ```typescript\n * @Injectable()\n * class Engine {\n * }\n *\n * @Injectable()\n * class
Car {\n * constructor(public engine:Engine) {\n * }\n *\n * var injector =
ReflectiveInjector.resolveAndCreate([Car, Engine]);\n * expect(injector.get(Car) instanceof Car).toBe(true);\n *
```
*\n

```

```

*/\n static resolveAndCreate(providers: Provider[], parent?: Injector): ReflectiveInjector {\n  const
ResolvedReflectiveProviders = ReflectiveInjector.resolve(providers);\n  return
ReflectiveInjector.fromResolvedProviders(ResolvedReflectiveProviders, parent);\n }\n\n /**\n * Creates an
injector from previously resolved providers.\n * \n * This API is the recommended way to construct injectors in
performance-sensitive parts.\n * \n * @usageNotes\n * ### Example\n * \n * ```typescript\n * @Injectable()\n
* class Engine {\n * }\n * \n * @Injectable()\n * class Car {\n *   constructor(public engine:Engine) {\n *
}\n * }\n * \n * var providers = ReflectiveInjector.resolve([Car, Engine]);\n * var injector =
ReflectiveInjector.fromResolvedProviders(providers);\n * expect(injector.get(Car) instanceof Car).toBe(true);\n *
```\n */\n\n */\n\n static fromResolvedProviders(providers: ResolvedReflectiveProvider[], parent?: Injector):\n
ReflectiveInjector {\n
  return new ReflectiveInjector_(providers, parent);\n }\n\n\n /**\n * Parent of this injector.\n * \n * <!--
TODO: Add a link to the section of the user guide talking about hierarchical injection.\n * -->\n */\n\n abstract get
parent(): Injector|null;\n\n /**\n * Resolves an array of providers and creates a child injector from those
providers.\n * \n * <!-- TODO: Add a link to the section of the user guide talking about hierarchical injection.\n *
-->\n * \n * The passed-in providers can be an array of `Type`, `Provider`,\n * or a recursive array of more
providers.\n * \n * @usageNotes\n * ### Example\n * \n * ```typescript\n * class ParentProvider {\n * }\n * class
ChildProvider {\n * }\n * \n * var parent = ReflectiveInjector.resolveAndCreate([ParentProvider]);\n * var child =
parent.resolveAndCreateChild([ChildProvider]);\n * \n * expect(child.get(ParentProvider) instanceof
ParentProvider).toBe(true);\n * \n * expect(child.get(ChildProvider) instanceof
ChildProvider).toBe(true);\n * \n * expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));\n *
```\n */\n\n */\n\n abstract resolveAndCreateChild(providers: Provider[]): ReflectiveInjector;\n\n /**\n * Creates a child injector
from previously resolved providers.\n * \n * <!-- TODO: Add a link to the section of the user guide talking about
hierarchical injection.\n * -->\n * \n * This API is the recommended way to construct injectors in performance-
sensitive parts.\n * \n * @usageNotes\n * ### Example\n * \n * ```typescript\n * class ParentProvider {\n * }\n
* class ChildProvider {\n * }\n * \n * var parentProviders = ReflectiveInjector.resolve([ParentProvider]);\n * var
childProviders = ReflectiveInjector.resolve([ChildProvider]);\n * \n * var parent =
ReflectiveInjector.fromResolvedProviders(parentProviders);\n * var child =
parent.createChildFromResolved(childProviders);\n * \n * expect(child.get(ParentProvider) instanceof
ParentProvider).toBe(true);\n * \n * expect(child.get(ChildProvider) instanceof ChildProvider).toBe(true);\n *
\n * expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));\n *
```\n */\n\n */\n\n abstract
createChildFromResolved(providers: ResolvedReflectiveProvider[]): ReflectiveInjector;\n\n\n /**\n * Resolves a
provider and instantiates an object in the context of the injector.\n * \n * The created object does not get cached by
the injector.\n * \n * @usageNotes\n * ### Example\n * \n * ```typescript\n * @Injectable()\n * class Engine
{\n * }\n * \n * @Injectable()\n * class Car {\n *   constructor(public engine:Engine) {\n * }\n * }\n * \n * var
injector = ReflectiveInjector.resolveAndCreate([Engine]);\n * \n * var car = injector.resolveAndInstantiate(Car);\n
* \n * expect(car.engine).toBe(injector.get(Engine));\n * \n * expect(car).not.toBe(injector.resolveAndInstantiate(Car));\n
*
```\n */\n\n */\n\n abstract resolveAndInstantiate(provider: Provider): any;\n\n\n /**\n * Instantiates an
object using a resolved provider in the context of the injector.\n * \n * The created object does not get cached by
the injector.\n * \n * @usageNotes\n * ### Example\n * \n * ```typescript\n * @Injectable()\n * class Engine
{\n * }\n * \n * @Injectable()\n * class Car {\n *   constructor(public engine:Engine) {\n * }\n * }\n * \n * var
injector = ReflectiveInjector.resolveAndCreate([Engine]);\n * var carProvider =
ReflectiveInjector.resolve([Car])[0];\n * var car = injector.instantiateResolved(carProvider);\n * \n *
expect(car.engine).toBe(injector.get(Engine));\n * \n * expect(car).not.toBe(injector.instantiateResolved(carProvider));\n
*
```\n */\n\n */\n\n abstract
instantiateResolved(provider: ResolvedReflectiveProvider): any;\n\n\n abstract get(token: any, notFoundValue?:
any): any;\n\n\n\nexport class ReflectiveInjector_ implements ReflectiveInjector {\n  private static INJECTOR_KEY
= (/ * @__PURE__ */ ReflectiveKey.get(Injector));\n  /** @internal */\n  _constructionCounter:

```

```

number = 0;\n /** @internal */\n public _providers: ResolvedReflectiveProvider[];\n public readonly parent:
Injector|null;\n\n keyIds: number[];\n objs: any[];\n /**\n * Private\n */\n constructor(_providers:
ResolvedReflectiveProvider[], _parent?: Injector) {\n this._providers = _providers;\n this.parent = _parent ||
null;\n\n const len = _providers.length;\n\n this.keyIds = [];\n this.objs = [];\n\n for (let i = 0; i < len; i++) {\n
this.keyIds[i] = _providers[i].key.id;\n this.objs[i] = UNDEFINED;\n }\n }\n\n get(token: any,
notFoundValue: any = THROW_IF_NOT_FOUND): any {\n return this._getByKey(ReflectiveKey.get(token),
null, notFoundValue);\n }\n\n resolveAndCreateChild(providers: Provider[]): ReflectiveInjector {\n const
ResolvedReflectiveProviders = ReflectiveInjector.resolve(providers);\n return
this.createChildFromResolved(ResolvedReflectiveProviders);\n }\n\n createChildFromResolved(providers:
ResolvedReflectiveProvider[]):
ReflectiveInjector {\n const inj = new ReflectiveInjector_(providers);\n (inj as {parent: Injector | null}).parent =
this;\n return inj;\n }\n\n resolveAndInstantiate(provider: Provider): any {\n return
this.instantiateResolved(ReflectiveInjector.resolve([provider])[0]);\n }\n\n instantiateResolved(provider:
ResolvedReflectiveProvider): any {\n return this._instantiateProvider(provider);\n }\n\n
getProviderAtIndex(index: number): ResolvedReflectiveProvider {\n if (index < 0 || index >=
this._providers.length) {\n throw outOfBoundsError(index);\n }\n return this._providers[index];\n }\n\n /**
@internal */\n _new(provider: ResolvedReflectiveProvider): any {\n if (this._constructionCounter++ >
this._getMaxNumberOfObjects()) {\n throw cyclicDependencyError(this, provider.key);\n }\n return
this._instantiateProvider(provider);\n }\n\n private _getMaxNumberOfObjects(): number {\n return
this.objs.length;\n }\n\n private
_instantiateProvider(provider: ResolvedReflectiveProvider): any {\n if (provider.multiProvider) {\n const res =
[];\n for (let i = 0; i < provider.resolvedFactories.length; ++i) {\n res[i] = this._instantiate(provider,
provider.resolvedFactories[i]);\n }\n return res;\n } else {\n return this._instantiate(provider,
provider.resolvedFactories[0]);\n }\n }\n\n private _instantiate(\n provider: ResolvedReflectiveProvider,\n
ResolvedReflectiveFactory: ResolvedReflectiveFactory): any {\n const factory =
ResolvedReflectiveFactory.factory;\n\n let deps: any[];\n try {\n deps =\n
ResolvedReflectiveFactory.dependencies.map(dep => this._getByReflectiveDependency(dep));\n } catch (e: any)
{\n if (e.addKey) {\n e.addKey(this, provider.key);\n }\n throw e;\n }\n\n let obj: any;\n try {\n
obj = factory(...deps);\n } catch (e) {\n throw instantiationError(this, e, (e as Error).stack,
provider.key);\n }\n\n return obj;\n }\n\n private _getByReflectiveDependency(dep: ReflectiveDependency):
any {\n return this._getByKey(dep.key, dep.visibility, dep.optional ? null : THROW_IF_NOT_FOUND);\n }\n\n
private _getByKey(key: ReflectiveKey, visibility: Self|SkipSelf|null, notFoundValue: any): any {\n if (key ===
ReflectiveInjector_.INJECTOR_KEY) {\n return this;\n }\n\n if (visibility instanceof Self) {\n return
this._getByKeySelf(key, notFoundValue);\n }\n\n } else {\n return this._getByKeyDefault(key, notFoundValue,
visibility);\n }\n }\n\n private _getObjByKeyId(keyId: number): any {\n for (let i = 0; i < this.keyIds.length;
i++) {\n if (this.keyIds[i] === keyId) {\n if (this.objs[i] === UNDEFINED) {\n this.objs[i] =
this._new(this._providers[i]);\n }\n\n return this.objs[i];\n }\n }\n\n return UNDEFINED;\n }\n\n
/** @internal */\n _throwOrNull(key: ReflectiveKey, notFoundValue:
any): any {\n if (notFoundValue !== THROW_IF_NOT_FOUND) {\n return notFoundValue;\n } else {\n
throw noProviderError(this, key);\n }\n }\n\n /** @internal */\n _getByKeySelf(key: ReflectiveKey,
notFoundValue: any): any {\n const obj = this._getObjByKeyId(key.id);\n return (obj !== UNDEFINED) ? obj :
this._throwOrNull(key, notFoundValue);\n }\n\n /** @internal */\n _getByKeyDefault(key: ReflectiveKey,
notFoundValue: any, visibility: Self|SkipSelf|null): any {\n let inj: Injector|null;\n\n if (visibility instanceof
SkipSelf) {\n inj = this.parent;\n } else {\n inj = this;\n }\n\n while (inj instanceof ReflectiveInjector_)
{\n const inj_ = <ReflectiveInjector_>inj;\n const obj = inj_._getObjByKeyId(key.id);\n if (obj !==
UNDEFINED) return obj;\n inj = inj_.parent;\n }\n\n if (inj !== null) {\n return inj.get(key.token,
notFoundValue);\n } else {\n return this._throwOrNull(key, notFoundValue);\n }

```



```

    }
  }
  get displayName(): string {
    const providers = _mapProviders(this, (b: ResolvedReflectiveProvider) => `\" + b.key.displayName + \"`)
    return providers.join(',')
  }
  toString(): string {
    return this.displayName
  }
}

function _mapProviders(injector: ReflectiveInjector_, fn: Function): any[] {
  const res: any[] = []
  for (let i = 0; i < injector._providers.length; ++i) {
    res[i] = fn(injector.getProviderAtIndex(i))
  }
  return res
}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
@module
@description
The `di` module provides dependency injection container services.

export * from './metadata';
export { InjectFlags } from './interface/injector';
export { defineInjectable, defineInjectable, defineInjector, InjectableType, InjectorType } from './interface/defs';
export { forwardRef, resolveForwardRef, ForwardRefFn } from './forward_ref';
export { Injectable, InjectableDecorator, InjectableProvider } from './injectable';
export { Injector } from './injector';
export { EnvironmentInjector } from './r3_injector';
export { importProvidersFrom, ImportProvidersSource } from './provider_collection';
export { ENVIRONMENT_INITIALIZER } from './initializer_token';
export { ProviderToken } from './provider_token';
export { inject, inject, InjectOptions, invalidFactoryDep } from './injector_compatibility';
export { INJECTOR } from './injector_token';
export { ReflectiveInjector } from './reflective_injector';
export { ClassProvider, ModuleWithProviders, ClassSansProvider, ImportedNgModuleProviders, ConstructorProvider, ConstructorSansProvider, ExistingProvider, ExistingSansProvider, FactoryProvider, FactorySansProvider, Provider, StaticClassProvider, StaticClassSansProvider, StaticProvider, TypeProvider, ValueProvider, ValueSansProvider } from './interface/provider';
export { ResolvedReflectiveFactory, ResolvedReflectiveProvider } from './reflective_provider';
export { ReflectiveKey } from './reflective_key';
export { InjectionToken } from './injection_token';

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
This file should not be necessary because node resolution should just default to `./di/index`!
However it does not seem to work and it breaks:
- //packages/animations/browser/test:test_web_chromium-local
- //packages/compiler-cli/test:extract_i18n
- //packages/compiler-cli/test:ngc
- //packages/compiler-cli/test:perform_watch
- //packages/compiler-cli/test/diagnostics:check_types
- //packages/compiler-cli/test/transformers:test
- //packages/compiler/test:test
- //tools/public_api_guard:core_api

Remove this file once the above is solved or wait until `ngc` is deleted and then it should be safe to delete this file.

export * from './di/index';

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
import { InjectFlags, resolveForwardRef } from './di';
import { assertInjectImplementationNotEqual } from './di/inject_switch';
import { inject } from './di/injector_compatibility';
import { ProviderToken } from './di/provider_token';
import { getOrCreateInjectable } from './di';
import { TDirectiveHostNode } from './interfaces/node';
import { getCurrentTNode, getLView } from './state';

Returns the value associated to the given token from the injectors.
`directiveInject` is intended to be used for directive, component and pipe factories.
All other injection use `inject` which does not walk the node injector tree.

Usage example (in factory function):
class SomeDirective {
  constructor(directive: DirectiveA) {}
  static dir = defineDirective({
    type: SomeDirective,
    factory: () => new SomeDirective(directiveInject(DirectiveA))
  });
}

@param token the type or token to inject
@param flags Injection flags
@returns the value from the injector or `null` when not found

@codeGenApi
export function directiveInject<T>(token: ProviderToken<T>): T;
export function directiveInject<T>(token: ProviderToken<T>, flags: InjectFlags): T;
export function directiveInject<T>(token: ProviderToken<T>, flags = InjectFlags.Default): T | null {
  const lView = getLView();
  // Fall back to inject() if view hasn't been created. This situation can happen in tests // if inject utilities are used before bootstrapping.

```

```

    if (IView === null) {\n    // Verify that we will not get into infinite loop.\n    ngDevMode &&
assertInjectImplementationNotEqual(directiveInject);\n    return inject(token, flags);\n } \n const tNode =
getCurrentTNode();\n    return getOrCreateInjectable<T>(\n    tNode as TDirectiveHostNode, IView,
resolveForwardRef(token), flags);\n}\n\n/n/**\n * Throws an error indicating that a factory function could not be
generated by the compiler for a\n * particular class.\n *\n * This instruction allows the actual error message to be
optimized away when ngDevMode is turned\n * off, saving bytes of generated code while still providing a good
experience in dev mode.\n *\n * The name of the class is not mentioned here, but will be in the generated factory
function name\n * and thus in the stack trace.\n *\n * @codeGenApi\n */\nexport function invalidFactory(): never
{\n    const msg =\n    ngDevMode ? `This constructor was not compatible with Dependency Injection.` : 'invalid';\n    throw
new Error(msg);\n}\n\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n */\nimport './ng_dev_mode';\nimport {newTrustedFunctionForDev} from
'./security/trusted_types';\n\n/n/**\n * THIS FILE CONTAINS CODE WHICH SHOULD BE TREE SHAKEN AND
NEVER CALLED FROM PRODUCTION CODE!!!\n *\n */\n\n * Creates an `Array` construction with a given
name. This is useful when\n * looking for memory consumption to see what time of array it is.\n *\n *\n * @param
name Name to give to the constructor\n * @returns A subclass of `Array` if possible. This can only be done in\n *
environments which support `class` construct.\n */\nexport function createNamedArrayType(name: string): typeOf
Array {\n    // This should never be called in prod mode, so let's verify that is the case.\n    if (ngDevMode) {\n    try
{\n    // If this function were compromised
the following could lead to arbitrary\n    // script execution. We bless it with Trusted Types anyway since this\n
// function is stripped out of production binaries.\n    return (newTrustedFunctionForDev('Array', `return class
${name} extends Array{}`))(Array);\n    } catch (e) {\n    // If it does not work just give up and fall back to regular
Array.\n    return Array;\n    }\n    } else {\n    throw new Error(\n    'Looks like we are in `prod mode`, but we
are creating a named Array type, which is wrong! Check your code');\n    }\n}\n\n", "/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n */\nimport {KeyValueArray} from
'./../util/array_utils';\nimport {assertNumber, assertNumberInRange} from './../util/assert';\n\n/n/**\n * Value stored
in the `TData` which is needed to re-concatenate the styling.\n *\n */\n\n * See: `TStylingKeyPrimitive` and `TStylingStatic`\n */\nexport type TStylingKey =
TStylingKeyPrimitive|TStylingStatic;\n\n/n/**\n * The primitive portion (`TStylingStatic` removed) of the value
stored in the `TData` which is\n * needed to re-concatenate the styling.\n *\n * - `string`: Stores the property name.
Used with `styleProp`/`classProp` instruction.\n * - `null`: Represents map, so there is no name. Used with
`styleMap`/`classMap`.\n * - `false`: Represents an ignore case. This happens when `styleProp`/`classProp`
instruction\n * is combined with directive which shadows its input `@Input('class')`. That way the binding\n *
should not participate in the styling resolution.\n */\nexport type TStylingKeyPrimitive = string|null|false;\n\n/n/**\n *
Store the static values for the styling binding.\n *\n * The `TStylingStatic` is just `KeyValueArray` where key `\"\"`
(stored at location 0) contains the\n * `TStylingKey` (stored at location 1). In other words this wraps the
`TStylingKey` such that the\n * `\"\"` contains the wrapped value.\n *\n * When instructions are resolving styling
they may need to look forward or backwards in the linked\n * list to resolve the value. For this reason we have to
make sure that the linked list also contains\n * the static values. However the list only has space for one item per
styling instruction. For this\n * reason we store the static values here as part of the `TStylingKey`. This means that
the\n * resolution function when looking for a value needs to first look at the binding value, and then\n * at
`TStylingKey` (if it exists).\n *\n * Imagine we have:\n *\n * ``\n * <div class=\"TEMPLATE\" my-dir>\n *\n * @Directive({\n *   host: {\n *     class: 'DIR',\n *     '[class.dynamic]': 'exp' // classProp('dynamic', ctx.exp);\n *   }\n * })\n * ``\n *\n * In the above case the linked list will contain one item:\n *\n * ``\n * // assume binding location:
10 for `classProp('dynamic', ctx.exp)`;\n * tData[10] =

```

```

<TStylingStatic>{\n *   ": 'dynamic', // This is the wrapped value of `TStylingKey`\n *   'DIR': true, // This is the
default static value of directive binding.\n *   ];\n *   tData[10 + 1] = 0; // We don't have prev/next.\n *   \n *   IView[10] = undefined; // assume `ctx.exp` is `undefined`\n *   IView[10 + 1] = undefined; // Just normalized
`IView[10]`\n *   ```\n *   \n *   So when the function is resolving styling value, it first needs to look into the linked list\n
*   (there is none) and then into the static `TStylingStatic` too see if there is a default value for\n *   `dynamic` (there is
not). Therefore it is safe to remove it.\n *   \n *   If setting `true` case:\n *   ```\n *   IView[10] = true; // assume
`ctx.exp` is `true`\n *   IView[10 + 1] = true; // Just normalized `IView[10]`\n *   ```\n *   \n *   So when the function is
resolving styling value, it first needs to look into the linked list\n *   (there is none) and then into
`TNode.residualClass` (TNode.residualStyle) which contains\n
*   ```\n *   tNode.residualClass = [\n *   'TEMPLATE': true,\n *   ];\n *   ```\n *   \n *   This means that it is safe to add
class.\n *   \n *   ^\n *   \n *   export interface TStylingStatic extends KeyValueArray<any> { }\n *   \n *   /**\n *   \n *   This is a branded number
which contains previous and next index.\n *   \n *   \n *   When we come across styling instructions we need to store the
`TStylingKey` in the correct\n *   order so that we can re-concatenate the styling value in the desired priority.\n *   \n *   \n *
The insertion can happen either at the:\n *   - end of template as in the case of coming across additional styling
instruction in the template\n *   - in front of the template in the case of coming across additional instruction in the\n *
`hostBindings`.\n *   \n *   \n *   We use `TStylingRange` to store the previous and next index into the `TData` where the
template\n *   bindings can be found.\n *   \n *   \n *   - bit 0 is used to mark that the previous index has a duplicate for current
value.\n *   \n *   - bit 1 is used to mark that the next index has a duplicate
for the current value.\n *   \n *   - bits 2-16 are used to encode the next/tail of the template.\n *   \n *   - bits 17-32 are used to
encode the previous/head of template.\n *   \n *   \n *   NODE: *duplicate* false implies that it is statically known that this
binding will not collide\n *   with other bindings and therefore there is no need to check other bindings. For example
the\n *   bindings in `

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===\n  StylingRange.PREV_DUPLICATE;\n}\n\nexport function setTStylingRangePrev(\n  tStylingRange:
TStylingRange, previous: number): TStylingRange {\n  ngDevMode && assertNumber(tStylingRange, 'expected
number');\n  ngDevMode && assertNumberInRange(previous, 0, StylingRange.UNSIGNED_MASK);\n  return
(((tStylingRange as any as number) & ~StylingRange.PREV_MASK) |\n    (previous <<
StylingRange.PREV_SHIFT)) as any;\n}\n\nexport function setTStylingRangePrevDuplicate(tStylingRange:
TStylingRange): TStylingRange {\n  ngDevMode && assertNumber(tStylingRange, 'expected number');\n  return
((tStylingRange as any as number) | StylingRange.PREV_DUPLICATE) as any;\n}\n\nexport function
getTStylingRangeNext(tStylingRange: TStylingRange): number {\n  ngDevMode && assertNumber(tStylingRange,
'expected number');\n  return ((tStylingRange as any as number) & StylingRange.NEXT_MASK) >>
StylingRange.NEXT_SHIFT;\n}\n\nexport function setTStylingRangeNext(tStylingRange: TStylingRange,
next: number): TStylingRange {\n  ngDevMode && assertNumber(tStylingRange, 'expected number');\n
ngDevMode && assertNumberInRange(next, 0, StylingRange.UNSIGNED_MASK);\n  return (((tStylingRange as
any as number) & ~StylingRange.NEXT_MASK) | /\n    next << StylingRange.NEXT_SHIFT) as
any;\n}\n\nexport function getTStylingRangeNextDuplicate(tStylingRange: TStylingRange): boolean {\n
ngDevMode && assertNumber(tStylingRange, 'expected number');\n  return ((tStylingRange as any as number) &
StylingRange.NEXT_DUPLICATE) ===\n  StylingRange.NEXT_DUPLICATE;\n}\n\nexport function
setTStylingRangeNextDuplicate(tStylingRange: TStylingRange): TStylingRange {\n  ngDevMode &&
assertNumber(tStylingRange, 'expected number');\n  return ((tStylingRange as any as number) |
StylingRange.NEXT_DUPLICATE) as any;\n}\n\nexport function getTStylingRangeTail(tStylingRange:
TStylingRange): number {\n  ngDevMode && assertNumber(tStylingRange, 'expected number');\n  const next =
getTStylingRangeNext(tStylingRange);\n  return next === 0 ? getTStylingRangePrev(tStylingRange) : next;\n}\n"}
/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\n/**\n * Patch a `debug` property on top of the existing
object.\n * NOTE: always call this method with `ngDevMode && attachDebugObject(...)`\n * @param obj
Object to patch\n * @param debug Value to patch\n */\nexport function attachDebugObject(obj: any, debug: any):
void {\n  if (ngDevMode) {\n    Object.defineProperty(obj, 'debug', { value: debug, enumerable: false});\n  } else {\n
throw new Error(\n    'This method should be guarded with `ngDevMode` so that it can be tree shaken in
production!');\n  }\n}\n\n/**\n * Patch a `debug` property getter on top of the existing object.\n * NOTE: always
call this method with `ngDevMode && attachDebugObject(...)`\n * @param obj Object to patch\n * @param debugGetter Getter returning a value to patch\n */\nexport function
attachDebugGetter<T>(obj: T, debugGetter: (this: T) => any): void {\n  if (ngDevMode) {\n    Object.defineProperty(obj, 'debug', { get: debugGetter, enumerable: false});\n  } else {\n    throw new Error(\n      'This method should be guarded with `ngDevMode` so that it can be tree shaken in production!');\n    }\n}\n"}
/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Injector} from
'./di/injector';\nimport {Type} from './interface/type';\nimport {SchemaMetadata} from
'./metadata/schema';\nimport {Sanitizer} from './sanitization/sanitizer';\nimport {KeyValueArray} from
'./util/array_utils';\nimport {assertDefined} from './util/assert';\nimport {createNamedArrayType} from
'./util/named_array_type';\nimport
{assertNodeInjector} from './assert';\nimport {getInjectorIndex, getParentInjectorLocation} from './di';\nimport
{CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS,
NATIVE} from './interfaces/container';\nimport {ComponentTemplate, DirectiveDef, DirectiveDefList,
PipeDefList, ViewQueriesFunction} from './interfaces/definition';\nimport {NO_PARENT_INJECTOR,
NodeInjectorOffset} from './interfaces/injector';\nimport {AttributeMarker, InsertBeforeIndex, PropertyAliases,
TConstants, TContainerNode, TElementNode, TNode as ITNode, TNodeFlags, TNodeProviderIndexes,
TNodeType, toTNodeTypeAsString} from './interfaces/node';\nimport {SelectorFlags} from
'./interfaces/projection';\nimport {LQueries, TQueries} from './interfaces/query';\nimport {Renderer,

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RendererFactory} from './interfaces/renderer';\nimport {RComment, RElement, RNode} from
 './interfaces/renderer_dom';\nimport {getTStylingRangeNext, getTStylingRangeNextDuplicate,
getTStylingRangePrev,
getTStylingRangePrevDuplicate, TStylingKey, TStylingRange} from './interfaces/styling';\nimport
{CHILD_HEAD, CHILD_TAIL, CLEANUP, CONTEXT, DebugNode, DECLARATION_VIEW,
DestroyHookData, FLAGS, HEADER_OFFSET, HookData, HOST, HostBindingOpCodes, ID, INJECTOR,
LContainerDebug as ILContainerDebug, LView, LViewDebug as ILViewDebug, LViewDebugRange,
LViewDebugRangeContent, LViewFlags, NEXT, NodeInjectorDebug, PARENT, QUERIES, RENDERER,
RENDERER_FACTORY, SANITIZER, T_HOST, TData, TView as ITView, TVIEW, TView, TViewType,
TViewTypeAsString} from './interfaces/view';\nimport {attachDebugObject} from './util/debug_utils';\nimport
{getParentInjectorIndex, getParentInjectorView} from './util/injector_utils';\nimport {unwrapRNode} from
 './util/view_utils';\n\n/*\n * This file contains conditionally attached classes which provide human readable (debug)
level\n * information for `LView`, `LContainer` and other internal data structures. These data structures\n * are
stored internally as array
which makes it very difficult during debugging to reason about the\n * current state of the system.\n *\n * Patching
the array with extra property does change the array's hidden class' but it does not\n * change the cost of access,
therefore this patching should not have significant if any impact in\n * `ngDevMode` mode. (see:
https://jsperf.com/array-vs-monkey-patch-array)\n *\n * So instead of seeing:\n * ```\n * Array(30) [Object, 659,
null, ...]\n * ```\n *\n * You get to see:\n * ```\n * LViewDebug {\n *   views: [...],\n *   flags: {attached: true, ...}\n
 *   nodes: [\n *     {html: '<div id="123">', ..., nodes: [\n *       {html: '<span>', ..., nodes: null}\n *     ]}\n *
 }\n * ```\n *\n * \nlet LVIEW_COMPONENT_CACHE: Map<string|null, Array<any>>|undefined;\nlet
LVIEW_EMBEDDED_CACHE: Map<string|null, Array<any>>|undefined;\nlet LVIEW_ROOT:
Array<any>|undefined;\nlet LVIEW_COMPONENT: Array<any>|undefined;\nlet LVIEW_EMBEDDED:
Array<any>|undefined;\n\ninterface TViewDebug
extends ITView {\n  type: TViewType;\n}\n\n/**\n * This function clones a blueprint and creates LView.\n *\n *
Simple slice will keep the same type, and we need it to be LView\n *\n * \nexport function
cloneToLViewFromTViewBlueprint<T>(tView: TView): LView<T> {\n  const debugTView = tView as
TViewDebug;\n  const IView = getLViewToClone(debugTView.type, tView.template && tView.template.name);\n
return IView.concat(tView.blueprint) as any;\n}\n\nclass LRootView extends Array {} \n\nclass LComponentView
extends Array {} \n\nclass LEmbeddedView extends Array {} \n\nfunction getLViewToClone(type: TViewType,
name: string|null): Array<any> {\n  switch (type) {\n    case TViewType.Root:\n      if (LVIEW_ROOT ===
undefined) LVIEW_ROOT = new LRootView();\n      return LVIEW_ROOT;\n    case TViewType.Component:\n
      if (!ngDevMode || !ngDevMode.namedConstructors) {\n        if (LVIEW_COMPONENT === undefined)\n          LVIEW_COMPONENT = new LComponentView();\n        return LVIEW_COMPONENT;\n      }\n      if
(LVIEW_COMPONENT_CACHE
=== undefined) LVIEW_COMPONENT_CACHE = new Map();\n      let componentArray =
LVIEW_COMPONENT_CACHE.get(name);\n      if (componentArray === undefined) {\n        componentArray =
new (createNamedArrayType('LComponentView' + nameSuffix(name)));\n        LVIEW_COMPONENT_CACHE.set(name,
componentArray);\n      }\n      return componentArray;\n    case
TViewType.Embedded:\n      if (!ngDevMode || !ngDevMode.namedConstructors) {\n        if
(LVIEW_EMBEDDED === undefined) LVIEW_EMBEDDED = new LEmbeddedView();\n        return
LVIEW_EMBEDDED;\n      }\n      if (LVIEW_EMBEDDED_CACHE === undefined)\n        LVIEW_EMBEDDED_CACHE =
new Map();\n      let embeddedArray =
LVIEW_EMBEDDED_CACHE.get(name);\n      if (embeddedArray === undefined) {\n        embeddedArray =
new (createNamedArrayType('LEmbeddedView' + nameSuffix(name)));\n        LVIEW_EMBEDDED_CACHE.set(name,
embeddedArray);\n      }\n      return embeddedArray;\n    }\n  }\n}\n\nfunction nameSuffix(text: string|null|undefined):

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string {\n if (text == null) return \";\n const index = text.lastIndexOf('_Template');\n return '_' + (index === -1 ?
text : text.slice(0, index));\n}\n\n/**\n * This class is a debug version of Object literal so that we can have
constructor name show up\n * in\n * debug tools in ngDevMode.\n */\nexport const TViewConstructor = class
TView implements ITView {\n constructor(\n public type: TViewType,\n public blueprint: LView,\n
public template: ComponentTemplate<{ }>|null,\n public queries: TQueries|null,\n public viewQuery:
ViewQueriesFunction<{ }>|null,\n public declTNode: ITNode|null,\n public data: TData,\n public
bindingStartIndex: number,\n public expandoStartIndex: number,\n public hostBindingOpCodes:
HostBindingOpCodes|null,\n public firstCreatePass: boolean,\n public firstUpdatePass: boolean,\n public
staticViewQueries: boolean,\n public staticContentQueries: boolean,\n public preOrderHooks:
HookData|null,\n
public preOrderCheckHooks: HookData|null,\n public contentHooks: HookData|null,\n public
contentCheckHooks: HookData|null,\n public viewHooks: HookData|null,\n public viewCheckHooks:
HookData|null,\n public destroyHooks: DestroyHookData|null,\n public cleanup: any[]|null,\n public
contentQueries: number[]|null,\n public components: number[]|null,\n public directiveRegistry:
DirectiveDefList|null,\n public pipeRegistry: PipeDefList|null,\n public firstChild: ITNode|null,\n public
schemas: SchemaMetadata[]|null,\n public consts: TConstants|null,\n public incompleteFirstPass: boolean,\n
public _decls: number,\n public _vars: number,\n\n ) {} \n\n get template_(): string {\n const buf: string[] =
[];\n processTNodeChildren(this.firstChild, buf);\n return buf.join(\");\n }\n\n get type_(): string {\n return
TViewTypeAsString[this.type] || `TViewType.?$${this.type}`;\n }\n};\n\n\nclass
TNode implements ITNode {\n constructor(\n public tView_: TView, //\n
public type: TNodeType, //\n public index: number,
//\n public insertBeforeIndex: InsertBeforeIndex, //\n public injectorIndex:
number, //\n public directiveStart: number, //\n
public directiveEnd: number, //\n public directiveStylingLast: number,
//\n public propertyBindings: number[]|null, //\n public flags:
TNodeFlags, //\n public providerIndexes: TNodeProviderIndexes,
//\n public value: string|null, //\n public attrs:
(string|AttributeMarker|(string|SelectorFlags)[]|)|null, //\n public mergedAttrs:
(string|AttributeMarker|(string|SelectorFlags)[]|)|null, //\n public localNames: (string|number)[]|null,
//\n public initialInputs: (string[]|null)[]|null|undefined, //\n public inputs:
PropertyAliases|null, //\n public outputs: PropertyAliases|null,
//\n public tViews: ITView|ITView[]|null, //\n public next: ITNode|null,
//\n public projectionNext: ITNode|null, //\n public child:
ITNode|null, //\n
public parent: TElementNode|TContainerNode|null, //\n public projection:
number|(ITNode|RNode)[]|null, //\n public styles: string|null,
//\n public stylesWithoutHost: string|null, //\n public residualStyles:
KeyValueArray<any>|undefined|null, //\n public classes: string|null,
//\n public classesWithoutHost: string|null, //\n public residualClasses:
KeyValueArray<any>|undefined|null, //\n public classBindings: TStylingRange,
//\n public styleBindings: TStylingRange, //\n ) {} \n\n /**\n * Return a human
debug version of the set of `NodeInjector`s which will be consulted when\n
* resolving tokens from this `TNode`. \n * \n * When debugging applications, it is often difficult to determine
which `NodeInjector`s will be\n * consulted. This method shows a list of `DebugNode`s representing the `TNode`s
which will be\n * consulted in order when resolving a token starting at this `TNode`. \n * \n * The original data is
stored in `LView` and `TView` with a lot of offset indexes, and so it is\n * difficult to reason about. \n * \n *
@param lView The `LView` instance for this `TNode`. \n * \n * \n debugNodeInjectorPath(lView: LView):
DebugNode[] {\n const path: DebugNode[] = [];\n let injectorIndex = getInjectorIndex(this, lView);\n if

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(injectorIndex === -1) {\n    // Looks like the current `TNode` does not have `NodeInjector` associated with it =>
look for\n    // parent NodeInjector.\n    const parentLocation = getParentInjectorLocation(this, IView);\n    if
(parentLocation !== NO_PARENT_INJECTOR) {\n        // We found a parent, so start
searching from the parent location.\n        injectorIndex = getParentInjectorIndex(parentLocation);\n        IView =
getParentInjectorView(parentLocation, IView);\n    } else {\n        // No parents have been found, so there are no
`NodeInjector`s to consult.\n    }\n    while (injectorIndex !== -1) {\n        ngDevMode &&
assertNodeInjector(IView, injectorIndex);\n        const tNode = IView[TVIEW].data[injectorIndex +
NodeInjectorOffset.TNODE] as TNode;\n        path.push(buildDebugNode(tNode, IView));\n        const
parentLocation = IView[injectorIndex + NodeInjectorOffset.PARENT];\n        if (parentLocation ===
NO_PARENT_INJECTOR) {\n            injectorIndex = -1;\n        } else {\n            injectorIndex =
getParentInjectorIndex(parentLocation);\n            IView = getParentInjectorView(parentLocation, IView);\n        }\n    }\n    return path;\n}\n\nget type_(): string {\n    return toTNodeTypeAsString(this.type) ||
`TNodeType.${this.type}`;\n}\n\nget flags_(): string {\n
const flags: string[] = [];\n    if (this.flags & TNodeFlags.hasClassInput)
flags.push('TNodeFlags.hasClassInput');\n    if (this.flags & TNodeFlags.hasContentQuery)
flags.push('TNodeFlags.hasContentQuery');\n    if (this.flags & TNodeFlags.hasStyleInput)
flags.push('TNodeFlags.hasStyleInput');\n    if (this.flags & TNodeFlags.hasHostBindings)
flags.push('TNodeFlags.hasHostBindings');\n    if (this.flags & TNodeFlags.isComponentHost)
flags.push('TNodeFlags.isComponentHost');\n    if (this.flags & TNodeFlags.isDirectiveHost)
flags.push('TNodeFlags.isDirectiveHost');\n    if (this.flags & TNodeFlags.isDetached)
flags.push('TNodeFlags.isDetached');\n    if (this.flags & TNodeFlags.isProjected)
flags.push('TNodeFlags.isProjected');\n    return flags.join('');\n}\n\nget template_(): string {\n    if (this.type &
TNodeType.Text) return this.value!;\n    const buf: string[] = [];\n    const tagName = typeof this.value === 'string'
&& this.value || this.type_;\n    buf.push('<', tagName);\n
if (this.flags) {\n    buf.push(' ', this.flags_);\n    }\n    if (this.attrs) {\n        for (let i = 0; i < this.attrs.length; i++) {\n
const attrName = this.attrs[i];\n            if (typeof attrName === 'number') {\n                break;\n            }\n            const
attrValue = this.attrs[i];\n            buf.push(' ', attrName as string, '=', attrValue as string, '\"');\n        }\n    }\n    buf.push('>');\n    processTNodeChildren(this.child, buf);\n    buf.push('</', tagName, '>');\n    return buf.join('');\n}\n\nget styleBindings_(): DebugStyleBindings {\n    return toDebugStyleBinding(this, false);\n}\n\nget
classBindings_(): DebugStyleBindings {\n    return toDebugStyleBinding(this, true);\n}\n\nget
providerIndexStart_(): number {\n    return this.providerIndexes &
TNodeProviderIndexes.ProvidersStartIndexMask;\n}\n\nget providerIndexEnd_(): number {\n    return
this.providerIndexStart_ +\n        (this.providerIndexes >>>
TNodeProviderIndexes.CptViewProvidersCountShift);\n}\n}\n\nexport const TNodeDebug = TNode;\nexport type TNodeDebug = TNode;\nexport interface
DebugStyleBindings extends\n    Array<KeyValueArray<any>|DebugStyleBinding|string|null> {\n}\nexport interface
DebugStyleBinding {\n    key: TStylingKey;\n    index: number;\n    isTemplate: boolean;\n    prevDuplicate: boolean;\n    nextDuplicate: boolean;\n    prevIndex: number;\n    nextIndex: number;\n}\n\nfunction toDebugStyleBinding(tNode:
TNode, isClassBased: boolean): DebugStyleBindings {\n    const tData = tNode.tView_.data;\n    const bindings:
DebugStyleBindings = [] as any;\n    const range = isClassBased ? tNode.classBindings : tNode.styleBindings;\n    const prev = getTStylingRangePrev(range);\n    const next = getTStylingRangeNext(range);\n    let isTemplate = next
!== 0;\n    let cursor = isTemplate ? next : prev;\n    while (cursor !== 0) {\n        const itemKey = tData[cursor] as
TStylingKey;\n        const itemRange = tData[cursor + 1] as TStylingRange;\n        bindings.unshift({\n            key:
itemKey,\n            index: cursor,\n            isTemplate: isTemplate,\n            prevDuplicate: getTStylingRangePrevDuplicate(itemRange),\n            nextDuplicate: getTStylingRangeNextDuplicate(itemRange),\n            nextIndex: getTStylingRangeNext(itemRange),\n            prevIndex: getTStylingRangePrev(itemRange),\n        });\n        if (cursor === prev) isTemplate = false;\n        cursor =
getTStylingRangePrev(itemRange);\n    }\n    bindings.push((isClassBased ? tNode.residualClasses :

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tNode.residualStyles) || null);\n return bindings;\n}\n\nfunction processTNodeChildren(tNode: ITNode|null, buf:
string[]) {\n while (tNode) {\n buf.push((tNode as any as {template_: string}).template_);\n tNode =
tNode.next;\n }\n}\n\n\nclass TViewData extends Array {} \nlet TVIEWDATA_EMPTY: unknown[]; // can't
initialize here or it will not be tree shaken, because\n // `LView` constructor could have side-
effects.\n/**\n * This function clones a blueprint and creates TData.\n * Simple slice will keep the same type,
and we need it to be TData\n */\nexport function cloneToTViewData(list: any[]): TData {\n if
(TVIEWDATA_EMPTY === undefined) TVIEWDATA_EMPTY = new TViewData();\n return
TVIEWDATA_EMPTY.concat(list) as any;\n}\n\n\nclass LViewBlueprint extends Array {} \nexport class
MatchesArray extends Array {} \nexport class TViewComponents extends Array {} \nexport class
TNodeLocalNames extends Array {} \nexport class TNodeInitialInputs extends Array {} \nexport class
LCleanup extends Array {} \nexport class TCleanup extends Array {} \n\nexport function attachLViewDebug(IView: LView)
{\n attachDebugObject(IView, new LViewDebug(IView));\n}\n\nexport function
attachLContainerDebug(lContainer: LContainer) {\n attachDebugObject(lContainer, new
LContainerDebug(lContainer));\n}\n\nexport function toDebug<T>(obj: LView<T>): ILViewDebug<T>;\nexport
function toDebug<T>(obj: LView<T>|null): ILViewDebug<T>|null;\nexport function toDebug<T>(obj:
LView<T>|LContainer|null): ILViewDebug<T>|ILContainerDebug|null;\nexport
function toDebug(obj: any): any {\n if (obj) {\n const debug = (obj as any).debug;\n assertDefined(debug,
'Object does not have a debug representation.);\n return debug;\n } else {\n return obj;\n }\n}\n\n/**\n * Use
this method to unwrap a native element in `LView` and convert it into HTML for easier\n * reading.\n */\n *
@param value possibly wrapped native DOM node.\n * @param includeChildren If `true` then the serialized HTML
form will include child elements\n * (same\n * as `outerHTML`). If `false` then the serialized HTML form will only
contain the element\n * itself\n * (will not serialize child elements).\n */\nfunction toHtml(value: any,
includeChildren: boolean = false): string|null {\n const node: Node|null = unwrapRNode(value) as any;\n if (node)
{\n switch (node.nodeType) {\n case Node.TEXT_NODE:\n return node.textContent;\n case
Node.COMMENT_NODE:\n return `<!--${(node as Comment).textContent}-->`;\n case
Node.ELEMENT_NODE:\n
const outerHTML = (node as Element).outerHTML;\n if (includeChildren) {\n return outerHTML;\n
} else {\n const innerHTML = '>' + (node as Element).innerHTML + '<';\n return
(outerHTML.split(innerHTML)[0]) + '>';\n }\n }\n }\n return null;\n}\n\nexport class LViewDebug<T =
unknown> implements ILViewDebug<T> {\n constructor(private readonly _raw_IView: LView<T>) {} \n\n /**\n
* Flags associated with the `LView` unpacked into a more readable state.\n */\n get flags() {\n const flags =
this._raw_IView[FLAGS];\n return {\n __raw__flags__: flags,\n initPhaseState: flags &
LViewFlags.InitPhaseStateMask,\n creationMode: !(flags & LViewFlags.CreationMode),\n firstViewPass:
!(flags & LViewFlags.FirstLViewPass),\n checkAlways: !(flags & LViewFlags.CheckAlways),\n dirty:
!(flags & LViewFlags.Dirty),\n attached: !(flags & LViewFlags.Attached),\n destroyed: !(flags &
LViewFlags.Destroyed),\n isRoot: !(flags & LViewFlags.IsRoot),\n indexWithinInitPhase: flags >>
LViewFlags.IndexWithinInitPhaseShift,\n }; \n }\n get parent(): ILViewDebug<T>|ILContainerDebug|null {\n
return toDebug<T>(this._raw_IView[PARENT] as LView<T>|LContainer | null);\n }\n get hostHTML():
string|null {\n return toHtml(this._raw_IView[HOST], true);\n }\n get html(): string {\n return (this.nodes ||
[]).map(mapToHTML).join("");\n }\n get context(): T {\n return this._raw_IView[CONTEXT];\n }\n /**\n
* The tree of nodes associated with the current `LView`. The nodes have been normalized into\n * a tree structure
with relevant details pulled out for readability.\n */\n get nodes(): DebugNode[] {\n const IView =
this._raw_IView;\n const tNode = IView[TVIEW].firstChild;\n return toDebugNodes(tNode, IView);\n }\n get
template(): string {\n return (this.tView as any as {template_: string}).template_;\n }\n get tView(): ITView {\n
return this._raw_IView[TVIEW];\n }\n get cleanup(): any[]|null {\n return this._raw_IView[CLEANUP];\n
}\n get injector(): Injector|null {\n return this._raw_IView[INJECTOR];\n }\n get rendererFactory():
RendererFactory {\n return this._raw_IView[RENDERER_FACTORY];\n }\n get renderer(): Renderer {\n
return this._raw_IView[RENDERER];\n }\n get sanitizer(): Sanitizer|null {\n return

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this._raw_IView[SANITIZER];\n }\n get childHead(): ILViewDebug|ILContainerDebug|null {\n return
toDebug(this._raw_IView[CHILD_HEAD]);\n }\n get next(): ILViewDebug<T>|ILContainerDebug|null {\n
return toDebug<T>(this._raw_IView[NEXT] as LView<T>| LContainer | null);\n }\n get childTail():
ILViewDebug|ILContainerDebug|null {\n return toDebug(this._raw_IView[CHILD_TAIL]);\n }\n get
declarationView(): ILViewDebug|null {\n return toDebug(this._raw_IView[DECLARATION_VIEW]);\n }\n get
queries(): LQueries|null {\n return this._raw_IView[QUERIES];\n }\n get tHost():
ITNode|null {\n return this._raw_IView[T_HOST];\n }\n get id(): number {\n return this._raw_IView[ID];\n
}\n\n get decls(): LViewDebugRange {\n return toLViewRange(this.tView, this._raw_IView,
HEADER_OFFSET, this.tView.bindingStartIndex);\n }\n\n get vars(): LViewDebugRange {\n return
toLViewRange(\n this.tView, this._raw_IView, this.tView.bindingStartIndex, this.tView.expandoStartIndex);\n
}\n\n get expando(): LViewDebugRange {\n return toLViewRange(\n this.tView, this._raw_IView,
this.tView.expandoStartIndex, this._raw_IView.length);\n }\n\n /**\n * Normalized view of child views (and
containers) attached at this location.\n *\n get childViews(): Array<ILViewDebug<T>|ILContainerDebug> {\n
const childViews: Array<ILViewDebug<T>|ILContainerDebug> = [];\n let child = this.childHead;\n while
(child) {\n childViews.push(child as ILViewDebug<T>| ILContainerDebug);\n child = child.next;\n }\n
return childViews;\n }\n}\n\nfunction
mapToHTML(node: DebugNode): string {\n if (node.type === 'ElementContainer') {\n return (node.children ||
[]).map(mapToHTML).join("");\n } else if (node.type === 'IcuContainer') {\n throw new Error('Not
implemented');\n } else {\n return toHtml(node.native, true) || ";\n }\n}\n\nfunction toLViewRange(tView:
TView, IView: LView, start: number, end: number): LViewDebugRange {\n let content:
LViewDebugRangeContent[] = [];\n for (let index = start; index < end; index++) {\n content.push({index: index,
t: tView.data[index], l: IView[index]});\n }\n return {start: start, end: end, length: end - start, content:
content};\n}\n\n/**\n * Turns a flat list of nodes into a tree by walking the associated `TNode` tree.\n *\n @param
tNode\n * @param IView\n */\nexport function toDebugNodes(tNode: ITNode|null, IView: LView): DebugNode[]
{\n if (tNode) {\n const debugNodes: DebugNode[] = [];\n let tNodeCursor: ITNode|null = tNode;\n while
(tNodeCursor) {\n
debugNodes.push(buildDebugNode(tNodeCursor, IView));\n tNodeCursor = tNodeCursor.next;\n }\n
return debugNodes;\n } else {\n return [];\n }\n}\n\nexport function buildDebugNode(tNode: ITNode, IView:
LView): DebugNode {\n const rawValue = IView[tNode.index];\n const native = unwrapRNode(rawValue);\n
const factories: Type<any>[] = [];\n const instances: any[] = [];\n const tView = IView[TVIEW];\n for (let i =
tNode.directiveStart; i < tNode.directiveEnd; i++) {\n const def = tView.data[i] as DirectiveDef<any>;\n
factories.push(def.type);\n instances.push(IView[i]);\n }\n return {\n html: toHtml(native),\n type:
toTNodeTypeAsString(tNode.type),\n tNode,\n native: native as any,\n children: toDebugNodes(tNode.child,
IView),\n factories,\n instances,\n injector: buildNodeInjectorDebug(tNode, tView, IView),\n get
injectorResolutionPath() {\n return (tNode as TNode).debugNodeInjectorPath(IView);\n },\n };\n}\n\nfunction
buildNodeInjectorDebug(tNode: ITNode, tView: ITView, IView: LView): NodeInjectorDebug {\n const
viewProviders: Type<any>[] = [];\n for (let i = (tNode as TNode).providerIndexStart_; i < (tNode as
TNode).providerIndexEnd_; i++) {\n viewProviders.push(tView.data[i] as Type<any>);\n }\n const providers:
Type<any>[] = [];\n for (let i = (tNode as TNode).providerIndexEnd_; i < (tNode as TNode).directiveEnd; i++) {\n
providers.push(tView.data[i] as Type<any>);\n }\n const nodeInjectorDebug = {\n bloom: toBloom(IView,
tNode.injectorIndex),\n cumulativeBloom: toBloom(tView.data, tNode.injectorIndex),\n providers,\n
viewProviders,\n parentInjectorIndex: IView[(tNode as TNode).providerIndexStart_ - 1],\n }; \n return
nodeInjectorDebug;\n }\n\n/**\n * Convert a number at `idx` location in `array` into binary representation.\n *\n @param
array\n * @param idx\n */\nfunction binary(array: any[], idx: number): string {\n const value =
array[idx];\n // If not a number
we print 8 `?` to retain alignment but let user know that it was called on\n // wrong type.\n if (typeof value !==
'number') return '????????';\n // We prefix 0s so that we have constant length number\n const text = '00000000' +
value.toString(2);\n return text.substring(text.length - 8);\n }\n\n/**\n * Convert a bloom filter at location `idx` in

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`array` into binary representation.\n *\n * @param array\n * @param idx\n *\nfunction toBloom(array: any[], idx:
number): string {\n  if (idx < 0) {\n    return 'NO_NODE_INJECTOR';\n  }\n  return `${binary(array, idx +
7)}_${binary(array, idx + 6)}_${binary(array, idx + 5)}_${\n    binary(array, idx + 4)}_${binary(array, idx +
3)}_${binary(array, idx + 2)}_${\n    binary(array, idx + 1)}_${binary(array, idx + 0)}`;\n}\n\nexport class
LContainerDebug implements ILContainerDebug {\n  constructor(private readonly _raw_LContainer: LContainer)
{\n}\n\n  get hasTransplantedViews(): boolean {\n    return
this._raw_LContainer[HAS_TRANSPLANTED_VIEWS];\n\n    }\n\n  get views(): ILViewDebug[] {\n    return this._raw_LContainer.slice(CONTAINER_HEADER_OFFSET)\n
.map(toDebug as (l: LView) => ILViewDebug);\n  }\n\n  get parent(): ILViewDebug|null {\n    return
toDebug(this._raw_LContainer[PARENT]);\n  }\n\n  get movedViews(): LView[]|null {\n    return
this._raw_LContainer[MOVED_VIEWS];\n  }\n\n  get host(): RElement|RComment|LView {\n    return
this._raw_LContainer[HOST];\n  }\n\n  get native(): RComment {\n    return this._raw_LContainer[NATIVE];\n  }\n\n
get next() {\n    return toDebug(this._raw_LContainer[NEXT]);\n  }\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\n\nimport {Injector} from './di/injector';\nimport
{ErrorHandler} from './error_handler';\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport
{DoCheck, OnChanges, OnInit} from './interface/lifecycle_hooks';\nimport
{SchemaMetadata} from './metadata/schema';\nimport {ViewEncapsulation} from './metadata/view';\nimport
{validateAgainstEventAttributes, validateAgainstEventProperties} from './sanitization/sanitization';\nimport
{Sanitizer} from './sanitization/sanitizer';\nimport {assertDefined, assertEqual, assertGreaterThanOrEqual,
assertIndexInRange, assertNotEqual, assertNotSame, assertSame, assertString} from './util/assert';\nimport
{escapeCommentText} from './util/dom';\nimport {normalizeDebugBindingName,
normalizeDebugBindingValue} from './util/ng_reflect';\nimport {stringify} from './util/stringify';\nimport
{assertFirstCreatePass, assertFirstUpdatePass, assertLContainer, assertLView, assertTNodeForLView,
assertTNodeForTView} from './assert';\nimport {attachPatchData, readPatchedLView} from
'./context_discovery';\nimport {getFactoryDef} from './definition_factory';\nimport {diPublicInInjector,
getNodeInjectable, getOrCreateNodeInjectorForNode}
from './di';\nimport {throwMultipleComponentError} from './errors';\nimport {executeCheckHooks,
executeInitAndCheckHooks, incrementInitPhaseFlags} from './hooks';\nimport
{CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS} from
'./interfaces/container';\nimport {ComponentDef, ComponentTemplate, DirectiveDef, DirectiveDefListOrFactory,
HostBindingsFunction, PipeDefListOrFactory, RenderFlags, ViewQueriesFunction} from
'./interfaces/definition';\nimport {NodeInjectorFactory} from './interfaces/injector';\nimport {getUniqueLViewId}
from './interfaces/lview_tracking';\nimport {AttributeMarker, InitialInputData, InitialInputs, LocalRefExtractor,
PropertyAliases, PropertyAliasValue, TAttributes, TConstantsOrFactory, TContainerNode, TDirectiveHostNode,
TElementContainerNode, TElementNode, TIcuContainerNode, TNode, TNodeFlags, TNodeType,
TProjectionNode} from './interfaces/node';\nimport {Renderer, RendererFactory} from
'./interfaces/renderer';\nimport
{RComment, RElement, RNode, RText} from './interfaces/renderer_dom';\nimport {SanitizerFn} from
'./interfaces/sanitization';\nimport {isComponentDef, isComponentHost, isContentQueryHost, isRootView} from
'./interfaces/type_checks';\nimport {CHILD_HEAD, CHILD_TAIL, CLEANUP, CONTEXT,
DECLARATION_COMPONENT_VIEW, DECLARATION_VIEW, EMBEDDED_VIEW_INJECTOR, FLAGS,
HEADER_OFFSET, HOST, HostBindingOpCodes, ID, InitPhaseState, INJECTOR, LView, LViewFlags, NEXT,
PARENT, RENDERER, RENDERER_FACTORY, SANITIZER, T_HOST, TData,
TRANSPLANTED_VIEWS_TO_REFRESH, TVIEW, TView, TViewType} from './interfaces/view';\nimport
{assertPureTNodeType, assertTNodeType} from './node_assert';\nimport {updateTextNode} from
'./node_manipulation';\nimport {isInlineTemplate, isNodeMatchingSelectorList} from
'./node_selector_matcher';\nimport {profiler, ProfilerEvent} from './profiler';\nimport {enterView,

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getBindingsEnabled, getCurrentDirectiveIndex, getCurrentParentTNode, getCurrentTNode,
getCurrentTNodePlaceholderOk,
getSelectedIndex, isCurrentTNodeParent, isInCheckNoChangesMode, isInI18nBlock, leaveView, setBindingIndex,
setBindingRootForHostBindings, setCurrentDirectiveIndex, setCurrentQueryIndex, setCurrentTNode,
setIsInCheckNoChangesMode, setSelectedIndex } from './state';\nimport {NO_CHANGE} from './tokens';\nimport
{mergeHostAttrs} from './util/attrs_utils';\nimport {INTERPOLATION_DELIMITER} from
 './util/misc_utils';\nimport {renderStringify, stringifyForError} from './util/stringify_utils';\nimport
{getFirstLContainer, getLViewParent, getNextLContainer} from './util/view_traversal_utils';\nimport
{getComponentLViewByIndex, getNativeByIndex, getNativeByTNode, isCreationMode, resetPreOrderHookFlags,
unwrapLView, updateTransplantedViewCount, viewAttachedToChangeDetector} from './util/view_utils';\n\nimport
{selectIndexInternal} from './advance';\nimport {directiveInject} from './di';\nimport
{handleUnknownPropertyError, isPropertyValid, matchingSchemas} from './element_validation';\nimport
{attachLContainerDebug, attachLViewDebug, cloneToLViewFromTViewBlueprint, cloneToTViewData,
LCleanup, LViewBlueprint, MatchesArray, TCleanup, TNodeDebug, TNodeInitialInputs, TNodeLocalNames,
TViewComponents, TViewConstructor} from './lview_debug';\n\n/**\n * Invoke `HostBindingsFunction`s for
view.\n * This methods executes `TView.hostBindingOpCodes`. It is used to execute the\n *
`HostBindingsFunction`s associated with the current `LView`.\n * @param tView Current `TView`.\n *
@param lView Current `LView`.\n */\nexport function processHostBindingOpCodes(tView: TView, lView:
LView): void {\n  const hostBindingOpCodes = tView.hostBindingOpCodes;\n  if (hostBindingOpCodes === null)
return;\n  try {\n    for (let i = 0; i < hostBindingOpCodes.length; i++) {\n      const opCode =
hostBindingOpCodes[i] as number;\n      if (opCode < 0) {\n        // Negative numbers are element indexes.\n
setSelectedIndex(~opCode);\n      } else {\n        // Positive
numbers are NumberTuple which store bindingRootIndex and directiveIndex.\n        const directiveIdx = opCode;\n
const bindingRootIdx = hostBindingOpCodes[++i] as number;\n        const hostBindingFn =
hostBindingOpCodes[++i] as HostBindingsFunction<any>;\n
setBindingRootForHostBindings(bindingRootIdx, directiveIdx);\n        const context = lView[directiveIdx];\n
hostBindingFn(RenderFlags.Update, context);\n      }\n    } finally {\n      setSelectedIndex(-1);\n    }\n  }\n\n/**
Refreshes all content queries declared by directives in a given view */\nfunction refreshContentQueries(tView:
TView, lView: LView): void {\n  const contentQueries = tView.contentQueries;\n  if (contentQueries !== null) {\n
for (let i = 0; i < contentQueries.length; i += 2) {\n    const queryStartIdx = contentQueries[i];\n    const
directiveDefIdx = contentQueries[i + 1];\n    if (directiveDefIdx !== -1) {\n      const directiveDef =
tView.data[directiveDefIdx] as DirectiveDef<any>;\n
ngDevMode && assertDefined(directiveDef, 'DirectiveDef not found.);\n      ngDevMode &&\n
assertDefined(directiveDef.contentQueries, 'contentQueries function should be defined');\n
setCurrentQueryIndex(queryStartIdx);\n      directiveDef.contentQueries!(RenderFlags.Update,
lView[directiveDefIdx], directiveDefIdx);\n    }\n  }\n\n/** Refreshes child components in the current
view (update mode). */\nfunction refreshChildComponents(hostLView: LView, components: number[]): void {\n
for (let i = 0; i < components.length; i++) {\n  refreshComponent(hostLView, components[i]);\n }\n}\n\n/**
Renders child components in the current view (creation mode). */\nfunction renderChildComponents(hostLView:
LView, components: number[]): void {\n  for (let i = 0; i < components.length; i++) {\n
renderComponent(hostLView, components[i]);\n }\n}\n\nexport function createLView<T>(\n  parentLView:
LView|null, tView: TView, context: T|null, flags: LViewFlags,
host: RElement|null, tHostNode: TNode|null, rendererFactory: RendererFactory|null, renderer: Renderer|null,\n
sanitizer: Sanitizer|null, injector: Injector|null, embeddedViewInjector: Injector|null): LView {\n  const lView
=\n  ngDevMode ? cloneToLViewFromTViewBlueprint(tView) : tView.blueprint.slice() as LView;\n
lView[HOST] = host;\n  lView[FLAGS] = flags | LViewFlags.CreationMode | LViewFlags.Attached |
LViewFlags.FirstLViewPass;\n  if (embeddedViewInjector !== null ||\n    (parentLView &&
(parentLView[FLAGS] & LViewFlags.HasEmbeddedViewInjector))) {\n    lView[FLAGS] |=

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LViewFlags.HasEmbeddedViewInjector;\n }\n resetPreOrderHookFlags(IView);\n ngDevMode &&\n tView.declTNode && parentLView && assertTNodeForLView(tView.declTNode, parentLView);\n IView[PARENT] = IView[DECLARATION_VIEW] = parentLView;\n IView[CONTEXT] = context;\n IView[RENDERER_FACTORY] = (rendererFactory || parentLView &&\n parentLView[RENDERER_FACTORY]);\n ngDevMode && assertDefined(IView[RENDERER_FACTORY],\n 'RendererFactory is required');\n IView[RENDERER] = (renderer || parentLView &&\n parentLView[RENDERER]);\n ngDevMode && assertDefined(IView[RENDERER], 'Renderer is required');\n IView[SANITIZER] = sanitizer || parentLView && parentLView[SANITIZER] || null!;\n IView[INJECTOR as\n any] = injector || parentLView && parentLView[INJECTOR] || null;\n IView[T_HOST] = tHostNode;\n IView[ID]\n = getUniqueLViewId();\n IView[EMBEDDED_VIEW_INJECTOR as any] = embeddedViewInjector;\n ngDevMode &&\n assertEqual(\n tView.type == TViewType.Embedded ? parentLView !== null : true,\n true,\n 'Embedded views must have parentLView');\n IView[DECLARATION_COMPONENT_VIEW] =\n tView.type == TViewType.Embedded ? parentLView![DECLARATION_COMPONENT_VIEW] : IView;\n ngDevMode && attachLViewDebug(IView);\n return IView;\n}\n\n/**\n * Create and stores the TNode, and hooks\n it up to the tree.\n *\n * @param tView The current `TView`.\n * @param index The index\n at which the TNode should be saved (null if view, since they are not\n * saved).\n * @param type The type of\n TNode to create\n * @param native The native element for this node, if applicable\n * @param name The tag name\n of the associated native element, if applicable\n * @param attrs Any attrs for the native element, if applicable\n */\nexport function getOrCreateTNode(\n tView: TView, index: number, type:\n TNodeType.Element|TNodeType.Text, name: string|null,\n attrs: TAttributes|null): TElementNode;\nexport\nfunction getOrCreateTNode(\n tView: TView, index: number, type: TNodeType.Container, name: string|null,\n attrs: TAttributes|null): TContainerNode;\nexport function getOrCreateTNode(\n tView: TView, index: number,\n type: TNodeType.Projection, name: null,\n attrs: TAttributes|null): TProjectionNode;\nexport function\ngetOrCreateTNode(\n tView: TView, index: number, type: TNodeType.ElementContainer, name: string|null,\n attrs: TAttributes|null): TElementContainerNode;\nexport\nfunction getOrCreateTNode(\n tView: TView, index: number, type: TNodeType.Icu, name: null,\n attrs:\n TAttributes|null): TElementContainerNode;\nexport function getOrCreateTNode(\n tView: TView, index:\n number, type: TNodeType, name: string|null, attrs: TAttributes|null):\n TElementNode&TContainerNode&TElementContainerNode&TProjectionNode&TIcuContainerNode {\n ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See `createContainerRef` in\n\n // `view_engine_compatibility` for additional context.\n assertGreaterThanOrEqual(index,\n HEADER_OFFSET, 'TNodes can\\'t be in the LView header.);\n // Keep this function short, so that the VM will\n inline it.\n ngDevMode && assertPureTNodeType(type);\n let tNode = tView.data[index] as TNode;\n if (tNode\n === null) {\n tNode = createTNodeAtIndex(tView, index, type, name, attrs);\n if (isInI18nBlock()) {\n // If\n we are in i18n block then all elements should be pre\n declared through `Placeholder`\n // See `TNodeType.Placeholder` and `LFrame.inI18n` for more context.\n //\n If the `TNode` was not pre-declared than it means it was not mentioned which means it was\n // removed, so we\n mark it as detached.\n tNode.flags |= TNodeFlags.isDetached;\n }\n } else if (tNode.type &\n TNodeType.Placeholder) {\n tNode.type = type;\n tNode.value = name;\n tNode.attrs = attrs;\n const parent\n = getCurrentParentTNode();\n tNode.injectorIndex = parent === null ? -1 : parent.injectorIndex;\n ngDevMode\n && assertTNodeForTView(tNode, tView);\n ngDevMode && assertEqual(index, tNode.index, 'Expecting same\n index');\n }\n setTNode(tNode, true);\n return tNode as TElementNode & TContainerNode &\n TElementContainerNode & TProjectionNode & TIcuContainerNode;\n}\n\nexport function\ncreateTNodeAtIndex(\n tView: TView, index: number, type: TNodeType, name: string|null, attrs:\n TAttributes|null) {\n const currentTNode = getCurrentTNodePlaceholderOk();\n const isParent = isCurrentTNodeParent();\n const parent = isParent ? currentTNode : currentTNode &&\n currentTNode.parent;\n // Parents cannot cross component boundaries because components will be used in multiple\n places.\n const tNode = tView.data[index] =\n createTNode(tView, parent as TElementNode | TContainerNode,\n
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type, index, name, attrs);\n // Assign a pointer to the first child node of a given view. The first node is not always\n the one\n // at index 0, in case of i18n, index 0 can be the instruction `i18nStart` and the first node has\n // the index\n 1 or more, so we can't just check node index.\n if (tView.firstChild === null) {\n   tView.firstChild = tNode;\n }\n if (currentTNode !== null) {\n   if (isParent) {\n     // FIXME(misko): This logic looks unnecessarily complicated.\n     Could we simplify?\n     if (currentTNode.child === null && tNode.parent !== null) {\n       // We are in the same\n       view, which means we are adding content\n       node to the parent view.\n       currentTNode.child = tNode;\n     } else {\n       if (currentTNode.next ===\n       null) {\n         // In the case of i18n the `currentTNode` may already be linked, in which case we don't want\n         //\n         to break the links which i18n created.\n         currentTNode.next = tNode;\n       }\n     }\n   }\n   return\n   tNode;\n }\n\n/**\n * When elements are created dynamically after a view blueprint is created (e.g. through\n * i18nApply()), we need to adjust the blueprint for future\n * template passes.\n * @param tView `TView`\n associated with `LView`\n * @param IView The `LView` containing the blueprint to adjust\n * @param\n numSlotsToAlloc The number of slots to alloc in the LView, should be >0\n * @param initialValue Initial value to\n store in blueprint\n */\nexport function allocExpando(\n  tView: TView, IView: LView, numSlotsToAlloc:\n  number, initialValue: any): number {\n  if (numSlotsToAlloc === 0) return -1;\n  if (ngDevMode) {\n    assertFirstCreatePass(tView);\n\n    assertSame(tView, IView[TVIEW], 'LView` must be associated with `TView`!');\n    assertEquals(tView.data.length, IView.length, 'Expecting LView to be same size as TView');\n    assertEquals(\n    tView.data.length, tView.blueprint.length, 'Expecting Blueprint to be same size as TView');\n    assertFirstUpdatePass(tView);\n  }\n  const allocIdx = IView.length;\n  for (let i = 0; i < numSlotsToAlloc; i++) {\n    IView.push(initialValue);\n    tView.blueprint.push(initialValue);\n    tView.data.push(null);\n  }\n  return\n  allocIdx;\n}\n\n//////////\n\nRender\n//////////\n\n/**\n * Processes a view in the creation\n mode. This includes a number of steps in a specific order:\n * - creating view query functions (if any);\n * -\n * executing a template function in the creation mode;\n * - updating static queries (if any);\n * - creating child\n * components defined in a given view.\n */\nexport function renderView<T>(tView: TView, IView: LView<T>,\n  context: T): void {\n  ngDevMode && assertEquals(isCreationMode(IView), true, 'Should be run in creation\n  mode');\n  enterView(IView);\n  try {\n    const viewQuery = tView.viewQuery;\n    if (viewQuery !== null) {\n      executeViewQueryFn<T>(RenderFlags.Create, viewQuery, context);\n    }\n\n    // Execute a template associated\n    with this view, if it exists. A template function might not be\n    // defined for the root component views.\n    const\n    templateFn = tView.template;\n    if (templateFn !== null) {\n      executeTemplate<T>(tView, IView, templateFn,\n      RenderFlags.Create, context);\n    }\n\n    // This needs to be set before children are processed to support recursive\n    components.\n    // This must be set to false immediately after the first creation run because in an\n    // ngFor loop,\n    all the views will be created together before update mode runs and turns\n    // off firstCreatePass. If we don't set it\n    here, instances will perform directive\n    // matching, etc again and again.\n\n    if (tView.firstCreatePass) {\n      tView.firstCreatePass = false;\n    }\n\n    // We resolve content queries\n    specifically marked as `static` in creation mode. Dynamic\n    // content queries are resolved during change detection\n    (i.e. update mode), after embedded\n    // views are refreshed (see block above).\n    if (tView.staticContentQueries)\n    {\n      refreshContentQueries(tView, IView);\n    }\n\n    // We must materialize query results before child\n    components are processed\n    // in case a child component has projected a container. The LContainer needs\n    // to\n    exist so the embedded views are properly attached by the container.\n    if (tView.staticViewQueries) {\n      executeViewQueryFn<T>(RenderFlags.Update, tView.viewQuery!, context);\n    }\n\n    // Render child component\n    views.\n    const components = tView.components;\n    if (components !== null) {\n      renderChildComponents(IView, components);\n    }\n  } catch (error) {\n    // If we didn't manage to get\n    past the first template pass due to\n    // an error, mark the view as corrupted so we can try to recover.\n    if\n    (tView.firstCreatePass) {\n      tView.incompleteFirstPass = true;\n      tView.firstCreatePass = false;\n    }\n\n    throw error;\n  } finally {\n    IView[FLAGS] &= ~LViewFlags.CreationMode;\n    leaveView();\n  }\n}\n\n/**\n * Processes a view in update mode. This includes a number of steps in a specific order:\n * - executing a template\n * function in update mode;\n * - executing hooks;\n * - refreshing queries;\n * - setting host bindings;\n * - refreshing
```

```

child (embedded and component) views.\n */\nexport function refreshView<T>(\n  tView: TView, IView: LView,\n  templateFn: ComponentTemplate<{ }>|null, context: T) {\n  ngDevMode && assertEquals(isCreationMode(IView),\n  false, 'Should be run in update mode');\n  const flags = IView[FLAGS];\n  if ((flags & LViewFlags.Destroyed) ===\n  LViewFlags.Destroyed) return;\n  enterView(IView);\n  // Check no changes mode is a dev only\n  mode used to verify that bindings have not changed\n  // since they were assigned. We do not want to execute\n  lifecycle hooks in that mode.\n  const isInCheckNoChangesPass = ngDevMode && isInCheckNoChangesMode();\n  try {\n  resetPreOrderHookFlags(IView);\n  setBindingIndex(tView.bindingStartIndex);\n  if (templateFn !==\n  null) {\n  executeTemplate(tView, IView, templateFn, RenderFlags.Update, context);\n  }\n  const\n  hooksInitPhaseCompleted =\n  (flags & LViewFlags.InitPhaseStateMask) ===\n  InitPhaseState.InitPhaseCompleted;\n  // execute pre-order hooks (OnInit, OnChanges, DoCheck)\n  // PERF\n  WARNING: do NOT extract this to a separate function without running benchmarks\n  if\n  (!isInCheckNoChangesPass) {\n  if (hooksInitPhaseCompleted) {\n  const preOrderCheckHooks =\n  tView.preOrderCheckHooks;\n  if (preOrderCheckHooks !== null) {\n  executeCheckHooks(IView,\n  preOrderCheckHooks, null);\n  }\n  } else {\n  const preOrderHooks\n  = tView.preOrderHooks;\n  if (preOrderHooks !== null) {\n  executeInitAndCheckHooks(IView,\n  preOrderHooks, InitPhaseState.OnInitHooksToBeRun, null);\n  }\n  incrementInitPhaseFlags(IView,\n  InitPhaseState.OnInitHooksToBeRun);\n  }\n  }\n  // First mark transplanted views that are declared in this\n  IView as needing a refresh at their\n  // insertion points. This is needed to avoid the situation where the template is\n  defined in this\n  // `LView` but its declaration appears after the insertion component.\n  markTransplantedViewsForRefresh(IView);\n  refreshEmbeddedViews(IView);\n  // Content query results must\n  be refreshed before content hooks are called.\n  if (tView.contentQueries !== null) {\n  refreshContentQueries(tView, IView);\n  }\n  // execute content hooks (AfterContentInit,\n  AfterContentChecked)\n  // PERF WARNING: do NOT extract this to a separate function without running\n  benchmarks\n  if (!isInCheckNoChangesPass)\n  {\n  if (hooksInitPhaseCompleted) {\n  const contentCheckHooks = tView.contentCheckHooks;\n  if\n  (contentCheckHooks !== null) {\n  executeCheckHooks(IView, contentCheckHooks);\n  }\n  } else {\n  const contentHooks = tView.contentHooks;\n  if (contentHooks !== null) {\n  executeInitAndCheckHooks(\n  IView, contentHooks, InitPhaseState.AfterContentInitHooksToBeRun);\n  }\n  incrementInitPhaseFlags(IView, InitPhaseState.AfterContentInitHooksToBeRun);\n  }\n  }\n  processHostBindingOpCodes(tView, IView);\n  // Refresh child component views.\n  const components =\n  tView.components;\n  if (components !== null) {\n  refreshChildComponents(IView, components);\n  }\n  // View queries must execute after refreshing child components because a template in this view\n  // could be inserted\n  in a child component. If the view query executes before child component\n  // refresh, the template\n  might not yet be inserted.\n  const viewQuery = tView.viewQuery;\n  if (viewQuery !== null) {\n  executeViewQueryFn<T>(RenderFlags.Update, viewQuery, context);\n  }\n  // execute view hooks\n  (AfterViewInit, AfterViewChecked)\n  // PERF WARNING: do NOT extract this to a separate function without\n  running benchmarks\n  if (!isInCheckNoChangesPass) {\n  if (hooksInitPhaseCompleted) {\n  const\n  viewCheckHooks = tView.viewCheckHooks;\n  if (viewCheckHooks !== null) {\n  executeCheckHooks(IView, viewCheckHooks);\n  }\n  } else {\n  const viewHooks =\n  tView.viewHooks;\n  if (viewHooks !== null) {\n  executeInitAndCheckHooks(IView, viewHooks,\n  InitPhaseState.AfterViewInitHooksToBeRun);\n  }\n  incrementInitPhaseFlags(IView,\n  InitPhaseState.AfterViewInitHooksToBeRun);\n  }\n  }\n  if (tView.firstUpdatePass === true) {\n  // We\n  need to make sure that we only flip the flag on successful `refreshView` only\n  // Don't do this in `finally` block.\n  // If we did this in `finally` block then an exception could block the\n  execution of styling\n  // instructions which in turn would be unable to insert themselves into the styling linked\n  // list. The result of this would be that if the exception would not be throw on subsequent CD\n  // the styling\n  would be unable to process it data and reflect to the DOM.\n  tView.firstUpdatePass = false;\n  }\n  // Do not\n  reset the dirty state when running in check no changes mode. We don't want components\n  // to behave differently

```

depending on whether check no changes is enabled or not. For example:

```

// Marking an OnPush component as
dirty from within the `ngAfterViewInit` hook in order to
// refresh a `NgClass` binding should work. If we
would reset the dirty state in the check
// no changes cycle, the component would be not be dirty for the next
update pass. This would
// be different in production mode
where the component dirty state is not reset.
if (!isInCheckNoChangesPass) {
  lView[FLAGS] &=
  ~(LViewFlags.Dirty | LViewFlags.FirstLViewPass);
}
if (lView[FLAGS] &
LViewFlags.RefreshTransplantedView) {
  lView[FLAGS] &= ~LViewFlags.RefreshTransplantedView;
updateTransplantedViewCount(lView[PARENT] as LContainer, -1);
}
} finally {
  leaveView();
}
}
function executeTemplate<T>(tView: TView, lView: LView<T>, templateFn:
ComponentTemplate<T>, rf: RenderFlags, context: T) {
  const prevSelectedIndex = getSelectedIndex();
  const isUpdatePhase = rf & RenderFlags.Update;
  try {
    setSelectedIndex(-1);
    if (isUpdatePhase &&
lView.length > HEADER_OFFSET) {
      // When we're updating, inherently select 0 so we don't
      // have to
      generate that instruction for most update blocks.
      selectIndexInternal(tView, lView, HEADER_OFFSET,
!!ngDevMode && isInCheckNoChangesMode());
    }
    const preHookType =
isUpdatePhase
? ProfilerEvent.TemplateUpdateStart : ProfilerEvent.TemplateCreateStart;
    profiler(preHookType, context as
unknown as {});
    templateFn(rf, context);
  } finally {
    setSelectedIndex(prevSelectedIndex);
    const
postHookType =
isUpdatePhase ? ProfilerEvent.TemplateUpdateEnd : ProfilerEvent.TemplateCreateEnd;
    profiler(postHookType, context as unknown as {});
  }
}
}
export function executeContentQueries(tView: TView, tNode: TNode, lView:
LView) {
  if (isContentQueryHost(tNode)) {
    const start = tNode.directiveStart;
    const end =
tNode.directiveEnd;
    for (let directiveIndex = start; directiveIndex < end; directiveIndex++) {
      const def =
tView.data[directiveIndex] as DirectiveDef<any>;
      if (def.contentQueries) {
        def.contentQueries(RenderFlags.Create, lView[directiveIndex], directiveIndex);
      }
    }
  }
}
Creates directive
instances.
export function createDirectivesInstances(tView: TView, lView: LView, tNode:
TDirectiveHostNode) {
  if (!getBindingsEnabled()) return;
  instantiateAllDirectives(tView, lView, tNode,
getNativeByTNode(tNode, lView));
  if ((tNode.flags & TNodeFlags.hasHostBindings) ===
TNodeFlags.hasHostBindings) {
    invokeDirectivesHostBindings(tView, lView, tNode);
  }
}
* Takes
a list of local names and indices and pushes the resolved local variable values
* to LView in the same order as
they are loaded in the template with load().
export function saveResolvedLocalsInData(lView: LView,
tNode: TDirectiveHostNode,
localRefExtractor: LocalRefExtractor = getNativeByTNode): void {
  const
localNames = tNode.localNames;
  if (localNames !== null) {
    let localIndex = tNode.index + 1;
    for (let i =
0; i < localNames.length; i += 2) {
      const index = localNames[i + 1] as number;
      const value = index === -1
? localRefExtractor(
tNode as TElementNode | TContainerNode | TElementContainerNode, viewData) :
viewData[index];
      viewData[localIndex++] = value;
    }
  }
}
* Gets TView from a template
function or creates a new TView
* if it doesn't already exist.
* @param def ComponentDef
* @returns
TView
export function getOrCreateComponentTView(def: ComponentDef<any>): TView {
  const tView =
def.tView;
  // Create a TView if there isn't one, or recreate it if the first create pass didn't
  // complete
  successfully since we can't know for sure whether it's in a usable shape.
  if (tView === null ||
tView.incompleteFirstPass) {
    // Declaration node here is null since this function is called when we dynamically
    create a
    // component and hence there is no declaration.
    const declTNode = null;
    return def.tView =
createTView(
TViewType.Component, declTNode, def.template, def.decls, def.vars, def.directiveDefs,
def.pipeDefs, def.viewQuery, def.schemas, def.consts);
  }
  return tView;
}
* Creates a
TView instance
* @param type Type of `TView`
* @param declTNode Declaration location of this
`TView`
* @param templateFn Template function
* @param decls The number of nodes, local refs, and pipes
in this template
* @param directives Registry of directives for this view
* @param pipes Registry of pipes for
this view
* @param viewQuery View queries for this view
* @param schemas Schemas for this view

```

```

@param consts Constants for this view\n */\nexport function createTView(\n  type: TViewType, declTNode:
TNode|null, templateFn: ComponentTemplate<any>|null, decls: number,\n  vars: number, directives:
DirectiveDefListOrFactory|null, pipes: PipeDefListOrFactory|null,\n  viewQuery:
ViewQueriesFunction<any>|null, schemas: SchemaMetadata[]|null,\n  constsOrFactory:
TConstantsOrFactory|null): TView {\n  ngDevMode && ngDevMode.tView++; \n  const bindingStartIndex
= HEADER_OFFSET + decls;\n  // This length does not yet contain host bindings from child directives because at
this point,\n  // we don't know which directives are active on this template. As soon as a directive is matched\n  //
that has a host binding, we will update the blueprint with that def's hostVars count.\n  const initialViewLength =
bindingStartIndex + vars;\n  const blueprint = createViewBlueprint(bindingStartIndex, initialViewLength);\n  const
consts = typeof constsOrFactory === 'function' ? constsOrFactory() : constsOrFactory;\n  const tView =
blueprint[TVIEW as any] = ngDevMode ?\n    new TViewConstructor(\n      type, // type: TViewType,\n      blueprint, // blueprint: LView,\n      templateFn, // template: ComponentTemplate<{}>|null,\n      null, //
queries: TQueries|null\n      viewQuery, // viewQuery: ViewQueriesFunction<{}>|null,\n      declTNode, //
declTNode: TNode|null,\n      cloneToTViewData(blueprint).fill(null,
bindingStartIndex), // data: TData,\n      bindingStartIndex, // bindingStartIndex:
number,\n      initialViewLength, // expandoStartIndex: number,\n      null,
// hostBindingOpCodes: HostBindingOpCodes,\n      true, // firstCreatePass: boolean,\n      true, // firstUpdatePass: boolean,\n      false, // staticViewQueries:
boolean,\n      false, // staticContentQueries: boolean,\n      null, //
preOrderHooks: HookData|null,\n      null, // preOrderCheckHooks: HookData|null,\n      null, // contentHooks: HookData|null,\n      null, // contentCheckHooks:
HookData|null,\n      null, // viewHooks: HookData|null,\n      null, // viewCheckHooks:
HookData|null,\n      null, // destroyHooks: DestroyHookData|null,\n      null, // cleanup: any[]|null,\n      null, // contentQueries: number[]|null,\n      null, // components: number[]|null,\n      typeof directives === 'function' ? //\n      directives() : //\n      directives, // directiveRegistry: DirectiveDefList|null,\n      typeof pipes === 'function' ? pipes() :
pipes, // pipeRegistry: PipeDefList|null,\n      null, // firstChild: TNode|null,\n      schemas, // schemas: SchemaMetadata[]|null,\n      consts, //
consts: TConstants|null\n      false, // incompleteFirstPass: boolean\n      decls, //
ngDevMode only: decls\n      vars, // ngDevMode only: vars\n      ) : \n      {\n
type: type,\n      blueprint: blueprint,\n      template: templateFn,\n      queries: null,\n      viewQuery:
viewQuery,\n      declTNode: declTNode,\n      data: blueprint.slice().fill(null, bindingStartIndex),\n
bindingStartIndex: bindingStartIndex,\n      expandoStartIndex: initialViewLength,\n      hostBindingOpCodes:
null,\n      firstCreatePass: true,\n      firstUpdatePass: true,\n      staticViewQueries: false,\n
staticContentQueries: false,\n      preOrderHooks: null,\n      preOrderCheckHooks: null,\n      contentHooks:
null,\n      contentCheckHooks: null,\n      viewHooks: null,\n      viewCheckHooks: null,\n      destroyHooks:
null,\n      null,\n      cleanup: null,\n      contentQueries: null,\n      components: null,\n      directiveRegistry: typeof directives
=== 'function' ? directives() : directives,\n      pipeRegistry: typeof pipes === 'function' ? pipes() : pipes,\n
firstChild: null,\n      schemas: schemas,\n      consts: consts,\n      incompleteFirstPass: false\n    };\n  if
(ngDevMode) {\n    // For performance reasons it is important that the tView retains the same shape during
runtime.\n    // (To make sure that all of the code is monomorphic.) For this reason we seal the object to\n    //
prevent class transitions.\n    Object.seal(tView);\n  }\n  return tView;\n}\n\nfunction
createViewBlueprint(bindingStartIndex: number, initialViewLength: number): LView {\n  const blueprint =
ngDevMode ? new LViewBlueprint() : [];\n  for (let i = 0; i < initialViewLength; i++) {\n    blueprint.push(i <
bindingStartIndex ? null : NO_CHANGE);\n  }\n  return blueprint as LView;\n}\n\nfunction createError(text:

```



```

string, token: any) {\n return new Error(`Renderer: ${text} [${stringifyForError(token)}]`);\n}\n\n/**\n * Locates
the host native element, used for bootstrapping existing nodes into rendering pipeline.\n *\n * @param
rendererFactory Factory function to create renderer instance.\n * @param elementOrSelector Render element or
CSS selector to locate the element.\n * @param encapsulation View Encapsulation defined for component that
requests host element.\n */\nexport function locateHostElement(\n  renderer: Renderer, elementOrSelector:
RElement|string,\n  encapsulation: ViewEncapsulation): RElement {\n // When using native Shadow DOM, do not
clear host element to allow native slot projection\n const preserveContent = encapsulation ===
ViewEncapsulation.ShadowDom;\n return renderer.selectRootElement(elementOrSelector,
preserveContent);\n}\n\n/**\n * Saves context for this cleanup function in LView.cleanupInstances.\n *\n * On the
first template pass, saves in TView:\n
* - Cleanup function\n * - Index of context we just saved in LView.cleanupInstances\n *\n * This function can also
be used to store instance specific cleanup fns. In that case the `context` is `null` and the function is store in
`LView` (rather than it `TView`).\n */\nexport function storeCleanupWithContext(\n  tView: TView, lView:
LView, context: any, cleanupFn: Function): void {\n const lCleanup = getOrCreateLViewCleanup(lView);\n if
(context === null) {\n // If context is null that this is instance specific callback. These callbacks can only be\n //
inserted after template shared instances. For this reason in ngDevMode we freeze the TView.\n if (ngDevMode)
{\n Object.freeze(getOrCreateTViewCleanup(tView));\n }\n lCleanup.push(cleanupFn);\n } else {\n
lCleanup.push(context);\n if (tView.firstCreatePass) {\n getOrCreateTViewCleanup(tView).push(cleanupFn,
lCleanup.length - 1);\n }\n }\n}\n\n/**\n * Constructs a TNode object from the arguments.\n *\n * @param tView `TView` to which this `TNode` belongs (used only in `ngDevMode`)\n * @param tParent
Parent `TNode`\n * @param type The type of the node\n * @param index The index of the TNode in TView.data,
adjusted for HEADER_OFFSET\n * @param tagName The tag name of the node\n * @param attrs The attributes
defined on this node\n * @param tViews Any TViews attached to this node\n * @returns the TNode object\n
*/\nexport function createTNode(\n  tView: TView, tParent: TElementNode|TContainerNode|null, type:
TNodeType.Container,\n  index: number, tagName: string|null, attrs: TAttributes|null): TContainerNode;\nexport
function createTNode(\n  tView: TView, tParent: TElementNode|TContainerNode|null, type:
TNodeType.Element|TNodeType.Text,\n  index: number, tagName: string|null, attrs: TAttributes|null):
TElementNode;\nexport function createTNode(\n  tView: TView, tParent: TElementNode|TContainerNode|null,
type: TNodeType.ElementContainer,\n  index: number, tagName:
string|null, attrs: TAttributes|null): TElementContainerNode;\nexport function createTNode(\n  tView: TView,
tParent: TElementNode|TContainerNode|null, type: TNodeType.Icu, index: number,\n  tagName: string|null, attrs:
TAttributes|null): TIcuContainerNode;\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.Projection,\n  index: number, tagName: string|null, attrs:
TAttributes|null): TProjectionNode;\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType, index: number,\n  tagName: string|null, attrs:
TAttributes|null): TNode;\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType, index: number,\n  value: string|null, attrs:
TAttributes|null): TNode {\n ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See
`createContainerRef` in\n // `view_engine_compatibility` for
additional context.\n assertGreaterThanOrEqual(index, HEADER_OFFSET, 'TNodes can\\'t be in the LView
header.);\n ngDevMode && assertNotSame(attrs, undefined, '\\`undefined\\` is not valid value for \\`attrs\\`');\n
ngDevMode && ngDevMode.tNode++;\n ngDevMode && tParent && assertTNodeForTView(tParent, tView);\n
let injectorIndex = tParent ? tParent.injectorIndex : -1;\n const tNode = ngDevMode ?\n new TNodeDebug(\n
tView, // tView_: TView\n type, // type: TNodeType\n index, // index: number\n null, // insertBeforeIndex: null|-1|number|number[]\n injectorIndex, // injectorIndex: number\n -1,
// directiveStart: number\n -1, // directiveEnd: number\n -1, // directiveStylingLast:
number\n null, // propertyBindings: number[]\n null\n 0, // flags: TNodeFlags\n 0,
// providerIndexes:

```

```

TNodeProviderIndexes value, // value: string|null attrs, // attrs:
(string|AttributeMarker|(string|SelectorFlags)[])[]|null null, // mergedAttrs null, //
localNames: (string|number)|null|undefined, // initialInputs: (string[]|null)|null|undefined null,
// inputs: PropertyAliases|null null, // outputs: PropertyAliases|null null, // tViews:
ITView|ITView[]|null null, // next: ITNode|null null, // projectionNext: ITNode|null null,
null, // child: ITNode|null tParent, // parent: TElementNode|TContainerNode|null null,
// projection: number|(ITNode|RNode[])[]|null null, // styles: string|null null, //
stylesWithoutHost: string|null|undefined, // residualStyles: string|null|undefined, //
null, // classes: string|null|undefined, // classesWithoutHost: string|null|undefined, //
residualClasses: string|null|undefined, // 0 as any, // classBindings: TStylingRange;|undefined, //
styleBindings: TStylingRange;|undefined, // ) :|undefined { type, index, insertBeforeIndex: null,
injectorIndex, directiveStart: -1, directiveEnd: -1, directiveStylingLast: -1,
propertyBindings: null, flags: 0, providerIndexes: 0, value: value, attrs: attrs,
mergedAttrs: null, localNames: null, initialInputs: undefined, inputs: null, outputs: null,
tViews: null, next: null, projectionNext: null, child: null, parent: tParent,
projection: null, styles: null, stylesWithoutHost: null, residualStyles: undefined,
classes: null, classesWithoutHost: null, residualClasses: undefined, classBindings: 0 as
any, styleBindings: 0 as any, };
if (ngDevMode) { // For performance reasons it is important that
the tNode retains the same shape during runtime. // (To make sure that all of the code is monomorphic.) For this
reason we seal the object to // prevent class transitions. Object.seal(tNode); }
return
tNode;}
function generatePropertyAliases(inputAliasMap: {[publicName: string]: string},
directiveDefIdx: number, propStore: PropertyAliases|null): PropertyAliases|null {
for (let publicName in
inputAliasMap) {
if (inputAliasMap.hasOwnProperty(publicName)) {
propStore = propStore === null ? {}
: propStore;
const internalName = inputAliasMap[publicName];
if
(propStore.hasOwnProperty(publicName)) {
propStore[publicName].push(directiveDefIdx, internalName);
} else {
(propStore[publicName] = [directiveDefIdx, internalName]);
}
}
}
return
propStore;}
}
// Initializes data structures required to work with directive inputs and outputs.
// Initialization is done for all directives matched on a given TNode.
export function
initializeInputAndOutputAliases(tView: TView, tNode: TNode): void {
ngDevMode &&
assertFirstCreatePass(tView);
const start = tNode.directiveStart;
const end = tNode.directiveEnd;
const
tViewData = tView.data;
const tNodeAttrs = tNode.attrs;
const inputsFromAttrs: InitialInputData =
ngDevMode ? new TNodeInitialInputs() : [];
let inputsStore: PropertyAliases|null = null;
let outputsStore:
PropertyAliases|null = null;
for (let i = start; i < end; i++) {
const directiveDef = tViewData[i] as
DirectiveDef<any>;
const directiveInputs = directiveDef.inputs;
// Do not use unbound attributes as inputs to
structural directives, since structural
// directive inputs can only be set using microsyntax (e.g. `<div *dir="exp">`).
// TODO(FW-1930):
microsyntax expressions may also contain unbound/static attributes, which
// should be set for inline
templates.
const initialInputs = (tNodeAttrs !== null && !isInlineTemplate(tNode)) ?
generateInitialInputs(directiveInputs, tNodeAttrs) :
null;
inputsFromAttrs.push(initialInputs);
inputsStore = generatePropertyAliases(directiveInputs, i, inputsStore);
outputsStore =
generatePropertyAliases(directiveDef.outputs, i, outputsStore);
}
if (inputsStore !== null) {
if
(inputsStore.hasOwnProperty('class')) {
tNode.flags |= TNodeFlags.hasClassInput;
}
if
(inputsStore.hasOwnProperty('style')) {
tNode.flags |= TNodeFlags.hasStyleInput;
}
}
}
tNode.initialInputs = inputsFromAttrs;
tNode.inputs = inputsStore;
tNode.outputs = outputsStore;}
}
// Mapping between attributes names that don't
correspond to their element property names.
// Performance note: this function is written as a series of if
checks (instead of, say, a property
// object lookup) for performance reasons - the series of `if` checks seems to be
the fastest way of
// mapping property names. Do NOT change without benchmarking.
// Note: this mapping

```

```

has to be kept in sync with the equally named mapping in the template
 * type-checking machinery of ngts.
 *
function mapPropName(name: string): string {
  if (name === 'class') return 'className';
  if (name === 'for') return 'htmlFor';
  if (name === 'formaction') return 'formAction';
  if (name === 'innerHTML') return 'innerHTML';
  if (name === 'readonly') return 'readOnly';
  if (name === 'tabindex') return 'tabIndex';
  return name;
}
export function elementPropertyInternal<T>(
  tView: TView, tNode: TNode, IView: LView,
  propName: string, value: T, renderer: Renderer,
  sanitizer: SanitizerFn|undefined, nativeOnly: boolean):
  void {
  ngDevMode && assertNotSame(value, NO_CHANGE as any, 'Incoming value should never be NO_CHANGE. ');
  const element = getNativeByTNode(tNode, IView) as RElement | RComment;
  let inputData = tNode.inputs;
  let dataValue: PropertyAliasValue|undefined;
  if (!nativeOnly && inputData != null && (dataValue = inputData[propName])) {
    setInputsForProperty(tView, IView, dataValue, propName, value);
    if (isComponentHost(tNode)) markDirtyIfOnPush(IView, tNode.index);
    if (ngDevMode) {
      setNgReflectProperties(IView, element, tNode.type, dataValue, value);
    }
  } else if (tNode.type & TNodeType.AnyRNode) {
    propName = mapPropName(propName);
    if (ngDevMode) {
      validateAgainstEventProperties(propName);
      if (!isPropertyValid(element, propName, tNode.value, tView.schemas)) {
        handleUnknownPropertyError(propName, tNode.value, tNode.type, IView);
      }
      ngDevMode.renderer.setProperty++;
    }
    // It is assumed that the sanitizer is only added when the compiler determines that the
    // property is risky, so sanitization can be done without further checks.
    value = sanitizer != null ? (sanitizer(value, tNode.value || "", propName) as any) : value;
    renderer.setProperty(element as RElement, propName, value);
  } else if (tNode.type & TNodeType.AnyContainer) {
    // If the node is a container and the property didn't match any of the inputs or schemas we should throw.
    if (ngDevMode && !matchingSchemas(tView.schemas, tNode.value)) {
      handleUnknownPropertyError(propName, tNode.value, tNode.type, IView);
    }
  }
}
/** If node is an OnPush component, marks its LView dirty. */
export function markDirtyIfOnPush(IView: LView, viewIndex: number): void {
  ngDevMode && assertLView(IView);
  const childComponentLView = getComponentLViewByIndex(viewIndex, IView);
  if (!(childComponentLView[FLAGS] & LViewFlags.CheckAlways)) {
    childComponentLView[FLAGS] |= LViewFlags.Dirty;
  }
}
function setNgReflectProperty(
  IView: LView, element: RElement|RComment, type: TNodeType, attrName: string, value: any) {
  const renderer = IView[RENDERER];
  attrName = normalizeDebugBindingName(attrName);
  const debugValue = normalizeDebugBindingValue(value);
  if (type & TNodeType.AnyRNode) {
    if (value == null) {
      renderer.removeAttribute((element as RElement), attrName);
    } else {
      renderer.setAttribute((element as RElement), attrName, debugValue);
    }
  } else {
    const textContent = `
    escapeCommentText(`bindings=${JSON.stringify({[attrName]: debugValue}, null, 2)} `);
    renderer.setValue((element as RComment), textContent);
  }
}
export function setNgReflectProperties(
  IView: LView, element: RElement|RComment, type: TNodeType, dataValue: PropertyAliasValue,
  value: any) {
  if (type & (TNodeType.AnyRNode | TNodeType.Container)) {
    /**
    * dataValue is an array containing runtime input or output names for the directives:
    * i+0: directive instance index
    * i+1: privateName
    * e.g. [0, 'change', 'change-minified']
    * we want to set the reflected property with the privateName: dataValue[i+1]
    */
    for (let i = 0; i < dataValue.length; i += 2) {
      setNgReflectProperty(IView, element, type, dataValue[i + 1] as string, value);
    }
  }
}
/**
 * Instantiate a root component.
 */
export function instantiateRootComponent<T>(
  tView: TView, IView: LView, def: ComponentDef<T>): T {
  const rootTNode = getCurrentTNode();
  if (tView.firstCreatePass) {
    if (def.providersResolver) def.providersResolver(def);
    const directiveIndex = allocExpando(tView, IView, 1, null);
    ngDevMode && assertEqual(
      directiveIndex, rootTNode.directiveStart,
      'Because this is a root component the allocated expando should match the TNode component. ');
    configureViewWithDirective(tView, rootTNode, IView, directiveIndex, def);
    initializeInputAndOutputAliases(tView, rootTNode);
  }
  const directive = getNodeInjectable(IView, tView, rootTNode.directiveStart, rootTNode as TElementNode);
  attachPatchData(directive, IView);
  const native = getNativeByTNode(rootTNode, IView);
  if (native) {

```

```

attachPatchData(native, IView);
}
return directive;
}

/**
 * Resolve the matched directives on a node.
 */
export function resolveDirectives(
  tView: TView, IView: LView, tNode:
  TElementNode|TContainerNode|TElementContainerNode,
  localRefs: string[]|null): boolean {
  // Please make
  // sure to have explicit type for `exportsMap`. Inferred type triggers bug in
  // tsickle.
  ngDevMode &&
  assertFirstCreatePass(tView);
  let hasDirectives = false;
  if (getBindingsEnabled()) {
    const directiveDefs:
    DirectiveDef<any>[]|null = findDirectiveDefMatches(tView, IView, tNode);
    const exportsMap: ({[key: string]:
    number}|null) = localRefs === null ? null : {
      -1};
    if (directiveDefs !== null) {
      hasDirectives = true;
      initTNodeFlags(tNode, tView.data.length,
      directiveDefs.length);
      // When the same token is provided by several directives on the same node, some rules
      // apply in
      // the viewEngine:
      // - viewProviders have priority over providers
      // - the last directive in
      NgModule.declarations has priority over the previous one
      // So to match these rules, the order in which
      providers are added in the arrays is very
      // important.
      for (let i = 0; i < directiveDefs.length; i++) {
        const def = directiveDefs[i];
        if (def.providersResolver) def.providersResolver(def);
      }
      let
      preOrderHooksFound = false;
      let preOrderCheckHooksFound = false;
      let directiveIdx =
      allocExpando(tView, IView, directiveDefs.length, null);
      ngDevMode &&
      assertSame(
      directiveIdx, tNode.directiveStart,
      "TNode.directiveStart
      should point to just allocated space");
      for (let i = 0; i < directiveDefs.length; i++) {
        const def =
        directiveDefs[i];
        // Merge the attrs in the order of matches. This assumes that the first directive is the
        // component itself, so that the component has the least priority.
        tNode.mergedAttrs =
        mergeHostAttrs(tNode.mergedAttrs, def.hostAttrs);
        configureViewWithDirective(tView, tNode, IView,
        directiveIdx, def);
        saveNameToExportMap(directiveIdx, def, exportsMap);
        if (def.contentQueries !==
        null) tNode.flags |= TNodeFlags.hasContentQuery;
        if (def.hostBindings !== null || def.hostAttrs !== null ||
        def.hostVars !== 0)
          tNode.flags |= TNodeFlags.hasHostBindings;
        const lifeCycleHooks:
        OnChanges&OnInit&DoCheck = def.type.prototype;
        // Only push a node index into the preOrderHooks array
        if this is the first
        // pre-order hook found on this node.
        if (!preOrderHooksFound
        &&
        (lifeCycleHooks.ngOnChanges || lifeCycleHooks.ngOnInit || lifeCycleHooks.ngDoCheck)) {
          // We will push the actual hook function into this array later during dir instantiation.
          // We cannot do it now
          because we must ensure hooks are registered in the same
          // order that directives are created (i.e. injection
          order).
          (tView.preOrderHooks || (tView.preOrderHooks = [])).push(tNode.index);
          preOrderHooksFound = true;
        }
        if (!preOrderCheckHooksFound && (lifeCycleHooks.ngOnChanges ||
        lifeCycleHooks.ngDoCheck)) {
          (tView.preOrderCheckHooks || (tView.preOrderCheckHooks =
          [])).push(tNode.index);
          preOrderCheckHooksFound = true;
        }
        directiveIdx++;
      }
      initializeInputAndOutputAliases(tView, tNode);
    }
    if (exportsMap) cacheMatchingLocalNames(tNode,
    localRefs, exportsMap);
  }
  // Merge the template attrs last so that they have the highest priority.
  tNode.mergedAttrs = mergeHostAttrs(tNode.mergedAttrs, tNode.attrs);
  return hasDirectives;
}

/**
 * Add
 * `hostBindings` to the `TView.hostBindingOpCodes`.
 */
export function registerHostBindingOpCodes(
  tView: TView, tNode:
  TNode, IView: LView, directiveIdx: number, directiveVarsIdx: number, def:
  ComponentDef<any>|DirectiveDef<any>): void {
  ngDevMode && assertFirstCreatePass(tView);
  const
  hostBindings = def.hostBindings;
  if (hostBindings) {
    let hostBindingOpCodes =
    tView.hostBindingOpCodes;
    if (hostBindingOpCodes === null) {
      hostBindingOpCodes
      = tView.hostBindingOpCodes = [] as any as HostBindingOpCodes;
    }
    const elementIdx = ~tNode.index;
    if (lastSelectedElementIdx(hostBindingOpCodes) != elementIdx) {
      // Conditionally add select element so that
      // we are more efficient in execution.
      // NOTE: this is strictly not necessary and it trades code size for runtime
      // perf.
      // (We could just always add it.)
      hostBindingOpCodes.push(elementIdx);
    }
  }
}

```

```

hostBindingOpCodes.push(directiveIdx, directiveVarsIdx, hostBindings);\n } }\n\n/**\n * Returns the last
selected element index in the `HostBindingOpCodes`\n *\n * For perf reasons we don't need to update the selected
element index in `HostBindingOpCodes` only\n *\n * if it changes. This method returns the last index (or '0' if not
found.)\n *\n * Selected element index are only the ones which are negative.\n */\nfunction
lastSelectedElementIdx(hostBindingOpCodes: HostBindingOpCodes): number {\n let i =
hostBindingOpCodes.length;\n while (i
> 0) {\n const value = hostBindingOpCodes[--i];\n if (typeof value === 'number' && value < 0) {\n return
value;\n }\n }\n return 0;\n }\n\n\n/**\n * Instantiate all the directives that were previously resolved on the current
node.\n */\nfunction instantiateAllDirectives(\n tView: TView, lView: LView, tNode: TDirectiveHostNode,
native: RNode) {\n const start = tNode.directiveStart;\n const end = tNode.directiveEnd;\n if
(!tView.firstCreatePass) {\n getOrCreateNodeInjectorForNode(tNode, lView);\n }\n attachPatchData(native,
lView);\n const initialInputs = tNode.initialInputs;\n for (let i = start; i < end; i++) {\n const def = tView.data[i]
as DirectiveDef<any>;\n const isComponent = isComponentDef(def);\n if (isComponent) {\n ngDevMode
&& assertTNodeType(tNode, TNodeType.AnyRNode);\n addComponentLogic(lView, tNode as TElementNode,
def as ComponentDef<any>);\n }\n }\n const directive = getNodeInjectable(lView, tView, i, tNode);\n
attachPatchData(directive, lView);\n if (initialInputs !== null) {\n setInputsFromAttrs(lView, i - start,
directive, def, tNode, initialInputs!);\n }\n if (isComponent) {\n const componentView =
getComponentLViewByIndex(tNode.index, lView);\n componentView[CONTEXT] = directive;\n }\n }\n }\n\nfunction invokeDirectivesHostBindings(tView: TView, lView: LView, tNode: TNode) {\n const start =
tNode.directiveStart;\n const end = tNode.directiveEnd;\n const elementIndex = tNode.index;\n const
currentDirectiveIndex = getCurrentDirectiveIndex();\n try {\n setSelectedIndex(elementIndex);\n for (let
dirIndex = start; dirIndex < end; dirIndex++) {\n const def = tView.data[dirIndex] as DirectiveDef<unknown>;\n
const directive = lView[dirIndex];\n setCurrentDirectiveIndex(dirIndex);\n if (def.hostBindings !== null ||
def.hostVars !== 0 || def.hostAttrs !== null) {\n invokeHostBindingsInCreationMode(def, directive);\n }\n
}\n } finally {\n setSelectedIndex(-1);\n setCurrentDirectiveIndex(currentDirectiveIndex);\n }\n }\n\n\n/**\n * Invoke the host bindings in creation mode.\n *\n * @param def `DirectiveDef` which may contain the
`hostBindings` function.\n *\n * @param directive Instance of directive.\n */\nexport function
invokeHostBindingsInCreationMode(def: DirectiveDef<any>, directive: any) {\n if (def.hostBindings !== null) {\n
def.hostBindings!(RenderFlags.Create, directive);\n }\n }\n\n\n/**\n * Matches the current node against all available
selectors.\n *\n * If a component is matched (at most one), it is returned in first position in the array.\n */\nfunction
findDirectiveDefMatches(\n tView: TView, viewData: LView, tNode:
TElementNode|TContainerNode|TElementContainerNode): DirectiveDef<any>[]|null {\n ngDevMode &&
assertFirstCreatePass(tView);\n ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode |
TNodeType.AnyContainer);\n const registry = tView.directiveRegistry;\n let matches:
any[]|null = null;\n if (registry) {\n for (let i = 0; i < registry.length; i++) {\n const def = registry[i] as
ComponentDef<any>| DirectiveDef<any>;\n if (isNodeMatchingSelectorList(tNode, def.selectors!, /*
isProjectionMode */ false)) {\n matches || (matches = ngDevMode ? new MatchesArray() : []);\n
diPublicInInjector(getOrCreateNodeInjectorForNode(tNode, viewData), tView, def.type);\n if
(isComponentDef(def)) {\n if (ngDevMode) {\n assertTNodeType(\n tNode,
TNodeType.Element, \n `\"${tNode.value}\" tags cannot be used as component hosts. ` +\n
`Please use a different tag to activate the ${stringify(def.type)} component.`);\n if (tNode.flags &
TNodeFlags.isComponentHost) {\n // If another component has been matched previously, it's the first
element in the\n // `matches` array, see how we store components/directives in `matches` below.\n
throwMultipleComponentError(tNode, matches[0].type, def.type);\n }\n }\n }\n }\n }\n markAsComponentHost(tView, tNode);\n // The component is always stored first with directives after.\n
matches.unshift(def);\n } else {\n matches.push(def);\n }\n }\n }\n }\n }\n return
matches;\n }\n\n\n/**\n * Marks a given TNode as a component's host. This consists of:\n *\n * - setting appropriate
TNode flags;\n *\n * - storing index of component's host element so it will be queued for view refresh during CD.\n

```

```

*^nextport function markAsComponentHost(tView: TView, hostTNode: TNode): void {\n ngDevMode &&
assertFirstCreatePass(tView);\n hostTNode.flags |= TNodeFlags.isComponentHost;\n (tView.components ||
(tView.components = ngDevMode ? new TViewComponents() : []))\n .push(hostTNode.index);\n}\n\n/**
Caches local names and their matching directive indices for query and template lookups. */^nfunction
cacheMatchingLocalNames(\n
  tNode: TNode, localRefs: string[]|null, exportsMap: {[key: string]: number}): void {\n if (localRefs) {\n const
localNames: (string|number)[] = tNode.localNames = ngDevMode ? new TNodeLocalNames() : [];\n\n // Local
names must be stored in tNode in the same order that localRefs are defined\n // in the template to ensure the data is
loaded in the same slots as their refs\n // in the template (for template queries).\n for (let i = 0; i <
localRefs.length; i += 2) {\n const index = exportsMap[localRefs[i + 1]];\n if (index == null)\n throw new
RuntimeError(\n      RuntimeErrorCode.EXPORT_NOT_FOUND,\n      ngDevMode && `Export of name
'${localRefs[i + 1]}' not found!`);\n localNames.push(localRefs[i], index);\n }\n }\n}\n\n/** * Builds up an
export map as directives are created, so local refs can be quickly mapped\n * to their directive instances.\n
*/^nfunction saveNameToExportMap(\n  directiveIdx: number, def: DirectiveDef<any>|ComponentDef<any>,\n
  exportsMap: {[key: string]: number}|null) {\n if (exportsMap) {\n if (def.exportAs) {\n for (let i = 0; i <
def.exportAs.length; i++) {\n exportsMap[def.exportAs[i]] = directiveIdx;\n }\n }\n if
(isComponentDef(def)) exportsMap[""] = directiveIdx;\n }\n }\n\n/** * Initializes the flags on the current node,
setting all indices to the initial index,\n * the directive count to 0, and adding the isComponent flag.\n * @param
index the initial index\n */^nextport function initTNodeFlags(tNode: TNode, index: number, numberOfDirectives:
number) {\n ngDevMode &&\n assertNotEqual(\n      numberOfDirectives, tNode.directiveEnd -
tNode.directiveStart,\n      `Reached the max number of directives`);\n tNode.flags |=
TNodeFlags.isDirectiveHost;\n // When the first directive is created on a node, save the index\n
tNode.directiveStart = index;\n tNode.directiveEnd = index + numberOfDirectives;\n tNode.providerIndexes =
index;\n}\n}\n\n/**\n
* Setup directive for instantiation.\n * We need to create a `NodeInjectorFactory` which is then inserted in both
the `Blueprint` as well\n * as `LView`. `TView` gets the `DirectiveDef`. \n * @param tView `TView`\n *
@param tNode `TNode`\n * @param lView `LView`\n * @param directiveIndex Index where the directive will be
stored in the Expando.\n * @param def `DirectiveDef`\n */^nfunction configureViewWithDirective<T>(\n  tView:
TView, tNode: TNode, lView: LView, directiveIndex: number, def: DirectiveDef<T>): void {\n ngDevMode &&\n
assertGreaterThanOrEqual(directiveIndex, HEADER_OFFSET, `Must be in Expando section`);\n
tView.data[directiveIndex] = def;\n const directiveFactory =\n def.factory || ((def as {factory: Function}).factory
= getFactoryDef(def.type, true));\n // Even though `directiveFactory` will already be using `directiveInject` in its
generated code,\n // we also want to support `inject()` directly from the directive constructor context
so we set\n // `directiveInject` as the inject implementation here too.\n const nodeInjectorFactory =\n new
NodeInjectorFactory(directiveFactory, isComponentDef(def), directiveInject);\n tView.blueprint[directiveIndex] =
nodeInjectorFactory;\n lView[directiveIndex] = nodeInjectorFactory;\n\n registerHostBindingOpCodes(\n
  tView, tNode, lView, directiveIndex, allocExpando(tView, lView, def.hostVars, NO_CHANGE),\n
  def);\n}\n\nfunction addComponentLogic<T>(lView: LView, hostTNode: TElementNode, def:
ComponentDef<T>): void {\n const native = getNativeByTNode(hostTNode, lView) as RElement;\n const tView
= getOrCreateComponentTView(def);\n\n // Only component views should be added to the view tree directly.
Embedded views are\n // accessed through their containers because they may be removed / re-added later.\n const
rendererFactory = lView[RENDERER_FACTORY];\n const componentView = addToViewTree(\n  lView,\n
  createLView(\n    lView, tView, null,\n
    def.onPush ? lViewFlags.Dirty : lViewFlags.CheckAlways, native,\n    hostTNode as TElementNode,\n
    rendererFactory, rendererFactory.createRenderer(native, def),\n    null, null, null));\n\n // Component view will
always be created before any injected LContainers,\n // so this is a regular element, wrap it with the component
view\n lView[hostTNode.index] = componentView;\n}\n\nexport function elementAttributeInternal(\n  tNode:
TNode, lView: LView, name: string, value: any, sanitizer: SanitizerFn|null|undefined,\n  namespace:

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string|null|undefined) {\n if (ngDevMode) {\n   assertNotSame(value, NO_CHANGE as any, 'Incoming value
should never be NO_CHANGE.');

```

```

    // Boolean `true` in this position signifies that this is an `LContainer`
    false, // has transplanted views
    currentView, // parent
    null, // next
    0, // transplanted views to refresh count
    tNode, //
    t_host
    native, // native,
    null, // view refs
    null, // moved views
);
ngDevMode &&
assertEqual(LContainer.length,
CONTAINER_HEADER_OFFSET, 'Should allocate correct number of slots for LContainer header.');
```

```

ngDevMode && attachLContainerDebug(LContainer);
return LContainer;
}

/**
 * Goes over embedded views (ones created through ViewContainerRef APIs) and refreshes
 * them by executing an associated template function.
 */
function refreshEmbeddedViews(IView: LView) {
  for (let LContainer = getFirstLContainer(IView); LContainer !== null; LContainer = getNextLContainer(LContainer)) {
    for (let i = CONTAINER_HEADER_OFFSET; i < LContainer.length; i++) {
      const embeddedLView = LContainer[i];
      const embeddedTView = embeddedLView[TVIEW];
      ngDevMode && assertDefined(embeddedTView, 'TView must be allocated');
      if (viewAttachedToChangeDetector(embeddedLView)) {
        refreshView(embeddedTView, embeddedLView, embeddedTView.template, embeddedLView[CONTEXT]);
      }
    }
  }
}

/**
 * Mark transplanted views as needing to be refreshed at their insertion points.
 */
@param IView The `LView` that may have transplanted views.
function markTransplantedViewsForRefresh(IView: LView) {
  for (let LContainer = getFirstLContainer(IView); LContainer !== null; LContainer = getNextLContainer(LContainer)) {
    if (!LContainer[HAS_TRANSPLANTED_VIEWS]) continue;
    const movedViews = LContainer[MOVED_VIEWS];
    ngDevMode && assertDefined(movedViews, 'Transplanted View flags set but missing MOVED_VIEWS');
    for (let i = 0; i < movedViews.length; i++) {
      const movedLView = movedViews[i];
      const insertionLContainer = movedLView[PARENT] as LContainer;
      ngDevMode && assertLContainer(insertionLContainer);
      // We don't want to increment the counter if the moved LView was already marked for refresh.
      if ((movedLView[FLAGS] & LViewFlags.RefreshTransplantedView) === 0) {
        updateTransplantedViewCount(insertionLContainer, 1);
      }
      // Note, it is possible that the `movedViews` is tracking views that are transplanted
      // those that aren't (declaration component insertion component). In the latter case,
      // it's fine to add the flag, as we will clear it immediately in `refreshEmbeddedViews`
      // for the view currently being refreshed.
      movedLView[FLAGS] |= LViewFlags.RefreshTransplantedView;
    }
  }
}

/**
 * Refreshes components by entering the component view and processing its bindings, queries, etc.
 */
@param componentHostIdx Element index in LView[] (adjusted for HEADER_OFFSET)
function refreshComponent(hostLView: LView, componentHostIdx: number): void {
  ngDevMode && assertEqual(isCreationMode(hostLView), false, 'Should be run in update mode');
  const componentView = getComponentLViewByIndex(componentHostIdx, hostLView);
  // Only attached components that are CheckAlways or OnPush and dirty should be refreshed
  if (viewAttachedToChangeDetector(componentView)) {
    const tView = componentView[TVIEW];
    if (componentView[FLAGS] & (LViewFlags.CheckAlways | LViewFlags.Dirty)) {
      refreshView(tView, componentView, tView.template, componentView[CONTEXT]);
    } else if (componentView[TRANSPLANTED_VIEWS_TO_REFRESH] > 0) {
      // Only attached components that are CheckAlways or OnPush and dirty should be refreshed
      refreshContainsDirtyView(componentView);
    }
  }
}

/**
 * Refreshes all transplanted views marked with `LViewFlags.RefreshTransplantedView` that are
 * children or descendants of the given IView.
 */
@param IView The IView which contains descendant transplanted views that need to be refreshed.
function refreshContainsDirtyView(IView: LView) {
  for (let LContainer = getFirstLContainer(IView); LContainer !== null; LContainer = getNextLContainer(LContainer)) {
    for (let i = CONTAINER_HEADER_OFFSET; i < LContainer.length; i++) {
      const embeddedLView = LContainer[i];
      if (viewAttachedToChangeDetector(embeddedLView)) {
        if (embeddedLView[FLAGS] & LViewFlags.RefreshTransplantedView) {
          const embeddedTView = embeddedLView[TVIEW];

```







```

* @param IView the `LView` which contains the directives.\n * @param inputs mapping between the public
`input` name and privately-known,\n * possibly minified, property names to write to.\n * @param value Value
to set.\n */\nexport function setInputsForProperty(\n  tView: TView, IView: LView, inputs: PropertyAliasValue,
publicName: string, value: any): void {\n  for (let i = 0; i < inputs.length;) {\n    const index = inputs[i++] as
number;\n    const privateName = inputs[i++] as string;\n    const instance = IView[index];\n    ngDevMode &&
assertIndexInRange(IView, index);\n    const def = tView.data[index] as DirectiveDef<any>;\n    if
(def.setInput !== null) {\n      def.setInput!(instance, value, publicName, privateName);\n    } else {\n
instance[privateName] = value;\n    }\n  }\n}\n\n/**\n * Updates a text binding at a given index in a given LView.\n
*/\nexport function textBindingInternal(IView: LView, index: number, value: string): void {\n  ngDevMode &&
assertString(value, 'Value should be a string');\n  ngDevMode && assertNotSame(value, NO_CHANGE as any,
'value should not be NO_CHANGE');\n  ngDevMode && assertIndexInRange(IView, index);\n  const element =
getNativeByIndex(index, IView) as any as RText;\n  ngDevMode && assertDefined(element, 'native element
should exist');\n  updateTextNode(IView[RENDERER], element, value);\n}\n\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {concatStringsWithSpace} from
'../util/stringify';\nimport
{assertFirstCreatePass} from '../assert';\nimport {AttributeMarker, TAttributes, TNode} from
'../interfaces/node';\nimport {getTView} from '../state';\n\n/**\n * Compute the static styling (class/style) from
`TAttributes`.\n * This function should be called during `firstCreatePass` only.\n * @param tNode The
`TNode` into which the styling information should be loaded.\n * @param attrs `TAttributes` containing the styling
information.\n * @param writeToHost Where should the resulting static styles be written?\n * - `false` Write to
`tNode.stylesWithoutHost` / `TNode.classesWithoutHost`\n * - `true` Write to `TNode.styles` / `TNode.classes`\n
*/\nexport function computeStaticStyling(\n  tNode: TNode, attrs: TAttributes|null, writeToHost: boolean): void
{\n  ngDevMode &&\n    assertFirstCreatePass(getTView(), 'Expecting to be called in first template pass only');\n
let styles: string|null = writeToHost ? tNode.styles : null;\n  let classes: string|null = writeToHost ?
tNode.classes : null;\n  let mode: AttributeMarker|0 = 0;\n  if (attrs !== null) {\n    for (let i = 0; i <
attrs.length; i++)\n    {\n      const value = attrs[i];\n      if (typeof value === 'number') {\n        mode = value;\n      } else if (mode ==
AttributeMarker.Classes) {\n        classes = concatStringsWithSpace(classes, value as string);\n      } else if (mode
== AttributeMarker.Styles) {\n        const style = value as string;\n        const styleValue = attrs[++i] as string;\n
styles = concatStringsWithSpace(styles, style + ': ' + styleValue + ';');\n      }\n    }\n  }\n  writeToHost ?
tNode.styles = styles : tNode.stylesWithoutHost = styles;\n  writeToHost ? tNode.classes = classes :
tNode.classesWithoutHost = classes;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {assertParentView} from '../assert';\nimport
{IcuContainerIterate} from './i18n/i18n_tree_shaking';\nimport {CONTAINER_HEADER_OFFSET} from
'../interfaces/container';\nimport {TIcuContainerNode, TNode, TNodeType} from '../interfaces/node';\nimport
{RNode} from '../interfaces/renderer_dom';\nimport {isLContainer} from '../interfaces/type_checks';\nimport
{DECLARATION_COMPONENT_VIEW, LView, T_HOST, TVIEW, TView} from '../interfaces/view';\nimport
{assertTNodeType} from './node_assert';\nimport {getProjectionNodes} from './node_manipulation';\nimport
{getLViewParent} from './util/view_traversal_utils';\nimport {unwrapRNode} from './util/view_utils';\n\n\nexport
function collectNativeNodes(\n  tView: TView, IView: LView, tNode: TNode|null, result: any[],\n  isProjection:
boolean = false): any[] {\n  while (tNode !== null) {\n    ngDevMode &&\n      assertTNodeType(\n
tNode,\n      TNodeType.AnyRNode | TNodeType.AnyContainer | TNodeType.Projection | TNodeType.Icu);\n    const INode = IView[tNode.index];\n
    if (INode !== null) {\n      result.push(unwrapRNode(INode));\n    }\n\n    // A given INode can represent either a
native node or a LContainer (when it is a host of a\n    // ViewContainerRef). When we find a LContainer we need to
descend into it to collect root nodes\n    // from the views in this container.\n    if (isLContainer(INode)) {\n      for
(let i = CONTAINER_HEADER_OFFSET; i < INode.length; i++) {\n        const IViewInAContainer = INode[i];\n

```

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const IViewFirstChildTNode = IViewInAContainer[TVIEW].firstChild;\n    if (IViewFirstChildTNode !== null)
{\n    collectNativeNodes(\n        IViewInAContainer[TVIEW], IViewInAContainer, IViewFirstChildTNode,
result);\n    }\n    }\n    }\n    }\n    const tNodeType = tNode.type;\n    if (tNodeType &
TNodeType.ElementContainer) {\n    collectNativeNodes(tView, IView, tNode.child, result);\n    } else if
(tNodeType & TNodeType.Icu) {\n    const nextRNode = icuContainerIterate(tNode as TIcuContainerNode,
IView);\n    let rNode: RNode|null;\n    while (rNode = nextRNode()) {\n    result.push(rNode);\n    }\n    }
else if (tNodeType & TNodeType.Projection) {\n    const nodesInSlot = getProjectionNodes(IView, tNode);\n    if
(Array.isArray(nodesInSlot)) {\n    result.push(...nodesInSlot);\n    } else {\n    const parentView =
getLViewParent(IView[DECLARATION_COMPONENT_VIEW]);\n    ngDevMode &&
assertParentView(parentView);\n    collectNativeNodes(parentView[TVIEW], parentView, nodesInSlot, result,
true);\n    }\n    }\n    tNode = isProjection ? tNode.projectionNext : tNode.next;\n    }\n    }\n    return result;\n    }\n    }"/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-\n
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{ChangeDetectorRef as viewEngine_ChangeDetectorRef} from './change_detection/change_detector_ref';\nimport
{RuntimeError, RuntimeErrorCode}
from './errors';\nimport {EmbeddedViewRef as viewEngine_EmbeddedViewRef, InternalViewRef as
viewEngine_InternalViewRef, ViewRefTracker} from './linker/view_ref';\nimport {removeFromArray} from
'./util/array_utils';\nimport {assertEqual} from './util/assert';\nimport {collectNativeNodes} from
'./collect_native_nodes';\nimport {checkNoChangesInternal, detectChangesInternal, markViewDirty,
storeCleanupWithContext} from './instructions/shared';\nimport {CONTAINER_HEADER_OFFSET,
VIEW_REFS} from './interfaces/container';\nimport {isLContainer} from './interfaces/type_checks';\nimport
{CONTEXT, FLAGS, LView, LViewFlags, PARENT, TVIEW} from './interfaces/view';\nimport {destroyLView,
detachView, renderDetachView} from './node_manipulation';\n\n// Needed due to tsickle downleveling where
multiple `implements` with classes creates\n// multiple @extends in Closure annotations, which is illegal. This
workaround fixes\n// the multiple @extends by making the annotation @implements
instead\n\nexport interface viewEngine_ChangeDetectorRef_interface extends viewEngine_ChangeDetectorRef
{\n}\n\nexport class ViewRef<T> implements viewEngine_EmbeddedViewRef<T>, viewEngine_InternalViewRef,\n    viewEngine_ChangeDetectorRef_interface {\n    private _appRef: ViewRefTracker|null = null;\n    private
_attachedToViewContainer = false;\n\n    get rootNodes(): any[] {\n    const IView = this._IView;\n    const
tView = IView[TVIEW];\n    return collectNativeNodes(tView, IView, tView.firstChild, []);\n    }\n\n    constructor(\n
/**\n     * This represents `LView` associated with the component when ViewRef is a ChangeDetectorRef.\n
*\n     * When ViewRef is created for a dynamic component, this also represents the `LView` for the\n     *
component.\n     *\n     * For a "regular" ViewRef created for an embedded view, this is the `LView` for the
embedded\n     * view.\n     *\n     * @internal\n     */\n     public _IView:
LView,\n\n     /**\n     * This represents the `LView` associated with the point where `ChangeDetectorRef` was\n
*\n     * requested.\n     *\n     * This may be different from `_IView` if the `_cdRefInjectingView` is an embedded
view.\n     */\n     private _cdRefInjectingView?: LView) {\n\n    get context(): T {\n    return
this._IView[CONTEXT] as unknown as T;\n    }\n\n    set context(value: T) {\n    this._IView[CONTEXT] = value as
unknown as {};\n    }\n\n    get destroyed(): boolean {\n    return (this._IView[FLAGS] & LViewFlags.Destroyed) ===
LViewFlags.Destroyed;\n    }\n\n    destroy(): void {\n    if (this._appRef) {\n    this._appRef.detachView(this);\n
}\n    else if (this._attachedToViewContainer) {\n    const parent = this._IView[PARENT];\n    if (isLContainer(parent))
{\n    const viewRefs = parent[VIEW_REFS] as ViewRef<unknown>[] | null;\n    const index = viewRefs ?
viewRefs.indexOf(this) : -1;\n    if (index > -1) {\n    ngDevMode &&\n
assertEqual(\n        index, parent.indexOf(this._IView) - CONTAINER_HEADER_OFFSET,\n        'An
attached view should be in the same position within its container as its ViewRef in the VIEW_REFS array.);\n
}\n    detachView(parent, index);\n    removeFromArray(viewRefs!, index);\n    }\n    }\n\n    this._attachedToViewContainer = false;\n    }\n    destroyLView(this._IView[TVIEW], this._IView);\n    }\n\n    onDestroy(callback: Function) {\n    storeCleanupWithContext(this._IView[TVIEW], this._IView, null, callback);\n
}

```

```

})\n\n /**\n * Marks a view and all of its ancestors dirty.\n * This can be used to ensure an { @link
ChangeDetectionStrategy#OnPush OnPush} component is\n * checked when it needs to be re-rendered but the two
normal triggers haven't marked it\n * dirty (i.e. inputs haven't changed and events haven't fired in the view).\n *\n * <!-- TODO: Add a link to a chapter on OnPush components -->\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * @Component({\n * selector: 'app-root',\n * template: `Number of ticks:
{{numberOfTicks}}`\n * changeDetection: ChangeDetectionStrategy.OnPush,\n * })\n * class AppComponent
{\n * numberOfTicks = 0;\n *\n * constructor(private ref: ChangeDetectorRef) {\n * setInterval(() => {\n
* this.numberOfTicks++;\n * // the following is required, otherwise the view will not be updated\n *
this.ref.markForCheck();\n * }, 1000);\n * }\n * }\n * ```\n *\n * markForCheck(): void {\n
markViewDirty(this._cdRefInjectingView || this._IView);\n * }\n\n /**\n * Detaches the view from the change
detection tree.\n *\n * Detached views will not be checked during change detection runs until they are\n * re-
attached, even if they are dirty. `detach` can be used in combination with\n * { @link
ChangeDetectorRef#detectChanges detectChanges} to implement local change\n * detection checks.\n
*\n * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n * <!-- TODO: Add a live demo
once ref.detectChanges is merged into master -->\n * @usageNotes\n * ### Example\n *\n * The
following example defines a component with a large list of readonly data.\n * Imagine the data changes constantly,
many times per second. For performance reasons,\n * we want to check and update the list every five seconds. We
can do that by detaching\n * the component's change detector and doing a local check every five seconds.\n *\n *
```typescript\n * class DataProvider {\n * // in a real application the returned data will be different every time\n
* get data() {\n * return [1,2,3,4,5];\n * }\n * }\n *\n * @Component({\n * selector: 'giant-list',\n *
template: `\n * <li *ngFor="let d of dataProvider.data">Data {{ d }}</li>\n * `,\n * })\n * class GiantList
{\n * constructor(private ref: ChangeDetectorRef,\n * private dataProvider: DataProvider) {\n * ref.detach();\n *
setInterval(() => {\n * this.ref.detectChanges();\n * }, 5000);\n * }\n * }\n *\n * @Component({\n * selector: 'app',\n *
providers: [DataProvider],\n * template: `\n * <giant-list><giant-list>\n * `,\n * })\n * class App {\n *
}\n * ```\n *\n * detach(): void {\n * this._IView[FLAGS] &= ~LViewFlags.Attached;\n * }\n\n /**\n * Re-
attaches a view to the change detection tree.\n *\n * This can be used to re-attach views that were previously
detached from the tree\n * using { @link ChangeDetectorRef#detach detach}. Views are attached to the tree by
default.\n *\n * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n * @usageNotes\n
* ### Example\n *\n * The following example creates a component displaying `live` data. The component will
detach\n * its change detector from the main change detector tree when the component's
live property\n * is set to false.\n *\n * ```typescript\n * class DataProvider {\n * data = 1;\n *\n *
constructor() {\n * setInterval(() => {\n * this.data = this.data * 2;\n * }, 500);\n * }\n * }\n *\n *
@Component({\n * selector: 'live-data',\n * inputs: ['live'],\n * template: `Data: {{dataProvider.data}}`\n *
})\n * class LiveData {\n * constructor(private ref: ChangeDetectorRef, private dataProvider: DataProvider) {\n
*\n * set live(value) {\n * if (value) {\n * this.ref.reattach();\n * } else {\n * this.ref.detach();\n
* }\n * }\n * }\n *\n * @Component({\n * selector: 'app-root',\n * providers: [DataProvider],\n *
template: `\n * Live Update: <input type="checkbox" [(ngModel)]="live">\n * <live-data
[live]="live"><live-data>\n * `,\n * })\n * class AppComponent {\n * live = true;\n * }\n * ```\n *\n
reattach():\n
void {\n * this._IView[FLAGS] |= LViewFlags.Attached;\n * }\n\n /**\n * Checks the view and its children.\n
*\n * This can also be used in combination with { @link ChangeDetectorRef#detach detach} to implement\n *
local change detection checks.\n *\n * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n *
<!-- TODO: Add a live demo once ref.detectChanges is merged into master -->\n * @usageNotes\n * ###
Example\n *\n * The following example defines a component with a large list of readonly data.\n * Imagine, the
data changes constantly, many times per second. For performance reasons,\n * we want to check and update the list
every five seconds.\n *\n * We can do that by detaching the component's change detector and doing a local
change detection\n * check every five seconds.\n *\n * See { @link ChangeDetectorRef#detach detach} for more

```

```

information.\n */\n detectChanges(): void {\n  detectChangesInternal(this._IView[TVIEW],
  this._IView, this.context as unknown as {});\n }\n\n /**\n  * Checks the change detector and its children, and
  throws if any changes are detected.\n  */\n  * This is used in development mode to verify that running change
  detection doesn't\n  * introduce other changes.\n  */\n  checkNoChanges(): void {\n  if (ngDevMode) {\n  checkNoChangesInternal(this._IView[TVIEW], this._IView, this.context as unknown as {});\n  }\n }\n\n attachToViewContainerRef() {\n  if (this._appRef) {\n  throw new RuntimeError(\n
  RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n      ngDevMode && 'This view is already attached
  directly to the ApplicationRef!);\n  }\n  this._attachedToViewContainer = true;\n }\n\n detachFromAppRef() {\n
  this._appRef = null;\n  renderDetachView(this._IView[TVIEW], this._IView);\n }\n\n attachToAppRef(appRef:
  ViewRefTracker) {\n  if (this._attachedToViewContainer) {\n  throw new RuntimeError(\n
  RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n
      ngDevMode && 'This view is already attached to a ViewContainer!);\n  }\n  this._appRef = appRef;\n
}\n}\n\n /**\n  * @internal */\n  * export class RootViewRef<T> extends ViewRef<T> {\n  constructor(public _view:
  LView) {\n  super(_view);\n  }\n\n  override detectChanges(): void {\n  const IVIEW = this._view;\n  const tView
  = IVIEW[TVIEW];\n  const context = IVIEW[CONTEXT];\n  detectChangesInternal(tView, IVIEW, context,
  false);\n  }\n\n  override checkNoChanges(): void {\n  if (ngDevMode) {\n  const IVIEW = this._view;\n  const
  tView = IVIEW[TVIEW];\n  const context = IVIEW[CONTEXT];\n  checkNoChangesInternal(tView, IVIEW,
  context, false);\n  }\n  }\n\n  override get context(): T {\n  return null!;\n  }\n}\n\n", "/*\n  * @license\n  * Copyright
  Google LLC All Rights Reserved.\n  */\n  * Use of this source code is governed by an MIT-style license that can be\n
  * found in the LICENSE file at https://angular.io/license\n  */\n\nimport {ChangeDetectorRef}
  from './change_detection/change_detector_ref';\nimport {Injector} from './di/injector';\nimport {InjectFlags} from
  './di/interface/injector';\nimport {ProviderToken} from './di/provider_token';\nimport {EnvironmentInjector} from
  './di/r3_injector';\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from
  './interface/type';\nimport {ComponentFactory as AbstractComponentFactory, ComponentRef as
  AbstractComponentRef} from './linker/component_factory';\nimport {ComponentFactoryResolver as
  AbstractComponentFactoryResolver} from './linker/component_factory_resolver';\nimport {createElementRef,
  ElementRef} from './linker/element_ref';\nimport {NgModuleRef} from './linker/ng_module_factory';\nimport
  {RendererFactory2} from './render/api';\nimport {Sanitizer} from './sanitization/sanitizer';\nimport {assertDefined,
  assertIndexInRange} from './util/assert';\nimport {VERSION} from './version';\nimport
  {NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR} from
  './view/provider_flags';\nimport {assertComponentType} from './assert';\nimport {getComponentDef} from
  './definition';\nimport {diPublicInInjector, getOrCreateNodeInjectorForNode, NodeInjector} from './di';\nimport
  {throwProviderNotFoundError} from './errors_di';\nimport {registerPostOrderHooks} from './hooks';\nimport
  {reportUnknownPropertyError} from './instructions/element_validation';\nimport {addToViewTree, createLView,
  createTView, getOrCreateComponentTView, getOrCreateTNode, initTNodeFlags, instantiateRootComponent,
  invokeHostBindingsInCreationMode, locateHostElement, markAsComponentHost, markDirtyIfOnPush,
  registerHostBindingOpCodes, renderView, setInputsForProperty} from './instructions/shared';\nimport
  {ComponentDef, RenderFlags} from './interfaces/definition';\nimport {PropertyAliasValue, TContainerNode,
  TElementContainerNode, TElementNode, TNode, TNodeType} from './interfaces/node';\nimport {Renderer,
  RendererFactory} from './interfaces/renderer';\nimport {RElement,
  RNode} from './interfaces/renderer_dom';\nimport {CONTEXT, HEADER_OFFSET, LView, LViewFlags,
  TVIEW, TViewType} from './interfaces/view';\nimport {MATH_ML_NAMESPACE, SVG_NAMESPACE} from
  './namespaces';\nimport {createElementNode, writeDirectClass, writeDirectStyle} from
  './node_manipulation';\nimport {extractAttrsAndClassesFromSelector, stringifyCSSSelectorList} from
  './node_selector_matcher';\nimport {enterView, getCurrentTNode, getLView, leaveView, setSelectedIndex} from
  './state';\nimport {computeStaticStyling} from './styling/static_styling';\nimport {setUpAttributes} from
  './util/attrs_utils';\nimport {stringifyForError} from './util/stringify_utils';\nimport {getTNode} from
  './util/view_utils';\nimport {RootViewRef, ViewRef} from './view_ref';\n\nexport class ComponentFactoryResolver

```

```

extends AbstractComponentFactoryResolver {
  /**
   * @param ngModule The NgModuleRef to which all
   resolved factories are bound.
   */
  constructor(private ngModule?: NgModuleRef<any>) {
    super();
  }
  override resolveComponentFactory<T>(component: Type<T>): AbstractComponentFactory<T> {
    ngDevMode && assertComponentType(component);
    const componentDef = getComponentDef(component)!;
    return new ComponentFactory(componentDef, this.ngModule);
  }
}

function toRefArray(map: {[key: string]: string}): {propName: string; templateName: string;}[] {
  const array: {propName: string; templateName: string;}[] = [];
  for (let nonMinified in map) {
    if (map.hasOwnProperty(nonMinified)) {
      const minified = map[nonMinified];
      array.push({propName: minified, templateName: nonMinified});
    }
  }
  return array;
}

function getNamespace(elementName: string): string|null {
  const name = elementName.toLowerCase();
  return name === 'svg' ? SVG_NAMESPACE : (name === 'math' ? MATH_ML_NAMESPACE : null);
}

/**
 * Injector that looks up a value using a specific injector, before
 falling back to the module injector. Used primarily when creating
 components or embedded views dynamically.
 */
class ChainedInjector implements Injector {
  constructor(private injector: Injector, private parentInjector: Injector) {}

  get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T {
    const value = this.injector.get<T|typeof NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR>(token, NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR, flags);
    if (value !== NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR || notFoundValue === (NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR as unknown as T)) {
      // Return the value from the root element injector when
      // - it provides it
      // (value !== NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR)
      // - the module injector should not be checked
      // (notFoundValue === NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR)
      return value as T;
    }
    return this.parentInjector.get(token, notFoundValue, flags);
  }
}

/**
 * ComponentFactory interface implementation.
 */
export class ComponentFactory<T> extends AbstractComponentFactory<T> {
  override selector: string;
  override componentType: Type<any>;
  override ngContentSelectors: string[];
  isBoundToModule: boolean;

  override get inputs(): {propName: string; templateName: string;}[] {
    return toRefArray(this.componentDef.inputs);
  }
  override get outputs(): {propName: string; templateName: string;}[] {
    return toRefArray(this.componentDef.outputs);
  }
}

/**
 * @param componentDef The component definition.
 * @param ngModule The NgModuleRef to which the factory is bound.
 */
constructor(private componentDef: ComponentDef<any>, private ngModule?: NgModuleRef<any>) {
  super();
  this.componentType = componentDef.type;
  this.selector = stringifyCSSSelectorList(componentDef.selectors);
  this.ngContentSelectors = componentDef.ngContentSelectors ? componentDef.ngContentSelectors : [];
  this.isBoundToModule = !!ngModule;
}

override create(
  injector: Injector, projectableNodes?: any[]|undefined, rootSelectorOrNode?: any,
  environmentInjector?: NgModuleRef<any>|EnvironmentInjector|undefined): AbstractComponentRef<T> {
  environmentInjector = environmentInjector || this.ngModule;
  let realEnvironmentInjector = environmentInjector instanceof EnvironmentInjector ? environmentInjector : environmentInjector?.injector;
  if (realEnvironmentInjector && this.componentDef.getStandaloneInjector !== null) {
    realEnvironmentInjector = this.componentDef.getStandaloneInjector(realEnvironmentInjector) || realEnvironmentInjector;
  }
  const rootViewInjector = realEnvironmentInjector ? new ChainedInjector(injector, realEnvironmentInjector) : injector;
  const rendererFactory = rootViewInjector.get(RendererFactory2, null);
  if (rendererFactory === null) {
    throw new RuntimeError(
      RuntimeErrorCode.RENDERER_NOT_FOUND,
      ngDevMode && `Angular was not able to inject a renderer (RendererFactory2).` +
      `Likely this is due to a broken DI hierarchy.` +
      `Make sure that any injector used to create this component has a correct parent.`);
  }
  const sanitizer = rootViewInjector.get(Sanitizer, null);
  const hostRenderer = rendererFactory.createRenderer(null, this.componentDef);
  // Determine a tag name used for

```

```

creating host elements when this component is created\n // dynamically. Default to 'div' if this component did not
specify any tag name in its selector.\n const elementName = this.componentDef.selectors[0][0] as string || 'div';\n
const hostRNode = rootSelectorOrNode ?\n locateHostElement(hostRenderer, rootSelectorOrNode,
this.componentDef.encapsulation) :\n createElementNode(hostRenderer, elementName,
getNamespace(elementName));\n const rootFlags = this.componentDef.onPush ? LViewFlags.Dirty
| LViewFlags.IsRoot :\n LViewFlags.CheckAlways | LViewFlags.IsRoot;\n\n //
Create the root view. Uses empty TView and ContentTemplate.\n const rootTView =
createTView(TViewType.Root, null, null, 1, 0, null, null, null, null, null);\n const rootLView = createLView(\n
null, rootTView, null, rootFlags, null, null, rendererFactory, hostRenderer, sanitizer,\n rootViewInjector,
null);\n\n // rootView is the parent when bootstrapping\n // TODO(misko): it looks like we are entering view
here but we don't really need to as\n // `renderView` does that. However as the code is written it is needed
because\n // `createRootComponentView` and `createRootComponent` both read global state. Fixing those\n //
issues would allow us to drop this.\n enterView(rootLView);\n\n let component: T;\n let tElementNode:
TElementNode;\n\n try {\n const componentView = createRootComponentView(\n hostRNode,
this.componentDef, rootLView, rendererFactory, hostRenderer);\n if (hostRNode) {\n if
(rootSelectorOrNode) {\n setUpAttributes(hostRenderer, hostRNode, ['ng-version', VERSION.full]);\n }
else {\n // If host element is created as a part of this function call (i.e. `rootSelectorOrNode`\n // is not
defined), also apply attributes and classes extracted from component selector.\n // Extract attributes and classes
from the first selector only to match VE behavior.\n const {attrs, classes} =\n
extractAttrsAndClassesFromSelector(this.componentDef.selectors[0]);\n if (attrs) {\n
setUpAttributes(hostRenderer, hostRNode, attrs);\n } if (classes && classes.length > 0) {\n
writeDirectClass(hostRenderer, hostRNode, classes.join(' '));\n } }\n\n tElementNode =
getTNode(rootTView, HEADER_OFFSET) as TElementNode;\n\n if (projectableNodes !==
undefined) {\n const projection: (TNode|RNode[]|null)[] = tElementNode.projection = [];\n for (let i = 0; i
< this.ngContentSelectors.length; i++) {\n const nodesforSlot = projectableNodes[i];\n // Projectable
nodes can be passed as array of arrays or an array of iterables (ngUpgrade\n // case). Here we do normalize
passed data structure to be an array of arrays to avoid\n // complex checks down the line.\n // We also
normalize the length of the passed in projectable nodes (to match the number of\n // <ng-container> slots
defined by a component).\n projection.push(nodesforSlot !== null ? Array.from(nodesforSlot) : null);\n }
}\n\n // TODO: should LifecycleHooksFeature and other host features be generated by the compiler and\n //
executed here?\n // Angular 5 reference: https://stackblitz.com/edit/lifecycle-hooks-vcref\n component =\n
createRootComponent(componentView,
this.componentDef, rootLView, [LifecycleHooksFeature]);\n renderView(rootTView, rootLView, null);\n }
finally {\n leaveView();\n }\n\n return new ComponentRef(\n this.componentType, component,
createElementRef(tElementNode, rootLView), rootLView,\n tElementNode);\n }\n\nconst
componentFactoryResolver: ComponentFactoryResolver = new ComponentFactoryResolver();\n\n/**\n * Creates a
ComponentFactoryResolver and stores it on the injector. Or, if the\n * ComponentFactoryResolver\n * already
exists, retrieves the existing ComponentFactoryResolver.\n *\n * @returns The ComponentFactoryResolver instance
to use\n *\nexport function injectComponentFactoryResolver(): AbstractComponentFactoryResolver {\n return
componentFactoryResolver;\n }\n\n/**\n * Represents an instance of a Component created via a {@link
ComponentFactory}.\n *\n * `ComponentRef` provides access to the Component Instance as well other objects
related to this\n * Component Instance and allows
you to destroy the Component Instance via the {@link #destroy}\n * method.\n *\nexport class
ComponentRef<T> extends AbstractComponentRef<T> {\n override instance: T;\n override hostView:
ViewRef<T>;\n override changeDetectorRef: ChangeDetectorRef;\n override componentType: Type<T>;\n\n
constructor(\n componentType: Type<T>, instance: T, public location: ElementRef, private _rootLView:
LView,\n private _tNode: TElementNode|TContainerNode|TElementContainerNode) {\n super();\n
this.instance = instance;\n this.hostView = this.changeDetectorRef = new RootViewRef<T>(_rootLView);\n

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this.componentType = componentType;\n }\n\n override setInput(name: string, value: unknown): void {\n  const
inputData = this._tNode.inputs;\n  let dataValue: PropertyAliasValue|undefined;\n  if (inputData !== null &&
(dataValue = inputData[name])) {\n  const IView = this._rootLView;\n  setInputsForProperty(IView[TVIEW],
IView, dataValue, name, value);\n  markDirtyIfOnPush(IView,
this._tNode.index);\n  } else {\n  if (ngDevMode) {\n  const cmpNameForError =
stringifyForError(this.componentType);\n  let message =\n    `Can't set value of the '${name}' input on the
'${cmpNameForError}' component.`;\n  message += `Make sure that the '${\n    name}' property is
annotated with @Input() or a mapped @Input('${name}') exists.`;\n  reportUnknownPropertyError(message);\n
  }\n  }\n }\n\n override get injector(): Injector {\n  return new NodeInjector(this._tNode, this._rootLView);\n
}\n\n override destroy(): void {\n  this.hostView.destroy();\n }\n\n override onDestroy(callback: () => void): void
{\n  this.hostView.onDestroy(callback);\n }\n}\n\n/** Represents a HostFeature function. */\ntype HostFeature =
(<T>(component: T, componentDef: ComponentDef<T>) => void);\n\n// TODO: A hack to not pull in the
NullInjector from @angular/core.\nexport const NULL_INJECTOR: Injector = {\n  get: (token:
any, notFoundValue?: any) => {\n  throwProviderNotFoundError(token, 'NullInjector');\n  };\n};\n\n/**\n *
Creates the root component view and the root component node.\n *\n * @param rNode Render host element.\n *\n *
@param def ComponentDef\n * @param rootView The parent view where the host node is stored\n * @param
rendererFactory Factory to be used for creating child renderers.\n * @param hostRenderer The current renderer\n *
@param sanitizer The sanitizer, if provided\n *\n * @returns Component view created\n */\nexport function
createRootComponentView(\n  rNode: RElement|null, def: ComponentDef<any>, rootView: LView,\n  rendererFactory: RendererFactory,\n  hostRenderer: Renderer, sanitizer?: Sanitizer|null): LView {\n  const tView =
rootView[TVIEW];\n  const index = HEADER_OFFSET;\n  ngDevMode && assertIndexInRange(rootView,\n  index);\n  rootView[index] = rNode;\n  // '#host' is added here as we don't know the real host DOM name (we don't
want to read it) and at\n  // the same time\n  we want to communicate the debug `TNode` that this is a special `TNode`\n  // representing a host element.\n  const
tNode: TElementNode = getOrCreateTNode(tView, index, TNodeType.Element, '#host', null);\n  const mergedAttrs
= tNode.mergedAttrs = def.hostAttrs;\n  if (mergedAttrs !== null) {\n  computeStaticStyling(tNode, mergedAttrs,\n  true);\n  if (rNode !== null) {\n  setUpAttributes(hostRenderer, rNode, mergedAttrs);\n  if (tNode.classes !===
null) {\n  writeDirectClass(hostRenderer, rNode, tNode.classes);\n  }\n  if (tNode.styles !=== null) {\n
writeDirectStyle(hostRenderer, rNode, tNode.styles);\n  }\n  }\n }\n\n const viewRenderer =
rendererFactory.createRenderer(rNode, def);\n  const componentView = createLView(\n  rootView,\n  getOrCreateComponentTView(def), null,\n  def.onPush ? LViewFlags.Dirty : LViewFlags.CheckAlways,\n  rootView[index], tNode,\n  rendererFactory, viewRenderer, sanitizer || null, null, null);\n  if
(tView.firstCreatePass)\n  {\n  diPublicInInjector(getOrCreateNodeInjectorForNode(tNode, rootView), tView, def.type);\n  markAsComponentHost(tView, tNode);\n  initTNodeFlags(tNode, rootView.length, 1);\n  }\n\n  addToViewTree(rootView, componentView);\n\n  // Store component\n  view at node index, with node as the HOST\n\n  return rootView[index] = componentView;\n }\n\n/**\n * Creates a root component and sets it up with features and
host bindings. Shared by\n * renderComponent() and ViewContainerRef.createComponent().\n */\nexport function
createRootComponent<T>(\n  componentView: LView, componentDef: ComponentDef<T>, rootLView:
LView,\n  hostFeatures: HostFeature[]|null): any {\n  const tView = rootLView[TVIEW];\n  // Create directive
instance with factory() and store at next index in viewData\n  const component = instantiateRootComponent(tView,\n  rootLView, componentDef);\n\n  // Root view only contains an instance of this component,\n  // so we use a
reference to that component instance as a\n  context.\n  componentView[CONTEXT] = rootLView[CONTEXT] = component;\n\n  if (hostFeatures !=== null)\n  {\n  for (const feature of hostFeatures) {\n  feature(component, componentDef);\n  }\n  }\n\n  // We want to
generate an empty QueryList for root content queries for backwards\n  // compatibility with ViewEngine.\n  if
(componentDef.contentQueries) {\n  const tNode = getCurrentTNode();\n  ngDevMode &&
assertDefined(tNode, 'TNode expected');\n  componentDef.contentQueries(RenderFlags.Create, component,

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tNode.directiveStart);\n }\n\n const rootTNode = getCurrentTNode(!);\n ngDevMode &&\n assertDefined(rootTNode, 'Node should have been already created');\n if (tView.firstCreatePass &&\n (componentDef.hostBindings !== null || componentDef.hostAttrs !== null)) {\n\n setSelectedIndex(rootTNode.index);\n\n const rootTView = rootLView[TVIEW];\n\n registerHostBindingOpCodes(\n rootTView, rootTNode, rootLView, rootTNode.directiveStart,\n rootTNode.directiveEnd,\n\n componentDef);\n\n invokeHostBindingsInCreationMode(componentDef, component);\n }\n\n return\n component;\n}\n\n/**\n * Used to enable lifecycle hooks on the root component.\n *\n * Include this feature when\n calling `renderComponent` if the root component\n * you are rendering has lifecycle hooks defined. Otherwise, the\n hooks won't\n * be called properly.\n *\n * Example:\n *\n * ```\n * renderComponent(AppComponent,\n {hostFeatures: [LifecycleHooksFeature]});\n * ```\n */\n\nexport function LifecycleHooksFeature(): void {\n const\n tNode = getCurrentTNode(!);\n ngDevMode && assertDefined(tNode, 'TNode is required');\n\n registerPostOrderHooks(getLView()[TVIEW], tNode);\n}\n\n"/**\n * @license\n * Copyright Google LLC All\n Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n LICENSE file at https://angular.io/license\n */\n\nimport {RuntimeError, RuntimeErrorCode} from\n './../errors';\nimport {Type, Writable} from './../interface/type';\nimport\n {EMPTY_ARRAY, EMPTY_OBJ} from './../util/empty';\nimport {fillProperties} from './../util/property';\nimport\n {ComponentDef, ContentQueriesFunction, DirectiveDef, DirectiveDefFeature, HostBindingsFunction, RenderFlags,\n ViewQueriesFunction} from './interfaces/definition';\nimport {TAttributes} from './interfaces/node';\nimport\n {isComponentDef} from './interfaces/type_checks';\nimport {mergeHostAttrs} from './util/attrs_utils';\nimport\n {stringifyForError} from './util/stringify_utils';\n\nexport function getSuperType(type: Type<any>): Type<any>&\n {cmp?: ComponentDef<any>, dir?: DirectiveDef<any>} {\n return\n Object.getPrototypeOf(type.prototype).constructor;\n}\n\n\ntype WritableDef =\n Writable<DirectiveDef<any>|ComponentDef<any>>;\n\n/**\n * Merges the definition from a super class to a sub\n class.\n *\n * @param definition The definition that is a SubClass of another directive of component\n *\n * @codeGenApi\n */\n\nexport function InheritDefinitionFeature(definition:\n DirectiveDef<any>|ComponentDef<any>): void {\n let superType = getSuperType(definition.type);\n let\n shouldInheritFields = true;\n const inheritanceChain: WritableDef[] = [definition];\n\n while (superType) {\n let\n superDef: DirectiveDef<any>|ComponentDef<any>|undefined = undefined;\n if (isComponentDef(definition)) {\n\n // Don't use getComponentDef/getDirectiveDef. This logic relies on inheritance.\n superDef = superType.cmp\n || superType.dir;\n } else {\n if (superType.cmp) {\n throw new RuntimeError(\n RuntimeErrorCode.INVALID_INHERITANCE,\n ngDevMode &&\n `Directives cannot inherit\n Components. Directive ${\n stringifyForError(definition.type)} is attempting to extend component ${\n stringifyForError(superType)}`);\n }\n\n // Don't use getComponentDef/getDirectiveDef. This logic\n relies on inheritance.\n superDef = superType.dir;\n }\n\n if (superDef)\n {\n if (shouldInheritFields) {\n inheritanceChain.push(superDef);\n\n // Some fields in the definition may\n be empty, if there were no values to put in them that\n // would've justified object creation. Unwrap them if\n necessary.\n const writeableDef = definition as WritableDef;\n writeableDef.inputs =\n maybeUnwrapEmpty(definition.inputs);\n writeableDef.declaredInputs =\n maybeUnwrapEmpty(definition.declaredInputs);\n writeableDef.outputs =\n maybeUnwrapEmpty(definition.outputs);\n\n // Merge hostBindings\n const superHostBindings =\n superDef.hostBindings;\n superHostBindings && inheritHostBindings(definition, superHostBindings);\n\n // Merge queries\n const superViewQuery = superDef.viewQuery;\n const superContentQueries =\n superDef.contentQueries;\n superViewQuery && inheritViewQuery(definition, superViewQuery);\n superContentQueries && inheritContentQueries(definition, superContentQueries);\n\n // Merge inputs and outputs\n fillProperties(definition.inputs, superDef.inputs);\n\n fillProperties(definition.declaredInputs, superDef.declaredInputs);\n fillProperties(definition.outputs,\n superDef.outputs);\n\n // Merge animations metadata\n // If `superDef` is a Component, the `data` field is

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present (defaults to an empty object).\n    if (isComponentDef(superDef) && superDef.data.animation) {\n
// If super def is a Component, the `definition` is also a Component, since Directives can\n    // not inherit
Components (we throw an error above and cannot reach this code).\n    const defData = (definition as
ComponentDef<any>).data;\n    defData.animation = (defData.animation ||
[]).concat(superDef.data.animation);\n    }\n    }\n\n    // Run parent features\n    const features =
superDef.features;\n    if (features) {\n    for (let i = 0; i < features.length; i++) {\n    const
feature = features[i];\n    if (feature && feature.ngInherit) {\n    (feature as
DirectiveDefFeature)(definition);\n    }\n    // If `InheritDefinitionFeature` is a part of the current `superDef`,
it means that this\n    // def already has all the necessary information inherited from its super class(es), so we\n
// can stop merging fields from super classes. However we need to iterate through the\n    // prototype chain to
look for classes that might contain other `"features"` (like\n    // NgOnChanges), which we should invoke for the
original `definition`. We set the\n    // `shouldInheritFields` flag to indicate that, essentially skipping fields
inheritance\n    // logic and only invoking functions from the `"features"` list.\n    if (feature ===
InheritDefinitionFeature) {\n    shouldInheritFields = false;\n    }\n    }\n    }\n\n    superType =
Object.getPrototypeOf(superType);\n
}\n mergeHostAttrsAcrossInheritance(inheritanceChain);\n}\n\n/**\n * Merge the `hostAttrs` and `hostVars` from
the inherited parent to the base class.\n *\n * @param inheritanceChain A list of `WritableDefs` starting at the top
most type and listing\n * sub-types in order. For each type take the `hostAttrs` and `hostVars` and merge it with the
child\n * type.\n *\nfunction mergeHostAttrsAcrossInheritance(inheritanceChain: WritableDef[]) {\n let hostVars:
number = 0;\n let hostAttrs: TAttributes|null = null;\n // We process the inheritance order from the base to the
leaves here.\n for (let i = inheritanceChain.length - 1; i >= 0; i--) {\n const def = inheritanceChain[i];\n // For
each `hostVars`, we need to add the superclass amount.\n def.hostVars = (hostVars += def.hostVars);\n // for
each `hostAttrs` we need to merge it with superclass.\n def.hostAttrs =\n mergeHostAttrs(def.hostAttrs,
hostAttrs = mergeHostAttrs(hostAttrs, def.hostAttrs));\n }\n}\n\nfunction
maybeUnwrapEmpty<T>(value: T[]): T[];\nfunction maybeUnwrapEmpty<T>(value: T): T;\nfunction
maybeUnwrapEmpty(value: any): any {\n if (value === EMPTY_OBJ) {\n return {};\n } else if (value ===
EMPTY_ARRAY) {\n return [];\n } else {\n return value;\n }\n}\n\nfunction inheritViewQuery(definition:
WritableDef, superViewQuery: ViewQueriesFunction<any>) {\n const prevViewQuery = definition.viewQuery;\n
if (prevViewQuery) {\n definition.viewQuery = (rf, ctx) => {\n superViewQuery(rf, ctx);\n
prevViewQuery(rf, ctx);\n }; }\n } else {\n definition.viewQuery = superViewQuery;\n }\n}\n\nfunction
inheritContentQueries(\n definition: WritableDef, superContentQueries: ContentQueriesFunction<any>) {\n const
prevContentQueries = definition.contentQueries;\n if (prevContentQueries) {\n definition.contentQueries = (rf,
ctx, directiveIndex) => {\n superContentQueries(rf, ctx, directiveIndex);\n prevContentQueries(rf, ctx,
directiveIndex);\n }; }\n
}\n } else {\n definition.contentQueries = superContentQueries;\n }\n}\n\nfunction inheritHostBindings(\n
definition: WritableDef, superHostBindings: HostBindingsFunction<any>) {\n const prevHostBindings =
definition.hostBindings;\n if (prevHostBindings) {\n definition.hostBindings = (rf: RenderFlags, ctx: any) => {\n
superHostBindings(rf, ctx);\n prevHostBindings(rf, ctx);\n }; }\n } else {\n definition.hostBindings =
superHostBindings;\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport { ComponentDef, DirectiveDef } from '../interfaces/definition';\nimport
{ isComponentDef } from '../interfaces/type_checks';\nimport { getSuperType } from
'./inherit_definition_feature';\n\n/**\n * Fields which exist on either directive or component definitions, and need to
be copied from\n * parent to child
classes by the `CopyDefinitionFeature`.\n *\nconst COPY_DIRECTIVE_FIELDS: (keyof
DirectiveDef<unknown>>[] = [\n // The child class should use the providers of its parent.\n 'providersResolver',\n\n
// Not listed here are any fields which are handled by the `InheritDefinitionFeature`, such\n // as inputs, outputs, and
host binding functions.\n];\n\n/**\n * Fields which exist only on component definitions, and need to be copied from

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parent to child\n * classes by the `CopyDefinitionFeature`\n *\n * The type here allows any field of
`ComponentDef` which is not also a property of `DirectiveDef`,\n *\n * since those should go in
`COPY_DIRECTIVE_FIELDS` above.\n *\nconst COPY_COMPONENT_FIELDS: Exclude<keyof
ComponentDef<unknown>, keyof DirectiveDef<unknown>>[] = [\n // The child class should use the template
function of its parent, including all template\n // semantics.\n 'template',\n 'decls',\n 'consts',\n 'vars',\n 'onPush',\n
'ngContentSelectors',\n\n // The child class
should use the CSS styles of its parent, including all styling semantics.\n 'styles',\n 'encapsulation',\n\n // The child
class should be checked by the runtime in the same way as its parent.\n 'schemas',\n];\n\n/**\n * Copies the fields
not handled by the `InheritDefinitionFeature` from the supertype of a\n * definition.\n *\n * This exists primarily to
support ngcc migration of an existing View Engine pattern, where an\n * entire decorator is inherited from a parent
to a child class. When ngcc detects this case, it\n * generates a skeleton definition on the child class, and applies this
feature.\n *\n * The `CopyDefinitionFeature` then copies any needed fields from the parent class' definition,\n *\n * including things like the component template function.\n *\n * @param definition The definition of a child class
which inherits from a parent class with its\n * own definition.\n *\n * @codeGenApi\n *\nexport function
CopyDefinitionFeature(definition: DirectiveDef<any>|ComponentDef<any>):
void {\n let superType = getSuperType(definition.type!);\n let superDef:
DirectiveDef<any>|ComponentDef<any>|undefined = undefined;\n if (isComponentDef(definition)) {\n // Don't
use GetComponentDef/getDirectiveDef. This logic relies on inheritance.\n superDef = superType.cmp!;\n } else
{\n // Don't use GetComponentDef/getDirectiveDef. This logic relies on inheritance.\n superDef =
superType.dir!;\n }\n\n // Needed because `definition` fields are readonly.\n const defAny = (definition as
any);\n\n // Copy over any fields that apply to either directives or components.\n for (const field of
COPY_DIRECTIVE_FIELDS) {\n defAny[field] = superDef[field];\n }\n\n if (isComponentDef(superDef)) {\n
// Copy over any component-specific fields.\n for (const field of COPY_COMPONENT_FIELDS) {\n
defAny[field] = superDef[field];\n }\n }\n\n"}\n\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed
by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport
{global as _global} from './global';\n\n// When Symbol.iterator doesn't exist, retrieves the key used in es6-
shim\nndeclare const Symbol: any;\nlet _symbolIterator: any = null;\nexport function getSymbolIterator():
string|symbol {\n if (!_symbolIterator) {\n const Symbol = _global['Symbol'];\n if (Symbol &&
Symbol.iterator) {\n _symbolIterator = Symbol.iterator;\n } else {\n // es6-shim specific logic\n const
keys = Object.getOwnPropertyNames(Map.prototype);\n for (let i = 0; i < keys.length; ++i) {\n const key =
keys[i];\n if (key !== 'entries' && key !== 'size' &&\n (Map as any).prototype[key] ===
Map.prototype['entries']) {\n _symbolIterator = key;\n }\n }\n }\n }\n return
_symbolIterator;\n }\n\n"}\n\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {getSymbolIterator} from './symbol';\n\nexport function isIterable(obj: any): obj is Iterable<any> {\n
return obj !== null && typeof obj === 'object' && (obj as any)[getSymbolIterator()] !== undefined;\n }\n\nexport
function isListLikeIterable(obj: any): boolean {\n if (!isJsObject(obj)) return false;\n return Array.isArray(obj) ||\n
!(obj instanceof Map) && // JS Map are iterables but return entries as [k, v]\n getSymbolIterator() in obj);\n
// JS Iterable have a Symbol.iterator prop\n\nexport function areIterablesEqual(\n a: any, b: any, comparator:
(a: any, b: any) => boolean): boolean {\n const iterator1 = a[getSymbolIterator()]();\n const iterator2 =
b[getSymbolIterator()]();\n\n while (true) {\n const item1 = iterator1.next();\n const item2 = iterator2.next();\n
if (item1.done && item2.done) return true;\n if (item1.done
|| item2.done) return false;\n if (!comparator(item1.value, item2.value)) return false;\n }\n }\n\nexport function
iterateListLike(obj: any, fn: (p: any) => any) {\n if (Array.isArray(obj)) {\n for (let i = 0; i < obj.length; i++) {\n
fn(obj[i]);\n }\n } else {\n const iterator = obj[getSymbolIterator()]();\n let item: any;\n while (!(item =
iterator.next()).done) {\n fn(item.value);\n }\n }\n }\n\nexport function isJsObject(o: any): boolean {\n return

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o !== null && (typeof o === 'function' || typeof o === 'object');\n}\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n *\n\nimport {areIterablesEqual, isListLikeIterable} from
'./iterable';\n\nexport function devModeEqual(a: any, b: any): boolean {\n  const isListLikeIterableA =
isListLikeIterable(a);\n  const isListLikeIterableB = isListLikeIterable(b);\n  if (isListLikeIterableA && isListLikeIterableB) {\n    return areIterablesEqual(a, b, devModeEqual);\n  } else {\n
const isAObject = a && (typeof a === 'object' || typeof a === 'function');\n    const isBObject = b && (typeof b ===
'object' || typeof b === 'function');\n    if (!isListLikeIterableA && isAObject && !isListLikeIterableB &&
isBObject) {\n      return true;\n    } else {\n      return Object.is(a, b);\n    }\n  }\n}\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {assertIndexInRange,
assertLessThan, assertNotSame} from './util/assert';\nimport {devModeEqual} from './util/comparison';\nimport
{getExpressionChangedErrorDetails, throwErrorIfNoChangesMode} from './errors';\nimport {LView} from
'./interfaces/view';\nimport {isInCheckNoChangesMode} from './state';\nimport {NO_CHANGE}
from './tokens';\n\n\n// TODO(misko): consider inlining\n/** Updates binding and returns the value. *\nexport
function updateBinding(IView: LView, bindingIndex: number, value: any): any {\n  return IView[bindingIndex] =
value;\n}\n\n\n/** Gets the current binding value. *\nexport function getBinding(IView: LView, bindingIndex:
number): any {\n  ngDevMode && assertIndexInRange(IView, bindingIndex);\n  ngDevMode &&
assertNotSame(IView[bindingIndex], NO_CHANGE, 'Stored value should never be NO_CHANGE.);\n  return
IView[bindingIndex];\n}\n\n\n/** Updates binding if changed, then returns whether it was updated.\n *\n * This
function also checks the `CheckNoChangesMode` and throws if changes are made.\n * Some changes
(Objects/iterables) during `CheckNoChangesMode` are exempt to comply with VE\n * behavior.\n *\n * @param
IView current `LView`\n *\n * @param bindingIndex The binding in the `LView` to check\n *\n * @param value New
value to check against `IView[bindingIndex]`\n *\n * @returns
`true` if the bindings has changed. (Throws if binding has changed during\n * `CheckNoChangesMode`)\n
*\nexport function bindingUpdated(IView: LView, bindingIndex: number, value: any): boolean {\n  ngDevMode
&& assertNotSame(value, NO_CHANGE, 'Incoming value should never be NO_CHANGE.);\n  ngDevMode &&
assertLessThan(bindingIndex, IView.length, `Slot should have been initialized to NO_CHANGE`);\n  const
oldValue = IView[bindingIndex];\n  if (Object.is(oldValue, value)) {\n    return false;\n  } else {\n    if
(ngDevMode && isInCheckNoChangesMode()) {\n      // View engine didn't report undefined values as changed on
the first checkNoChanges pass\n      // (before the change detection was run).\n      const oldValueToCompare =
oldValue !== NO_CHANGE ? oldValue : undefined;\n      if (!devModeEqual(oldValueToCompare, value)) {\n
const details =\n        getExpressionChangedErrorDetails(IView, bindingIndex, oldValueToCompare, value);\n        throwErrorIfNoChangesMode(\n
          oldValue === NO_CHANGE, details.oldValue, details.newValue, details.propName);\n      }\n      // There
was a change, but the `devModeEqual` decided that the change is exempt from an error.\n      // For this reason we
exit as if no change. The early exit is needed to prevent the changed\n      // value to be written into `LView` (If we
would write the new value that we would not see it\n      // as change on next CD.))\n      return false;\n    }\n
IView[bindingIndex] = value;\n    return true;\n  }\n}\n\n\n/** Updates 2 bindings if changed, then returns whether
either was updated. *\nexport function bindingUpdated2(IView: LView, bindingIndex: number, exp1: any, exp2:
any): boolean {\n  const different = bindingUpdated(IView, bindingIndex, exp1);\n  return bindingUpdated(IView,
bindingIndex + 1, exp2) || different;\n}\n\n\n/** Updates 3 bindings if changed, then returns whether any was updated.
*\nexport function bindingUpdated3(\n  IView: LView, bindingIndex:
  number, exp1: any, exp2: any, exp3: any): boolean {\n  const different = bindingUpdated2(IView, bindingIndex,
exp1, exp2);\n  return bindingUpdated(IView, bindingIndex + 2, exp3) || different;\n}\n\n\n/** Updates 4 bindings if
changed, then returns whether any was updated. *\nexport function bindingUpdated4(\n  IView: LView,
  bindingIndex: number, exp1: any, exp2: any, exp3: any, exp4: any): boolean {\n  const different =
bindingUpdated2(IView, bindingIndex, exp1, exp2);\n  return bindingUpdated2(IView, bindingIndex + 2, exp3,

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exp4) || different;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {bindingUpdated} from './bindings';\nimport {SanitizerFn} from
 './interfaces/sanitization';\nimport {getLView, getSelectedTNode, getTView, nextBindingIndex} from
 './state';\nimport {elementAttributeInternal, storePropertyBindingMetadata}
from './shared';\n\n\n/**\n * Updates the value of or removes a bound attribute on an Element.\n *\n * Used in the
case of `[attr.title]="value"`\n *\n * @param name name The name of the attribute.\n * @param value value The
attribute is removed when value is `null` or `undefined`.\n * Otherwise the attribute value is set to the
stringified value.\n * @param sanitizer An optional function used to sanitize the value.\n * @param namespace
Optional namespace to use when setting the attribute.\n *\n * @codeGenApi\n */\nexport function attribute(\n
name: string, value: any, sanitizer?: SanitizerFn|null, namespace?: string): typeof attribute {\n
const IView = getLView();\n
const bindingIndex = nextBindingIndex();\n
if (bindingUpdated(IView, bindingIndex, value)) {\n
const tView = getTView();\n
const tNode = getSelectedTNode();\n
elementAttributeInternal(tNode, IView, name, value, sanitizer, namespace);\n
ngDevMode && storePropertyBindingMetadata(tView.data, tNode, 'attr.' + name, bindingIndex);\n
}\n
return attribute;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {assertEqual, assertLessThan} from
 './util/assert';\nimport {bindingUpdated, bindingUpdated2, bindingUpdated3, bindingUpdated4} from
 './bindings';\nimport {LView} from './interfaces/view';\nimport {getBindingIndex, incrementBindingIndex,
nextBindingIndex, setBindingIndex} from './state';\nimport {NO_CHANGE} from './tokens';\nimport
 {renderStringify} from './util/stringify_utils';\n\n\n/**\n * Create interpolation bindings with a variable number of
expressions.\n *\n * If there are 1 to 8 expressions `interpolation1()` to `interpolation8()` should be used instead.\n *
Those are faster because there is no need to create an array of expressions and iterate
over it.\n *\n * `values`:\n * - has static text at even indexes,\n * - has evaluated expressions at odd indexes.\n *\n *
Returns the concatenated string when any of the arguments changes, `NO_CHANGE` otherwise.\n */\nexport
function interpolationV(IView: LView, values: any[]): string|NO_CHANGE {\n
ngDevMode &&
assertLessThan(2, values.length, 'should have at least 3 values');\n
ngDevMode &&
assertEqual(values.length % 2, 1, 'should have an odd number of values');\n
let isBindingUpdated = false;\n
let bindingIndex = getBindingIndex();\n\n
for (let i = 1; i < values.length; i += 2) {\n
// Check if bindings (odd indexes) have
changed\n
isBindingUpdated = bindingUpdated(IView, bindingIndex++, values[i]) || isBindingUpdated;\n
}\n
setBindingIndex(bindingIndex);\n\n
if (!isBindingUpdated) {\n
return NO_CHANGE;\n
}\n\n
// Build the updated content\n
let content = values[0];\n
for (let i = 1; i < values.length; i += 2) {\n
content +=
renderStringify(values[i]) + values[i
+ 1];\n
}\n\n
return content;\n}\n\n\n/**\n * Creates an interpolation binding with 1 expression.\n *\n * @param
prefix static value used for concatenation only.\n * @param v0 value checked for change.\n * @param suffix static
value used for concatenation only.\n */\nexport function interpolation1(IView: LView, prefix: string, v0: any, suffix:
string): string|NO_CHANGE {\n
const different = bindingUpdated(IView, nextBindingIndex(), v0);\n
return different ? prefix + renderStringify(v0) + suffix : NO_CHANGE;\n}\n\n\n/**\n * Creates an interpolation binding
with 2 expressions.\n */\nexport function interpolation2(\n
IView: LView, prefix: string, v0: any, i0: string, v1: any, suffix: string): string|NO_CHANGE {\n
const bindingIndex = getBindingIndex();\n
const different = bindingUpdated2(IView, bindingIndex, v0, v1);\n
incrementBindingIndex(2);\n\n
return different ? prefix +
renderStringify(v0) + i0 + renderStringify(v1) + suffix : NO_CHANGE;\n}\n\n\n/**\n * Creates an interpolation
binding with 3 expressions.\n */\nexport function interpolation3(\n
IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): string|NO_CHANGE {\n
const bindingIndex = getBindingIndex();\n
const different = bindingUpdated3(IView, bindingIndex, v0, v1, v2);\n
incrementBindingIndex(3);\n\n
return different ? prefix +
renderStringify(v0) + i0 + renderStringify(v1) + i1 +
renderStringify(v2) + suffix : NO_CHANGE;\n}\n\n\n/**\n * Create an interpolation binding with 4
expressions.\n */\nexport function interpolation4(\n
IView: LView, prefix: string, v0: any, i0: string, v1: any, i1:

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string, v2: any, i2: string,\n  v3: any, suffix: string): string|NO_CHANGE {\n  const bindingIndex =
getBindingIndex();\n  const different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n
incrementBindingIndex(4);\n\n  return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n
  renderStringify(v2)
  + i2 + renderStringify(v3) + suffix : \n      NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding
with 5 expressions.\n */\nexport function interpolation5(\n  IView: LView, prefix: string, v0: any, i0: string, v1:
any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, suffix: string): string|NO_CHANGE {\n  const
bindingIndex = getBindingIndex();\n  let different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n
different = bindingUpdated(IView, bindingIndex + 4, v4) || different;\n  incrementBindingIndex(5);\n\n  return
different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n      renderStringify(v2) + i2 +
renderStringify(v3) + i3 + renderStringify(v4) + suffix : \n      NO_CHANGE;\n}\n\n/**\n * Creates an
interpolation binding with 6 expressions.\n */\nexport function interpolation6(\n  IView: LView, prefix: string, v0:
any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any,
i5: string, v6: any, suffix: string): string|NO_CHANGE {\n  const bindingIndex =
getBindingIndex();\n  let different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n  different =
bindingUpdated2(IView, bindingIndex + 4, v4, v5) || different;\n  incrementBindingIndex(6);\n\n  return
different ?\n  prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 + renderStringify(v2) + i2 +\n
renderStringify(v3) + i3 + renderStringify(v4) + i4 + renderStringify(v5) + suffix : \n      NO_CHANGE;\n}\n\n/**\n
* Creates an interpolation binding with 7 expressions.\n */\nexport function interpolation7(\n  IView: LView,
prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5:
any, i5: string, v6: any, suffix: string): string|\n  NO_CHANGE {\n  const bindingIndex = getBindingIndex();\n  let
different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n  different = bindingUpdated3(IView,
bindingIndex + 4, v4, v5, v6) || different;\n  incrementBindingIndex(7);\n\n  return different ? prefix +
renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n      renderStringify(v2) + i2 + renderStringify(v3) + i3 +
renderStringify(v4) + i4 +\n      renderStringify(v5) + i5 + renderStringify(v6) + suffix : \n
NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 8 expressions.\n */\nexport function
interpolation8(\n  IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3:
any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n  suffix: string):
string|NO_CHANGE {\n  const bindingIndex = getBindingIndex();\n  let different = bindingUpdated4(IView,
bindingIndex, v0, v1, v2, v3);\n  different = bindingUpdated4(IView, bindingIndex + 4, v4, v5, v6, v7) || different;\n
incrementBindingIndex(8);\n\n  return different ? prefix + renderStringify(v0) + i0 +
renderStringify(v1) + i1 +\n      renderStringify(v2) + i2 + renderStringify(v3) + i3 + renderStringify(v4) + i4 +\n
renderStringify(v5) + i5 + renderStringify(v6) + i6 + renderStringify(v7) + suffix : \n
NO_CHANGE;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport {SanitizerFn} from './interfaces/sanitization';\nimport {getBindingIndex, getLView, getSelectedTNode,
getTView} from './state';\nimport {NO_CHANGE} from './tokens';\nimport {interpolation1, interpolation2,
interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from
 './interpolation';\nimport {elementAttributeInternal, storePropertyBindingMetadata} from './shared';\n\n\n/**\n
* Update an interpolated attribute on an element with single bound value surrounded
by text.\n */\n * Used when the value passed to a property has 1 interpolated value in it:\n */\n * ``html\n * <div
attr.title="prefix{{v0}}suffix"></div>\n * ``\n */\n * Its compiled representation is:\n */\n * ``ts\n *
attributeInterpolate1('title', 'prefix', v0, 'suffix');\n */\n * @param attrName The name of the attribute to
update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n *
@param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n *
@returns itself, so that it may be chained.\n */\n * @codeGenApi\n */\nexport function attributeInterpolate1(\n
attrName: string, prefix: string, v0: any, suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string): typeOf
attributeInterpolate1 {\n  const IView = getLView();\n  const interpolatedValue = interpolation1(IView, prefix, v0,

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suffix);\n if (interpolatedValue !== NO_CHANGE) {\n  const tNode = getSelectedTNode();\n  elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n  ngDevMode &&\n  storePropertyBindingMetadata(\n    getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 1, prefix, suffix);\n } \n return attributeInterpolate1;\n}\n\n/**\n * Update an interpolated attribute on an element with 2 bound values surrounded by text.\n * Used when the value passed to a property has 2 interpolated values in it:\n * `html` <div attr.title="prefix{v0}-{v1}suffix"></div>\n * Its compiled representation is:\n * `ts` attributeInterpolate2('title', 'prefix', v0, '-', v1, 'suffix');\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * ^\nexport function attributeInterpolate2(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n  sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate2 {\n  const IView = getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n    ngDevMode &&\n    storePropertyBindingMetadata(\n      getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 2, prefix, i0, suffix);\n  } \n return attributeInterpolate2;\n}\n\n/**\n * Update an interpolated attribute on an element with 3 bound values surrounded by text.\n * Used when the value passed to a property has 3 interpolated values in it:\n * `html` <div attr.title="prefix{v0}-{v1}-{v2}suffix"></div>\n * Its compiled representation is:\n * `ts` attributeInterpolate3('title', 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * ^\nexport function attributeInterpolate3(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n  suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate3 {\n  const IView = getLView();\n  const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n    ngDevMode &&\n    storePropertyBindingMetadata(\n      getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 3, prefix, i0, i1,\n      suffix);\n  } \n return attributeInterpolate3;\n}\n\n/**\n * Update an interpolated attribute on an element with 4 bound values surrounded by text.\n * Used when the value passed to a property has 4 interpolated values in it:\n * `html` <div attr.title="prefix{v0}-{v1}-{v2}-{v3}suffix"></div>\n * Its compiled representation is:\n * `ts` attributeInterpolate4('title', 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * ^\nexport function attributeInterpolate4(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string): typeof attributeInterpolate4 {\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n    ngDevMode &&\n    storePropertyBindingMetadata(\n
```



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getTextView().data, tNode, 'attr.' + attrName, getBindingIndex() - 4, prefix, i0, i1, i2,\n      suffix);\n }\n return
attributeInterpolate4);\n}\n\n/**\n *\n * Update an interpolated attribute on an element with 5 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 5 interpolated values in it:\n *\n *
```html\n * <div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix"></div>\n * ```\n *\n * Its compiled
representation is::\n *\n * ```ts\n * attributeInterpolate5(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n *
```\n *\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for
concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static
value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for
concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation
only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n *
@param v4 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param
sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codegenApi\n
*/\nexport function attributeInterpolate5(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any, i2: string,\n  v3: any, i3: string, v4: any, suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string):
typeof attributeInterpolate5 {\n  const IView = getLView();\n  const interpolatedValue =\n    interpolation5(IView,
prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n  if (interpolatedValue !== NO_CHANGE)\n    {\n      const tNode =
getSelectedTNode();\n      elementAttributeInternal(tNode, IView, attrName, interpolatedValue,
sanitizer, namespace);\n      ngDevMode &&\n        storePropertyBindingMetadata(\n          getTextView().data, tNode,
'attr.' + attrName, getBindingIndex() - 5, prefix, i0, i1, i2,\n            i3, suffix);\n    }\n  }\n  return
attributeInterpolate5);\n}\n\n/**\n *\n * Update an interpolated attribute on an element with 6 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 6 interpolated values in it:\n *\n *
```html\n * <div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix"></div>\n * ```\n *\n * Its
compiled representation is::\n *\n * ```ts\n * attributeInterpolate6(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4,
'-', v5, 'suffix');\n *
```\n *\n * @param attrName The name of the attribute to update\n * @param prefix Static value
used for concatenation only.\n * @param v0 Value checked for change.\n *
@param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1
Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value
used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for
concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation
only.\n * @param v5 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codegenApi\n
*/\nexport function attributeInterpolate6(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string):
typeof attributeInterpolate6 {\n  const IView = getLView();\n  const
interpolatedValue =\n    interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n  if
(interpolatedValue !== NO_CHANGE) {\n    const tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        getTextView().data, tNode, 'attr.' + attrName, getBindingIndex() - 6, prefix,
i0, i1, i2,\n          i3, i4, suffix);\n  }\n  }\n  return attributeInterpolate6);\n}\n\n/**\n *\n * Update an interpolated
attribute on an element with 7 bound values surrounded by text.\n *\n * Used when the value passed to a property
has 7 interpolated values in it:\n *\n *
```html\n * <div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix"></div>\n * ```\n *\n * Its compiled representation is::\n *\n *
```ts\n * attributeInterpolate7(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n *
```\n *\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for
concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation
only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n *
@param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3
Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked

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for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function attributeInterpolate7(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate7 {\n const IView = getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 7, prefix, i0, i1, i2,\n i3, i4, i5, suffix);\n }\n return attributeInterpolate7;\n }\n\n/\*\*\n \* Update an interpolated attribute on an element with 8 bound values surrounded by text.\n \* Used when the value passed to a property has 8 interpolated values in it:\n \* ```html\n \* <div attr.title="prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}-{v7}suffix"></div>\n \* ```\n \* Its compiled representation is:\n \* ```ts\n \* attributeInterpolate8(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n \* ```\n \* @param attrName The name of the attribute to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function attributeInterpolate8(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate8 {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 8, prefix, i0, i1, i2,\n i3, i4, i5, i6, suffix);\n }\n return attributeInterpolate8;\n }\n\n/\*\*\n \* Update an interpolated attribute on an element with 9 or more bound values surrounded by text.\n \* Used when the number of interpolated values exceeds 8.\n \* ```html\n \* <div\n \* title="prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}-{v7}-{v8}-{v9}suffix"></div>\n \* ```\n \* Its compiled representation is:\n \* ```ts\n \* attributeInterpolateV(\n \* 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']);\n \* ```\n \* @param attrName The name of the attribute to update.\n \* @param values The collection of values and the strings in-between those values, beginning with\n \* a string prefix and ending with a string suffix.\n \* (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function attributeInterpolateV(\n attrName: string, values: any[], sanitizer?: SanitizerFn,\n namespace?: string): typeof attributeInterpolateV {\n const IView = getLView();\n const interpolated = interpolationV(IView, values);\n if (interpolated !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolated, sanitizer, namespace);\n if (ngDevMode) {\n const interpolationInBetween = [values[0]]; // prefix\n for (let i = 2; i <

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values.length; i += 2) {\n    interpolationInBetween.push(values[i]);\n    }\n    storePropertyBindingMetadata(\n        getTView().data, tNode, 'attr.' + attrName,\n        getBindingIndex() - interpolationInBetween.length + 1,\n        ...interpolationInBetween);\n    }\n    }\n    return attributeInterpolateV;\n}\n\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an\n * MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport\n {getComponentViewByInstance} from './context_discovery';\nimport {TVIEW} from './interfaces/view';\nimport\n {detectChangesInternal} from './shared';\n\n/**\n * Synchronously perform change detection on a component (and\n * possibly its sub-components).\n * This function triggers change detection in a synchronous way on a\n * component.\n * @param component The component which the change detection should be performed on.\n */\nexport function detectChanges(component: {}): void {\n    const view =\n        getComponentViewByInstance(component);\n    detectChangesInternal(view[TVIEW], view,\n        component);\n}\n\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source\n * code is governed by an MIT-style license that can be\n * found\n * in the LICENSE file at https://angular.io/license\n */\n\nimport {assertFirstCreatePass} from './assert';\nimport\n {attachPatchData} from './context_discovery';\nimport {registerPostOrderHooks} from './hooks';\nimport\n {ComponentTemplate} from './interfaces/definition';\nimport {LocalRefExtractor, TAttributes, TContainerNode,\n    TNodeType} from './interfaces/node';\nimport {isDirectiveHost} from './interfaces/type_checks';\nimport\n {HEADER_OFFSET, LView, RENDERER, TView, TViewType} from './interfaces/view';\nimport {appendChild}\n from './node_manipulation';\nimport {getLView, getTView, setCurrentTNode} from './state';\nimport\n {getConstant} from './util/view_utils';\nimport {addToViewTree, createDirectivesInstances, createLContainer,\n    createTView, getOrCreateTNode, resolveDirectives, saveResolvedLocalsInData} from './shared';\n\n\nfunction\n templateFirstCreatePass(\n    index: number, tView: TView, IView: LView, templateFn:\n    ComponentTemplate<any>|null,\n    decls: number, vars: number,\n    tagName?: string|null, attrsIndex?: number|null,\n    localRefsIndex?: number|null): TContainerNode {\n    ngDevMode && assertFirstCreatePass(tView);\n    ngDevMode && ngDevMode.firstCreatePass++;\n    const\n        tViewConsts = tView.consts;\n    // TODO(pk): refactor getOrCreateTNode to have the \"create\" only version\n    const tNode = getOrCreateTNode(\n        tView, index, TNodeType.Container, tagName || null,\n        getConstant<TAttributes>(tViewConsts, attrsIndex));\n    resolveDirectives(tView, IView, tNode,\n        getConstant<string[]>(tViewConsts, localRefsIndex));\n    registerPostOrderHooks(tView, tNode);\n\n    const\n        embeddedTView = tNode.tViews = createTView(\n            TViewType.Embedded, tNode, templateFn, decls, vars,\n            tView.directiveRegistry,\n            tView.pipeRegistry, null, tView.schemas, tViewConsts);\n\n    if (tView.queries !==\n        null) {\n        tView.queries.template(tView, tNode);\n        embeddedTView.queries =\n            tView.queries.embeddedTView(tNode);\n    }\n\n    return tNode;\n}\n\n/**\n * Creates an LContainer\n * for an ng-template (dynamically-inserted view), e.g.\n * <ng-template #foo>\n * <div></div>\n * </ng-\n * template>\n * @param index The index of the container in the data array\n * @param templateFn Inline\n * template\n * @param decls The number of nodes, local refs, and pipes for this template\n * @param vars The\n * number of bindings for this template\n * @param tagName The name of the container element, if applicable\n * @param attrsIndex Index of template attributes in the `consts` array.\n * @param localRefs Index of the local\n * references in the `consts` array.\n * @param localRefExtractor A function which extracts local-refs values from the\n * template.\n * Defaults to the current element associated with the local-ref.\n * @codeGenApi\n */\nexport\n function template(\n    index: number, templateFn: ComponentTemplate<any>|null, decls: number, vars: number,\n    tagName?: string|null, attrsIndex?: number|null, localRefsIndex?: number|null,\n    localRefExtractor?:\n    LocalRefExtractor)\n    {\n        const IView = getLView();\n        const tView = getTView();\n        const adjustedIndex = index +\n            HEADER_OFFSET;\n        const tNode = tView.firstCreatePass ? templateFirstCreatePass(\n            adjustedIndex, tView, IView, templateFn, decls, vars,\n            tagName, attrsIndex,\n            localRefsIndex) :\n            tView.data[adjustedIndex] as TContainerNode;\n        setCurrentTNode(tNode, false);\n        const comment = IView[RENDERER].createComment(ngDevMode ?

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'container' : '');\n appendChild(tView, IView, comment, tNode);\n attachPatchData(comment, IView);\n\n addToViewTree(IView, IView[adjustedIndex] = createLContainer(comment, IView, comment, tNode));\n\n if\n (isDirectiveHost(tNode)) {\n createDirectivesInstances(tView, IView, tNode);\n }\n\n if (localRefsIndex != null)\n {\n saveResolvedLocalsInData(IView, tNode, localRefExtractor);\n }\n}\n", "/*\n * @license\n * Copyright\n Google\n LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found\n in the LICENSE file at https://angular.io/license\n *\n\nimport {HEADER_OFFSET, LView, TView} from\n './interfaces/view';\nimport {getContextLView} from './state';\nimport {load} from './util/view_utils';\n\n\n/**\n Store a value in the `data` at a given `index`.\n *\n\nexport function store<T>(tView: TView, IView: LView, index:\n number, value: T): void {\n // We don't store any static data for local variables, so the first time\n // we see the\n template, we should store as null to avoid a sparse array\n if (index >= tView.data.length) {\n tView.data[index] =\n null;\n tView.blueprint[index] = null;\n }\n IView[index] = value;\n }\n\n\n/**\n * Retrieves a local reference from\n the current contextViewData.\n *\n * If the reference to retrieve is in a parent view, this instruction is used in\n conjunction\n * with a nextContext() call, which walks up the tree and updates the\n contextViewData instance.\n *\n * @param index The index of the local ref in contextViewData.\n *\n * @codeGenApi\n *\n\nexport function reference<T>(index: number) {\n const contextLView =\n getContextLView();\n return load<T>(contextLView, HEADER_OFFSET + index);\n }\n\n", "/*\n * @license\n * Copyright\n Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license\n that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {bindingUpdated} from\n './bindings';\nimport {TNode} from './interfaces/node';\nimport {SanitizerFn} from\n './interfaces/sanitization';\nimport {LView, RENDERER, TView} from './interfaces/view';\nimport {getLView,\n getSelectedTNode, getTView, nextBindingIndex} from './state';\nimport {elementPropertyInternal,\n setInputsForProperty, storePropertyBindingMetadata} from './shared';\n\n\n\n/**\n * Update a property on a selected\n element.\n *\n * Operates on the element selected by index via the {@link select}\n instruction.\n *\n * If the property name also exists as an input property on one of the element's directives,\n * the\n component property will be set instead of the element property. This check must\n * be conducted at runtime so\n child components that add new `@Inputs` don't have to be re-compiled\n *\n * @param propName Name of\n property. Because it is going to DOM, this is not subject to\n * renaming as part of minification.\n *\n * @param\n value New value to write.\n *\n * @param sanitizer An optional function used to sanitize the value.\n *\n * @returns This\n function returns itself so that it may be chained\n * (e.g. `property('name', ctx.name)(title, ctx.title)`)\n *\n * @codeGenApi\n *\n\nexport function property<T>(\n propName: string, value: T, sanitizer?: SanitizerFn|null):\n typeof property {\n const IView = getLView();\n const bindingIndex = nextBindingIndex();\n if\n (bindingUpdated(IView, bindingIndex, value)) {\n const tView = getTView();\n const tNode =\n getSelectedTNode();\n\n elementPropertyInternal(\n tView, tNode, IView, propName, value, IView[RENDERER], sanitizer, false);\n\n ngDevMode && storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n }\n }\n\n return\n property;\n }\n\n\n\n/**\n * Given `

` and `MyDir` with `@Input('style')` we need to write to\n * directive input.\n *\n\nexport function setDirectiveInputsWhichShadowsStyling(\n tView: TView, tNode: TNode,\n IView: LView, value: any, isClassBased: boolean) {\n const inputs = tNode.inputs!;\n const property =\n isClassBased ? 'class' : 'style';\n // We support both 'class' and `className` hence the fallback.\n\n setInputsForProperty(tView, IView, inputs[property], property, value);\n }\n\n", "/*\n * @license\n * Copyright\n Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n *\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {assertDefined, assertEqual,\n assertIndexInRange}\n from './util/assert';\nimport {assertFirstCreatePass, assertHasParent} from './assert';\nimport {attachPatchData}\n from './context_discovery';\nimport {registerPostOrderHooks} from './hooks';\nimport {hasClassInput,\n hasStyleInput, TAttributes, TElementNode, TNodeFlags, TNodeType}\n from './interfaces/node';\nimport {\n RElement} from './interfaces/renderer_dom';\nimport {isContentQueryHost, isDirectiveHost} from


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../interfaces/type_checks';\nimport {HEADER_OFFSET, LView, RENDERER, TView} from
../interfaces/view';\nimport {assertTNodeType} from '../node_assert';\nimport {appendChild, createElementNode,
writeDirectClass, writeDirectStyle} from '../node_manipulation';\nimport {decreaseElementDepthCount,
getBindingIndex, getCurrentTNode, getElementDepthCount, getLView, getNamespace, getTView,
increaseElementDepthCount, isCurrentTNodeParent, setCurrentTNode, setCurrentTNodeAsNotParent} from
../state';\nimport {computeStaticStyling} from '../styling/static_styling';\nimport
{setUpAttributes} from '../util/attrs_utils';\nimport {getConstant} from '../util/view_utils';\n\nimport
{validateElementIsKnown} from '../element_validation';\nimport {setDirectiveInputsWhichShadowsStyling} from
../property';\nimport {createDirectivesInstances, executeContentQueries, getOrCreateTNode, resolveDirectives,
saveResolvedLocalsInData} from '../shared';\n\n\nfunction elementStartFirstCreatePass(\n  index: number, tView:
TView, IView: LView, native: RElement, name: string,\n  attrsIndex?: number|null, localRefsIndex?: number):
TElementNode {\n  ngDevMode && assertFirstCreatePass(tView);\n  ngDevMode &&
ngDevMode.firstCreatePass++;\n\n  const tViewConsts = tView.consts;\n  const attrs =
getConstant<TAttributes>(tViewConsts, attrsIndex);\n  const tNode = getOrCreateTNode(tView, index,
TNodeType.Element, name, attrs);\n\n  const hasDirectives =\n    resolveDirectives(tView, IView, tNode,
getConstant<string[]>(tViewConsts, localRefsIndex));\n  if (ngDevMode) {\n    validateElementIsKnown(native,
IView, tNode.value, tView.schemas, hasDirectives);\n  }\n\n  if (tNode.attrs !== null) {\n
computeStaticStyling(tNode, tNode.attrs, false);\n  }\n\n  if (tNode.mergedAttrs !== null) {\n
computeStaticStyling(tNode, tNode.mergedAttrs, true);\n  }\n\n  if (tView.queries !== null) {\n
tView.queries.elementStart(tView, tNode);\n  }\n\n  return tNode;\n}\n\n/**\n * Create DOM element. The
instruction must later be followed by `elementEnd()` call.\n * @param index Index of the element in the LView
array\n * @param name Name of the DOM Node\n * @param attrsIndex Index of the element's attributes in the
`consts` array.\n * @param localRefsIndex Index of the element's local references in the `consts` array.\n * @returns
This function returns itself so that it may be chained.\n * @param attrs Attributes and localRefs are passed as an array of
strings where elements with an even index\n * hold an attribute name and elements with an odd index hold an
attribute value, ex.:\n
* ['id', 'warning5', 'class', 'alert']\n * @codeGenApi\n */\nexport function elementStart(\n  index: number,
name: string, attrsIndex?: number|null,\n  localRefsIndex?: number): typeof elementStart {\n  const IView =
getLView();\n  const tView = getTView();\n  const adjustedIndex = HEADER_OFFSET + index;\n\n  ngDevMode
&&\n  assertEqual(\n    getBindingIndex(), tView.bindingStartIndex,\n    'elements should be created
before any bindings');\n  ngDevMode && assertIndexInRange(IView, adjustedIndex);\n\n  const renderer =
IView[RENDERER];\n  const native = IView[adjustedIndex] = createElementNode(renderer, name,
getNamespace());\n  const tNode = tView.firstCreatePass ?\n    elementStartFirstCreatePass(\n      adjustedIndex,
tView, IView, native, name, attrsIndex, localRefsIndex) :\n    tView.data[adjustedIndex] as TElementNode;\n  setCurrentTNode(tNode, true);\n\n  const mergedAttrs = tNode.mergedAttrs;\n  if (mergedAttrs !== null) {\n
setUpAttributes(renderer,
native, mergedAttrs);\n  }\n\n  const classes = tNode.classes;\n  if (classes !== null) {\n    writeDirectClass(renderer,
native, classes);\n  }\n\n  const styles = tNode.styles;\n  if (styles !== null) {\n    writeDirectStyle(renderer, native,
styles);\n  }\n\n  if ((tNode.flags & TNodeFlags.isDetached) !== TNodeFlags.isDetached) {\n    // In the i18n case,
the translation may have removed this element, so only add it if it is not\n    // detached. See
`TNodeType.Placeholder` and `LFrame.inI18n` for more context.\n    appendChild(tView, IView, native, tNode);\n  }\n\n  // any immediate children of a component or template container must be pre-emptively\n  // monkey-patched
with the component view data so that the element can be inspected\n  // later on using any element discovery utility
methods (see `element_discovery.ts`)\n  if (getElementDepthCount() === 0) {\n    attachPatchData(native, IView);\n  }\n  increaseElementDepthCount();\n\n  if (isDirectiveHost(tNode)) {\n
createDirectivesInstances(tView, IView, tNode);\n    executeContentQueries(tView, tNode, IView);\n  }\n\n  if
(localRefsIndex !== null) {\n    saveResolvedLocalsInData(IView, tNode);\n  }\n  return elementStart;\n}\n\n/**\n *
Mark the end of the element.\n * @returns This function returns itself so that it may be chained.\n * @param

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@codeGenApi\n *^\nexport function elementEnd(): typeof elementEnd {\n let currentTNode =
getCurrentTNode();\n ngDevMode && assertDefined(currentTNode, 'No parent node to close.);\n if
(isCurrentTNodeParent()) {\n setCurrentTNodeAsNotParent();\n } else {\n ngDevMode &&
assertHasParent(getCurrentTNode());\n currentTNode = currentTNode.parent!;\n
setCurrentTNode(currentTNode, false);\n }\n\n const tNode = currentTNode;\n ngDevMode &&
assertTNodeType(tNode, TNodeType.AnyRNode);\n\n decreaseElementDepthCount();\n\n const tView =
getTView();\n if (tView.firstCreatePass) {\n registerPostOrderHooks(tView, currentTNode);\n if
(isContentQueryHost(currentTNode))
{\n tView.queries!.elementEnd(currentTNode);\n }\n }\n\n if (tNode.classesWithoutHost != null &&
hasClassInput(tNode)) {\n setDirectiveInputsWhichShadowsStyling(tView, tNode, getLView(),
tNode.classesWithoutHost, true);\n }\n\n if (tNode.stylesWithoutHost != null && hasStyleInput(tNode)) {\n
setDirectiveInputsWhichShadowsStyling(tView, tNode, getLView(), tNode.stylesWithoutHost, false);\n }\n return
elementEnd;\n }\n\n/**\n * Creates an empty element using { @link elementStart} and { @link elementEnd}\n *\n *
@param index Index of the element in the data array\n * @param name Name of the DOM Node\n * @param
attrsIndex Index of the element's attributes in the `const`s` array.\n * @param localRefsIndex Index of the element's
local references in the `const`s` array.\n * @returns This function returns itself so that it may be chained.\n *\n *
@codeGenApi\n *^\nexport function element(\n index: number, name: string, attrsIndex?: number|null,\n
localRefsIndex?: number): typeof element {\n elementStart(index, name, attrsIndex, localRefsIndex);\n
return element;\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {assertEqual, assertIndexInRange} from '././util/assert';\nimport
{assertHasParent} from './assert';\nimport {attachPatchData} from './context_discovery';\nimport
{registerPostOrderHooks} from './hooks';\nimport {TAttributes, TElementContainerNode, TNodeType} from
 './interfaces/node';\nimport {isContentQueryHost, isDirectiveHost} from './interfaces/type_checks';\nimport
{HEADER_OFFSET, LView, RENDERER, TView} from './interfaces/view';\nimport {assertTNodeType} from
 './node_assert';\nimport {appendChild} from './node_manipulation';\nimport {getBindingIndex, getCurrentTNode,
getLView, getTView, isCurrentTNodeParent,
setCurrentTNode, setCurrentTNodeAsNotParent} from './state';\nimport {computeStaticStyling} from
 './styling/static_styling';\nimport {getConstant} from './util/view_utils';\nimport {createDirectivesInstances,
executeContentQueries, getOrCreateTNode, resolveDirectives, saveResolvedLocalsInData} from
 './shared';\n\nfunction elementContainerStartFirstCreatePass(\n index: number, tView: TView, lView: LView,
attrsIndex?: number|null,\n localRefsIndex?: number): TElementContainerNode {\n ngDevMode &&
ngDevMode.firstCreatePass++;\n\n const tViewConsts = tView.consts;\n const attrs =
getConstant<TAttributes>(tViewConsts, attrsIndex);\n const tNode = getOrCreateTNode(tView, index,
TNodeType.ElementContainer, 'ng-container', attrs);\n\n // While ng-container doesn't necessarily support styling,
we use the style context to identify\n // and execute directives on the ng-container.\n if (attrs !== null) {\n
computeStaticStyling(tNode, attrs, true);\n }\n\n const localRefs
= getConstant<string[]>(tViewConsts, localRefsIndex);\n resolveDirectives(tView, lView, tNode, localRefs);\n\n
if (tView.queries !== null) {\n tView.queries.elementStart(tView, tNode);\n }\n\n return tNode;\n }\n\n/**\n *
Creates a logical container for other nodes (<ng-container>) backed by a comment node in the DOM.\n * The
instruction must later be followed by `elementContainerEnd()` call.\n *\n * @param index Index of the element in
the LView array\n * @param attrsIndex Index of the container attributes in the `const`s` array.\n * @param
localRefsIndex Index of the container's local references in the `const`s` array.\n * @returns This function returns
itself so that it may be chained.\n *\n * Even if this instruction accepts a set of attributes no actual attribute values
are propagated to\n * the DOM (as a comment node can't have attributes). Attributes are here only for directive\n *
matching purposes and setting initial inputs of directives.\n *\n * @codeGenApi\n *^\nexport
function elementContainerStart(\n index: number, attrsIndex?: number|null,\n localRefsIndex?: number): typeof
elementContainerStart {\n const lView = getLView();\n const tView = getTView();\n const adjustedIndex = index

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+ HEADER_OFFSET;\n\n ngDevMode && assertIndexInRange(IView, adjustedIndex);\n ngDevMode &&\n
assertEqual(\n      getBindingIndex(), tView.bindingStartIndex,\n      'element containers should be created
before any bindings');\n\n const tNode = tView.firstCreatePass ?\n      elementContainerStartFirstCreatePass(\n
adjustedIndex, tView, IView, attrsIndex, localRefsIndex) :\n      tView.data[adjustedIndex] as
TElementContainerNode;\n setCurrentTNode(tNode, true);\n\n ngDevMode &&
ngDevMode.rendererCreateComment++;\n const native = IView[adjustedIndex] =\n
IView[RENDERER].createComment(ngDevMode ? 'ng-container' : ");\n appendChild(tView, IView, native,
tNode);\n attachPatchData(native, IView);\n\n if (isDirectiveHost(tNode))
{\n      createDirectivesInstances(tView, IView, tNode);\n      executeContentQueries(tView, tNode, IView);\n }
}\n\n if (localRefsIndex != null) {\n      saveResolvedLocalsInData(IView, tNode);\n }
}\n\n return
elementContainerStart;\n}\n\n**\n * Mark the end of the <ng-container>.\n * @returns This function returns itself
so that it may be chained.\n * \n * @codeGenApi\n * ^\nexport function elementContainerEnd(): typeof
elementContainerEnd {\n      let currentTNode = getCurrentTNode();\n      const tView = getTView();\n      if
(isCurrentTNodeParent()) {\n          setCurrentTNodeAsNotParent();\n      } else {\n          ngDevMode &&
assertHasParent(currentTNode);\n          currentTNode = currentTNode.parent!;\n          setCurrentTNode(currentTNode,
false);\n      }\n      ngDevMode && assertTNodeType(currentTNode, TNodeType.ElementContainer);\n      if
(tView.firstCreatePass) {\n          registerPostOrderHooks(tView, currentTNode);\n      } if
(isContentQueryHost(currentTNode)) {\n          tView.queries!.elementEnd(currentTNode);\n      }
}\n      }\n      return elementContainerEnd;\n}\n\n**\n * Creates an empty logical container using { @link
elementContainerStart}\n * and { @link elementContainerEnd}\n * \n * @param index Index of the element in the
LView array\n * @param attrsIndex Index of the container attributes in the `consts` array.\n * @param
localRefsIndex Index of the container's local references in the `consts` array.\n * @returns This function returns
itself so that it may be chained.\n * \n * @codeGenApi\n * ^\nexport function elementContainer(\n      index: number,
attrsIndex?: number|null, localRefsIndex?: number): typeof elementContainer {\n      elementContainerStart(index,
attrsIndex, localRefsIndex);\n      elementContainerEnd();\n      return elementContainer;\n}\n\n", "**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\nimport { OpaqueViewState } from
'../interfaces/view';\nimport
{ getLView } from '../state';\n\n**\n * Returns the current OpaqueViewState instance.\n * \n * Used in conjunction
with the restoreView() instruction to save a snapshot\n * of the current view and restore it when listeners are
invoked. This allows\n * walking the declaration view tree in listeners to get vars from parent views.\n * \n *
@codeGenApi\n * ^\nexport function getCurrentViewState(): OpaqueViewState {\n      return getLView() as any as
OpaqueViewState;\n}\n\n", "**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * ^\nimport { Observable, Subscribable } from 'rxjs';\n\n**\n * Determine if the
argument is shaped like a Promise\n * ^\nexport function isPromise<T = any>(obj: any): obj is Promise<T> {\n      //
allow any Promise/A+ compliant thenable.\n      // It's up to the caller to ensure that obj.then conforms to the spec\n
return
!!obj && typeof obj.then === 'function';\n}\n\n**\n * Determine if the argument is a Subscribable\n * ^\nexport
function isSubscribable(obj: any|Subscribable<any>): obj is Subscribable<any> {\n      return !!obj && typeof
obj.subscribe === 'function';\n}\n\n**\n * Determine if the argument is an Observable\n * \n * Strictly this tests that
the `obj` is `Subscribable`, since `Observable` \n * types need additional methods, such as `lift()`. But it is adequate
for our\n * needs since within the Angular framework code we only ever need to use the\n * `subscribe()` method,
and RxJS has mechanisms to wrap `Subscribable` objects\n * into `Observable` as needed.\n * ^\nexport const
isObservable =\n      isSubscribable as ((obj: any|Observable<any>) => obj is Observable<any>);\n\n", "**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport

```

```

{assertIndexInRange} from './../util/assert';\nimport {isObservable} from './../util/lang';\nimport
{PropertyAliasValue, TNode, TNodeFlags, TNodeType} from './interfaces/node';\nimport {GlobalTargetResolver,
Renderer} from './interfaces/renderer';\nimport {RElement} from './interfaces/renderer_dom';\nimport
{isDirectiveHost} from './interfaces/type_checks';\nimport {CLEANUP, CONTEXT, LView, RENDERER,
TView} from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {profiler,
ProfilerEvent} from './profiler';\nimport {getCurrentDirectiveDef, getCurrentTNode, getLView, getTView} from
'./state';\nimport {getComponentLViewByIndex, getNativeByTNode, unwrapRNode} from
'./util/view_utils';\n\nimport {getOrCreateLViewCleanup, getOrCreateTViewCleanup, handleError,
loadComponentRenderer, markViewDirty} from './shared';\n\n\n\n\n * Adds an event listener to the current
node.\n * If an output exists on one of the node's directives, it also subscribes to
the output\n * and saves the subscription for later cleanup.\n * @param eventName Name of the event\n *
@param listenerFn The function to be called when event emits\n * @param useCapture Whether or not to use
capture in event listener\n * @param eventTargetResolver Function that returns global target information in case
this listener\n * should be attached to a global object like window, document or body\n * @codeGenApi\n
*\n\nexport function listener(\n  eventName: string, listenerFn: (e?: any) => any, useCapture?: boolean,\n
eventTargetResolver?: GlobalTargetResolver): typeof listener {\n  const IView = getLView<{}>|null>();\n  const
tView = getTView();\n  const tNode = getCurrentTNode(!);\n  listenerInternal(\n    tView, IView,
IView[RENDERER], tNode, eventName, listenerFn, !useCapture,\n    eventTargetResolver);\n  return
listener;\n}\n\n\n\n * Registers a synthetic host listener (e.g. `@foo.start`) on a component or directive.\n *
This instruction is for
compatibility purposes and is designed to ensure that a\n * synthetic host listener (e.g.
`@HostListener('@foo.start')`) properly gets rendered\n * in the component's renderer. Normally all host listeners
are evaluated with the\n * parent component's renderer, but, in the case of animation @triggers, they need\n * to be
evaluated with the sub component's renderer (because that's where the\n * animation triggers are defined).\n *
Do not use this instruction as a replacement for `listener`. This instruction\n * only exists to ensure compatibility
with the ViewEngine's host binding behavior.\n * @param eventName Name of the event\n * @param
listenerFn The function to be called when event emits\n * @param useCapture Whether or not to use capture in
event listener\n * @param eventTargetResolver Function that returns global target information in case this listener\n
* should be attached to a global object like window, document or body\n * @codeGenApi\n
*\n\nexport function
syntheticHostListener(\n  eventName: string, listenerFn: (e?: any) => any): typeof syntheticHostListener {\n  const tNode =
getCurrentTNode(!);\n  const IView = getLView<{}>|null>();\n  const tView = getTView();\n  const currentDef =
getCurrentDirectiveDef(tView.data);\n  const renderer = loadComponentRenderer(currentDef, tNode, IView);\n  listenerInternal(tView, IView, renderer, tNode, eventName, listenerFn, false);\n  return
syntheticHostListener;\n}\n\n\n\n * A utility function that checks if a given element has already an event handler
registered for an\n * event with a specified name. The TView.cleanup data structure is used to find out which
events\n * are registered for a given element.\n * \n\nfunction findExistingListener(\n  tView: TView, IView: LView,
eventName: string, tNodeIdx: number): ((e?: any) => any)|null {\n  const tCleanup = tView.cleanup;\n  if (tCleanup
!= null) {\n    for (let i = 0; i < tCleanup.length - 1; i += 2) {\n      const cleanupEventName = tCleanup[i];\n      if (cleanupEventName === eventName && tCleanup[i + 1] === tNodeIdx) {\n        // We have found a
matching event name on the same node but it might not have been\n        // registered yet, so we must explicitly
verify entries in the LView cleanup data\n        // structures.\n        const lCleanup = IView[CLEANUP]!;\n        const listenerIdxInLCleanup = tCleanup[i + 2];\n        return lCleanup.length > listenerIdxInLCleanup ?
lCleanup[listenerIdxInLCleanup] : null;\n      }\n    }\n    // TView.cleanup can have a mix of 4-elements entries (for
event handler cleanups) or\n    // 2-element entries (for directive and queries destroy hooks). As such we can
encounter\n    // blocks of 4 or 2 items in the tView.cleanup and this is why we iterate over 2 elements\n    // first
and jump another 2 elements if we detect listeners cleanup (4 elements). Also check\n    // documentation of
TView.cleanup for more details of this data structure layout.\n    if (typeof cleanupEventName

```



```

==== 'string') {\n    i += 2;\n    }\n  }\n  return null;\n}\n\nfunction listenerInternal(\n  tView: TView,\n  IView: LView<{}|null>, renderer: Renderer, tNode: TNode, eventName: string,\n  listenerFn: (e?: any) => any,\n  useCapture: boolean,\n  eventTargetResolver?: GlobalTargetResolver): void {\n  const isTNodeDirectiveHost =\n  isDirectiveHost(tNode);\n  const firstCreatePass = tView.firstCreatePass;\n  const tCleanup: false|any[] =\n  firstCreatePass && getOrCreateTViewCleanup(tView);\n  const context = IView[CONTEXT];\n  \n  // When the\n  listener instruction was generated and is executed we know that there is either a\n  // native listener or a directive\n  output on this element. As such we we know that we will have to\n  // register a listener and store its cleanup\n  function on LView.\n  const lCleanup = getOrCreateLViewCleanup(IView);\n  \n  ngDevMode &&\n  assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.AnyContainer);\n  \n  let processOutputs = true;\n  \n  // Adding a native\n  event listener is applicable when:\n  // - The corresponding TNode represents a DOM element.\n  // - The event\n  target has a resolver (usually resulting in a global object,\n  // such as `window` or `document`).\n  if ((tNode.type\n  & TNodeType.AnyRNode) || eventTargetResolver) {\n    const native = getNativeByTNode(tNode, IView) as\n    RElement;\n    const target = eventTargetResolver ? eventTargetResolver(native) : native;\n    const lCleanupIndex\n    = lCleanup.length;\n    const idxOrTargetGetter = eventTargetResolver ?\n    (_IView: LView) =>\n    eventTargetResolver(unwrapRNode(_IView[tNode.index])) : \n    tNode.index;\n    \n    // In order to match current\n    behavior, native DOM event listeners must be added for all\n    // events (including outputs).\n    \n    // There might be\n    cases where multiple directives on the same element try to register an event\n    // handler function for the same\n    event. In this situation we want to avoid registration of\n    // several native listeners as each\n    registration would be intercepted by NgZone and\n    // trigger change detection. This would mean that a single user\n    action would result in several\n    // change detections being invoked. To avoid this situation we want to have only\n    one call to\n    // native handler registration (for the same element and same type of event).\n    \n    // In order to\n    have just one native event handler in presence of multiple handler functions,\n    // we just register a first handler\n    function as a native event listener and then chain\n    // (coalesce) other handler functions on top of the first native\n    handler function.\n    let existingListener = null;\n    // Please note that the coalescing described here doesn't happen\n    for events specifying an\n    // alternative target (ex. (document:click)) - this is to keep backward compatibility with\n    the\n    // view engine.\n    // Also, we don't have to search for existing listeners is there are no directives\n    //\n    matching on a given node as we can't register\n    multiple event handlers for the same event in\n    // a template (this would mean having duplicate attributes).\n    if\n    (!eventTargetResolver && isTNodeDirectiveHost) {\n      existingListener = findExistingListener(tView, IView,\n      eventName, tNode.index);\n    }\n    if (existingListener !== null) {\n      // Attach a new listener to coalesced\n      listeners list, maintaining the order in which\n      // listeners are registered. For performance reasons, we keep a\n      reference to the last\n      // listener in that list (in `__ngLastListenerFn__` field), so we can avoid going through\n      // the entire set each time we need to add a new listener.\n      const lastListenerFn =\n      (<any>existingListener).__ngLastListenerFn__ || existingListener;\n      lastListenerFn.__ngNextListenerFn__ =\n      listenerFn;\n      (<any>existingListener).__ngLastListenerFn__ = listenerFn;\n      processOutputs = false;\n    } else\n    {\n      listenerFn = wrapListener(tNode, IView, context, listenerFn, false /** preventDefault\n      */);\n      const cleanupFn = renderer.listen(target as RElement, eventName, listenerFn);\n      ngDevMode &&\n      ngDevMode.rendererAddEventListener++;\n      \n      lCleanup.push(listenerFn, cleanupFn);\n      tCleanup &&\n      tCleanup.push(eventName, idxOrTargetGetter, lCleanupIndex, lCleanupIndex + 1);\n    }\n  }\n  \n  } else {\n    // Even if\n    there is no native listener to add, we still need to wrap the listener so that OnPush\n    // ancestors are marked dirty\n    when an event occurs.\n    listenerFn = wrapListener(tNode, IView, context, listenerFn, false /** preventDefault\n    */);\n  }\n  \n  // subscribe to directive outputs\n  const outputs = tNode.outputs;\n  let props:\n  PropertyAliasValue|undefined;\n  if (processOutputs && outputs !== null && (props = outputs[eventName])) {\n    const propsLength = props.length;\n    if (propsLength) {\n      for (let i = 0; i < propsLength; i += 2) {\n        const\n        index = props[i] as number;\n        ngDevMode && assertIndexInRange(IView, index);\n        \n        const minifiedName = props[i + 1];\n        const directiveInstance = IView[index];\n        const output =\n        directiveInstance[minifiedName];\n        \n        if (ngDevMode && !isObservable(output)) {\n          throw new

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Error( @Output ${minifiedName} not initialized in '${\n      directiveInstance.constructor.name}');\n
}\n\n  const subscription = output.subscribe(listenerFn);\n  const idx = lCleanup.length;\n  lCleanup.push(listenerFn, subscription);\n  tCleanup && tCleanup.push(eventName, tNode.index, idx, -(idx + 1));\n  }\n  }\n  }\n}\n\nfunction executeListenerWithErrorHandling(\n  lView: LView, context: {}|null, listenerFn: (e?: any) => any, e: any): boolean {\n  try {\n    profiler(ProfilerEvent.OutputStart, context, listenerFn);\n    // Only explicitly returning false from a listener should preventDefault\n    return listenerFn(e) !== false;\n  } catch (error) {\n    handleError(lView, error);\n    return false;\n  } finally {\n    profiler(ProfilerEvent.OutputEnd, context, listenerFn);\n  }}\n\n/**\n * Wraps an event listener with a function that marks ancestors dirty and prevents default behavior,\n * if applicable.\n * @param tNode The TNode associated with this listener\n * @param lView The LView that contains this listener\n * @param listenerFn The listener function to call\n * @param wrapWithPreventDefault Whether or not to prevent default behavior\n * (the procedural renderer does this already, so in those cases, we should skip)\n */\nfunction wrapListener(\n  tNode: TNode, lView: LView<{}|null>, context: {}|null, listenerFn: (e?: any) => any,\n  wrapWithPreventDefault: boolean): EventListener {\n  // Note: we are performing most of the work in the listener function itself\n  // to optimize listener registration.\n  return function wrapListenerIn_markDirtyAndPreventDefault(e: any) {\n    // Ivy uses `Function` as a special token that allows us to unwrap the function\n    // so that it can be invoked programmatically by `DebugNode.triggerEventHandler`.\n    if (e === Function) {\n      return listenerFn;\n    }\n    // In order to be backwards compatible with View Engine, events on component host nodes\n    // must also mark the component view itself dirty (i.e. the view that it owns).\n    const startView = tNode.flags & TNodeFlags.isComponentHost ?\n      getComponentLViewByIndex(tNode.index, lView) :\n      lView;\n    markViewDirty(startView);\n    let result = executeListenerWithErrorHandling(lView, context, listenerFn, e);\n    // A just-invoked listener function might have coalesced listeners so we need to check for\n    // their presence and invoke as needed.\n    let nextListenerFn = (<any>wrapListenerIn_markDirtyAndPreventDefault).__ngNextListenerFn__;\n    while (nextListenerFn) {\n      // We should prevent default if any of the listeners explicitly return false\n      result = executeListenerWithErrorHandling(lView, context, nextListenerFn, e) && result;\n      nextListenerFn = (<any>nextListenerFn).__ngNextListenerFn__;\n    }\n    if (wrapWithPreventDefault && result === false) {\n      e.preventDefault();\n      // Necessary for legacy browsers that don't support preventDefault (e.g. IE)\n      e.returnValue = false;\n    }\n    return result;\n  };}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport {namespaceHTML, namespaceMathML, namespaceSVG} from './state';\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {nextContextImpl} from './state';\n"/**\n * Retrieves a context at the level specified and saves it as the global, contextViewData.\n * Will get the next level up if level is not specified.\n * This is used to save contexts of parent views so they can be bound in embedded views, or\n * in conjunction with reference() to bind a ref from a parent view.\n * @param level The relative level of the view from which to grab context compared to contextVewData\n * @returns context\n * @codeGenApi\n */\nexport function nextContext<T = any>(level: number = 1): T {\n  return nextContextImpl(level);\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {newArray} from './../util/array_utils';\nimport {TAttributes, TElementNode, TNode, TNodeFlags, TNodeType} from './../interfaces/node';\nimport {ProjectionSlots} from './../interfaces/projection';\nimport {DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, T_HOST} from './../interfaces/view';\nimport {applyProjection} from './node_manipulation';\nimport {getProjectAsAttrValue, isNodeMatchingSelectorList, isSelectorInSelectorList} from './node_selector_matcher';\nimport {getLView, getTView, setCurrentTNodeAsNotParent} from './state';\nimport {getOrCreateTNode} from './shared';\n\n/**\n * Checks a given node against matching projection slots and returns the\n * determined slot index. Returns `null` if

```

no slot matched the given node.  
 \* This function takes into account the parsed ngProjectAs selector from the  
 \* node's attributes. If present, it will check whether the ngProjectAs selector  
 \* matches any of the projection slot selectors.  
 \*/  
 \*export function matchingProjectionSlotIndex(tNode: TNode, projectionSlots: ProjectionSlots):  
 number  
 null {  
 let wildcardNgContentIndex = null;  
 const ngProjectAsAttrVal =  
 getProjectAsAttrValue(tNode);  
 for (let i = 0; i < projectionSlots.length; i++) {  
 const slotValue =  
 projectionSlots[i];  
 // The last wildcard projection slot should match all nodes which aren't matching  
 // any selector. This is necessary to be backwards compatible with view engine.  
 if (slotValue === '\*') {  
 wildcardNgContentIndex = i;  
 continue;  
 }  
 // If we ran into an `ngProjectAs` attribute, we should match  
 its parsed selector  
 // to the list of selectors, otherwise we fall back to matching against the node.  
 if  
 (ngProjectAsAttrVal === null ?  
 isNodeMatchingSelectorList(tNode, slotValue, /\* isProjectionMode \*/  
 true) :  
 isSelectorInSelectorList(ngProjectAsAttrVal, slotValue)) {  
 return i; // first matching selector  
 }  
 }  
 return wildcardNgContentIndex;  
 }  
 }  
 \* Instruction to distribute  
 projectable nodes among <ng-content> occurrences in a given template.  
 \* It takes all the selectors from the entire  
 component's template and decides where  
 \* each projected node belongs (it re-distributes nodes among "buckets"  
 where each "bucket" is  
 \* backed by a selector).  
 \*  
 \*

This function requires CSS selectors to be provided in 2 forms: parsed (by a compiler) and text,  
 \* un-parsed  
 form.  
 \* The parsed form is needed for efficient matching of a node against a given CSS selector.  
 \* The un-  
 parsed, textual form is needed for support of the ngProjectAs attribute.  
 \* Having a CSS selector in 2 different  
 formats is not ideal, but alternatives have even more  
 \* drawbacks:  
 \* - having only a textual form would require  
 runtime parsing of CSS selectors;  
 \* - we can't have only a parsed as we can't re-construct textual form from it (as  
 entered by a  
 \* template author).  
 \* @param projectionSlots? A collection of projection slots. A projection  
 slot can be based  
 \* on a parsed CSS selectors or set to the wildcard selector ("\*") in order to match  
 \* all nodes which do not match any selector. If not specified, a single wildcard  
 \* selector projection slot will be  
 defined.  
 \* @codeGenApi  
 \*/  
 \*export function projectionDef(projectionSlots?:  
 ProjectionSlots): void {  
 const componentNode =  
 getLView()[DECLARATION\_COMPONENT\_VIEW][T\_HOST] as TElementNode;  
 if  
 (!componentNode.projection) {  
 // If no explicit projection slots are defined, fall back to a single  
 // projection  
 slot with the wildcard selector.  
 const numProjectionSlots = projectionSlots ? projectionSlots.length : 1;  
 const  
 projectionHeads: (TNode|null)[] = componentNode.projection =  
 new Array(numProjectionSlots, null!  
 as  
 TNode);  
 const tails: (TNode|null)[] = projectionHeads.slice();  
 let componentChild: TNode|null =  
 componentNode.child;  
 while (componentChild !== null) {  
 const slotIndex =  
 projectionSlots ?  
 matchingProjectionSlotIndex(componentChild, projectionSlots) : 0;  
 if (slotIndex !== null) {  
 if  
 (tails[slotIndex]) {  
 tails[slotIndex]!.projectionNext = componentChild;  
 } else {  
 projectionHeads[slotIndex] = componentChild;  
 }  
 }  
 tails[slotIndex] = componentChild;  
 }  
 componentChild = componentChild.next;  
 }  
 }  
 }  
 \* Inserts previously re-distributed projected nodes. This instruction must be preceded by a call  
 \* to the projectionDef instruction.  
 \* @param nodeIndex  
 \* @param selectorIndex:  
 \* - 0 when the selector  
 is `\*` (or unspecified as this is the default value),  
 \* - 1 based index of the selector from the { @link  
 projectionDef}  
 \* @codeGenApi  
 \*/  
 \*export function projection(  
 nodeIndex: number, selectorIndex:  
 number = 0, attrs?: TAttributes): void {  
 const IView = getLView();  
 const tView = getTView();  
 const  
 tProjectionNode =  
 getOrCreateTNode(tView, HEADER\_OFFSET + nodeIndex, TNodeType.Projection, null,  
 attrs || null);  
 // We can't use viewData[HOST\_NODE] because projection nodes can be nested in embedded  
 views.  
 if (tProjectionNode.projection === null) tProjectionNode.projection = selectorIndex;  
 // <ng-content>  
 has no content  
 setCurrentTNodeAsNotParent();  
 if ((tProjectionNode.flags & TNodeFlags.isDetached) !==  
 TNodeFlags.isDetached) {  
 // re-distribution of projectable nodes is stored on a component's view level  
 applyProjection(tView, IView, tProjectionNode);  
 }  
 }  
 }  
 \* @license  
 \* Copyright Google LLC All  
 Rights Reserved.  
 \* Use of this source code is governed by an MIT-style license that can be  
 \* found in the  
 LICENSE file at <https://angular.io/license>  
 \*/  
 \*import { SanitizerFn } from './interfaces/sanitization';

```

{RENDERER} from './interfaces/view';\nimport {getBindingIndex, getLView, getSelectedTNode, getTView} from
'./state';\nimport {NO_CHANGE} from './tokens';\n\nimport {interpolation1, interpolation2, interpolation3,
interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from
'./interpolation';\nimport {elementPropertyInternal, storePropertyBindingMetadata} from './shared';\n\n\n/**\n *\n * Update an interpolated property on an element with a lone bound value\n *\n * Used when the value passed to a
property has 1 interpolated value in it, an no additional text\n *\n * surrounds that interpolated value:\n *\n * ```html\n *
<div title="{v0}"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n *
propertyInterpolate('title', v0);\n * ```\n *\n * If the property name also exists as an input property on one of the
element's directives,\n * the component property will be set instead of the element property. This check must\n * be
conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param
propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param
sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport
function propertyInterpolate(\n  propName: string, v0: any, sanitizer?: SanitizerFn): typeof propertyInterpolate {\n
propertyInterpolate1(propName, "", v0, "", sanitizer);\n  return propertyInterpolate;\n}\n\n\n/**\n *\n * Update an
interpolated property on an element with single bound value surrounded by text.\n *\n * Used when the value passed
to a property has 1 interpolated value in it:\n *\n * ```html\n * <div title="prefix{v0}suffix"></div>\n * ```\n *\n *
Its compiled representation is:\n *\n * ```ts\n * propertyInterpolate1('title', 'prefix', v0, 'suffix');\n * ```\n *\n *
If the property name also exists as an input property on one of the element's directives,\n * the component property
will be set instead of the element property. This check must\n * be conducted at runtime so child components that
add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n *
@param prefix Static value used for concatenation
only.\n * @param v0 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport function propertyInterpolate1(\n  propName: string, prefix: string, v0: any, suffix: string,\n  sanitizer?:
SanitizerFn): typeof propertyInterpolate1 {\n  const IView = getLView();\n  const interpolatedValue =
interpolation1(IView, prefix, v0, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView =
getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView,
propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n      tView.data, tNode, propName, getBindingIndex() - 1, prefix, suffix);\n  }\n
return propertyInterpolate1;\n}\n\n\n/**\n *\n * Update an interpolated property on an element with 2 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 2 interpolated values in it:\n *\n *
```html\n * <div title="prefix{v0}-{v1}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n *
```ts\n * propertyInterpolate2('title', 'prefix', v0, '-', v1, 'suffix');\n * ```\n *\n * If the property name
also exists as an input property on one of the element's directives,\n * the component property will be set instead
of the element property. This check must\n * be conducted at runtime so child components that add new `@Inputs`
don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n * @param prefix Static
value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for concatenation
only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may
be chained.\n * @codeGenApi\n
*/\nexport function propertyInterpolate2(\n  propName: string, prefix: string, v0:
any, i0: string, v1: any, suffix: string,\n  sanitizer?: SanitizerFn): typeof propertyInterpolate2 {\n  const IView =
getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  if (interpolatedValue
!== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n
elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer,
false);\n    ngDevMode &&\n    storePropertyBindingMetadata(\n      tView.data, tNode, propName,
getBindingIndex() - 2, prefix, i0, suffix);\n  }\n  return propertyInterpolate2;\n}\n\n\n/**\n *\n * Update an

```

interpolated property on an element with 3 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 3 interpolated values in it:\n \* \n \* ```html\n \* <div title=\"prefix{{v0}}-{{v1}}-{{v2}}suffix\"></div>\n \* ```\n \* \n \* Its compiled representation is::\n \* \n \* ```ts\n \* propertyInterpolate3(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, 'suffix');\n \* ```\n \* \n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* \n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codegenApi\n \* ^\n \* export function

```

propertyInterpolate3(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n  suffix: string, sanitizer?: SanitizerFn): typeof propertyInterpolate3 {\n  const IView = getLView();\n  const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer,\n      false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        tView.data, tNode, propName, getBindingIndex() - 3, prefix, i0, i1, suffix);\n  }\n  return propertyInterpolate3;\n}\n\n/**\n * \n * Update an interpolated property on an element with 4 bound values surrounded by text.\n * \n * Used when the value passed to a property has 4 interpolated values in it:\n * \n * ```html\n * <div title=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix\"></div>\n * ```\n * \n * Its compiled representation is::\n * \n * ```ts\n * propertyInterpolate4(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ```\n * \n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codegenApi\n * ^\n * export function
```

```

propertyInterpolate4(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, suffix: string, sanitizer?: SanitizerFn): typeof propertyInterpolate4 {\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer,\n      false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        tView.data, tNode, propName, getBindingIndex() - 4, prefix, i0, i1, i2, suffix);\n  }\n  return propertyInterpolate4;\n}\n\n/**\n * \n * Update an interpolated property on an element with 5 bound values surrounded by text.\n * \n * Used when the value passed to a property has 5 interpolated values in it:\n * \n * ```html\n * <div title=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix\"></div>\n * ```\n * \n * Its compiled representation is::\n * \n * ```ts\n * propertyInterpolate5(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ```\n * \n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n *

```

```

@param v2 Value checked for change.\n * @param i2 Static value used for concatenation
only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n *
@param v4 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param
sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport function propertyInterpolate5(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any, i2: string,\n  v3: any, i3: string, v4: any, suffix: string,\n  sanitizer?: SanitizerFn): typeof
propertyInterpolate5 {\n  const IView = getLView();\n  const interpolatedValue =\n    interpolation5(IView, prefix,
v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView =
getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView,
propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n
  tView.data, tNode, propName, getBindingIndex() - 5, prefix, i0, i1, i2, i3, suffix);\n  }\n  return
propertyInterpolate5;\n}\n\n/**\n * \n * Update an interpolated property on an element with 6 bound values
surrounded by text.\n * \n * Used when the value passed to a property has 6 interpolated values in it:\n * \n *
```html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix"></div>\n * ```\n * \n * Its
compiled representation is::\n * \n * ```ts\n * propertyInterpolate6(\n *   'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4,
'-', v5, 'suffix');\n * ```\n * \n * If the property name also exists as an input property on one of the element's
directives,\n * the component property will be set instead of the element property. This check must\n * be conducted
at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param propName
The name of the property to update\n * @param prefix Static value used
for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n *
@param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4
Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer
function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function
propertyInterpolate6(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n
v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string,\n  sanitizer?: SanitizerFn): typeof
propertyInterpolate6
{\n  const IView = getLView();\n  const interpolatedValue =\n    interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2,
v3, i3, v4, i4, v5, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const
tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName,
interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n      tView.data, tNode, propName, getBindingIndex() - 6, prefix, i0, i1, i2, i3,
i4, suffix);\n  }\n  return propertyInterpolate6;\n}\n\n/**\n * \n * Update an interpolated property on an element with
7 bound values surrounded by text.\n * \n * Used when the value passed to a property has 7 interpolated values in
it:\n * \n * ```html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix"></div>\n *
```\n * \n * Its compiled representation is::\n * \n * ```ts\n * propertyInterpolate7(\n *   'title', 'prefix', v0, '-',
v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ```\n * \n * If the property name also exists as an input property on
one of the element's directives,\n * the component property will be set instead of the element property. This check
must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n * \n *
@param propName The name of the property to update\n * @param prefix Static value used for concatenation
only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n *
@param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2
Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked
for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n *
@param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n *

```

@param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolate7(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n sanitizer?: SanitizerFn): typeof propertyInterpolate7 {\n const IView = getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 7, prefix, i0, i1, i2, i3, i4, i5,\n suffix);\n }\n return propertyInterpolate7;\n}\n\n/\*\*\n \* Update an interpolated property on an element with 8 bound values surrounded by text.\n \* Used when the value passed to a property has 8 interpolated values in it:\n \* ``html\n \* <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* propertyInterpolate8(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n \* ``\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* \n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolate8(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, sanitizer?: SanitizerFn): typeof propertyInterpolate8 {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 8, prefix, i0, i1, i2, i3, i4, i5, i6,\n suffix);\n }\n return propertyInterpolate8;\n}\n\n/\*\*\n \* Update an interpolated property on an element with 9 or more bound values surrounded by text.\n \* Used when the number of interpolated values exceeds 8.\n \* ``html\n \* <div\n \* title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* propertyInterpolateV(\n \* 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']);\n \* ``\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* \n \* @param propName The name of the property to update.\n \* @param values The collection of values and the strings in between those values, beginning with a\n \* string prefix and ending with a string suffix.\n \* (e.g. `[prefix, value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolateV(\n propName: string, values: any[], sanitizer?:

```

SanitizerFn): typeof propertyInterpolateV {\n  const IView = getLView();\n  const interpolatedValue =
interpolationV(IView, values);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n
const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName,
interpolatedValue, IView[RENDERER], sanitizer, false);\n    if (ngDevMode) {\n      const interpolationInBetween
= [values[0]]; // prefix\n      for (let i = 2; i < values.length; i += 2) {\n
interpolationInBetween.push(values[i]);\n      }\n      storePropertyBindingMetadata(\n        tView.data, tNode,
propName, getBindingIndex() - interpolationInBetween.length + 1,\n        ...interpolationInBetween);\n      }\n    }\n  }\n  return propertyInterpolateV;\n}\n\n", "/**\n
* @license\n* Copyright Google LLC All Rights Reserved.\n*\n* Use of this source code is governed by an
MIT-style license that can be\n* found in the LICENSE file at https://angular.io/license\n*/\n\nimport
{KeyValueArray, keyValueArrayIndexOf} from '../util/array_utils';\nimport {assertEqual, assertIndexInRange,
assertNotEqual} from '../util/assert';\nimport {assertFirstUpdatePass} from './assert';\nimport {TNode} from
'./interfaces/node';\nimport {getTStylingRangeNext, getTStylingRangePrev, setTStylingRangeNext,
setTStylingRangeNextDuplicate, setTStylingRangePrev, setTStylingRangePrevDuplicate, toTStylingRange,
TStylingKey, TStylingKeyPrimitive, TStylingRange} from './interfaces/styling';\nimport {TData} from
'./interfaces/view';\nimport {getTView} from './state';\n\n\n/**\n* NOTE: The word `styling` is used
interchangeably as style or class styling.\n*\n* This file contains code to link styling instructions together so that
they can be replayed
in\n* priority order. The file exists because Ivy styling instruction execution order does not match\n* that of the
priority order. The purpose of this code is to create a linked list so that the\n* instructions can be traversed in
priority order when computing the styles.\n*\n* Assume we are dealing with the following code:\n* ```\n* @Component({\n*   template: \n*     <my-cmp [style]=" {color: '#001'} "\n*       [style.color]=" #002 "\n*
dir-style-color-1\n*       dir-style-color-2> \n*     })\n*   class ExampleComponent {\n*     static ngComp =
... {\n*       ... \n*       // Compiler ensures that `styleProp` is after `styleMap`\n*       styleMap({color: '#001'});\n*
styleProp('color', '#002');\n*       ... \n*     }}\n*   @Directive({\n*     selector: '[dir-style-color-1]',\n*   })\n*   class Style1Directive {\n*     @HostBinding('style') style = {color: '#005'};\n*     @HostBinding('style.color') color =
'#006';\n*     static ngDir
= ... {\n*       ... \n*       // Compiler ensures that `styleProp` is after `styleMap`\n*       styleMap({color: '#005'});\n*
styleProp('color', '#006');\n*       ... \n*     }}\n*   @Directive({\n*     selector: '[dir-style-color-2]',\n*   })\n*   class Style2Directive {\n*     @HostBinding('style') style = {color: '#007'};\n*     @HostBinding('style.color') color =
'#008';\n*     static ngDir = ... {\n*       ... \n*       // Compiler ensures that `styleProp` is after `styleMap`\n*
styleMap({color: '#007'});\n*       styleProp('color', '#008');\n*       ... \n*     }}\n*   @Directive({\n*     selector:
`my-cmp`,\n*   })\n*   class MyComponent {\n*     @HostBinding('style') style = {color: '#003'};\n*
@HostBinding('style.color') color = '#004';\n*     static ngComp = ... {\n*       ... \n*       // Compiler ensures that
`styleProp` is after `styleMap`\n*       styleMap({color: '#003'});\n*       styleProp('color', '#004');\n*       ... \n*
}}\n*   }\n*   * ```\n*   * The Order of instruction execution is:\n*   * NOTE: the comment binding location is for illustrative
purposes only.\n*   * ```\n*   * // Template: (ExampleComponent)\n*   *   styleMap({color: '#001'}); // Binding index:
10\n*   *   styleProp('color', '#002'); // Binding index: 12\n*   * // MyComponent\n*   *   styleMap({color: '#003'}); //
Binding index: 20\n*   *   styleProp('color', '#004'); // Binding index: 22\n*   * // Style1Directive\n*   *
styleMap({color: '#005'}); // Binding index: 24\n*   *   styleProp('color', '#006'); // Binding index: 26\n*   * //
Style2Directive\n*   *   styleMap({color: '#007'}); // Binding index: 28\n*   *   styleProp('color', '#008'); // Binding
index: 30\n*   * ```\n*   * The correct priority order of concatenation is:\n*   * ```\n*   * // MyComponent\n*   *
styleMap({color: '#003'}); // Binding index: 20\n*   *   styleProp('color', '#004'); // Binding index: 22\n*   * //
Style1Directive\n*   *   styleMap({color: '#005'});\n*   * // Binding index: 24\n*   *   styleProp('color', '#006'); // Binding index: 26\n*   * // Style2Directive\n*   *
styleMap({color: '#007'}); // Binding index: 28\n*   *   styleProp('color', '#008'); // Binding index: 30\n*   * //
Template: (ExampleComponent)\n*   *   styleMap({color: '#001'}); // Binding index: 10\n*   *   styleProp('color',

```



'#002'); // Binding index: 12\n \* ``\n \*\n \* What color should be rendered?\n \*\n \* Once the items are correctly sorted in the list, the answer is simply the last item in the\n \* concatenation list which is '#002'.\n \*\n \* To do so we keep a linked list of all of the bindings which pertain to this element.\n \* Notice that the bindings are inserted in the order of execution, but the `TVView.data` allows\n \* us to traverse them in the order of priority.\n \*\n \*

```
|Idx|TVView.data|LView` | Notes\n * |---|-----|-----\n * |...| | \n * |10|`null` |`{color: '#001'}|`styleMap('color', {color: '#001'})\n * |11|`30|12` |... | \n * |12|`color` |`'#002` |`styleProp('color', '#002')\n * |13|`10|0` |... | \n * |20|`null` |`{color: '#003'}|`styleMap('color', {color: '#003'})\n * |21|`0|22` |... | \n * |22|`color` |`'#004` |`styleProp('color', '#004')\n * |23|`20|24` |... | \n * |24|`null` |`{color: '#005'}|`styleMap('color', {color: '#005'})\n * |25|`22|26` |... | \n * |26|`color` |`'#006` |`styleProp('color', '#006')\n * |27|`24|28` |... | \n * |28|`null` |`{color: '#007'}|`styleMap('color', {color: '#007'})\n * |29|`26|30` |... | \n * |30|`color` |`'#008` |`styleProp('color', '#008')\n * |31|`28|10` |... | \n *\n * The above data structure allows us to re-concatenate the styling
```

no matter which data binding\n \* changes.\n \*\n \* NOTE: in addition to keeping track of next/previous index the `TVView.data` also stores prev/next\n \* duplicate bit. The duplicate bit if true says there either is a binding with the same name or\n \* there is a map (which may contain the name). This information is useful in knowing if other\n \* styles with higher priority need to be searched for overwrites.\n \*\n \* NOTE: See `should support example in 'tnode\_linked\_list.ts' documentation` in\n \* `tnode\_linked\_list\_spec.ts` for working example.\n \*/

```
__unused_const_as_closure_does_not_like_standalone_comment_blocks__: undefined;\n\n/**\n * Insert new `tStyleValue` at `TData` and link existing style bindings such that we maintain linked\n * list of styles and compute the duplicate flag.\n *\n * Note: this function is executed during `firstUpdatePass` only to populate the `TVView.data`.\n *\n * The function works by keeping track of `tStylingRange` which contains two pointers pointing to\n * the head/tail of the template portion of the styles.\n * - if `isHost === false` (we are template) then insertion is at tail of `tStylingRange`\n * - if `isHost === true` (we are host binding) then insertion is at head of `tStylingRange`\n *\n * @param tData The `TData` to insert into.\n * @param tNode `TNode` associated with the styling element.\n * @param tStylingKey See `TStylingKey`.\n * @param index location of where `tStyleValue` should be stored (and linked into list).\n * @param isHostBinding `true` if the insertion is for a `hostBinding`.
```

```
(insertion is in front of\n * template.)\n * @param isClassBinding True if the associated `tStylingKey` as a `class` styling.\n * `tNode.classBindings` should be used (or `tNode.styleBindings` otherwise.)\n */\n\nexport function insertTStylingBinding(\n tData: TData, tNode: TNode, tStylingKeyWithStatic: TStylingKey, index: number,\n isHostBinding: boolean, isClassBinding: boolean): void {\n
```

```
ngDevMode && assertFirstUpdatePass(getTVView());\n let tBindings = isClassBinding ? tNode.classBindings : tNode.styleBindings;\n let tmpHead = getTStylingRangePrev(tBindings);\n let tmpTail = getTStylingRangeNext(tBindings);\n tData[index] = tStylingKeyWithStatic;\n let isKeyDuplicateOfStatic = false;\n let tStylingKey: TStylingKeyPrimitive;\n if (Array.isArray(tStylingKeyWithStatic)) {\n // We are case when the `TStylingKey` contains static fields as well.\n const staticKeyValueArray = tStylingKeyWithStatic as KeyValueArray<any>;\n tStylingKey = staticKeyValueArray[1]; // unwrap.\n // We need to check if our key is present in the static so that we can mark it as duplicate.\n if (tStylingKey === null ||\n keyValueArrayIndexOf(staticKeyValueArray, tStylingKey as string) > 0) {\n // tStylingKey is present in the statics, need to mark it as duplicate.\n isKeyDuplicateOfStatic = true;\n } } else {\n tStylingKey = tStylingKeyWithStatic;\n
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} } if (isHostBinding) {\n // We are inserting host bindings\n // If we don't have template bindings then `tail` is 0.\n const hasTemplateBindings = tmpTail !== 0;\n // This is important to know because that means that the `head` can't point to the first\n // template bindings (there are none.) Instead the head points to the tail of the template.\n if (hasTemplateBindings) {\n // template head's `prev` will point to last host binding or to 0 if no host bindings yet\n const previousNode = getTStylingRangePrev(tData[tmpHead + 1] as TStylingRange);\n tData[index + 1] = toTStylingRange(previousNode, tmpHead);\n // if a host binding has already been registered,
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we need to update the next of that host\n    // binding to point to this one\n    if (previousNode !== 0) {\n    //
We need to update the template-tail value to point to us.\n        tData[previousNode + 1] =\nsetTStylingRangeNext(tData[previousNode + 1] as TStylingRange,\n    index);\n    }\n    // The \"previous\" of the template binding head should point to this host binding\n    tData[tmplHead + 1] = setTStylingRangePrev(tData[tmplHead + 1] as TStylingRange, index);\n    } else {\n    tData[index + 1] = toTStylingRange(tmplHead, 0);\n    // if a host binding has already been registered, we need to
update the next of that host\n    // binding to point to this one\n    if (tmplHead !== 0) {\n    // We need to update
the template-tail value to point to us.\n        tData[tmplHead + 1] = setTStylingRangeNext(tData[tmplHead + 1] as
TStylingRange, index);\n    }\n    // if we don't have template, the head points to template-tail, and needs to be
advanced.\n        tmplHead = index;\n    }\n    } else {\n    // We are inserting in template section.\n    // We need to set
this binding's \"previous\" to the current template tail\n        tData[index + 1] = toTStylingRange(tmplTail, 0);\n
ngDevMode &&\n        assertEqual(\n            tmplHead
        !== 0 && tmplTail === 0, false,\n            'Adding template bindings after hostBindings is not allowed.);\n        if
(tmplHead === 0) {\n            tmplHead = index;\n        } else {\n            // We need to update the previous value \"next\" to
point to this binding\n            tData[tmplTail + 1] = setTStylingRangeNext(tData[tmplTail + 1] as TStylingRange,
index);\n        }\n        tmplTail = index;\n    }\n    // Now we need to update / compute the duplicates.\n    // Starting with
our location search towards head (least priority)\n    if (isKeyDuplicateOfStatic) {\n        tData[index + 1] =
setTStylingRangePrevDuplicate(tData[index + 1] as TStylingRange);\n    }\n    markDuplicates(tData, tStylingKey,
index, true, isClassBinding);\n    markDuplicates(tData, tStylingKey, index, false, isClassBinding);\n    markDuplicateOfResidualStyling(tNode, tStylingKey, tData, index, isClassBinding);\n\n    tBindings =
toTStylingRange(tmplHead, tmplTail);\n    if (isClassBinding) {\n        tNode.classBindings = tBindings;\n    } else {\n
        tNode.styleBindings = tBindings;\n    }\n\n    /**\n     * Look into the residual styling to see if the current
`tStylingKey` is duplicate of residual.\n     * @param tNode `TNode` where the residual is stored.\n     * @param
tStylingKey `TStylingKey` to store.\n     * @param tData `TData` associated with the current `LView`.\n     * @param
index location of where `tStyleValue` should be stored (and linked into list).\n     * @param isClassBinding True if the
associated `tStylingKey` as a `class` styling.\n     * @param tNode.classBindings` should be used (or
`tNode.styleBindings` otherwise.)\n     */\n    function markDuplicateOfResidualStyling(\n        tNode: TNode, tStylingKey:
TStylingKey, tData: TData, index: number, isClassBinding: boolean) {\n        const residual = isClassBinding ?
tNode.residualClasses : tNode.residualStyles;\n        if (residual != null /* or undefined */ && typeof tStylingKey ==
'string' &&\n            keyValueArrayIndexOf(residual, tStylingKey) >= 0) {\n            // We have duplicate in the residual
so mark ourselves as duplicate.\n            tData[index + 1] = setTStylingRangeNextDuplicate(tData[index + 1] as
TStylingRange);\n        }\n\n        /**\n         * Marks `TStyleValue`s as duplicates if another style binding in the list has the
same\n         * `TStyleValue`.\n         * NOTE: this function is intended to be called twice once with `isPrevDir` set to
`true` and once\n         * with it set to `false` to search both the previous as well as next items in the list.\n         * No
duplicate case\n         * ```\n         * [style.color]\n         * [style.width.px] <<- index\n         * [style.height.px]\n         * ```\n         * In the
above case adding `[style.width.px]` to the existing `[style.color]` produces no\n         * duplicates because `width` is not
found in any other part of the linked list.\n         * Duplicate case\n         * ```\n         * [style.color]\n         * [style.width.em]\n         *
[style.width.px] <<- index\n         * ```\n         * In the above case adding `[style.width.px]` will produce a duplicate with
`[style.width.em]`\n         * because `width` is found in the chain.\n         */\n        * Map case 1\n         * ```\n         * [style.width.px]\n         * [style.color]\n         * [style] <<- index\n         * ```\n         * In the above case
adding `[style]` will produce a duplicate with any other bindings because\n         * `[style]` is a Map and as such is fully
dynamic and could produce `color` or `width`.\n         * Map case 2\n         * ```\n         * [style]\n         * [style.width.px]\n         *
[style.color] <<- index\n         * ```\n         * In the above case adding `[style.color]` will produce a duplicate because there is
already a\n         * `[style]` binding which is a Map and as such is fully dynamic and could produce `color` or\n         *
`width`.\n         * NOTE: Once `[style]` (Map) is added into the system all things are mapped as duplicates.\n         *
NOTE: We use `style` as example, but same logic is applied to `class`es as well.\n         * @param tData `TData`
where the linked list is stored.\n         * @param tStylingKey `TStylingKeyPrimitive` which contains the value to
compare to other keys in\n         * the linked list.\n         * @param index Starting location

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in the linked list to search from\n * @param isPrevDir Direction.\n * - `true` for previous (lower priority);\n * - `false` for next (higher priority).\n */\nfunction markDuplicates(\n  tData: TData, tStylingKey:
TStylingKeyPrimitive, index: number, isPrevDir: boolean, isClassBinding: boolean) {\n  const tStylingAtIndex
= tData[index + 1] as TStylingRange;\n  const isMap = tStylingKey === null;\n  let cursor =\n  isPrevDir ?
getTStylingRangePrev(tStylingAtIndex) : getTStylingRangeNext(tStylingAtIndex);\n  let foundDuplicate = false;\n
// We keep iterating as long as we have a cursor\n // AND either:\n // - we found what we are looking for, OR\n // -
we are a map in which case we have to continue searching even after we find what we were\n // looking for since
we are a wild card and everything needs to be flipped to duplicate.\n  while (cursor !== 0 && (foundDuplicate ===
false || isMap)) {\n    ngDevMode && assertIndexInRange(tData, cursor);\n    const tStylingValueAtCursor
= tData[cursor] as TStylingKey;\n    const tStyleRangeAtCursor = tData[cursor + 1] as TStylingRange;\n    if
(isStylingMatch(tStylingValueAtCursor, tStylingKey)) {\n      foundDuplicate = true;\n      tData[cursor + 1] =
isPrevDir ? setTStylingRangeNextDuplicate(tStyleRangeAtCursor) :\n      setTStylingRangePrevDuplicate(tStyleRangeAtCursor);\n      cursor = isPrevDir ?
getTStylingRangePrev(tStyleRangeAtCursor) :\n      getTStylingRangeNext(tStyleRangeAtCursor);\n    }\n    if (foundDuplicate) {\n      // if we found a duplicate, than mark ourselves.\n      tData[index + 1] = isPrevDir ?
setTStylingRangePrevDuplicate(tStylingAtIndex) :\n      setTStylingRangeNextDuplicate(tStylingAtIndex);\n    }\n  }\n}\n\n/**\n * Determines if two `TStylingKey`s are a
match.\n * When computing whether a binding contains a duplicate, we need to compare if the instruction\n *
`TStylingKey` has a match.\n *\n * Here are examples of `TStylingKey`s which match given `tStylingKeyCursor` is:\n * - `color`\n * - `color` //
Match another color\n * - `null` // That means that `tStylingKey` is a `classMap`/`styleMap` instruction\n * -
`['', 'color', 'other', true]` // wrapped `color` so match\n * - `['', null, 'other', true]` // wrapped `null` so match\n *
- `['', 'width', 'color', 'value']` // wrapped static value contains a match on `color`\n * - `null` //
`tStylingKeyCursor` always match as it is `classMap`/`styleMap` instruction\n */\n * @param tStylingKeyCursor\n *
@param tStylingKey\n */\nfunction isStylingMatch(tStylingKeyCursor: TStylingKey, tStylingKey:
TStylingKeyPrimitive) {\n  ngDevMode &&\n  assertNotEqual(\n    Array.isArray(tStylingKey), true,\n    'Expected that `tStylingKey` has been unwrapped');\n  if (\n    tStylingKeyCursor === null || // If the cursor is
`null` it means that we have map at that\n    // location so we must assume that we have a match.\n    tStylingKey === null || // If `tStylingKey` is `null` then it
is a map therefor assume that it\n    // contains a match.\n    (Array.isArray(tStylingKeyCursor) ?\n    tStylingKeyCursor[1] : tStylingKeyCursor) ===\n    tStylingKey // If the keys match explicitly than we are a
match.\n  ) {\n    return true;\n  } else if (Array.isArray(tStylingKeyCursor) && typeof tStylingKey === 'string') {\n
// if we did not find a match, but `tStylingKeyCursor` is `KeyValueArray` that means cursor has\n // statics and
we need to check those as well.\n    return keyValueArrayIndexOf(tStylingKeyCursor, tStylingKey) >= 0; //
see if we are matching the key\n  } return false;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {assertEqual,\n  throwError} from '../util/assert';\nimport {CharCode} from '../util/char_code';\n\n/**\n * Stores the locations of
key/value indexes while parsing styling.\n * In case of `cssText` parsing the indexes are like so:\n * ```\n * |key1: value1; key2: value2; key3: value3|\n * ^ ^ ^ ^ ^\n * | | | | | +--\n * textEnd\n * | | | +----- valueEnd\n * | | +----- value\n * +----- keyEnd\n * +----- key\n * ```\n * In case of `className`
parsing the indexes are like so:\n * ```\n * |key1 key2 key3|\n * ^ ^ ^\n * | | +--- textEnd\n * +----- keyEnd\n * +----- key\n * ```\n * NOTE: `value` and `valueEnd` are
used only for styles, not classes.\n */\ninterface ParserState {\n  textEnd: number;\n  key: number;\n  keyEnd: number;\n  value: number;\n  valueEnd: number;\n}\n\n// Global state
of the parser. (This makes parser non-reentrant, but that is not an issue)\nconst parserState: ParserState = {\n  textEnd: 0,\n  key: 0,\n  keyEnd: 0,\n  value: 0,\n  valueEnd: 0;\n};\n\n/**\n * Retrieves the last parsed `key` of

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style.\n * @param text the text to substring the key from.\n */\nexport function getLastParsedKey(text: string):
string {\n  return text.substring(parserState.key, parserState.keyEnd);\n}\n\n/**\n * Retrieves the last parsed `value`
of style.\n * @param text the text to substring the key from.\n */\nexport function getLastParsedValue(text: string):
string {\n  return text.substring(parserState.value, parserState.valueEnd);\n}\n\n/**\n * Initializes `className` string
for parsing and parses the first token.\n * This function is intended to be used in this format:\n * ```\n * for (let i
= parseClassName(text); i >= 0; i = parseClassNameNext(text,
i)) {\n *   const key = getLastParsedKey();\n *   ...}\n * }\n * ```\n * @param text `className` to parse\n * @returns
index where the next invocation of `parseClassNameNext` should resume.\n */\nexport function
parseClassName(text: string): number {\n  resetParserState(text);\n  return parseClassNameNext(text,
consumeWhitespace(text, 0, parserState.textEnd));\n}\n\n/**\n * Parses next `className` token.\n * This
function is intended to be used in this format:\n * ```\n * for (let i = parseClassName(text); i >= 0; i =
parseClassNameNext(text, i)) {\n *   const key = getLastParsedKey();\n *   ...}\n * }\n * ```\n * @param text
`className` to parse\n * @param index where the parsing should resume.\n * @returns index where the next
invocation of `parseClassNameNext` should resume.\n */\nexport function parseClassNameNext(text: string, index:
number): number {\n  const end = parserState.textEnd;\n  if (end === index) {\n    return -1;\n  }\n  index =
parserState.keyEnd = consumeClassToken(text,
parserState.key = index, end);\n  return consumeWhitespace(text, index, end);\n}\n\n/**\n * Initializes `cssText`
string for parsing and parses the first key/values.\n * This function is intended to be used in this format:\n * ```\n
* for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n *   const key = getLastParsedKey();\n *   const
value = getLastParsedValue();\n *   ...}\n * }\n * ```\n * @param text `cssText` to parse\n * @returns index where the
next invocation of `parseStyleNext` should resume.\n */\nexport function parseStyle(text: string): number {\n
resetParserState(text);\n  return parseStyleNext(text, consumeWhitespace(text, 0, parserState.textEnd));\n}\n\n/**\n
* Parses the next `cssText` key/values.\n * This function is intended to be used in this format:\n * ```\n
* for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n *   const key = getLastParsedKey();\n *   const
value =
getLastParsedValue();\n *   ...}\n * }\n
*\n * @param text `cssText` to parse\n * @param index where the parsing should resume.\n * @returns index
where the next invocation of `parseStyleNext` should resume.\n */\nexport function parseStyleNext(text: string,
startIndex: number): number {\n  const end = parserState.textEnd;\n  let index = parserState.key =
consumeWhitespace(text, startIndex, end);\n  if (end === index) {\n    // we reached an end so just quit\n    return -
1;\n  }\n  index = parserState.keyEnd = consumeStyleKey(text, index, end);\n  index = consumeSeparator(text,
index, end, CharCode.COLON);\n  index = parserState.value = consumeWhitespace(text, index, end);\n  index =
parserState.valueEnd = consumeStyleValue(text, index, end);\n  return consumeSeparator(text, index, end,
CharCode.SEMI_COLON);\n}\n\n/**\n * Reset the global state of the styling parser.\n * @param text The styling
text to parse.\n */\nexport function resetParserState(text: string): void {\n  parserState.key = 0;\n  parserState.keyEnd
= 0;\n  parserState.value
= 0;\n  parserState.valueEnd = 0;\n  parserState.textEnd = text.length;\n}\n\n/**\n * Returns index of next non-
whitespace character.\n * @param text Text to scan\n * @param startIndex Starting index of character where the
scan should start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index
of next non-whitespace character (May be the same as `start` if no whitespace at\n * that location.)\n */\nexport
function consumeWhitespace(text: string, startIndex: number, endIndex: number): number {\n  while
(startIndex < endIndex && text.charCodeAt(startIndex) <= CharCode.SPACE) {\n    startIndex++;\n  }\n  return
startIndex;\n}\n\n/**\n * Returns index of last char in class token.\n * @param text Text to scan\n * @param
startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character
where the scan should end.\n * @returns Index after last char in class token.\n */\nexport
function consumeClassToken(text: string, startIndex: number, endIndex: number): number {\n  while (startIndex <
endIndex && text.charCodeAt(startIndex) > CharCode.SPACE) {\n    startIndex++;\n  }\n  return
startIndex;\n}\n\n/**\n * Consumes all of the characters belonging to style key and token.\n * @param text Text
to scan\n * @param startIndex Starting index of character where the scan should start.\n * @param endIndex Ending

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index of character where the scan should end.\n * @returns Index after last style key character.\n */\nexport function
consumeStyleKey(text: string, startIndex: number, endIndex: number): number {\n let ch: number;\n while
(startIndex < endIndex &&\n      ((ch = text.charCodeAtAt(startIndex)) === CharCode.DASH || ch ===
CharCode.UNDERSCORE ||\n      ((ch & CharCode.UPPER_CASE) >= CharCode.A && (ch &
CharCode.UPPER_CASE) <= CharCode.Z) ||\n      (ch >= CharCode.ZERO && ch <= CharCode.NINE))) {\n
startIndex++;\n }\n return startIndex;\n}\n\n/**\n * Consumes all whitespace and the separator `:` after the style key.\n */\n * @param text Text to scan\n * @param
startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character
where the scan should end.\n * @returns Index after separator and surrounding whitespace.\n */\nexport function
consumeSeparator(\n  text: string, startIndex: number, endIndex: number, separator: number): number {\n
startIndex = consumeWhitespace(text, startIndex, endIndex);\n if (startIndex < endIndex) {\n   if (ngDevMode &&
text.charCodeAtAt(startIndex) !== separator) {\n     malformedStyleError(text, String.fromCharCode(separator),
startIndex);\n   }\n   startIndex++;\n }\n return startIndex;\n}\n\n\n/**\n * Consumes style value honoring `url()`
and `\"\"` text.\n */\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan
should start.\n * @param endIndex Ending index of character where the scan should end.\n *
@returns Index after last style value character.\n */\nexport function consumeStyleValue(text: string, startIndex:
number, endIndex: number): number {\n let ch1 = -1; // 1st previous character\n let ch2 = -1; // 2nd previous
character\n let ch3 = -1; // 3rd previous character\n let i = startIndex;\n let lastChIndex = i;\n while (i < endIndex)
{\n   const ch: number = text.charCodeAtAt(i++);\n   if (ch === CharCode.SEMI_COLON) {\n     return
lastChIndex;\n   } else if (ch === CharCode.DOUBLE_QUOTE || ch === CharCode.SINGLE_QUOTE) {\n
lastChIndex = i = consumeQuotedText(text, ch, i, endIndex);\n   } else if (\n     startIndex ===\n     i - 4 &&
// We have seen only 4 characters so far \"URL(\" (Ignore \"foo_URL()\")\n     ch3 === CharCode.U &&\n
ch2 === CharCode.R && ch1 === CharCode.L && ch === CharCode.OPEN_PAREN) {\n     lastChIndex = i =
consumeQuotedText(text, CharCode.CLOSE_PAREN, i, endIndex);\n   } else if (ch > CharCode.SPACE) {\n     //
if we have a non-whitespace character then capture its location\n     lastChIndex = i;\n   }\n   ch3 = ch2;\n   ch2 =
ch1;\n   ch1 = ch & CharCode.UPPER_CASE;\n }\n return lastChIndex;\n}\n\n\n/**\n * Consumes all of the quoted
characters.\n */\n * @param text Text to scan\n * @param quoteCharCode CharCode of either `\"` or `` quote or `)`
for `url(...)`.\n * @param startIndex Starting index of character where the scan should start.\n * @param endIndex
Ending index of character where the scan should end.\n * @returns Index after quoted characters.\n */\nexport
function consumeQuotedText(\n  text: string, quoteCharCode: number, startIndex: number, endIndex: number):
number {\n let ch1 = -1; // 1st previous character\n let index = startIndex;\n while (index < endIndex) {\n   const
ch = text.charCodeAtAt(index++);\n   if (ch == quoteCharCode && ch1 !== CharCode.BACK_SLASH) {\n     return
index;\n   }\n   if (ch == CharCode.BACK_SLASH && ch1 === CharCode.BACK_SLASH) {\n
// two back slashes cancel each other out. For example `\"\"` should properly end the\n // quotation. (It should
not assume that the last `` is escaped.)\n     ch1 = 0;\n   } else {\n     ch1 = ch;\n   }\n }\n throw ngDevMode ?
malformedStyleError(text, String.fromCharCode(quoteCharCode), endIndex) :\n   new
Error();\n}\n\nfunction malformedStyleError(text: string, expecting: string, index: number): never {\n ngDevMode
&& assertEquals(typeof text === 'string', true, 'String expected here');\n throw throwError(\n   `Malformed style at
location ${index} in string ` + text.substring(0, index) + `[>>` +\n   text.substring(index, index + 1) + `<<` +
text.slice(index + 1) +\n   ``. Expecting `${expecting}`.`);\n}\n\n\"/>\n * @license\n * Copyright Google LLC All
Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport { SafeValue, unwrapSafeValue }
from '../sanitization/bypass';\nimport { KeyValueArray, keyValueArrayGet, keyValueArraySet } from
'../util/array_utils';\nimport { assertDefined, assertEquals, assertLessThan, assertNotEqual, throwError } from
'../util/assert';\nimport { EMPTY_ARRAY } from '../util/empty';\nimport { concatStringsWithSpace, stringify }
from '../util/stringify';\nimport { assertFirstUpdatePass } from '../assert';\nimport { bindingUpdated } from
'../bindings';\nimport { DirectiveDef } from '../interfaces/definition';\nimport { AttributeMarker, TAttributes, TNode,
TNodeFlags, TNodeType } from '../interfaces/node';\nimport { Renderer } from '../interfaces/renderer';\nimport

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{RElement} from './interfaces/renderer_dom';\nimport {getTStylingRangeNext, getTStylingRangeNextDuplicate,
getTStylingRangePrev, getTStylingRangePrevDuplicate, TStylingKey, TStylingRange} from
 './interfaces/styling';\nimport {LView, RENDERER, TData, TView} from './interfaces/view';\nimport
 {applyStyling} from './node_manipulation';\nimport
 {getCurrentDirectiveDef, getLView, getSelectedIndex, getTView, incrementBindingIndex} from './state';\nimport
 {insertTStylingBinding} from './styling/style_binding_list';\nimport {getLastParsedKey, getLastParsedValue,
parseClassName, parseClassNameNext, parseStyle, parseStyleNext} from './styling/styling_parser';\nimport
 {NO_CHANGE} from './tokens';\nimport {getNativeByIndex} from './util/view_utils';\n\nimport
 {setDirectiveInputsWhichShadowsStyling} from './property';\n\n\n/**\n * Update a style binding on an element with
the provided value.\n * \n * If the style value is falsy then it will be removed from the element\n * (or assigned a
different value depending if there are any styles placed\n * on the element with `styleMap` or any static styles that
are\n * present from when the element was created with `styling`).\n * \n * Note that the styling element is updated
as part of `stylingApply`.\n * \n * @param prop A valid CSS property.\n * @param value New value to
write ( `null` or an empty string to remove).\n * @param suffix Optional suffix. Used with scalar values to add unit
such as `px`.\n * \n * Note that this will apply the provided style value to the host element if this function is called\n
 * within a host binding function.\n * \n * @codeGenApi\n */\nexport function styleProp(\n  prop: string, value:
string|number|SafeValue|undefined|null,\n  suffix?: string|null): typeof styleProp {\n  checkStylingProperty(prop,
value, suffix, false);\n  return styleProp;\n}\n\n\n/**\n * Update a class binding on an element with the provided
value.\n * \n * This instruction is meant to handle the `[class.foo]="exp"` case and,\n * therefore, the class binding
itself must already be allocated using\n * `styling` within the creation block.\n * \n * @param prop A valid CSS class
(only one).\n * @param value A true/false value which will turn the class on or off.\n * \n * Note that this will apply
the provided class value to the host element if this function\n
 * is called within a host binding function.\n * \n * @codeGenApi\n */\nexport function classProp(className: string,
value: boolean|undefined|null): typeof classProp {\n  checkStylingProperty(className, value, null, true);\n  return
classProp;\n}\n\n\n/**\n * Update style bindings using an object literal on an element.\n * \n * This instruction is
meant to apply styling via the `[style]="exp"` template bindings.\n * \n * When styles are applied to the element they
will then be updated with respect to\n * any styles/classes set via `styleProp`. If any styles are set to falsy\n * then
they will be removed from the element.\n * \n * Note that the styling instruction will not be applied until
`stylingApply` is called.\n * \n * @param styles A key/value style map of the styles that will be applied to the given
element.\n * \n * Any missing styles (that have already been applied to the element beforehand) will be\n *
removed (unset) from the element's styling.\n * \n * Note that
this will apply the provided styleMap value to the host element if this function\n * is called within a host binding.\n
 * \n * @codeGenApi\n */\nexport function styleMap(styles: {[styleName: string]: any}|string|undefined|null): void
{\n  checkStylingMap(styleKeyValueArraySet, styleStringParser, styles, false);\n}\n\n\n/**\n * Parse text as style
and add values to KeyValueArray.\n * \n * This code is pulled out to a separate function so that it can be tree shaken
away if it is not\n * needed. It is only referenced from `styleMap`.\n * \n * @param keyValueArray KeyValueArray
to add parsed values to.\n * @param text text to parse.\n */\nexport function styleStringParser(keyValueArray:
KeyValueArray<any>, text: string): void {\n  for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n
styleKeyValueArraySet(keyValueArray, getLastParsedKey(text), getLastParsedValue(text));\n  }\n}\n\n\n/**\n *
Update class bindings using an object literal or class-string on an element.\n
 * \n * This instruction is meant to apply styling via the `[class]="exp"` template bindings.\n * \n * When classes are
applied to the element they will then be updated with\n * respect to any styles/classes set via `classProp`. If any\n
 * classes are set to falsy then they will be removed from the element.\n * \n * Note that the styling instruction will not
be applied until `stylingApply` is called.\n * \n * Note that this will the provided classMap value to the host element if
this function is called\n * within a host binding.\n * \n * @param classes A key/value map or string of CSS classes
that will be added to the\n * \n * given element. Any missing classes (that have already been applied to the
element\n * \n * beforehand) will be removed (unset) from the element's list of CSS classes.\n * \n *
@codeGenApi\n */\nexport function classMap(classes: {[className: string]:

```

```

boolean|undefined|null}|string|undefined|\n
null): void {\n checkStylingMap(keyValueArraySet,
classStringParser, classes, true);\n}\n\n/**\n * Parse text as class and add values to KeyValueArray.\n *\n * This
code is pulled out to a separate function so that it can be tree shaken away if it is not\n * needed. It is only
referenced from `classMap`.\n *\n * @param keyValueArray KeyValueArray to add parsed values to.\n *\n * @param
text text to parse.\n */\nexport function classStringParser(keyValueArray: KeyValueArray<any>, text: string): void
{\n for (let i = parseClassName(text); i >= 0; i = parseClassNameNext(text, i)) {\n
keyValueArraySet(keyValueArray, getLastParsedKey(text), true);\n }\n}\n\n/**\n * Common code between
`classProp` and `styleProp`.\n *\n * @param prop property name.\n *\n * @param value binding value.\n *\n * @param
suffix suffix for the property (e.g. `em` or `px`)\n *\n * @param isClassBased `true` if `class` change (`false` if
`style`)\n */\nexport function checkStylingProperty(\n prop: string, value: any|NO_CHANGE, suffix:
string|undefined|null,\n isClassBased:
boolean): void {\n const IView = getLView();\n const tView = getTView();\n // Styling instructions use 2 slots
per binding.\n // 1. one for the value / TStylingKey\n // 2. one for the intermittent-value / TStylingRange\n const
bindingIndex = incrementBindingIndex(2);\n if (tView.firstUpdatePass) {\n stylingFirstUpdatePass(tView, prop,
bindingIndex, isClassBased);\n }\n if (value !== NO_CHANGE && bindingUpdated(IView, bindingIndex, value))
{\n const tNode = tView.data[getSelectedIndex()] as TNode;\n updateStyling(\n tView, tNode, IView,
IView[RENDERER], prop,\n IView[bindingIndex + 1] = normalizeSuffix(value, suffix), isClassBased,
bindingIndex);\n }\n}\n\n/**\n * Common code between `classMap` and `styleMap`.\n *\n * @param
keyValueArraySet (See `keyValueArraySet` in `util/array_utils`) Gets passed in as a\n * function so that
`style` can be processed. This is done for tree shaking purposes.\n *\n * @param stringParser Parser used to
parse `value` if `string`. (Passed in as `style` and `class`\n * have different parsers.)\n *\n * @param value bound
value from application\n *\n * @param isClassBased `true` if `class` change (`false` if `style`)\n */\nexport function
checkStylingMap(\n keyValueArraySet: (keyValueArray: KeyValueArray<any>, key: string, value: any) =>
void,\n stringParser: (styleKeyValueArray: KeyValueArray<any>, text: string) => void,\n value:
any|NO_CHANGE, isClassBased: boolean): void {\n const tView = getTView();\n const bindingIndex =
incrementBindingIndex(2);\n if (tView.firstUpdatePass) {\n stylingFirstUpdatePass(tView, null, bindingIndex,
isClassBased);\n }\n const IView = getLView();\n if (value !== NO_CHANGE && bindingUpdated(IView,
bindingIndex, value)) {\n // `getSelectedIndex()` should be here (rather than in instruction) so that it is guarded by
the\n // if so as not to read unnecessarily.\n const tNode = tView.data[getSelectedIndex()] as TNode;\n if
(hasStylingInputShadow(tNode,
isClassBased) && !isInHostBindings(tView, bindingIndex)) {\n if (ngDevMode) {\n // verify that if we are
shadowing then `TData` is appropriately marked so that we skip\n // processing this binding in styling
resolution.\n const tStylingKey = tView.data[bindingIndex];\n assertEqual(\n
Array.isArray(tStylingKey) ? tStylingKey[1] : tStylingKey, false,\n `Styling linked list shadow input should
be marked as \\false\\`);\n }\n // VE does not concatenate the static portion like we are doing here.\n //
Instead VE just ignores the static completely if dynamic binding is present.\n // Because of locality we have
already set the static portion because we don't know if there\n // is a dynamic portion until later. If we would
ignore the static portion it would look like\n // the binding has removed it. This would confuse
`[ngStyle]`/`[ngClass]` to do the wrong\n // thing as it would think
that the static portion was removed. For this reason we\n // concatenate it so that `[ngStyle]`/`[ngClass]` can
continue to work on changed.\n let staticPrefix = isClassBased ? tNode.classesWithoutHost :
tNode.stylesWithoutHost;\n ngDevMode && isClassBased === false && staticPrefix !== null &&\n
assertEqual(\n staticPrefix.endsWith(';'), true, 'Expecting static portion to end with `;`');\n if
(staticPrefix !== null) {\n // We want to make sure that falsy values of `value` become empty strings.\n
value = concatStringsWithSpace(staticPrefix, value ? value : '');\n }\n // Given `

` such that
`my-dir` has `@Input('style')`.\n // This takes over the `[style]` binding. (Same for `[class]`)\n
setDirectiveInputsWhichShadowsStyling(tView, tNode, IView, value, isClassBased);\n } else {\n
updateStylingMap(\n tView, tNode, IView, IView[RENDERER], IView[bindingIndex + 1],\n


```





```

    // - Template styling instruction already ran and it has consumed the static\n    // styling into its
    `TStylingKey` and so there is no need to update residual. Instead\n    // we need to update the `TStylingKey`
    associated with the first template node\n    // instruction. OR\n    // - Some other styling instruction ran and
    determined that there are no residuals\n    let templateStylingKey = getTemplateHeadTStylingKey(tData, tNode,
    isClassBased);\n    if (templateStylingKey !== undefined && Array.isArray(templateStylingKey)) {\n    //
    Only recompute if `templateStylingKey` had static values. (If no static value found\n    // then there is nothing to
    do since this operation can only produce less static keys, not\n    // more.)\n    templateStylingKey =
    collectStylingFromDirectives(\n    null, tData, tNode, templateStylingKey[1] /* unwrap previous statics */,\n
    isClassBased);\n    templateStylingKey
    =\n    collectStylingFromTAttrs(templateStylingKey, tNode.attrs, isClassBased);\n
    setTemplateHeadTStylingKey(tData, tNode, isClassBased, templateStylingKey);\n    }\n    } else {\n    // We
    only need to recompute residual if it is not `null`.\n    // - If existing residual (implies there was no template
    styling). This means that some of\n    // the statics may have moved from the residual to the `stylingKey` and so
    we have to\n    // recompute.\n    // - If `undefined` this is the first time we are running.\n    residual =
    collectResidual(tData, tNode, isClassBased);\n    }\n    }\n    }\n    if (residual !== undefined) {\n    isClassBased ?
    (tNode.residualClasses = residual) : (tNode.residualStyles = residual);\n    }\n    return stylingKey;\n    }\n    }\n    /**
    Retrieve the `TStylingKey` for the template styling instruction.\n    *\n    * This is needed since `hostBinding` styling
    instructions are inserted after the template\n    *\n    * instruction.
  
```

While the template instruction needs to update the residual in `TNode` the `hostBinding` instructions need to update the `TStylingKey` of the template instruction because the template instruction is downstream from the `hostBindings` instructions.

```

    @param tData `TData` where the linked list is stored.
    @param tNode `TNode` for which the styling is being computed.
    @param isClassBased `true` if `class` (`false` if `style`)
    @return `TStylingKey` if found or `undefined` if not found.
    \nfunction getTemplateHeadTStylingKey(tData:
    TData, tNode: TNode, isClassBased: boolean): TStylingKey|\n    undefined {\n    const bindings = isClassBased ?
    tNode.classBindings : tNode.styleBindings;\n    if (getTStylingRangeNext(bindings) === 0) {\n    // There does not
    seem to be a styling instruction in the `template`.\n    return undefined;\n    }\n    return
    tData[getTStylingRangePrev(bindings)] as TStylingKey;\n    }\n    /**
    Update the `TStylingKey` of the first
    template instruction
  
```

```

    in `TNode`.\n    *\n    * Logically `hostBindings` styling instructions are of lower priority than that of the template.\n    *\n    * However, they execute after the template styling instructions. This means that they get inserted\n    *\n    * in front of the
    template styling instructions.\n    *\n    * If we have a template styling instruction and a new `hostBindings` styling
    instruction is\n    *\n    * executed it means that it may need to steal static fields from the template instruction. This\n    *\n    * method allows us to update the first template instruction `TStylingKey` with a new value.\n    *\n    * Assume:\n    *\n    * <div my-dir style=\`color: red\` [style.color]=\`tmplExp\`></div>\n    *\n    * @Directive({\n    *   host: {\n    *     'style':
    *     'width: 100px',\n    *     '[style.color]': 'dirExp',\n    *   }\n    * })\n    * class MyDir {\n    *   when
    *   '[style.color]=\`tmplExp\`' executes it creates this data structure.\n    *   [\n    *     'color', 'color', 'red', 'width',
    *     '100px'],\n    *   }\n    * }\n    *\n    * The reason for this is that the template
    instruction does not know if there are styling\n    *\n    * instructions and must assume that there are none and must collect
    all of the static styling.\n    *\n    * (both `color` and `width`)\n    *\n    * When `[style.color]: 'dirExp',` executes we need to
    insert a new data into the linked list.\n    *\n    * [\n    *   'color', 'width', '100px'], // newly inserted\n    *   [\n    *     'color', 'color',
    *     'red', 'width', '100px'], // this is wrong\n    *   ]\n    *\n    * Notice that the template statics is now wrong as it incorrectly
    contains `width` so we need to\n    *\n    * update it like so:\n    *\n    * [\n    *   'color', 'width', '100px'],\n    *   [\n    *     'color', 'color',
    *     'red'], // UPDATE\n    *   ]\n    *\n    * @param tData `TData` where the linked list is stored.
    @param tNode `TNode` for which the styling is being computed.
    @param isClassBased `true` if `class` (`false` if `style`)
    @param tStylingKey New `TStylingKey` which is replacing the old one.
    \nfunction
    setTemplateHeadTStylingKey(\n    tData: TData, tNode: TNode, isClassBased:
    boolean, tStylingKey: TStylingKey): void {\n    const bindings = isClassBased ? tNode.classBindings :
    tNode.styleBindings;\n    ngDevMode &&\n    assertNotEqual(\n    getTStylingRangeNext(bindings), 0,\n
  
```

```
'Expecting to have at least one template styling binding.');
```

```
  tData[getTStylingRangePrev(bindings)] =
  tStylingKey;}\n\n/**\n * Collect all static values after the current `TNode.directiveStylingLast` index.\n *\n * Collect the remaining styling information which has not yet been collected by an existing\n * styling instruction.\n *\n * @param tData `TData` where the `DirectiveDefs` are stored.\n * @param tNode `TNode` which contains the directive range.\n * @param isClassBased `true` if `class` (`false` if `style`)\n */\nfunction collectResidual(tData: TData, tNode: TNode, isClassBased: boolean): KeyValueArray<any>|\n  null {\n  let residual: KeyValueArray<any>|\n    null|undefined = undefined;\n  const directiveEnd = tNode.directiveEnd;\n  ngDevMode &&\n\n    assertNotEqual(\n      tNode.directiveStylingLast, -1,\n      'By the time this function gets called at least one hostBindings-node styling instruction must have executed.);\n  // We add `1 + tNode.directiveStart` because we need to skip the current directive (as we are\n  // collecting things after the last `hostBindings` directive which had a styling instruction.)\n  for (let i = 1 + tNode.directiveStylingLast; i < directiveEnd; i++) {\n    const attrs = (tData[i] as DirectiveDef<any>).hostAttrs;\n    residual = collectStylingFromTAttrs(residual, attrs, isClassBased) as KeyValueArray<any>|\n      null;\n  }\n  return collectStylingFromTAttrs(residual, tNode.attrs, isClassBased) as KeyValueArray<any>|\n    null;\n}\n\n/**\n * Collect the static styling information with lower priority than `hostDirectiveDef`.\n *\n * (This is opposite of residual styling.)\n *\n * @param hostDirectiveDef `DirectiveDef` for which we want to collect lower priority static\n * styling. (Or `null` if template styling)\n *\n * @param tData `TData` where the linked list is stored.\n * @param tNode `TNode` for which the styling is being computed.\n * @param stylingKey Existing `TStylingKey` to update or wrap.\n * @param isClassBased `true` if `class` (`false` if `style`)\n */\nfunction collectStylingFromDirectives(\n  hostDirectiveDef: DirectiveDef<any>|\n    null, tData: TData, tNode: TNode, stylingKey: TStylingKey,\n  isClassBased: boolean): TStylingKey {\n  // We need to loop because there can be directives which have `hostAttrs` but don't have\n  // `hostBindings` so this loop catches up to the current directive.\n  let currentDirective: DirectiveDef<any>|\n    null = null;\n  const directiveEnd = tNode.directiveEnd;\n  let directiveStylingLast = tNode.directiveStylingLast;\n  if (directiveStylingLast === -1) {\n    directiveStylingLast = tNode.directiveStart;\n  } else {\n    directiveStylingLast++;\n  }\n  while (directiveStylingLast < directiveEnd) {\n    currentDirective = tData[directiveStylingLast] as DirectiveDef<any>;\n    ngDevMode && assertDefined(currentDirective, 'expected to be defined');\n    stylingKey = collectStylingFromTAttrs(stylingKey, currentDirective.hostAttrs, isClassBased);\n    if (currentDirective === hostDirectiveDef) break;\n    directiveStylingLast++;\n  }\n  if (hostDirectiveDef !== null) {\n    // we only advance the styling cursor if we are collecting data from host bindings.\n    // Template executes before host bindings and so if we would update the index,\n    // host bindings would not get their statics.\n    tNode.directiveStylingLast = directiveStylingLast;\n  }\n  return stylingKey;\n}\n\n/**\n * Convert `TAttrs` into `TStylingStatic`.\n *\n * @param stylingKey existing `TStylingKey` to update or wrap.\n * @param attrs `TAttributes` to process.\n * @param isClassBased `true` if `class` (`false` if `style`)\n */\nfunction collectStylingFromTAttrs(\n  stylingKey: TStylingKey|undefined, attrs: TAttributes|\n    null, isClassBased: boolean): TStylingKey {\n  const desiredMarker = isClassBased ? AttributeMarker.Classes : AttributeMarker.Styles;\n  let currentMarker = AttributeMarker.ImplicitAttributes;\n  if (attrs !== null) {\n    for (let i = 0; i < attrs.length; i++) {\n      const item = attrs[i] as number | string;\n      if (typeof item === 'number') {\n        currentMarker = item;\n      } else {\n        if (currentMarker === desiredMarker) {\n          if (!Array.isArray(stylingKey)) {\n            stylingKey = stylingKey === undefined ? [] : [",", stylingKey] as any;\n          }\n          keyValueArraySet(\n            stylingKey as KeyValueArray<any>, item, isClassBased ? true : attrs[++i]);\n          }\n        }\n      }\n    }\n  }\n  return stylingKey === undefined ? null : stylingKey;\n}\n\n/**\n * Convert user input to `KeyValueArray`.\n *\n * This function takes user input which could be `string`, Object literal, or iterable and converts\n * it into a consistent representation. The output of this is `KeyValueArray` (which is an array\n * where even indexes contain keys and odd indexes contain values for those keys).\n *\n * The advantage of converting to `KeyValueArray` is that we can perform diff in an input\n * independent way.
```

\* (ie we can compare `foo bar` to `[bar, baz]` and determine a set of changes which need to be applied)

The fact that `KeyValueArray` is sorted is very important because it allows us to compute the difference in linear fashion without the need to allocate any additional data.

For example if we kept this as a `Map` we would have to iterate over previous `Map` to determine which values need to be deleted, over the new `Map` to determine additions, and we would have to keep additional `Map` to keep track of duplicates or items which have not yet been visited.

@param keyValueArraySet (See `keyValueArraySet` in `util/array\_utils`) Gets passed in as a function so that `style` can be processed. This is done for tree shaking purposes.

@param stringParser The parser is passed in so that it will be tree shakable. See `styleStringParser` and `classStringParser`

@param value The value to parse/convert to `KeyValueArray`

^next export function toStylingKeyValueArray(keyValueArraySet: (keyValueArray: KeyValueArray<any>, key: string, value: any) => void, stringParser: (styleKeyValueArray: KeyValueArray<any>, text: string) => void, value: string|string[]|{[key: string]: any}|SafeValue|null|undefined): KeyValueArray<any> {

if (value == null || value === undefined || value === "") return EMPTY\_ARRAY as any;

const styleKeyValueArray: KeyValueArray<any> = [] as any;

const unwrappedValue = unwrapSafeValue(value) as string | string[] | {[key: string]: any};

if (Array.isArray(unwrappedValue)) {

for (let i = 0; i < unwrappedValue.length; i++) {

keyValueArraySet(styleKeyValueArray, unwrappedValue[i], true);

}

} else if (typeof unwrappedValue === 'object') {

for (const key in unwrappedValue) {

if (unwrappedValue.hasOwnProperty(key)) {

keyValueArraySet(styleKeyValueArray, key, unwrappedValue[key]);

}

}

} else if (typeof unwrappedValue === 'string') {

stringParser(styleKeyValueArray, unwrappedValue);

} else {

ngDevMode && throwError('Unsupported styling type ' + typeof unwrappedValue + ': ' + unwrappedValue);

}

return styleKeyValueArray;

}

Set a `value` for a `key`.

See: `keyValueArraySet` for details

@param keyValueArray KeyValueArray to add to.

@param key Style key to add.

@param value The value to set.

^next export function styleKeyValueArraySet(keyValueArray: KeyValueArray<any>, key: string, value: any) {

keyValueArraySet(keyValueArray, key, unwrapSafeValue(value));

}

Update map based styling.

Map based styling could be anything which contains more than one binding. For example `string`, or object literal. Dealing with all of these types would complicate the logic so instead this function expects that the complex input is first converted into normalized `KeyValueArray`. The advantage of normalization is that we get the values sorted, which makes it very cheap to compute deltas between the previous and current value.

@param tView Associated `TView.data` contains the linked list of binding priorities.

@param tNode `TNode` where the binding is located.

@param lView `LView` contains the values associated with other styling binding at this `TNode`.

@param renderer Renderer to use if any updates.

@param oldKeyValueArray Previous value represented as `KeyValueArray`

@param newKeyValueArray Current value represented as `KeyValueArray`

@param isClassBased `true` if `class` (`false` if `style`)

@param bindingIndex Binding index of the binding.

function updateStylingMap(tView: TView, tNode: TNode, lView: LView, renderer: Renderer, oldKeyValueArray: KeyValueArray<any>, newKeyValueArray: KeyValueArray<any>, isClassBased: boolean, bindingIndex: number) {

if (oldKeyValueArray as KeyValueArray<any>| NO\_CHANGE === NO\_CHANGE) {

// On first execution the oldKeyValueArray is NO\_CHANGE => treat it as empty KeyValueArray.

oldKeyValueArray = EMPTY\_ARRAY as any;

} let oldIndex = 0;

let newIndex = 0;

let oldKey: string|null = 0 < oldKeyValueArray.length ? oldKeyValueArray[0] : null;

let newKey: string|null = 0 < newKeyValueArray.length ? newKeyValueArray[0] : null;

while (oldKey !== null || newKey !== null) {

ngDevMode && assertLessThan(oldIndex, 999, 'Are we stuck in infinite loop?');

ngDevMode && assertLessThan(newIndex, 999, 'Are we stuck in infinite loop?');

const oldValue = oldIndex < oldKeyValueArray.length ? oldKeyValueArray[oldIndex + 1] : undefined;

const newValue = newIndex < newKeyValueArray.length ? newKeyValueArray[newIndex

```

+ 1] : undefined;\n  let setKey: string|null = null;\n  let setValue: any = undefined;\n  if (oldKey === newKey)
{\n  // UPDATE: Keys are equal => new value is overwriting old value.\n  oldIndex += 2;\n  newIndex +=
2;\n  if (oldValue !== newValue) {\n    setKey = newKey;\n    setValue = newValue;\n  }\n } else if
(newKey === null || oldKey !== null && oldKey < newKey!) {\n  // DELETE: oldKey key is missing or we did
not find the oldKey in the newValue\n  // (because the keyValueArray is sorted and `newKey` is found later
alphabetically).\n  // `\"background\" < \"color\"` so we need to delete `\"background\"` because it is not found in
the\n  // new array.\n  oldIndex += 2;\n  setKey = oldKey;\n } else {\n  // CREATE: newKey's is earlier
alphabetically than oldKey's (or no oldKey) => we have new key.\n  // `\"color\" > \"background\"` so we need to
add `color` because it is in new array but not in\n
// old array.\n  ngDevMode && assertDefined(newKey, 'Expecting to have a valid key');\n  newIndex += 2;\n
setKey = newKey;\n  setValue = newValue;\n }\n if (setKey !== null) {\n  updateStyling(tView, tNode,
IView, renderer, setKey, setValue, isClassBased, bindingIndex);\n }\n oldKey = oldIndex <
oldKeyValueArray.length ? oldKeyValueArray[oldIndex] : null;\n newKey = newIndex <
newKeyValueArray.length ? newKeyValueArray[newIndex] : null;\n }\n}\n\n/**\n * Update a simple (property
name) styling.\n *\n * This function takes `prop` and updates the DOM to that value. The function takes the
binding\n * value as well as binding priority into consideration to determine which value should be written\n * to
DOM. (For example it may be determined that there is a higher priority overwrite which blocks\n * the DOM write,
or if the value goes to `undefined` a lower priority overwrite may be consulted.)\n *\n * @param tView Associated
`TView.data` contains the linked
list of binding priorities.\n *\n * @param tNode `TNode` where the binding is located.\n *\n * @param IView `LView`
contains the values associated with other styling binding at this `TNode`.\n *\n * @param renderer Renderer to use if
any updates.\n *\n * @param prop Either style property name or a class name.\n *\n * @param value Either style value for
`prop` or `true`/`false` if `prop` is class.\n *\n * @param isClassBased `true` if `class` (`false` if `style`)\n *\n * @param
bindingIndex Binding index of the binding.\n */\nfunction updateStyling(\n  tView: TView, tNode: TNode, IView:
LView, renderer: Renderer, prop: string,\n  value: string|undefined|null|boolean, isClassBased: boolean,
bindingIndex: number) {\n  if (!(tNode.type & TNodeType.AnyRNode)) {\n  // It is possible to have styling on
non-elements (such as ng-container).\n  // This is rare, but it does happen. In such a case, just ignore the binding.\n
return;\n }\n const tData = tView.data;\n const tRange = tData[bindingIndex + 1]
as TStylingRange;\n const higherPriorityValue = getTStylingRangeNextDuplicate(tRange) ?\n
findStylingValue(tData, tNode, IView, prop, getTStylingRangeNext(tRange), isClassBased) :\n  undefined;\n if
(!isStylingValuePresent(higherPriorityValue)) {\n  // We don't have a next duplicate, or we did not find a duplicate
value.\n  if (!isStylingValuePresent(value)) {\n  // We should delete current value or restore to lower priority
value.\n  if (getTStylingRangePrevDuplicate(tRange)) {\n  // We have a possible prev duplicate, let's retrieve
it.\n  value = findStylingValue(tData, null, IView, prop, bindingIndex, isClassBased);\n  }\n }\n const
rNode = getNativeByIndex(getSelectedIndex(), IView) as RElement;\n  applyStyling(renderer, isClassBased,
rNode, prop, value);\n }\n}\n\n/**\n * Search for styling value with higher priority which is overwriting current
value, or a\n * value of lower priority to which we should fall back if the value is `undefined`.\n
*\n * When value is being applied at a location, related values need to be consulted.\n * - If there is a higher priority
binding, we should be using that one instead.\n * For example `

---



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```

```

all the way to end. Return last value where\n * `isStylingValuePresent(value)` is true.\n * @param IView
`LView` used for retrieving the actual values.\n * @param prop Property which we are interested in.\n * @param
index Starting index in the linked list of styling bindings where the search should start.\n * @param isClassBased
`true` if `class` (`false` if `style`)\n */\nfunction findStylingValue(\n  tData: TData, tNode: TNode|null, IView:
LView, prop: string, index: number,\n  isClassBased: boolean): any {\n  // `TNode` to use for resolving static
styling. Also controls search direction.\n  // - `TNode` search next and quit as soon as
`isStylingValuePresent(value)` is true.\n  // If no value found consult `tNode.residualStyle`/`tNode.residualClass`
for default value.\n  // - `null` search prev and go all the way to end. Return last value where\n  //
`isStylingValuePresent(value)` is true.\n  const isPrevDirection = tNode === null;\n  let value: any = undefined;\n
while (index > 0) {\n  const rawKey = tData[index] as TStylingKey;\n  const containsStatics =
Array.isArray(rawKey);\n  // Unwrap the key if we contain static values.\n  const key = containsStatics ? (rawKey
as string[])[1] : rawKey;\n  const isStylingMap = key === null;\n  let valueAtLViewIndex = IView[index + 1];\n
if (valueAtLViewIndex === NO_CHANGE) {\n  // In firstUpdatePass the styling instructions create a linked list
of styling.\n  // On subsequent passes it is possible for a styling instruction to try to read a binding\n  // which\n
// has not yet executed. In that case we will find `NO_CHANGE` and we should assume that\n  // we have
`undefined` (or empty array in case of styling-map instruction) instead.\n  This\n  // allows the resolution to apply the value (which may later be overwritten when the\n  // binding
actually executes.)\n  valueAtLViewIndex = isStylingMap ? EMPTY_ARRAY : undefined;\n  }\n  let
currentValue = isStylingMap ? keyValueArrayGet(valueAtLViewIndex, prop) :\n  // (key ===
prop ? valueAtLViewIndex : undefined);\n  if (containsStatics && !isStylingValuePresent(currentValue)) {\n
currentValue = keyValueArrayGet(rawKey as KeyValueArray<any>, prop);\n  }\n  if
(isStylingValuePresent(currentValue)) {\n  value = currentValue;\n  if (isPrevDirection) {\n  return value;\n
}\n  }\n  const tRange = tData[index + 1] as TStylingRange;\n  index = isPrevDirection ?
getTStylingRangePrev(tRange) : getTStylingRangeNext(tRange);\n  }\n  if (tNode !== null) {\n  // in case where
we are going in next direction AND we did not find anything, we need to\n  // consult residual styling\n  let
residual
= isClassBased ? tNode.residualClasses : tNode.residualStyles;\n  if (residual != null /** OR residual !==
undefined */) {\n  value = keyValueArrayGet(residual!, prop);\n  }\n  }\n  return value;\n  }\n\n/**\n *
Determines if the binding value should be used (or if the value is 'undefined' and hence priority\n * resolution should
be used.)\n */\n * @param value Binding style value.\n */\nfunction isStylingValuePresent(value: any): boolean {\n
// Currently only `undefined` value is considered non-binding. That is `undefined` says I don't\n // have an opinion
as to what this binding should be and you should consult other bindings by\n // priority to determine the valid
value.\n // This is extracted into a single function so that we have a single place to control this.\n return value !==
undefined;\n}\n\n/**\n * Normalizes and/or adds a suffix to the value.\n */\n * If value is `null`/`undefined` no suffix
is added\n */\n * @param value\n */\n * @param suffix\n */\nfunction normalizeSuffix(value:
any, suffix: string|undefined|null): string|null|undefined|boolean {\n  if (value == null /** || value ===
undefined */) {\n  // do nothing\n  } else if (typeof suffix === 'string') {\n  value = value + suffix;\n  } else if (typeof value ===
'object') {\n  value = stringify(unwrapSafeValue(value));\n  }\n  return value;\n}\n\n/**\n * Tests if the `TNode`
has input shadow.\n */\n * An input shadow is when a directive steals (shadows) the input by using `@Input('style')`
or\n * `@Input('class')` as input.\n */\n * @param tNode `TNode` which we would like to see if it has shadow.\n *
@param isClassBased `true` if `class` (`false` if `style`)\n */\nexport function hasStylingInputShadow(tNode:
TNode, isClassBased: boolean) {\n  return (tNode.flags & (isClassBased ? TNodeFlags.hasClassInput :
TNodeFlags.hasStyleInput)) !== 0;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n *
Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\nimport {assertEqual, assertIndexInRange} from
'../util/assert';\nimport {TElementNode, TNodeType} from '../interfaces/node';\nimport {HEADER_OFFSET,
RENDERER, T_HOST} from '../interfaces/view';\nimport {appendChild, createTextNode} from
'../node_manipulation';\nimport {getBindingIndex, getLView, getTView, setCurrentTNode} from

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'./state';\n\nimport {getOrCreateTNode} from './shared';\n\n/**\n * Create static text node\n * @param\n index Index of the node in the data array\n * @param value Static string value to write.\n * @codeGenApi\n */\nexport function text(index: number, value: string = ""): void {\n  const IView = getLView();\n  const tView =\n  getTView();\n  const adjustedIndex = index + HEADER_OFFSET;\n\n  ngDevMode &&\n  assertEqual(\n  getBindingIndex(), tView.bindingStartIndex,\n  'text nodes should be created before any bindings');\n  ngDevMode && assertIndexInRange(IView, adjustedIndex);\n\n  const tNode = tView.firstCreatePass ?\n  getOrCreateTNode(tView, adjustedIndex, TNodeType.Text, value,\n  null) :\n  tView.data[adjustedIndex] as TElementNode;\n\n  const textNative = IView[adjustedIndex] =\n  createTextNode(IView[RENDERER], value);\n  appendChild(tView, IView, textNative, tNode);\n\n  // Text nodes\n  are self closing.\n  setCurrentTNode(tNode, false);\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights\n  Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n  LICENSE file at https://angular.io/license\n */\nimport {getLView, getSelectedIndex} from './state';\nimport\n {NO_CHANGE} from './tokens';\nimport {interpolation1, interpolation2, interpolation3, interpolation4,\n  interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from './interpolation';\nimport\n {textBindingInternal} from './shared';\n\n/**\n * Update text content with a lone bound value\n * @codeGenApi\n * Used\n  when a\n  text node has 1 interpolated value in it, an no additional text\n * surrounds that interpolated value:\n * @codeGenApi\n * `html\n * <div>{{v0}}</div>\n * `.\n * Its compiled representation is:\n * `ts\n * textInterpolate(v0);\n * `.\n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function\n  textInterpolate(v0: any): typeof textInterpolate {\n  textInterpolate1("", v0, "");\n  return textInterpolate;\n}\n\n/**\n * Update text content with single bound value surrounded by other text.\n * @codeGenApi\n * Used when a text node has 1\n  interpolated value in it:\n * @codeGenApi\n * `html\n * <div>prefix{{v0}}suffix</div>\n * `.\n * Its compiled\n  representation is:\n * @codeGenApi\n * `ts\n * textInterpolate1('prefix', v0, 'suffix');\n * `.\n * @returns itself, so that it may be\n  chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function textInterpolate1(\n  prefix: string, v0:\n  any, suffix: string): typeof textInterpolate1 {\n\n  const IView = getLView();\n  const interpolated = interpolation1(IView, prefix, v0, suffix);\n  if (interpolated !==\n  NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return\n  textInterpolate1;\n}\n\n/**\n * Update text content with 2 bound values surrounded by other text.\n * @codeGenApi\n * Used\n  when a text node has 2 interpolated values in it:\n * @codeGenApi\n * `html\n * <div>prefix{{v0}}-{{v1}}suffix</div>\n * `.\n * Its compiled\n  representation is:\n * @codeGenApi\n * `ts\n * textInterpolate2('prefix', v0, '-', v1, 'suffix');\n * `.\n * @returns\n  itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function\n  textInterpolate2(\n  prefix: string, v0: any, i0: string, v1: any,\n  suffix: string): typeof textInterpolate2 {\n\n  const\n  IView = getLView();\n  const interpolated = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  if (interpolated !==\n  NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated\n  as string);\n  }\n  return\n  textInterpolate2;\n}\n\n/**\n * Update text content with 3 bound values surrounded by\n  other text.\n * @codeGenApi\n * Used when a text node has 3 interpolated values in it:\n * @codeGenApi\n * `html\n * <div>prefix{{v0}}-\n  {{v1}}-{{v2}}suffix</div>\n * `.\n * Its compiled\n  representation is:\n * @codeGenApi\n * `ts\n * textInterpolate3(\n * 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * `.\n * @returns\n  itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function textInterpolate3(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2:\n  any,\n  suffix: string): typeof textInterpolate3 {\n\n  const\n  IView = getLView();\n  const interpolated =\n  interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  if (interpolated !==\n  NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return\n  textInterpolate3;\n}\n\n/**\n * Update text content with 4 bound values surrounded by other text.\n * @codeGenApi\n * Used when a text node has 4 interpolated values in it:\n * @codeGenApi\n * `html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}-\n  {{v3}}suffix</div>\n * `.\n * Its compiled\n  representation is:\n * @codeGenApi\n * `ts\n * textInterpolate4(\n * 'prefix', v0, '-\n  ', v1, '-', v2, '-', v3, 'suffix');\n * `.\n * @returns\n  itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function textInterpolate4(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2:\n  any, i2: string, v3: any,\n  suffix: string): typeof textInterpolate4 {\n\n  const\n  IView = getLView();\n  const

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interpolated = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n if (interpolated !== NO_CHANGE)
{\n  textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n }\n return
textInterpolate4;\n}\n\n/**\n * Update text content with 5 bound values surrounded by other text.\n * Used
when a text node has 5 interpolated values in it.\n * ``html\n
* <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix</div>\n * ``\n * Its compiled representation is:\n
*\n * ``ts\n * textInterpolate5(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ``\n * @returns itself, so that
it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function textInterpolate5(\n  prefix:
string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, suffix: string): typeof
textInterpolate5 {\n  const IView = getLView();\n  const interpolated = interpolation5(IView, prefix, v0, i0, v1, i1,
v2, i2, v3, i3, v4, suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView,
getSelectedIndex(), interpolated as string);\n  }\n  return textInterpolate5;\n}\n\n/**\n * Update text content with
6 bound values surrounded by other text.\n * Used when a text node has 6 interpolated values in it.\n * ``html\n
* <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix</div>\n
* ``\n * Its compiled representation is:\n * ``ts\n * textInterpolate6(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, '-', v5, 'suffix');\n * ``\n * @param i4 Static value used for concatenation only.\n * @param v5 Value
checked for change. @returns itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n
*/\nexport function textInterpolate6(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3:
any, i3: string, v4: any, i4: string, v5: any, suffix: string): typeof textInterpolate6 {\n  const IView =
getLView();\n  const interpolated =\n    interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5,
suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as
string);\n  }\n  return textInterpolate6;\n}\n\n/**\n * Update text content with 7 bound values surrounded by
other text.\n * Used when
a text node has 7 interpolated values in it.\n * ``html\n
* <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix</div>\n
* ``\n * Its compiled representation is:\n * ``ts\n * textInterpolate7(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, '-', v5, '-', v6, 'suffix');\n * ``\n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n
* @codeGenApi\n */\nexport function textInterpolate7(\n  prefix: string, v0: any, i0:
string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6:
string, v7: any, i7: string, v8: any, i8: string, v9: any, i9: string, suffix: string): typeof textInterpolate7 {\n  const
IView = getLView();\n  const interpolated =\n    interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5,
i5, v6, i6, v7, i7, v8, i8, v9, i9, suffix);\n  if (interpolated !==
NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return
textInterpolate7;\n}\n\n/**\n * Update text content
with 8 bound values surrounded by other text.\n * Used when a text node has 8 interpolated values in it.\n * ``html\n
* <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix</div>\n
* ``\n * Its compiled representation is:\n * ``ts\n * textInterpolate8(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * ``\n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n
* @codeGenApi\n */\nexport function textInterpolate8(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2:
any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, i7: string,
v8: any, i8: string, v9: any, i9: string, suffix: string): typeof textInterpolate8 {\n  const IView = getLView();\n  const
interpolated = interpolation8(\n    IView,
prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, i7, v8, i8, v9, i9, suffix);\n  if (interpolated !==
NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(),
interpolated as string);\n  }\n  return textInterpolate8;\n}\n\n/**\n * Update text content with 9 or more bound
values other surrounded by text.\n * Used when the number of interpolated values exceeds 8.\n * ``html\n
* <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix</div>\n
* ``\n * Its compiled representation is:\n * ``ts\n * textInterpolateV(\n * ['prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, '-', v5, '-', v6, '-', v7, '-', v8, '-', v9, 'suffix']);\n * ``\n * @param values The collection of values and the
strings in between those values, beginning with\n * a string prefix and ending with a string suffix.\n * (e.g. `['prefix',
value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport function textInterpolateV(values: any[]): typeof textInterpolateV {\n  const IView = getLView();\n  const

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interpolated = interpolationV(IView,
  values);\n if (interpolated !== NO_CHANGE) {\n  textBindingInternal(IView, getSelectedIndex(), interpolated as
string);\n }\n return textInterpolateV;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {keyValueArraySet} from './util/array_utils';\nimport {getLView} from
 './state';\nimport {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6,
interpolation7, interpolation8, interpolationV} from './interpolation';\nimport {checkStylingMap, classStringParser}
from './styling';\n\n/**\n * Update an interpolated class on an element with single bound value surrounded by
text.\n * Used when the value passed to a property has 1 interpolated value in it:\n * ``html\n * <div
class="prefix{{v0}}suffix"></div>\n * ``\n * Its compiled representation
is:\n * ``ts\n * classMapInterpolate1(prefix, v0, 'suffix');\n * ``\n * @param prefix Static value used for
concatenation only.\n * @param v0 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @codeGenApi\n */\nexport function classMapInterpolate1(prefix: string, v0: any, suffix:
string): void {\n  const IView = getLView();\n  const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n
  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n * Update an
interpolated class on an element with 2 bound values surrounded by text.\n * Used when the value passed to a
property has 2 interpolated values in it:\n * ``html\n * <div class="prefix{{v0}}-{{v1}}suffix"></div>\n *
``\n * Its compiled representation is:\n * ``ts\n * classMapInterpolate2(prefix, v0, '-', v1, 'suffix');\n * ``\n
*\n * @param prefix Static value used for concatenation only.\n * @param v0 Value
checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for
change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n */\nexport function
classMapInterpolate2(\n  prefix: string, v0: any, i0: string, v1: any, suffix: string): void {\n  const IView =
  getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n * Update an
interpolated class on an element with 3 bound values surrounded by text.\n * Used when the value passed to a
property has 3 interpolated values in it:\n * ``html\n * <div class="prefix{{v0}}-{{v1}}-
{{v2}}suffix"></div>\n * ``\n * Its compiled representation is:\n * ``ts\n * classMapInterpolate3(\n *
'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ``\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked
for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param suffix
Static value used for concatenation only.\n * @codeGenApi\n */\nexport function classMapInterpolate3(\n  prefix:
string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): void {\n  const IView = getLView();\n
  const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  checkStylingMap(keyValueArraySet,
  classStringParser, interpolatedValue, true);\n}\n\n/**\n * Update an interpolated class on an element with 4
bound values surrounded by text.\n * Used when the value passed to a property has 4 interpolated values in it:\n
*\n * ``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n * ``\n * Its compiled
representation is:\n * ``ts\n * classMapInterpolate4(\n * 'prefix', v0, '-',
  v1, '-', v2, '-', v3, 'suffix');\n * ``\n * @param prefix Static value used for concatenation only.\n * @param v0
Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked
for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n *
@param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param suffix
Static value used for concatenation only.\n * @codeGenApi\n */\nexport function classMapInterpolate4(\n  prefix:
string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  suffix: string): void {\n  const IView =
  getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n * Update an
interpolated class on an element with 5 bound values surrounded by text.\n * Used

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when the value passed to a property has 5 interpolated values in it:\n *\n * ``html\n * <div class="prefix{{v0}}-
{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix"></div>\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *
classMapInterpolate5(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ``\n *\n * @param prefix Static value
used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n *
@param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4
Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n
*/\nexport function classMapInterpolate5(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,
i2: string, v3: any, i3: string, v4: any, suffix: string): void {\n const IView = getLView();\n const
interpolatedValue =\n interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n
checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n *\n * Update an
interpolated class on an element with 6 bound values surrounded by text.\n *\n * Used when the value passed to a
property has 6 interpolated values in it:\n *\n * ``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}-{{v5}}suffix"></div>\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *
classMapInterpolate6(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n * ``\n *\n * @param prefix
Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value
used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for
concatenation
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n *
@param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4
Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n
*/\nexport function
classMapInterpolate6(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3:
string, v4: any, i4: string, v5: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n
interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n
checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n *\n * Update an
interpolated class on an element with 7 bound values surrounded by text.\n *\n * Used when the value passed to a
property
has 7 interpolated values in it:\n *\n * ``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-
{{v5}}-{{v6}}suffix"></div>\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *
classMapInterpolate7(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ``\n *\n * @param
prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static
value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for
concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation
only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n *
@param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5
Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6 Value checked
for change.\n
* @param suffix Static value used for concatenation only.\n * @codeGenApi\n
*/\nexport function
classMapInterpolate7(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3:
string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n const IView = getLView();\n const
interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n
checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n *\n * Update an
interpolated class on an element with 8 bound values surrounded by text.\n *\n * Used when the value passed to a
property has 8 interpolated values in it:\n *\n * ``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *
classMapInterpolate8(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6,

```

```

'-', v7, 'suffix');\n * ``\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value
checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for
change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n *
@param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3
Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value
used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for
concatenation only.\n * @param v6 Value checked for change.\n * @param i6 Static value used for concatenation
only.\n * @param v7 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@codeGenApi\n *\nexport function classMapInterpolate8(\n  prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any, i2:
string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, i7: string,
suffix: string):
void {\n  const IView = getLView();\n  const interpolatedValue = interpolation8(\n    IView, prefix, v0, i0, v1, i1,
v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser,
interpolatedValue, true);\n}\n\n/**\n * Update an interpolated class on an element with 9 or more bound values
surrounded by text.\n *\n * Used when the number of interpolated values exceeds 8.\n *\n * ``html\n * <div\n *
class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"></div>\n *
``\n *\n * Its compiled representation is:\n *\n * ``ts\n * classMapInterpolateV(\n *   ['prefix', v0, '-', v1, '-', v2, '-',
v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n *   'suffix']);\n *\n * ``\n *\n * @param values The collection of values and the
strings in-between those values, beginning with\n * a string
prefix and ending with a string suffix.\n * (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n *
@codeGenApi\n *\nexport function classMapInterpolateV(values: any[]): void {\n  const IView = getLView();\n  const
interpolatedValue = interpolationV(IView, values);\n  checkStylingMap(keyValueArraySet, classStringParser,
interpolatedValue, true);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {getLView} from './state';\nimport {interpolation1, interpolation2,
interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from
 './interpolation';\nimport {styleMap} from './styling';\n\n\n/**\n *\n * Update an interpolated style on an element
with single bound value surrounded by text.\n *\n * Used when the value passed to a property
has 1 interpolated value in it:\n *\n * ``html\n * <div style="key: {{v0}}suffix"></div>\n * ``\n *\n * Its
compiled representation is:\n *\n * ``ts\n * styleMapInterpolate1('key: ', v0, 'suffix');\n *\n * ``\n *\n * @param prefix
Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param suffix Static value
used for concatenation only.\n * @codeGenApi\n *\nexport function styleMapInterpolate1(prefix: string, v0: any,
suffix: string): void {\n  const IView = getLView();\n  const interpolatedValue = interpolation1(IView, prefix, v0,
suffix);\n  styleMap(interpolatedValue);\n}\n\n\n/**\n *\n * Update an interpolated style on an element with 2 bound
values surrounded by text.\n *\n * Used when the value passed to a property has 2 interpolated values in it:\n *\n *
``html\n * <div style="key: {{v0}}; key1: {{v1}}suffix"></div>\n * ``\n *\n * Its compiled representation is:\n
*\n * ``ts\n * styleMapInterpolate2('key: ', v0, '; key1: ', v1,
'suffix');\n *\n * ``\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for
change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param suffix Static value used for concatenation only.\n * @codeGenApi\n *\nexport function
styleMapInterpolate2(\n  prefix: string, v0: any, i0: string, v1: any, suffix: string): void {\n  const IView =
getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  styleMap(interpolatedValue);\n}\n\n\n/**\n *\n * Update an interpolated style on an element with 3 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 3 interpolated values in it:\n *\n *
``html\n * <div style="key: {{v0}}; key2: {{v1}}; key2: {{v2}}suffix"></div>\n * ``\n *\n * Its compiled
representation is:\n *\n * ``ts\n * styleMapInterpolate3(\n *   'key: ', v0, '; key1: ', v1, '; key2: ', v2, 'suffix');\n *\n *
``\n *\n

```

\* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolate3(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* \n \* Update an interpolated style on an element with 4 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 4 interpolated values in it:\n \* \n \* ```html\n \* <div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}suffix"></div>\n \* ```\n \* \n \* Its compiled representation is:\n \* \n \* ```ts\n \* styleMapInterpolate4(\n \* key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, 'suffix');\n \* ```\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolate4(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* \n \* Update an interpolated style on an element with 5 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 5 interpolated values in it:\n \* \n \* ```html\n \* <div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}suffix"></div>\n \* ```\n \* \n \* Its compiled representation is:\n \* \n \* ```ts\n \* styleMapInterpolate5(\n \* key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, 'suffix');\n \* ```\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolate5(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* \n \* Update an interpolated style on an element with 6 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 6 interpolated values in it:\n \* \n \* ```html\n \* <div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}}suffix"></div>\n \* ```\n \* \n \* Its compiled representation is:\n \* \n \* ```ts\n \* styleMapInterpolate6(\n \* key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5, 'suffix');\n \* ```\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolate6(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* \n \* Update an interpolated style on an element with 7 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 7 interpolated values in it:\n \* \n \* ```html\n \* <div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5:

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{{v5}};\n *      key6: {{v6}}suffix"></div>\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *
styleMapInterpolate7(\n *   'key: ', v0, ', ; key1: ', v1, ', ; key2: ', v2, ', ; key3: ', v3, ', ; key4: ', v4, ', ; key5: ', v5,\n *   ', ; key6: ', v6, 'suffix');\n * ``\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n *
@param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n *\n * \nexport function styleMapInterpolate7(\n   prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n   const IView = getLView();\n   const interpolatedValue =\n     interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n   styleMap(interpolatedValue);\n }\n\n/**\n *\n * Update an interpolated style on an element with 8 bound values surrounded by text.\n *\n * Used when the value passed to a property has 8 interpolated values in it:\n *\n * ``html\n *\n * <div style="\n *   'key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}};\n *   ',\n *   'key6: {{v6}}; key7: {{v7}}suffix"></div>\n *\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *\n * styleMapInterpolate8(\n *   'key: ', v0, ', ; key1: ', v1, ', ; key2: ', v2, ', ; key3: ', v3, ', ; key4: ', v4, ', ; key5: ', v5,\n *   ', ; key6: ', v6, ', ; key7: ', v7, 'suffix');\n * ``\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6 Value checked for change.\n * @param i6 Static value used for concatenation only.\n * @param v7 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n *\n * \nexport function styleMapInterpolate8(\n   prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, suffix: string): void {\n   const IView = getLView();\n   const interpolatedValue =\n     interpolation8(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n   styleMap(interpolatedValue);\n }\n\n\n/**\n *\n * Update an interpolated style on an element with 9 or more bound values surrounded by text.\n *\n * Used when the number of interpolated values exceeds 8.\n *\n * ``html\n *\n * <div\n *   class="\n *     'key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}};\n *     ',\n *     'key6: {{v6}}; key7: {{v7}}; key8: {{v8}}; key9: {{v9}}suffix"></div>\n *\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *\n * styleMapInterpolateV(\n *   ['key: ', v0, ', ; key1: ', v1, ', ; key2: ', v2, ', ; key3: ', v3, ', ; key4: ', v4, ', ; key5: ', v5,\n *   ', ; key6: ', v6, ', ; key7: ', v7, ', ; key8: ', v8, ', ; key9: ', v9, 'suffix'];\n * ``\n *\n * @param values The collection of values and the strings in-between those values, beginning with\n * a string prefix and ending with a string suffix.\n * (e.g. `[ 'prefix', value0, ', ; key2: ', value1, ', ; key2: ', value2, ..., value99, 'suffix' ]`)\n *\n * @codeGenApi\n *\n * \nexport function styleMapInterpolateV(values: any[]): void {\n   const IView = getLView();\n   const interpolatedValue = interpolationV(IView, values);\n   styleMap(interpolatedValue);\n }\n\n\n"/**\n *\n * @license\n *\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n */\n\nimport {getLView,} from './state';\nimport {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from './interpolation';\nimport {checkStylingProperty} from './styling';\n\n\n/**\n *\n * Update an interpolated style property on an element with single bound value surrounded by text.\n *\n * Used when the value passed to a property has 1 interpolated value in it:\n *\n * ``html\n *\n * <div style.color="\n *   'prefix{{v0}}suffix'\n * "></div>\n *\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *\n * stylePropInterpolate1(0, 'prefix', v0, 'suffix');\n * ``\n *\n *

```

@param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.

@param prefix Static value used for concatenation only.

@param v0 Value checked for change.

@param suffix Static value used for concatenation only.

@param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.

@returns itself, so that it may be chained.

@codeGenApi\n \* \nexport function stylePropInterpolate1(\n prop: string, prefix: string, v0: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate1 {\n const IView = getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate1;\n}\n\n/\*\*\n \* Update an interpolated style property on an element with 2 bound values surrounded by text.\n \* Used when the value passed to a property has 2 interpolated values in it:\n \* ``html\n \* <div style.color="prefix{{v0}}-{{v1}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* stylePropInterpolate2(0, 'prefix', v0, '-', v1, 'suffix');\n \* ``\n \* @param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function stylePropInterpolate2(\n prop: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate2 {\n const IView = getLView();\n const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate2;\n}\n\n/\*\*\n \* Update an interpolated style property on an element with 3 bound values surrounded by text.\n \* Used when the value passed to a property has 3 interpolated values in it:\n \* ``html\n \* <div style.color="prefix{{v0}}-{{v1}}-{{v2}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* stylePropInterpolate3(0, 'prefix', v0, '-', v1, '-', v2, 'suffix');\n \* ``\n \* @param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function stylePropInterpolate3(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate3 {\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate3;\n}\n\n/\*\*\n \* Update an interpolated style property on an element with 4 bound values surrounded by text.\n \* Used when the value passed to a property has 4 interpolated values in it:\n \* ``html\n \* <div style.color="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* stylePropInterpolate4(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n \* ``\n \* @param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function stylePropInterpolate4(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate4 {\n const IView = getLView();\n

```

const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n
checkStylingProperty(prop,
  interpolatedValue, valueSuffix, false);\n
return stylePropInterpolate4;\n\n/**\n * Update an interpolated
style property on an element with 5 bound values surrounded by text.\n * Used when the value passed to a
property has 5 interpolated values in it:\n * ``html\n * <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}suffix\"></div>\n * ``\n * Its compiled representation is:\n * ``ts\n * stylePropInterpolate5(0,
'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ``\n * @param styleIndex Index of style to update. This
index value refers to the\n *   index of the style in the style bindings array that was passed into\n *
`styling`.\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n
* @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1
Static value used for concatenation only.\n * @param v2 Value checked
for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n
* @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param suffix
Static value used for concatenation only.\n * @param valueSuffix Optional suffix. Used with scalar values to add
unit such as `px`.\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function
stylePropInterpolate5(\n  prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n
v3: any, i3: string, v4: any, suffix: string,\n  valueSuffix?: string|null): typeof stylePropInterpolate5 {\n
const IView = getLView();\n
const interpolatedValue =\n  interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4,
suffix);\n
checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n
return
stylePropInterpolate5;\n\n/**\n * Update an interpolated style property on an element with
6 bound values surrounded by text.\n * Used when the value passed to a property has 6 interpolated values in
it:\n * ``html\n * <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix\"></div>\n *
``\n * Its compiled representation is:\n * ``ts\n * stylePropInterpolate6(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, '-', v5, 'suffix');\n * ``\n * @param styleIndex Index of style to update. This index value refers to the\n *
index of the style in the style bindings array that was passed into\n *   `styling`.\n * @param prefix Static value
used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n *
@param v3 Value checked for change.\n * @param i3 Static value used for
concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation
only.\n * @param v5 Value checked for change.\n * @param suffix Static value used for concatenation only.\n
* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n * @returns itself, so that it
may be chained.\n * @codeGenApi\n */\nexport function stylePropInterpolate6(\n  prop: string, prefix: string, v0:
any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, suffix:
string,\n  valueSuffix?: string|null): typeof stylePropInterpolate6 {\n
const IView = getLView();\n
const interpolatedValue =\n  interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n
checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n
return stylePropInterpolate6;\n\n/**\n * Update an interpolated style property on an element with 7 bound values surrounded
by text.\n * Used when the value passed to a property has 7 interpolated values in it:\n * ``html\n * <div
style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix\"></div>\n * ``\n * Its
compiled representation is:\n * ``ts\n * stylePropInterpolate7(\n *   0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-',
v5, '-', v6, 'suffix');\n * ``\n * @param styleIndex Index of style to update. This index value refers to the\n *
index of the style in the style bindings array that was passed into\n *   `styling`.\n * @param prefix Static value
used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n *
@param v3 Value checked for change.\n * @param i3 Static value used for

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concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function stylePropInterpolate7(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate7 {\n const IView = getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n\n return stylePropInterpolate7;\n}\n\n/\*\*\n \* Update an interpolated style property on an element with 8 bound values surrounded by text.\n \* Used when the value passed to a property has 8 interpolated values in it:\n \* ``html\n \* <div style.color="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* stylePropInterpolate8(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n \* ``\n \* @param styleIndex Index of style to update. This index value refers to the\n \* index of the style in the style bindings array that was passed into\n \* `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function stylePropInterpolate8(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate8 {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate8;\n}\n\n/\*\*\n \* Update an interpolated style property on an element with 9 or more bound values surrounded by\n \* text.\n \* Used when the number of interpolated values exceeds 8.\n \* ``html\n \* <div\n \* style.color="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix">\n \* </div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* stylePropInterpolateV(\n \* 0, ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']);\n \* ``\n \* @param styleIndex Index of style to update. This index value refers to the\n \* index of the style in the style bindings array that was passed into\n \* `styling`.\n \* @param values The collection of values and the strings in-between those values, beginning with\n \* a string prefix and ending with a string suffix.\n \* (e.g. `[prefix, value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function stylePropInterpolateV(\n prop: string, values: any[], valueSuffix?: string|null): typeof stylePropInterpolateV {\n const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolateV;\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at\n \* https://angular.io/license\n \*/\nimport {bindingUpdated} from '../bindings';\nimport {SanitizerFn} from '../interfaces/sanitization';\nimport {RENDERER} from '../interfaces/view';\nimport {getCurrentDirectiveDef, getLView, getSelectedTNode, getTView, nextBindingIndex} from '../state';\nimport {NO\_CHANGE} from '../tokens';\nimport {elementPropertyInternal, loadComponentRenderer,

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storePropertyBindingMetadata} from './shared';\n\n/**\n * Update a property on a host element. Only applies to
native node properties, not inputs.\n *\n * Operates on the element selected by index via the {@link select}
instruction.\n *\n * @param propName Name of property. Because it is going to DOM, this is not subject to\n * renaming as part of minification.\n *\n * @param value New value to write.\n *\n * @param sanitizer An optional function
used to sanitize the value.\n *\n * @returns This function returns itself so that it may be chained\n * (e.g.
`property('name', ctx.name)('title', ctx.title)`)\n *\n * @codeGenApi\n */\nexport function hostProperty<T>(\n
propName: string, value:
T, sanitizer?: SanitizerFn|null): typeof hostProperty {\n
  const IView = getLView();\n
  const bindingIndex =
nextBindingIndex();\n
  if (bindingUpdated(IView, bindingIndex, value)) {\n
    const tView = getTView();\n
    const
tNode = getSelectedTNode();\n
    elementPropertyInternal(tView, tNode, IView, propName, value,
IView[RENDERER], sanitizer, true);\n
    ngDevMode && storePropertyBindingMetadata(tView.data, tNode,
propName, bindingIndex);\n
  }\n
  return hostProperty;\n
}\n\n\n/**\n * Updates a synthetic host binding (e.g.
`[@foo]`) on a component or directive.\n *\n * This instruction is for compatibility purposes and is designed to
ensure that a\n * synthetic host binding (e.g. `@HostBinding('@foo')`) properly gets rendered in\n * the component's
renderer. Normally all host bindings are evaluated with the parent\n * component's renderer, but, in the case of
animation @triggers, they need to be\n * evaluated with the sub component's renderer (because that's where the
animation\n
* triggers are defined).\n *\n * Do not use this instruction as a replacement for `elementProperty`. This instruction\n
* only exists to ensure compatibility with the ViewEngine's host binding behavior.\n *\n * @param index The index
of the element to update in the data array\n *\n * @param propName Name of property. Because it is going to DOM,
this is not subject to\n * renaming as part of minification.\n *\n * @param value New value to write.\n *\n * @param
sanitizer An optional function used to sanitize the value.\n *\n * @codeGenApi\n */\nexport function
syntheticHostProperty<T>(\n
  propName: string, value: T|NO_CHANGE,\n
  sanitizer?: SanitizerFn|null): typeof
syntheticHostProperty {\n
  const IView = getLView();\n
  const bindingIndex = nextBindingIndex();\n
  if
(bindingUpdated(IView, bindingIndex, value)) {\n
    const tView = getTView();\n
    const tNode =
getSelectedTNode();\n
    const currentDef = getCurrentDirectiveDef(tView.data);\n
    const renderer =
loadComponentRenderer(currentDef,\n
tNode, IView);\n
    elementPropertyInternal(tView, tNode, IView, propName, value, renderer, sanitizer, true);\n
    ngDevMode && storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n
  }\n
  return
syntheticHostProperty;\n
}\n\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {global} from './global';\n
declare global {\n
  const ngI18nClosureMode:
boolean;\n
}\n\n\n/**\n * NOTE: changes to the `ngI18nClosureMode` name must be synced with `compiler-
cli/src/tooling.ts`.\n *\n * \nif (typeof ngI18nClosureMode === 'undefined') {\n
// These property accesses can be
ignored because ngI18nClosureMode will be set to false\n
// when optimizing code and the whole if statement will
be dropped.\n
// Make sure to refer to ngI18nClosureMode as ['ngI18nClosureMode'] for closure.\n
// NOTE: we
need to have
it in IIFE so that the tree-shaker is happy.\n
(function() {\n
  // tslint:disable-next-line:no-toplevel-property-
access\n
  global['ngI18nClosureMode'] =\n
  // TODO(FW-1250): validate that this actually, you know,
works.\n
  // tslint:disable-next-line:no-toplevel-property-access\n
  typeof goog !== 'undefined' && typeof
goog.getMsg === 'function';\n
})();\n
}\n\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n// THIS CODE IS GENERATED - DO NOT MODIFY.\n
const u =
undefined;\n
function plural(val: number): number {\n
  const n = val, i = Math.floor(Math.abs(val)), v =
val.toString().replace(/^[^]*\./, "").length;\n
  if (i === 1 && v === 0)\n
    return 1;\n
  return 5;\n
}\n\n\nexport default
["en",["a","p"],["AM","PM"],u],[["AM","PM"],u,u],[["S","M","T","W","T","F"],["S"],["Sun"],"
Mon"],["Tue"],["Wed"],["Thu"],["Fri"],["Sat"],["Sunday"],["Monday"],["Tuesday"],["Wednesday"],["Thursday"],["F
riday"],["Saturday"],["Su"],["Mo"],["Tu"],["We"],["Th"],["Fr"],["Sa"],u],[["J","F","M","A","M","J","J","

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A|,"S|,"O|,"N|,"D|",[["Jan|","Feb|","Mar|","Apr|","May|","Jun|","Jul|","Aug|","Sep|","Oct|","Nov|","
Dec|"],[["January|","February|","March|","April|","May|","June|","July|","August|","September|","October|
|","November|","December|"]],u,[["B|","A|"],[["BC|","AD|"],[["Before
Christ|","Anno Domini|"]],0,[6,0],[["M/d/yy|","MMM d, y|","MMMM d, y|","EEEE, MMMM d, y|"],[["h:mm
a|","h:mm:ss a|","h:mm:ss a z|","h:mm:ss a zzzz|"],[["{1}, {0}|",u,"{1} 'at' {0}|",u],[[".",",",";","%",|"+|,"-
|","E|","×|","%o|","|","NaN|",":|"],[["#,##0.###|","#,##0%|","#.#00|","#E0|"],["USD|","$|","US
Dollar|",{}|,"ltr|", plural];\n","/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\nimport {RuntimeError, RuntimeErrorCode} from '../errors';\nimport {global} from '../util/global';\n\nimport
localeEn from './locale_en';\n\n/**\n * This const is used to store the locale data registered with
`registerLocaleData`\n *\nlet LOCALE_DATA: {[localeId: string]: any} = {};\n\n/**\n * Register locale data to be
used internally by Angular. See the\n * ["I18n guide"](guide/i18n-common-format-data-locale) to know how to
import additional locale\n * data.\n *\n * The signature `registerLocaleData(data: any, extraData?: any)` is
deprecated since v5.1\n *\nexport function registerLocaleData(data: any, localeId?: string|any, extraData?: any):
void {\n  if (typeof localeId !== 'string') {\n    extraData = localeId;\n    localeId =
data[LocaleDataIndex.LocaleId];\n  }\n  localeId = localeId.toLowerCase().replace(/_/g, '-');\n  LOCALE_DATA[localeId] = data;\n\n  if (extraData) {\n    LOCALE_DATA[localeId][LocaleDataIndex.ExtraData] = extraData;\n  }\n}\n\n/**\n * Finds
the locale data for a given locale.\n *\n * @param locale The locale code.\n *\n * @returns The locale data.\n *\n * @see
[Internationalization (i18n) Guide](https://angular.io/guide/i18n-overview)\n *\nexport function
findLocaleData(locale: string): any {\n  const normalizedLocale = normalizeLocale(locale);\n\n  let match =
getLocaleData(normalizedLocale);\n  if (match) {\n    return match;\n  }\n\n  // let's try to find a parent locale\n
const parentLocale = normalizedLocale.split('-')[0];\n  match = getLocaleData(parentLocale);\n  if (match) {\n
return match;\n  }\n\n  if (parentLocale === 'en') {\n    return localeEn;\n  }\n\n  throw new RuntimeError(\n
RuntimeErrorCode.MISSING_LOCALE_DATA,\n    ngDevMode && `Missing locale data for the locale
`"${locale}"`);\n}\n\n/**\n * Retrieves the default currency code for the given locale.\n *\n * The default is defined
as
the first currency which is still in use.\n *\n * @param locale The code of the locale whose currency code we
want.\n *\n * @returns The code of the default currency for the given locale.\n *\n *\nexport function
getLocaleCurrencyCode(locale: string): string|null {\n  const data = findLocaleData(locale);\n  return
data[LocaleDataIndex.CurrencyCode] || null;\n}\n\n/**\n * Retrieves the plural function used by ICU expressions to
determine the plural case to use\n * for a given locale.\n *\n * @param locale A locale code for the locale format rules
to use.\n *\n * @returns The plural function for the locale.\n *\n * @see `NgPlural`\n *\n * @see [Internationalization (i18n)
Guide](https://angular.io/guide/i18n-overview)\n *\nexport function getLocalePluralCase(locale: string): (value:
number) => number {\n  const data = findLocaleData(locale);\n  return
data[LocaleDataIndex.PluralCase];\n}\n\n\n\n/**\n * Helper function to get the given `normalizedLocale` from
`LOCALE_DATA`\n * or from the global `ng.common.locale`.\n
*\nexport function getLocaleData(normalizedLocale: string): any {\n  if (!(normalizedLocale in
LOCALE_DATA)) {\n    LOCALE_DATA[normalizedLocale] = global.ng && global.ng.common &&
global.ng.common.locales &&\n      global.ng.common.locales[normalizedLocale];\n  }\n  return
LOCALE_DATA[normalizedLocale];\n}\n\n\n/**\n * Helper function to remove all the locale data from
`LOCALE_DATA`\n *\nexport function unregisterAllLocaleData() {\n  LOCALE_DATA = {};\n}\n\n\n/**\n *
Index of each type of locale data from the locale data array\n *\nexport enum LocaleDataIndex {\n  LocaleId = 0,\n
DayPeriodsFormat,\n  DayPeriodsStandalone,\n  DaysFormat,\n  DaysStandalone,\n  MonthsFormat,\n
MonthsStandalone,\n  Eras,\n  FirstDayOfWeek,\n  WeekendRange,\n  DateFormat,\n  TimeFormat,\n
DateTimeFormat,\n  NumberSymbols,\n  NumberFormats,\n  CurrencyCode,\n  CurrencySymbol,\n
CurrencyName,\n  Currencies,\n  Directionality,\n  PluralCase,\n  ExtraData\n}\n\n\n/**\n * Index of each type of

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locale

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data from the extra locale data array\n */\nexport const enum ExtraLocaleDataIndex {\n  ExtraDayPeriodFormats = 0,\n  ExtraDayPeriodStandalone,\n  ExtraDayPeriodsRules\n}\n\n/**\n * Index of each value in currency data (used to describe CURRENCIES_EN in currencies.ts)\n */\nexport const enum CurrencyIndex {\n  Symbol = 0,\n  SymbolNarrow,\n  NbofDigits\n}\n\n/**\n * Returns the canonical form of a locale name - lowercase with ` ` replaced with ` `.\n */\nfunction normalizeLocale(locale: string): string {\n  return locale.toLowerCase().replace(/_/g, '-');\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\nimport {getLocalePluralCase} from './locale_data_api';\n\nconst pluralMapping = ['zero', 'one', 'two', 'few', 'many'];\n\n/**\n * Returns the plural case based on the locale\n */\nexport function getPluralCase(value: string, locale: string): string {\n  const plural = getLocalePluralCase(locale)(parseInt(value, 10));\n  const result = pluralMapping[plural];\n  return (result !== undefined) ? result : 'other';\n}\n\n/**\n * The locale id that the application is using by default (for translations and ICU expressions).\n */\nexport const DEFAULT_LOCALE_ID = 'en-US';\n\n/**\n * USD currency code that the application uses by default for CurrencyPipe when no\n * DEFAULT_CURRENCY_CODE is provided.\n */\nexport const USD_CURRENCY_CODE = 'USD';\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {SanitizerFn} from './sanitization';\n\n/**\n * Stores a list of nodes which need to be removed.\n * Numbers are indexes into the `LView`\n * - index > 0: `removeRNode(IView[0])`\n * - index < 0: `removeICU(~IView[0])`\n */\nexport interface I18nRemoveOpCodes extends Array<number> {\n  __brand__: 'I18nRemoveOpCodes';\n}\n\n/**\n * `I18nMutateOpCode` defines OpCodes for `I18nMutateOpCodes` array.\n * OpCodes are efficient operations which can be applied to the DOM to update it. (For example to\n * update to a new ICU case requires that we clean up previous elements and create new ones.)\n * OpCodes contain three parts:\n * 1) Parent node index offset. (p)\n * 2) Reference node index offset. (r)\n * 3) The instruction to execute. (i)\n * pppp pppp pppp pppp rrrr rrrr rrrr rrrr\n * 3322 2222 2222 1111 1111 1110 0000 0000\n * 1098 7654 3210 9876 5432 1098 7654 3210\n *\n * var parent = IView[opCode >>> SHIFT_PARENT];\n * var refNode = IView[((opCode & MASK_REF) >>> SHIFT_REF)];\n * var instruction = opCode & MASK_OPCODE;\n *\n * See: `I18nCreateOpCodes` for example of usage.\n */\nexport const enum IcuCreateOpCode {\n  /**\n   * Stores shift amount for bits 17-3 that contain reference index.\n   *\n   * SHIFT_REF = 1,\n   *\n   * Stores shift amount for bits 31-17 that contain parent index.\n   *\n   * SHIFT_PARENT = 17,\n   *\n   * Mask for OpCode\n   *\n   * MASK_INSTRUCTION = 0b1,\n   *\n   * Mask for the Reference node (bits 16-3)\n   *\n   * MASK_REF = 0b1111111111111110,\n   *\n   * Instruction to append the current node to `PARENT`.\n   *\n   * AppendChild = 0b0,\n   *\n   * Instruction to set the attribute of a node.\n   *\n   * Attr = 0b1,\n   *\n   * Array storing OpCode for dynamically creating `i18n` blocks.\n   *\n   * Example:\n   * ``ts\n   * <I18nCreateOpCode>[\n   *   // For adding text nodes\n   *   // -----\n   *   // Equivalent to:\n   *   // IView[1].appendChild(IView[0] = document.createTextNode('xyz'));\n   *   'xyz', 0, 1 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n   *   // For adding element nodes\n   *   // -----\n   *   // Equivalent to:\n   *   // IView[1].appendChild(IView[0] = document.createElement('div'));\n   *   ELEMENT_MARKER, 'div', 0, 1 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n   *   // For adding comment nodes\n   *   // -----\n   *   // Equivalent to:\n   *   // IView[1].appendChild(IView[0] = document.createComment(''));\n   *   ICU_MARKER, '', 0, 1 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n   *   // For moving existing nodes to a different location\n   *   // -----\n   *   // Equivalent to:\n   *   // const node = IView[1];\n   *   // IView[2].appendChild(node);\n   *   1 << SHIFT_REF | Select, 2 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n   *   // For removing existing nodes\n   *   // -----\n   *   //
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const node = IView[1];\n * // removeChild(tView.data(1), node, IView);\n * 1 << SHIFT_REF | Remove,\n *\n * // For writing attributes\n * // -----\n *
const node = IView[1];\n * // node.setAttribute('attr', 'value');\n * 1 << SHIFT_REF | Attr, 'attr', 'value'\n * ];\n *
*\n *\n * export interface IcuCreateOpCodes extends
Array<number|string>ELEMENT_MARKER|ICU_MARKER|null>,\n * I18nDebug {\n *
 * __brand__: 'I18nCreateOpCodes';\n * }\n *\n * export const enum I18nUpdateOpCode {\n * /**\n * * Stores shift amount
for bits 17-2 that contain reference index.\n * */\n * SHIFT_REF = 2,\n * /**\n * * Mask for OpCode\n * */\n *
 * MASK_OPCODE = 0b11,\n * /**\n * * Instruction to update a text node.\n * */\n * Text = 0b00,\n * /**\n * *
Instruction to update a attribute of a node.\n * */\n * Attr = 0b01,\n * /**\n * * Instruction to switch the current ICU
case.\n * */\n * IcuSwitch = 0b10,\n * /**\n * * Instruction to update the current ICU case.\n * */\n * IcuUpdate =
0b11,\n * }\n *\n * /**\n * * Marks that the next string is an element name.\n * */\n * See `I18nMutateOpCodes`
documentation.\n * */\n * export const ELEMENT_MARKER: ELEMENT_MARKER
= {\n * marker: 'element'\n * };\n *\n * export interface ELEMENT_MARKER {\n * marker: 'element';\n * }\n *\n * /**\n * * Marks
that the next string is comment text need for ICU.\n * */\n * See `I18nMutateOpCodes` documentation.\n * */\n * export
const ICU_MARKER: ICU_MARKER = {\n * marker: 'ICU'\n * };\n *\n * export interface ICU_MARKER {\n * marker:
'ICU';\n * }\n *\n * export interface I18nDebug {\n * /**\n * * Human readable representation of the OpCode arrays.\n * */\n *
 * NOTE: This property only exists if `ngDevMode` is set to `true` and it is not present in\n * production. Its
presence is purely to help debug issue in development, and should not be relied\n * on in production application.\n *
 */\n * debug?: string[];\n * }\n *\n * /**\n * * Array storing OpCode for dynamically creating `i18n` translation DOM
elements.\n * */\n * This array creates a sequence of `Text` and `Comment` (as ICU anchor) DOM elements. It
consists\n * of a pair of `number` and `string` pairs which encode the operations for the creation of the\n * translated
block.\n * */\n * The number is shifted and encoded according to `I18nCreateOpCode`\n * */\n * Pseudocode:\n * ```\n *
const i18nCreateOpCodes = [\n * 10 << I18nCreateOpCode.SHIFT, `Text Node add to DOM`,\n * 11 <<
I18nCreateOpCode.SHIFT | I18nCreateOpCode.COMMENT, `Comment Node add to DOM`,\n * 12 <<
I18nCreateOpCode.SHIFT | I18nCreateOpCode.APPEND_LATER, `Text Node added later`\n * ];\n *
 * for(var i=0; i<i18nCreateOpCodes.length; i++) {\n * const opcode = i18nCreateOpCodes[i++];\n * const index = opcode
>> I18nCreateOpCode.SHIFT;\n * const text = i18nCreateOpCodes[i];\n * let node: Text|Comment;\n * if
(opcode & I18nCreateOpCode.COMMENT === I18nCreateOpCode.COMMENT) {\n * node = IView[~index] =
document.createComment(text);\n * } else {\n * node = IView[index] = document.createText(text);\n * }\n *
 * if (opcode & I18nCreateOpCode.APPEND_EAGERLY !== I18nCreateOpCode.APPEND_EAGERLY) {\n *
parentNode.appendChild(node);\n * }\n * }\n * ```\n *
 * export
interface I18nCreateOpCodes extends Array<number|string>, I18nDebug {\n * __brand__:
'I18nCreateOpCodes';\n * }\n *\n * /**\n * * See `I18nCreateOpCodes`\n * */\n * export enum I18nCreateOpCode {\n * /**\n * *
Number of bits to shift index so that it can be combined with the `APPEND_EAGERLY` and\n * `COMMENT`.\n * */\n *
 * SHIFT = 2,\n * /**\n * * Should the node be appended to parent immediately after creation.\n * */\n *
 * APPEND_EAGERLY = 0b01,\n * /**\n * * If set the node should be comment (rather than a text) node.\n * */\n *
 * COMMENT = 0b10,\n * }\n *\n * /**\n * * Stores DOM operations which need to be applied to update DOM render tree
due to changes in\n * expressions.\n * */\n * The basic idea is that `i18nExp` OpCodes capture expression changes and
update a change\n * mask bit. (Bit 1 for expression 1, bit 2 for expression 2 etc..., bit 32 for expression 32 and\n *
higher.) The OpCodes then compare its own change mask against the expression change mask to\n * determine if
the OpCodes should execute.\n *
 * NOTE: 32nd bit is special as it says 32nd or higher. This way if we have more than 32 bindings\n * the code
still works, but with lower efficiency. (it is unlikely that a translation would have\n * more than 32 bindings.)\n *
 * These OpCodes can be used by both the i18n block as well as ICU sub-block.\n *
 * ## Example\n *
 * Assume\n * ```\n * if (rf & RenderFlags.Update) {\n * i18nExp(ctx.exp1); // If changed set mask bit 1\n *
i18nExp(ctx.exp2); // If changed set mask bit 2\n * i18nExp(ctx.exp3); // If changed set mask bit 3\n *
i18nExp(ctx.exp4); // If changed set mask bit 4\n * i18nApply(0); // Apply all changes by executing the
OpCodes.\n * }\n * ```\n *
 * We can assume that each call to `i18nExp` sets an internal `changeMask` bit depending

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on the index of `i18nExp`.
 * ### OpCodes
 * `ts`
 * <I18nUpdateOpCodes>
 * // The following OpCodes represent:
 * <div i18n-title="pre{ {exp1} }in{ {exp2} }post">
 * // If `changeMask & 0b11`
 * // has changed then execute update OpCodes.
 * // has NOT changed then skip `8` values and start processing next OpCodes.
 * 0b11, 8,
 * // Concatenate `newValue = 'pre'+IView[bindIndex-4]+'in'+IView[bindIndex-3]+'post';`
 * 'pre', -4, 'in', -3, 'post',
 * // Update attribute: `elementAttribute(1, 'title', sanitizerFn(newValue));`
 * 1 << SHIFT_REF | Attr, 'title', sanitizerFn,
 * // The following OpCodes represent:
 * <div i18n>Hello { {exp3} }!>
 * // If `changeMask & 0b100`
 * // has changed then execute update OpCodes.
 * // has NOT changed then skip `4` values and start processing next OpCodes.
 * 0b100, 4,
 * // Concatenate `newValue = 'Hello ' + IView[bindIndex -2] + '!';`
 * 'Hello ', -2, '!',
 * // Update text: `IView[1].textContent = newValue;`
 * 1 << SHIFT_REF | Text,
 * // The following OpCodes represent:
 * <div i18n>{exp4, plural, ... }>
 * // If `changeMask & 0b1000`
 * // has changed then execute update OpCodes.
 * // has NOT changed then skip `2` values and start processing next OpCodes.
 * 0b1000, 2,
 * // Concatenate `newValue = IView[bindIndex -1];`
 * -1,
 * // Switch ICU: `icuSwitchCase(IView[1], 0, newValue);`
 * 0 << SHIFT_ICU | 1 << SHIFT_REF | IcuSwitch,
 * // Note `changeMask & -1` is always true, so the IcuUpdate will always execute.
 * -1, 1,
 * // Update ICU: `icuUpdateCase(IView[1], 0);`
 * 0 << SHIFT_ICU | 1 << SHIFT_REF | IcuUpdate,
 * ];
 *
 * ^\nexport interface I18nUpdateOpCodes extends Array<string|number|SanitizerFn|null>, I18nDebug {
 *   __brand__: 'I18nUpdateOpCodes';
 * }
 *
 * ^\nexport interface TI18n {
 *   /**
 *    * A set of OpCodes which will create the Text Nodes and ICU anchors for the translation blocks.
 *    * NOTE: The ICU anchors are filled in with ICU Update OpCode.
 *    * ^\n create:
 *    I18nCreateOpCodes;
 *
 *    /**
 *    * A set of OpCodes which will be executed on each change detection to determine if any changes to
 *    * DOM are required.
 *    * ^\n update: I18nUpdateOpCodes;
 *
 *    /**
 *    * Defines the ICU type of `select` or `plural`
 *    * ^\nexport const enum IcuType {
 *    *   select = 0,
 *    *   plural = 1,
 *    * }
 *    * ^\nexport interface TIcu {
 *    *   /**
 *    *    * Defines the ICU type of `select` or `plural`
 *    *    * ^\n type: IcuType;
 *    *
 *    *   /**
 *    *    * Index in `LView` where the anchor node is stored.
 *    *    * <!-- ICU 0:0 -->
 *    *    * ^\n anchorIdx: number;
 *
 *    *   /**
 *    *    * Currently selected ICU case pointer.
 *    *
 *    *   `IView[currentCaseLViewIndex]` stores the currently selected case. This is needed to know how
 *    *   to clean up the current case when transitioning to the new case.
 *
 *    *   If the value stored is:
 *
 *    *   `null`: No current case selected.
 *
 *    *   `<0`: A flag which means that the ICU just switched and that `icuUpdate` must be executed
 *    *   regardless of the `mask`. (After the execution the flag is cleared)
 *
 *    *   `>=0` A currently selected case index.
 *
 *    *   ^\n currentCaseLViewIndex: number;
 *
 *    *   /**
 *    *    * A list of case values which the current ICU will try to match.
 *
 *    *   The last value is `other`
 *
 *    *   ^\n cases: any[];
 *
 *    *   /**
 *    *    * A set of OpCodes to apply in order to build up the DOM render tree for the ICU
 *
 *    *   ^\n create: IcuCreateOpCodes[];
 *
 *    *   /**
 *    *    * A set of OpCodes to apply in order to destroy the DOM render tree for the ICU.
 *
 *    *   ^\n remove: I18nRemoveOpCodes[];
 *
 *    *   /**
 *    *    * A set of OpCodes to apply in order to update the DOM render tree for the ICU bindings.
 *
 *    *   ^\n update: I18nUpdateOpCodes[];
 *
 *    *   ^\n// Note: This hack is necessary so we don't erroneously get a circular dependency
 *    *   failure based on types.
 *    *   ^\nexport const unusedValueExportToPlacateAjd = 1;
 *
 *    *   /**
 *    *    * Parsed ICU expression
 *
 *    *   ^\nexport interface IcuExpression {
 *    *     type: IcuType;
 *    *     mainBinding: number;
 *    *     cases: string[];
 *    *     values: (string|IcuExpression)[][];
 *    *   }
 *
 *    *   ^\n"/
 *
 *    * @license
 *    * Copyright Google LLC All Rights Reserved.
 *
 *    * Use of this source code is governed by an MIT-style license that can be
 *    * found in the LICENSE file at https://angular.io/license
 *
 *    * ^\nimport {DEFAULT_LOCALE_ID} from '../i18n/localization';
 *    * import {assertDefined} from '../util/assert';
 *
 *    * ^\n
 *
 *    * The locale id that the application is currently using (for translations and ICU expressions).
 *
 *    * This is the ivy version of `LOCALE_ID` that was defined as an injection token for the view engine
 *
 *    * but is now defined as a global value.
 *
 *    * ^\nlet LOCALE_ID = DEFAULT_LOCALE_ID;
 *
 *    * ^\n
 *
 *    * Sets the locale id that will be used for translations and ICU expressions.
 *
 *    * This is the ivy version of `LOCALE_ID` that was defined as an injection token for the view engine
 *
 *    * but is now defined as a global value.
 *
 *    * ^\n
 *
 *    * @param localeId
 *
 *    * ^\nexport function setLocaleId(localeId: string) {
 *    *   assertDefined(localeId, `Expected localeId to be defined`);
 *
 *    *   if (typeof localeId

```

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==== 'string') {\n  LOCALE_ID = localeId.toLowerCase().replace(/_/g, '-');\n }\n}\n\n/**\n * Gets the locale id
that will be used for translations and ICU expressions.\n * This is the ivy version of `LOCALE_ID` that was defined
as an injection token for the view engine\n * but is now defined as a global value.\n */\nexport function
getLocaleId(): string {\n  return LOCALE_ID;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {assertDomNode, assertIndexInRange} from
'./util/assert';\n\nimport {TNode, TNodeFlags, TNodeType} from './interfaces/node';\nimport {Renderer} from
'./interfaces/renderer';\nimport {RElement, RNode} from './interfaces/renderer_dom';\nimport {LView} from
'./interfaces/view';\nimport {getInsertInFrontOfRNodeWithNoI18n, nativeInsertBefore} from
'./node_manipulation';\nimport {unwrapRNode}
from './util/view_utils';\n\n\n/**\n * Find a node in front of which `currentTNode` should be inserted (takes i18n
into account).\n *\n * This method determines the `RNode` in front of which we should insert the `currentRNode`.
This\n * takes `TNode.insertBeforeIndex` into account.\n *\n * @param parentTNode parent `TNode`\n * @param
currentTNode current `TNode` (The node which we would like to insert into the DOM)\n * @param IView current
`LView`\n */\nexport function getInsertInFrontOfRNodeWithI18n(\n  parentTNode: TNode, currentTNode:
TNode, IView: LView): RNode|null {\n  const tNodeInsertBeforeIndex = currentTNode.insertBeforeIndex;\n  const
insertBeforeIndex =\n    Array.isArray(tNodeInsertBeforeIndex) ? tNodeInsertBeforeIndex[0] :\n  tNodeInsertBeforeIndex;\n  if (insertBeforeIndex === null) {\n    return
getInsertInFrontOfRNodeWithNoI18n(parentTNode, currentTNode, IView);\n  } else {\n    ngDevMode &&
assertIndexInRange(IView, insertBeforeIndex);\n    return unwrapRNode(IView[insertBeforeIndex]);\n  }\n}\n\n\n/**\n * Process `TNode.insertBeforeIndex` by adding i18n text nodes.\n *\n * See
`TNode.insertBeforeIndex`\n */\nexport function processI18nInsertBefore(\n  renderer: Renderer, childTNode:
TNode, IView: LView, childRNode: RNode|RNode[],\n  parentRElement: RElement|null): void {\n  const
tNodeInsertBeforeIndex = childTNode.insertBeforeIndex;\n  if (Array.isArray(tNodeInsertBeforeIndex)) {\n    // An
array indicates that there are i18n nodes that need to be added as children of this\n    // `childRNode`. These i18n
nodes were created before this `childRNode` was available and so\n    // only now can be added. The first element of
the array is the normal index where we should\n    // insert the `childRNode`. Additional elements are the extra
nodes to be added as children of\n    // `childRNode`.\n    ngDevMode && assertDomNode(childRNode);\n    let
i18nParent: RElement|null = childRNode as RElement;\n    let anchorRNode: RNode|null = null;\n    if
(!childTNode.type & TNodeType.AnyRNode) {\n      anchorRNode = i18nParent;\n      i18nParent =
parentRElement;\n    }\n    if (i18nParent !== null && (childTNode.flags & TNodeFlags.isComponentHost) === 0)
{\n      for (let i = 1; i < tNodeInsertBeforeIndex.length; i++) {\n        // No need to `unwrapRNode` because all of
the indexes point to i18n text nodes.\n        // see `assertDomNode` below.\n        const i18nChild =
IView[tNodeInsertBeforeIndex[i]];\n        nativeInsertBefore(renderer, i18nParent, i18nChild, anchorRNode,
false);\n      }\n    }\n  }\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {assertEqual} from './util/assert';\nimport {TNode, TNodeType} from
'./interfaces/node';\nimport {setI18nHandling} from './node_manipulation';\nimport
{getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore}
from './node_manipulation_i18n';\n\n\n/**\n * Add `tNode` to `previousTNodes` list and update relevant `TNode`s in
`previousTNodes` list\n *\n * `tNode.insertBeforeIndex`.\n *\n * Things to keep in mind:\n * 1. All i18n text nodes are
encoded as `TNodeType.Element` and are created eagerly by the\n * `i18nStart` instruction.\n * 2. All
`TNodeType.Placeholder` `TNodes` are elements which will be created later by\n * `elementStart` instruction.\n *
3. `elementStart` instruction will create `TNode`s in the ascending `TNode.index` order. (So a\n * smaller index
`TNode` is guaranteed to be created before a larger one)\n *\n * We use the above three invariants to determine
`TNode.insertBeforeIndex`.\n *\n * In an ideal world `TNode.insertBeforeIndex` would always be
`TNode.next.index`. However,\n * this will not work because `TNode.next.index` may be larger than `TNode.index`
which means that\n * the next node is not yet created and therefore we can't insert in front of it.\n

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*\n * Rule1: `TNode.insertBeforeIndex = null` if `TNode.next === null` (Initial condition, as we don't\n *
know if there will be further `TNode`s inserted after.)\n * Rule2: If `previousTNode` is created after the `tNode`
being inserted, then\n *   `previousTNode.insertBeforeNode = tNode.index` (So when a new `tNode` is added we
check\n *   previous to see if we can update its `insertBeforeTNode`)\n *\n * See `TNode.insertBeforeIndex` for
more context.\n *\n * @param previousTNodes A list of previous TNodes so that we can easily traverse `TNode`s
in\n *   reverse order. (If `TNode` would have `previous` this would not be necessary.)\n * @param newTNode A
TNode to add to the `previousTNodes` list.\n */\nexport function
addTNodeAndUpdateInsertBeforeIndex(previousTNodes: TNode[], newTNode: TNode) {\n // Start with Rule1\n
ngDevMode &&\n   assertEqual(newTNode.insertBeforeIndex, null, 'We expect that insertBeforeIndex is not
set');\n\n   previousTNodes.push(newTNode);\n\n   if (previousTNodes.length > 1) {\n     for (let i = previousTNodes.length - 2; i >= 0; i--) {\n       const existingTNode
= previousTNodes[i];\n       // Text nodes are created eagerly and so they don't need their `indexBeforeIndex`
updated.\n       // It is safe to ignore them.\n       if (!isI18nText(existingTNode)) {\n         if
(isNewTNodeCreatedBefore(existingTNode, newTNode) &&\n           getInsertBeforeIndex(existingTNode) ===
null) {\n           // If it was created before us in time, (and it does not yet have `insertBeforeIndex`)\n           // then add
the `insertBeforeIndex`.\n           setInsertBeforeIndex(existingTNode, newTNode.index);\n         }\n       }\n     }\n   }\n\n   function isI18nText(tNode: TNode): boolean {\n     return !(tNode.type &
TNodeType.Placeholder);\n   }\n\n   function isNewTNodeCreatedBefore(existingTNode: TNode, newTNode: TNode):
boolean {\n     return isI18nText(newTNode) || existingTNode.index > newTNode.index;\n   }\n\n   function
getInsertBeforeIndex(tNode: TNode):
number|null {\n     const index = tNode.insertBeforeIndex;\n     return Array.isArray(index) ? index[0] :
index;\n   }\n\n   function setInsertBeforeIndex(tNode: TNode, value: number): void {\n     const index =
tNode.insertBeforeIndex;\n     if (Array.isArray(index)) {\n       // Array is stored if we have to insert child nodes. See
`TNode.insertBeforeIndex`\n       index[0] = value;\n     } else {\n       setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);\n       tNode.insertBeforeIndex =
value;\n     }\n   }\n\n   /**\n    * @license\n    * Copyright Google LLC All Rights Reserved.\n    * Use of this source code
is governed by an MIT-style license that can be\n    * found in the LICENSE file at https://angular.io/license\n    */\n\n   import {assertEqual, assertGreaterThan, assertGreaterThanOrEqual, throwError} from '../util/assert';\n   import
{assertTICU, assertTNode} from '../assert';\n   import {createTNodeAtIndex} from '../instructions/shared';\n   import
{ICUCreateOpCode, TICU} from '../interfaces/i18n';\n   import
{TICUContainerNode, TNode, TNodeType} from '../interfaces/node';\n   import {LView, TView} from
 '../interfaces/view';\n   import {assertTNodeType} from '../node_assert';\n   import {setI18nHandling} from
 '../node_manipulation';\n   import {getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore} from
 '../node_manipulation_i18n';\n   import {addTNodeAndUpdateInsertBeforeIndex} from
 '../i18n_insert_before_index';\n\n   /**\n    * Retrieve `TICU` at a given `index`.\n    * The `TICU` can be stored either
directly (if it is nested ICU) OR\n    * it is stored inside the `TICUContainer` if it is top level ICU.\n    * The reason
for this is that the top level ICU need a `TNode` so that they are part of the render\n    * tree, but nested ICU's have no
TNode, because we don't know ahead of time if the nested ICU is\n    * expressed (parent ICU may have selected a
case which does not contain it.)\n    * @param tView Current `TView`.\n    * @param index Index where the value
should be read from.\n    */\n\n   export function getTICU(tView:
TView, index: number): TICU|null {\n     const value = tView.data[index] as null | TICU | TICUContainerNode |
string;\n     if (value === null || typeof value === 'string') return null;\n     if (ngDevMode &&\n       !(value.hasOwnProperty('tViews') || value.hasOwnProperty('currentCaseLViewIndex')))\n       throwError('We
expect to get \\null\\|\\TICU\\|\\TICUContainer\\', but got: ' + value);\n     }\n     // Here the
`value.hasOwnProperty('currentCaseLViewIndex')` is a polymorphic read as it can be\n     // either TICU or
TICUContainerNode. This is not ideal, but we still think it is OK because it\n     // will be just two cases which fits into
the browser inline cache (inline cache can take up to\n     // 4)\n     const tIcu =
value.hasOwnProperty('currentCaseLViewIndex') ? value as TICU :\n

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as TIcuContainerNode).value;\n ngDevMode && assertTIcu(tIcu);\n return tIcu;\n}\n\n/**\n * Store `TIcu` at a  

give `index`. \n *\n * The  

`TIcu` can be stored either directly (if it is nested ICU) OR\n * it is stored inside tho `TIcuContainer` if it is top  

level ICU.\n *\n * The reason for this is that the top level ICU need a `TNode` so that they are part of the render\n *  

tree, but nested ICU's have no TNode, because we don't know ahead of time if the nested ICU is\n * expressed  

(parent ICU may have selected a case which does not contain it.)\n *\n * @param tView Current `TVIEW`. \n *\n *  

@param index Index where the value should be stored at in `Tview.data`\n * @param tIcu The TIcu to store.\n\n *  

^\nexport function setTIcu(tView: TVIEW, index: number, tIcu: TIcu): void {\n  const tNode = tView.data[index] as  

null | TIcuContainerNode;\n  ngDevMode &&\n    assertEquals(\n      tNode === null ||  

tNode.hasOwnProperty('tViews'), true,\n      'We expect to get \\`null\\`\\`TIcuContainer\\`');\n  if (tNode === null)  

{\n    tView.data[index] = tIcu;\n  } else {\n    ngDevMode && assertTNodeType(tNode, TNodeType.Icu);\n    tNode.value = tIcu;\n  }\n}\n\n/**\n * Set `TNode.insertBeforeIndex` taking the `Array` into account.\n *\n * See  

`TNode.insertBeforeIndex`\n *^\nexport function setTNodeInsertBeforeIndex(tNode: TNode, index: number) {\n  ngDevMode && assertTNode(tNode);\n  let insertBeforeIndex = tNode.insertBeforeIndex;\n  if (insertBeforeIndex  

=== null) {\n    setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);\n    insertBeforeIndex = tNode.insertBeforeIndex =\n      [null!/* may be updated to number later */, index];\n  } else  

{\n    assertEquals(Array.isArray(insertBeforeIndex), true, 'Expecting array here');\n    (insertBeforeIndex as  

number[]).push(index);\n  }\n}\n\n/**\n * Create `TNode.type=TNodeType.Placeholder` node.\n *\n * See  

`TNodeType.Placeholder` for more information.\n *^\nexport function createTNodePlaceholder(\n  tView: TVIEW,  

previousTNodes: TNode[], index: number): TNode {\n  const tNode = createTNodeAtIndex(tView, index,  

TNodeType.Placeholder, null, null);\n  addTNodeAndUpdateInsertBeforeIndex(previousTNodes, tNode);\n  return tNode;\n}\n\n\n/**\n * Returns current  

ICU case.\n *\n * ICU cases are stored as index into the `TIcu.cases`. \n *\n * At times it is necessary to communicate  

that the ICU case just switched and that next ICU update\n * should update all bindings regardless of the mask. In  

such a case the we store negative numbers\n * for cases which have just been switched. This function removes the  

negative flag.\n *^\nexport function getCurrentICUCaseIndex(tIcu: TIcu, lView: LVIEW) {\n  const currentCase:  

number|null = lView[tIcu.currentCaseLViewIndex];\n  return currentCase === null ? currentCase : (currentCase < 0  

? ~currentCase : currentCase);\n}\n\n\nexport function getParentFromIcuCreateOpCode(mergedCode: number):  

number {\n  return mergedCode >>> IcuCreateOpCode.SHIFT_PARENT;\n}\n\n\nexport function  

getRefFromIcuCreateOpCode(mergedCode: number): number {\n  return (mergedCode &  

IcuCreateOpCode.MASK_REF) >>> IcuCreateOpCode.SHIFT_REF;\n}\n\n\nexport  

function getInstructionFromIcuCreateOpCode(mergedCode: number): number {\n  return mergedCode &  

IcuCreateOpCode.MASK_INSTRUCTION;\n}\n\n\nexport function icuCreateOpCode(opCode: IcuCreateOpCode,  

parentIdx: number, refIdx: number) {\n  ngDevMode && assertGreaterThanOrEqual(parentIdx, 0, 'Missing parent  

index');\n  ngDevMode && assertGreaterThanOrEqual(refIdx, 0, 'Missing ref index');\n  return opCode | parentIdx <<  

IcuCreateOpCode.SHIFT_PARENT | refIdx << IcuCreateOpCode.SHIFT_REF;\n}\n\n", /**\n * @license\n *  

Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license  

that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport { RuntimeError,  

RuntimeErrorCode } from './errors';\nimport { getPluralCase } from './i18n/localization';\nimport { assertDefined,  

assertDomNode, assertEquals, assertGreaterThan, assertIndexInRange, throwError } from './util/assert';\nimport  

{ assertIndexInExpandoRange, assertTIcu }  

from './assert';\nimport { attachPatchData } from './context_discovery';\nimport { elementPropertyInternal,  

setElementAttribute } from './instructions/shared';\nimport { ELEMENT_MARKER, I18nCreateOpCode,  

I18nCreateOpCodes, I18nUpdateOpCode, I18nUpdateOpCodes, ICU_MARKER, IcuCreateOpCode,  

IcuCreateOpCodes, IcuType, TI18n, TIcu } from './interfaces/i18n';\nimport { TNode } from  

'./interfaces/node';\nimport { RElement, RNode, RText } from './interfaces/renderer_dom';\nimport { SanitizerFn }  

from './interfaces/sanitization';\nimport { HEADER_OFFSET, LVIEW, RENDERER, TVIEW } from  

'./interfaces/view';\nimport { createCommentNode, createElementNode, createTextNode, nativeInsertBefore,

```

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nativeParentNode, nativeRemoveNode, updateTextNode } from './node_manipulation';
import { getBindingIndex } from './state';
import { renderStringify } from './util/stringify_utils';
import { getNativeByIndex, unwrapRNode } from './util/view_utils';
import { getLocaleId } from './i18n_locale_id';
import { getCurrentICUCaseIndex, getParentFromIcuCreateOpCode, getRefFromIcuCreateOpCode, getTicu } from './i18n_util';
import {
  * Keep track of which input bindings in `i18nExp` have changed.
  * This is used to efficiently update expressions in i18n only when the corresponding input has changed.
  * 1) Each bit represents which of the `i18nExp` has changed.
  * 2) There are 32 bits allowed in JS.
  * 3) Bit 32 is special as it is shared for all changes past 32. (In other words if you have more than 32 `i18nExp` then all changes past 32nd `i18nExp` will be mapped to same bit. This means that we may end up changing more than we need to. But i18n expressions with 32 bindings is rare so in practice it should not be an issue.)
  * Keeps track of which bit needs to be updated in `changeMask`
  * This value gets incremented on every call to `i18nExp`
  * let changeMaskCounter = 0;
  * Keep track of which input bindings in `i18nExp` have changed.
  * `setMaskBit` gets invoked by each call to `i18nExp`.
  * @param hasChange did `i18nExp` detect a change.
  * export function setMaskBit(hasChange: boolean) {
  if (hasChange) {
    changeMask = changeMask | (1 << Math.min(changeMaskCounter, 31));
  }
  changeMaskCounter++;
}
export function applyI18n(tView: TView, IView: LView, index: number) {
  if (changeMaskCounter > 0) {
    ngDevMode && assertDefined(tView, `tView should be defined`);
    const tI18n = tView.data[index] as TI18n | I18nUpdateOpCodes;
    // When `index` points to an `i18nAttributes` then we have an array otherwise `TI18n`
    const updateOpCodes: I18nUpdateOpCodes = Array.isArray(tI18n) ? tI18n as I18nUpdateOpCodes : (tI18n as TI18n).update;
    const bindingsStartIndex = getBindingIndex() - changeMaskCounter - 1;
    applyUpdateOpCodes(tView, IView, updateOpCodes, bindingsStartIndex, changeMask);
  }
  // Reset changeMask & maskBit to default for the next update cycle
  changeMask = 0b0;
  changeMaskCounter = 0;
}
import {
  * Apply `I18nCreateOpCodes` op-codes as stored in `TI18n.create`.
  * Creates text (and comment) nodes which are internationalized.
  * @param IView Current IView
  * @param createOpCodes Set of op-codes to apply
  * @param parentRNode Parent node (so that direct children can be added eagerly) or `null` if it is a root node.
  * @param insertInFrontOf DOM node that should be used as an anchor.
  * export function applyCreateOpCodes(IView: LView, createOpCodes: I18nCreateOpCodes, parentRNode: RElement|null, insertInFrontOf: RElement|null): void {
  const renderer = IView[RENDERER];
  for (let i = 0; i < createOpCodes.length; i++) {
    const opCode = createOpCodes[i] as any;
    const text = createOpCodes[i] as string;
    const isComment = (opCode & I18nCreateOpCode.COMMENT) === I18nCreateOpCode.COMMENT;
    const appendNow = (opCode & I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY;
    const index = opCode >>> I18nCreateOpCode.SHIFT;
    let rNode = IView[index];
    if (rNode === null) {
      // We only create new DOM nodes if they don't already exist:
      // If ICU switches case back to a case which was already instantiated, no need to create new DOM nodes.
      rNode = IView[index] = isComment ? renderer.createComment(text) : createTextNode(renderer, text);
    }
    if (appendNow && parentRNode !== null) {
      nativeInsertBefore(renderer, parentRNode, rNode, insertInFrontOf, false);
    }
  }
}
import {
  * Apply `I18nMutateOpCodes` OpCodes.
  * @param tView Current `TView`
  * @param mutableOpCodes Mutable OpCodes to process
  * @param IView Current `LView`
  * @param anchorRNode place where the i18n node should be inserted.
  * export function applyMutableOpCodes(tView: TView, mutableOpCodes: IcuCreateOpCodes, IView: LView, anchorRNode: RNode): void {
  ngDevMode && assertDomNode(anchorRNode);
  const renderer = IView[RENDERER];
  // `rootIdx` represents the node into which all inserts happen.
  let rootIdx: number|null = null;
  // `rootRNode` represents the real node into which we insert. This can be different from `IView[rootIdx]` if we have projection.
  // - null we don't have a parent (as can be the case in when we are inserting into a root of LView which has no parent.)
  // - `RElement` The element representing the root after taking projection into account.
  let rootRNode!:

```



```

RElement|null;\n for (let i = 0; i < mutableOpCodes.length; i++) {\n  const opCode = mutableOpCodes[i];\n  if
(typeof opCode == 'string') {\n    const textNodeIndex = mutableOpCodes[++i] as number;\n    if
(IView[textNodeIndex] === null) {\n      ngDevMode && ngDevMode.rendererCreateTextNode++;\n
ngDevMode && assertIndexInRange(IView, textNodeIndex);\n      IView[textNodeIndex] =
createTextNode(renderer, opCode);\n    }\n  } else if (typeof opCode == 'number') {\n    switch (opCode & IcuCreateOpCode.MASK_INSTRUCTION) {\n
case IcuCreateOpCode.AppendChild:\n      const parentIdx = getParentFromIcuCreateOpCode(opCode);\n
if (rootIdx === null) {\n        // The first operation should save the `rootIdx` because the first operation\n        //
must insert into the root. (Only subsequent operations can insert into a dynamic\n        // parent)\n        rootIdx =
parentIdx;\n        rootRNode = nativeParentNode(renderer, anchorRNode);\n      }\n      let insertInFrontOf:
RNode|null;\n      let parentRNode: RElement|null;\n      if (parentIdx === rootIdx) {\n        insertInFrontOf =
anchorRNode;\n        parentRNode = rootRNode;\n      } else {\n        insertInFrontOf = null;\n
parentRNode = unwrapRNode(IView[parentIdx]) as RElement;\n      }\n      // FIXME(misko): Refactor with
`processI18nText`\n      if (parentRNode
!== null) {\n        // This can happen if the `LView` we are adding to is not attached to a parent `LView`.\n
// In such a case there is no `root` we can attach to. This is fine, as we still need to\n        // create the elements.
When the `LView` gets later added to a parent these `root` nodes\n        // get picked up and added.\n
ngDevMode && assertDomNode(parentRNode);\n        const refIdx = getRefFromIcuCreateOpCode(opCode);\n
ngDevMode && assertGreaterThan(refIdx, HEADER_OFFSET, 'Missing ref');\n        // `unwrapRNode` is
not needed here as all of these point to RNodes as part of the i18n\n        // which can't have components.\n
const child = IView[refIdx] as RElement;\n        ngDevMode && assertDomNode(child);\n
nativeInsertBefore(renderer, parentRNode, child, insertInFrontOf, false);\n        const tIcu = getTIcu(tView,
refIdx);\n        if (tIcu !== null && typeof tIcu
=== 'object') {\n          // If we just added a comment node which has ICU then that ICU may have already been\n
// rendered and therefore we need to re-add it here.\n          ngDevMode && assertTIcu(tIcu);\n
const caseIndex = getCurrentICUCaseIndex(tIcu, IView);\n          if (caseIndex !== null) {\n
applyMutableOpCodes(tView, tIcu.create[caseIndex], IView, IView[tIcu.anchorIdx]);\n          }\n          }\n
}\n      break;\n      case IcuCreateOpCode.Attr:\n        const elementNodeIndex = opCode >>>
IcuCreateOpCode.SHIFT_REF;\n        const attrName = mutableOpCodes[++i] as string;\n        const attrValue =
mutableOpCodes[++i] as string;\n        // This code is used for ICU expressions only, since we don't support\n
// directives/components in ICUs, we don't need to worry about inputs here\n        setElementAttribute(\n
renderer, getNativeByIndex(elementNodeIndex, IView)
as RElement, null, null, attrName,\n          attrValue, null);\n        break;\n        default:\n          if (ngDevMode)
{\n            throw new RuntimeError(\n              RuntimeErrorCode.INVALID_I18N_STRUCTURE,\n
`Unable to determine the type of mutate operation for "${opCode}"`);\n          }\n          }\n        } else {\n          switch
(opCode) {\n            case ICU_MARKER:\n              const commentValue = mutableOpCodes[++i] as string;\n
const commentNodeIndex = mutableOpCodes[++i] as number;\n              if (IView[commentNodeIndex] === null) {\n
ngDevMode &&\n                assertEquals(\n                  typeof commentValue, 'string',\n
`Expected "${commentValue}" to be a comment node value`);\n                ngDevMode &&
ngDevMode.rendererCreateComment++;\n                ngDevMode && assertIndexInExpandoRange(IView,
commentNodeIndex);\n                const commentRNode = IView[commentNodeIndex] =\n
createCommentNode(renderer,
commentValue);\n                // FIXME(misko): Attaching patch data is only needed for the root (Also add tests)\n
attachPatchData(commentRNode, IView);\n              }\n              break;\n            case ELEMENT_MARKER:\n
const tagName = mutableOpCodes[++i] as string;\n            const elementNodeIndex = mutableOpCodes[++i] as
number;\n            if (IView[elementNodeIndex] === null) {\n              ngDevMode &&\n                assertEquals(\n
typeof tagName, 'string',\n                `Expected "${tagName}" to be an element node tag name`);\n            }\n
ngDevMode && ngDevMode.rendererCreateElement++;\n            ngDevMode &&

```



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IView[tIcu.currentCaseLViewIndex] = ~activeCaseIndex;\n    // -1 is same as all bits on, which simulates creation
since it marks all bits dirty\n
    mask = -1;\n    }n    applyUpdateOpCodes(tView, IView, tIcu.update[activeCaseIndex], bindingsStartIndex,
mask);\n    }n}\n\n/**\n * Apply OpCodes associated with switching a case on ICU.\n * This involves tearing
down existing case and than building up a new case.\n * @param tView Current `TVIEW`\n * @param tIcu
Current `TICU`\n * @param IView Current `LVIEW`\n * @param value Value of the case to update to.\n */\nfunction
applyIcuSwitchCase(tView: TVIEW, tIcu: TICU, IView: LVIEW, value: string) {\n    // Rebuild a new case for this
ICU\n    const caseIndex = getCaseIndex(tIcu, value);\n    let activeCaseIndex = getCurrentICUCaseIndex(tIcu,
IView);\n    if (activeCaseIndex !== caseIndex) {\n        applyIcuSwitchCaseRemove(tView, tIcu, IView);\n
IView[tIcu.currentCaseLViewIndex] = caseIndex === null ? null : ~caseIndex;\n        if (caseIndex !== null) {\n            //
Add the nodes for the new case\n            const anchorRNode = IView[tIcu.anchorIdx];\n            if (anchorRNode) {\n
                ngDevMode
                && assertDomNode(anchorRNode);\n                applyMutableOpCodes(tView, tIcu.create[caseIndex], IView,
anchorRNode);\n            }\n        }\n    }\n\n/**\n * Apply OpCodes associated with tearing ICU case.\n * This
involves tearing down existing case and than building up a new case.\n * @param tView Current `TVIEW`\n *
@param tIcu Current `TICU`\n * @param IView Current `LVIEW`\n */\nfunction
applyIcuSwitchCaseRemove(tView: TVIEW, tIcu: TICU, IView: LVIEW) {\n    let activeCaseIndex =
getCurrentICUCaseIndex(tIcu, IView);\n    if (activeCaseIndex !== null) {\n        const removeCodes =
tIcu.remove[activeCaseIndex];\n        for (let i = 0; i < removeCodes.length; i++) {\n            const nodeOrIcuIndex =
removeCodes[i] as number;\n            if (nodeOrIcuIndex > 0) {\n                // Positive numbers are `RNode`s.\n                const
rNode = getNativeByIndex(nodeOrIcuIndex, IView);\n                rNode !== null &&
                nativeRemoveNode(IView[RENDERER], rNode);\n            } else {\n                // Negative numbers are ICUs\n
                applyIcuSwitchCaseRemove(tView,
                getTicu(tView, ~nodeOrIcuIndex!), IView);\n            }\n        }\n    }\n\n/**\n * Returns the index of the current case
of an ICU expression depending on the main binding value\n * @param icuExpression\n * @param
bindingValue The value of the main binding used by this ICU expression\n */\nfunction
getCaseIndex(icuExpression: TICU, bindingValue: string): number|null {\n    let index =
icuExpression.cases.indexOf(bindingValue);\n    if (index === -1) {\n        switch (icuExpression.type) {\n            case
IcuType.plural: {\n                const resolvedCase = getPluralCase(bindingValue, getLocaleId());\n                index =
icuExpression.cases.indexOf(resolvedCase);\n                if (index === -1 && resolvedCase !== 'other') {\n                    index =
icuExpression.cases.indexOf('other');\n                }\n                break;\n            }\n            case IcuType.select: {\n                index =
icuExpression.cases.indexOf('other');\n                break;\n            }\n        }\n    }\n    return index === -1 ? null :
index;\n}\n\n"/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{assertDomNode, assertNumber, assertNumberInRange} from '../util/assert';\nimport {EMPTY_ARRAY} from
'../util/empty';\nimport {assertTicu, assertTNodeForLView} from '../assert';\nimport {getCurrentICUCaseIndex}
from './i18n/i18n_util';\nimport {I18nRemoveOpCodes, TICU} from './interfaces/i18n';\nimport
{TicuContainerNode} from './interfaces/node';\nimport {RNode} from './interfaces/renderer_dom';\nimport
{LVIEW, TVIEW} from './interfaces/view';\n\nexport function loadIcuContainerVisitor() {\n    const _stack: any[] =
[];\n    let _index: number = -1;\n    let _IView: LVIEW;\n    let _removes: I18nRemoveOpCodes;\n\n/**\n * Retrieves
a set of root nodes from `Ticu.remove`. Used by `TNode.Type.ICUContainer`\n * to determine which root belong
to the ICU.\n * Example
of usage.\n * ```\n * const nextRNode = icuContainerIteratorStart(tIcuContainerNode, IView);\n * let rNode:
RNode|null;\n * while(rNode = nextRNode()) {\n *     console.log(rNode);\n * }\n * ```\n * @param
tIcuContainerNode Current `TicuContainerNode`\n * @param IView `LVIEW` where the `RNode`s should be
looked up.\n */\nfunction icuContainerIteratorStart(tIcuContainerNode: TicuContainerNode, IView: LVIEW): ()
=> RNode | null {\n    _IView = IView;\n    while (_stack.length) _stack.pop();\n    ngDevMode &&

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assertTNodeForLView(tIcuContainerNode, IView);\n  enterIcu(tIcuContainerNode.value, IView);\n  return
icuContainerIteratorNext();\n }\n\n function enterIcu(tIcu: TIcu, IView: LView) {\n  _index = 0;\n  const
currentCase = getCurrentICUCaseIndex(tIcu, IView);\n  if (currentCase !== null) {\n    ngDevMode &&
assertNumberInRange(currentCase, 0, tIcu.cases.length - 1);\n    _removes = tIcu.remove[currentCase];\n  } else
{\n    _removes
= EMPTY_ARRAY as any;\n  }\n }\n\n function icuContainerIteratorNext(): RNode|null {\n  if (_index <
_remove.length) {\n    const removeOpCode = _removes[_index++] as number;\n    ngDevMode &&
assertNumber(removeOpCode, 'Expecting OpCode number');\n    if (removeOpCode > 0) {\n      const rNode =
_IView[removeOpCode];\n      ngDevMode && assertDomNode(rNode);\n      return rNode;\n    } else {\n      _stack.push(_index, _removes);\n      // ICUs are represented by negative indices\n      const tIcuIndex =
~removeOpCode;\n      const tIcu = _IView[TVIEW].data[tIcuIndex] as TIcu;\n      ngDevMode &&
assertTIcu(tIcu);\n      enterIcu(tIcu, _IView);\n      return icuContainerIteratorNext();\n    }\n  } else {\n    if
(_stack.length === 0) {\n      return null;\n    } else {\n      _removes = _stack.pop();\n      _index =
_stack.pop();\n      return icuContainerIteratorNext();\n    }\n  }\n }\n\n return
icuContainerIteratorStart();\n }\n\n", "/*\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{assertNumber, assertString} from '../util/assert';\n\nimport {ELEMENT_MARKER, I18nCreateOpCode,
I18nCreateOpCodes, I18nRemoveOpCodes, I18nUpdateOpCode, I18nUpdateOpCodes, ICU_MARKER,
IcuCreateOpCode, IcuCreateOpCodes} from './interfaces/i18n';\n\nimport {getInstructionFromIcuCreateOpCode,
getParentFromIcuCreateOpCode, getRefFromIcuCreateOpCode} from './i18n_util';\n\n\n/*\n * Converts
`I18nCreateOpCodes` array into a human readable format.\n * This function is attached to the
`I18nCreateOpCodes.debug` property if `ngDevMode` is enabled.\n * This function provides a human readable view
of the opcodes. This is useful when debugging the\n * application as well as writing more readable tests.\n *
*\n * @param this `I18nCreateOpCodes` if attached as a method.\n
*\n * @param opcodes `I18nCreateOpCodes` if invoked as a function.\n */\n\nexport function
i18nCreateOpCodesToString(\n  this: I18nCreateOpCodes|void, opcodes?: I18nCreateOpCodes): string[] {\n  const
createOpCodes: I18nCreateOpCodes = opcodes || (Array.isArray(this) ? this : [] as any);\n  let lines: string[] = [];\n  for (let i = 0; i < createOpCodes.length; i++) {\n    const opCode = createOpCodes[i++] as any;\n    const text =
createOpCodes[i] as string;\n    const isComment = (opCode & I18nCreateOpCode.COMMENT) ===
I18nCreateOpCode.COMMENT;\n    const appendNow =\n      (opCode &
I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY;\n    const index =
opCode >>> I18nCreateOpCode.SHIFT;\n    lines.push(`IView[${index}] = document.${isComment ?
'createComment' : 'createText'}(${\n      JSON.stringify(text)});`);\n    if (appendNow) {\n      lines.push(`parent.appendChild(IView[${index}]);`);\n    }\n  }\n  return lines;\n }\n\n\n/*\n * Converts
`I18nUpdateOpCodes` array
into a human readable format.\n * This function is attached to the `I18nUpdateOpCodes.debug` property if
`ngDevMode` is enabled.\n * This function provides a human readable view of the opcodes. This is useful when
debugging the\n * application as well as writing more readable tests.\n *
*\n * @param this `I18nUpdateOpCodes` if
attached as a method.\n * @param opcodes `I18nUpdateOpCodes` if invoked as a function.\n */\n\nexport function
i18nUpdateOpCodesToString(\n  this: I18nUpdateOpCodes|void, opcodes?: I18nUpdateOpCodes): string[] {\n  const
parser = new OpCodeParser(opcodes || (Array.isArray(this) ? this : []));\n  let lines: string[] = [];\n\n  function
consumeOpCode(value: number): string {\n    const ref = value >>> I18nUpdateOpCode.SHIFT_REF;\n    const
opCode = value & I18nUpdateOpCode.MASK_OPCODE;\n    switch (opCode) {\n      case
I18nUpdateOpCode.Text:\n        return `(IView[${ref}] as Text).textContent = $$$`;\n      case
I18nUpdateOpCode.Attr:\n        const attrName
= parser.consumeString();\n        const sanitizationFn = parser.consumeFunction();\n        const value =
sanitizationFn ? `(${sanitizationFn})($$$)` : $$$;\n        return `(IView[${ref}] as

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Element).setAttribute(`${attrName}`, ${value});\n  case I18nUpdateOpCode.IcuSwitch:\n    return
`icuSwitchCase(${ref}, $$$`);\n  case I18nUpdateOpCode.IcuUpdate:\n    return `icuUpdateCase(${ref})`;\n
}\n  throw new Error('unexpected OpCode');\n }\n\n while (parser.hasMore()) {\n  let mask =
parser.consumeNumber();\n  let size = parser.consumeNumber();\n  const end = parser.i + size;\n  const
statements: string[] = [];\n  let statement = ";\n  while (parser.i < end) {\n    let value =
parser.consumeNumberOrString();\n    if (typeof value === 'string') {\n      statement += value;\n    } else if
(value < 0) {\n      // Negative numbers are ref indexes\n      // Here `i` refers to current binding index. It is to
signify that the value is relative,\n
      // rather than absolute.\n      statement += `${IView[i] + value + '}`;\n    } else {\n      // Positive numbers are
operations.\n      const opCodeText = consumeOpCode(value);\n      statements.push(opCodeText.replace('$$$', ''
+ statement + '^') + ');'\n      statement = ";\n    }\n  }\n  lines.push(`if (mask & 0b${mask.toString(2)}) {\n
${statements.join(' ')} `);\n }\n return lines;\n}\n\n/**\n * Converts `I18nCreateOpCodes` array into a human
readable format.\n *\n * This function is attached to the `I18nCreateOpCodes.debug` if `ngDevMode` is enabled.
This\n * function provides a human readable view of the opcodes. This is useful when debugging the\n * application
as well as writing more readable tests.\n *\n * @param this `I18nCreateOpCodes` if attached as a method.\n *
@param opcodes `I18nCreateOpCodes` if invoked as a function.\n */\nexport function
icuCreateOpCodesToString(\n  this: IcuCreateOpCodes|void, opcodes?: IcuCreateOpCodes): string[]
{\n  const parser = new OpCodeParser(opcodes || (Array.isArray(this) ? this : []));\n  let lines: string[] = [];\n\n
function consumeOpCode(opCode: number): string {\n  const parent =
getParentFromIcuCreateOpCode(opCode);\n  const ref = getRefFromIcuCreateOpCode(opCode);\n  switch
(getInstructionFromIcuCreateOpCode(opCode)) {\n    case IcuCreateOpCode.AppendChild:\n      return
`IView[${parent}] as Element).appendChild(IView[${lastRef}]);`\n    case IcuCreateOpCode.Attr:\n      return
`IView[${ref}] as Element).setAttribute("${parser.consumeString()}", "${\n
parser.consumeString()}");`\n  }\n  throw new Error('Unexpected OpCode: ' +
getInstructionFromIcuCreateOpCode(opCode));\n }\n\n let lastRef = -1;\n while (parser.hasMore()) {\n  let value
= parser.consumeNumberStringOrMarker();\n  if (value === ICU_MARKER) {\n    const text =
parser.consumeString();\n    lastRef = parser.consumeNumber();\n    lines.push(`IView[${lastRef}] =
document.createComment("${text}")`);\n
  } else if (value === ELEMENT_MARKER) {\n    const text = parser.consumeString();\n    lastRef =
parser.consumeNumber();\n    lines.push(`IView[${lastRef}] = document.createElement("${text}")`);\n  } else if
(typeof value === 'string') {\n    lastRef = parser.consumeNumber();\n    lines.push(`IView[${lastRef}] =
document.createTextNode("${value}")`);\n  } else if (typeof value === 'number') {\n    const line =
consumeOpCode(value);\n    line && lines.push(line);\n  } else {\n    throw new Error('Unexpected value');\n
}\n }\n\n return lines;\n}\n\n/**\n * Converts `I18nRemoveOpCodes` array into a human readable format.\n *\n *
This function is attached to the `I18nRemoveOpCodes.debug` if `ngDevMode` is enabled. This\n * function
provides a human readable view of the opcodes. This is useful when debugging the\n * application as well as writing
more readable tests.\n *\n * @param this `I18nRemoveOpCodes` if attached as a method.\n *
@param opcodes `I18nRemoveOpCodes` if invoked as a function.\n */\nexport function
i18nRemoveOpCodesToString(\n  this: I18nRemoveOpCodes|void, opcodes?: I18nRemoveOpCodes): string[] {\n
const removeCodes = opcodes || (Array.isArray(this) ? this : []);\n  let lines: string[] = [];\n\n for (let i = 0; i <
removeCodes.length; i++) {\n    const nodeOrIcuIndex = removeCodes[i] as number;\n    if (nodeOrIcuIndex > 0)
{\n      // Positive numbers are `RNode`s.\n      lines.push(`remove(IView[${nodeOrIcuIndex}])`);\n    } else {\n      //
Negative numbers are ICUs\n      lines.push(`removeNestedICU(${~nodeOrIcuIndex})`);\n    }\n  }\n\n return
lines;\n}\n\n\nclass OpCodeParser {\n  i: number = 0;\n  codes: any[];\n\n constructor(codes: any[]) {\n  this.codes
= codes;\n }\n\n hasMore() {\n  return this.i < this.codes.length;\n }\n\n consumeNumber(): number {\n  let
value = this.codes[this.i++];\n  assertNumber(value, 'expecting number in OpCode');\n  return value;\n
}\n\n consumeString(): string {\n  let value = this.codes[this.i++];\n  assertString(value, 'expecting string in
OpCode');\n  return value;\n }\n\n consumeFunction(): Function|null {\n  let value = this.codes[this.i++];\n  if

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(value === null || typeof value === 'function') {\n  return value;\n }\n throw new Error('expecting function in
OpCode');\n }\n\n consumeNumberOrString(): number|string {\n  let value = this.codes[this.i++];\n  if (typeof
value === 'string') {\n  return value;\n }\n  assertNumber(value, 'expecting number or string in OpCode');\n
return value;\n }\n\n consumeNumberStringOrMarker(): number|string|ICU_MARKER|ELEMENT_MARKER {\n
  let value = this.codes[this.i++];\n  if (typeof value === 'string' || typeof value === 'number' || value ==
ICU_MARKER ||\n  value == ELEMENT_MARKER) {\n  return value;\n }\n  assertNumber(value,
'expecting number, string, ICU_MARKER or ELEMENT_MARKER in OpCode');\n  return value;\n
}\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\nimport './../util/ng_dev_mode';\nimport './../util/ng_i18n_closure_mode';\n\nimport {getTemplateContent,
URI_ATTRS, VALID_ATTRS, VALID_ELEMENTS} from './../sanitization/html_sanitizer';\nimport
{getInertBodyHelper} from './../sanitization/inert_body';\nimport {_sanitizeUrl} from
'./../sanitization/url_sanitizer';\nimport {assertDefined, assertEquals, assertGreaterThanOrEqual, assertOneOf,
assertString} from './../util/assert';\nimport {CharCode} from './../util/char_code';\nimport
{loadIcuContainerVisitor} from './instructions/i18n_icu_container_visitor';\nimport {allocExpando,
createTNodeAtIndex} from './instructions/shared';\nimport {getDocument} from './interfaces/document';\nimport
{ELEMENT_MARKER, I18nCreateOpCode, I18nCreateOpCodes, I18nRemoveOpCodes,
I18nUpdateOpCode, I18nUpdateOpCodes, ICU_MARKER, IcuCreateOpCode, IcuCreateOpCodes, IcuExpression,
IcuType, T118n, TIcu} from './interfaces/i18n';\nimport {TNode, TNodeType} from './interfaces/node';\nimport
{SanitizerFn} from './interfaces/sanitization';\nimport {HEADER_OFFSET, LView, TView} from
'./interfaces/view';\nimport {getCurrentParentTNode, getCurrentTNode, setCurrentTNode} from './state';\nimport
{attachDebugGetter} from './util/debug_utils';\n\nimport {i18nCreateOpCodesToString,
i18nRemoveOpCodesToString, i18nUpdateOpCodesToString, icuCreateOpCodesToString} from
'./i18n_debug';\nimport {addTNodeAndUpdateInsertBeforeIndex} from './i18n_insert_before_index';\nimport
{ensureIcuContainerVisitorLoaded} from './i18n_tree_shaking';\nimport {createTNodePlaceholder,
icuCreateOpCode, setTIcu, setTNodeInsertBeforeIndex} from './i18n_util';\n\n\nconst BINDING_REGEXP =
/((\d+):?\d*/gi;\nconst ICU_REGEXP = /({\|s*\|d+:\|d*\|s*,\|s*\|S{6}\|s*,[\|s\|S]*})/gi;\nconst NESTED_ICU
= /((\d+):?;\nconst ICU_BLOCK_REGEXP = /^(\|s*(\|d+:\|d*)\|s*,\|s*(select|plural)\|s*,/;\n\nconst MARKER =
``;\nconst SUBTEMPLATE_REGEXP = /\|/?\|*\|(\d+:\|d+)/gi;\nconst PH_REGEXP =
/(\|/?[#\|]\|(\d+):?\|d*/gi;\n\n/**\n * Angular Dart introduced &ngsp; as a placeholder for non-removable space, see:\n
* https://github.com/dart-
lang/angular/blob/0bb611387d29d65b5af7f9d2515ab571fd3fbee4/_tests/test/compiler/preserve_whitespace_test.dart
#L25-L32\n * In Angular Dart &ngsp; is converted to the 0xE500 PUA (Private Use Areas) unicode character\n *
and later on replaced by a space. We are re-implementing the same idea here, since translations\n * might contain
this special character.\n *\nconst NGSP_UNICODE_REGEXP = /\|uE500/g;\nfunction replaceNgsp(value: string):
string {\n  return value.replace(NGSP_UNICODE_REGEXP, ' ');}\n\n\n/**\n * Create dynamic nodes from i18n
translation block.\n *\n * - Text nodes are created synchronously\n * - TNodes are linked into tree lazily\n *\n *
@param
tView Current `TView`\n * @parentTNodeIndex index to the parent TNode of this i18n block\n * @param IView
Current `LView`\n * @param index Index of `i18nStart` instruction.\n * @param message Message to translate.\n *
@param subTemplateIndex Index into the sub template of message translation. (ie in case of\n * `ngIf`) (-1
otherwise)\n *\nexport function i18nStartFirstCreatePass(\n  tView: TView, parentTNodeIndex: number, IView:
LView, index: number, message: string,\n  subTemplateIndex: number) {\n  const rootTNode =
getCurrentParentTNode();\n  const createOpCodes: I18nCreateOpCodes = [] as any;\n  const updateOpCodes:
I18nUpdateOpCodes = [] as any;\n  const existingTNodeStack: TNode[][] = [[]];\n  if (ngDevMode) {\n
attachDebugGetter(createOpCodes, i18nCreateOpCodesToString);\n  attachDebugGetter(updateOpCodes,
i18nUpdateOpCodesToString);\n  }\n  message = getTranslationForTemplate(message, subTemplateIndex);\n
const msgParts = replaceNgsp(message).split(PH_REGEXP);\n

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    for (let i = 0; i < msgParts.length; i++) {\n    let value = msgParts[i];\n    if ((i & 1) === 0) {\n    // Even indexes
are text (including bindings & ICU expressions)\n    const parts = i18nParseTextIntoPartsAndICU(value);\n    for
(let j = 0; j < parts.length; j++) {\n    let part = parts[j];\n    if ((j & 1) === 0) {\n    // `j` is odd therefore
`part` is string\n    const text = part as string;\n    ngDevMode && assertString(text, 'Parsed ICU part should
be string');\n    if (text !== '') {\n    i18nStartFirstCreatePassProcessTextNode(\n    tView,
rootTNode, existingTNodeStack[0], createOpCodes, updateOpCodes, IView, text);\n    } else {\n    //
`j` is Even therefor `part` is an `ICUExpression`\n    const icuExpression: IcuExpression = part as
IcuExpression;\n    // Verify that ICU expression has the right shape. Translations might contain invalid\n    //
constructions (while
original messages were correct), so ICU parsing at runtime may\n    // not succeed (thus `icuExpression`
remains a string).\n    // Note: we intentionally retain the error here by not using `ngDevMode`, because\n    //
the value can change based on the locale and users aren't guaranteed to hit\n    // an invalid string while they're
developing.\n    if (typeof icuExpression !== 'object') {\n    throw new Error('Unable to parse ICU
expression in \''${message}\'' message.);\n    }\n    const icuContainerTNode =
createTNodeAndAddOpCode(\n    tView, rootTNode, existingTNodeStack[0], IView, createOpCodes,\n    ngDevMode ? `ICU ${index}:${icuExpression.mainBinding}` : '', true);\n    const icuNodeIndex =
icuContainerTNode.index;\n    ngDevMode &&\n    assertGreaterThanOrEqual(\n
icuNodeIndex, HEADER_OFFSET, 'Index must be in absolute LView offset');\n    icuStart(tView, IView,
updateOpCodes, parentTNodeIndex, icuExpression, icuNodeIndex);\n    }\n    }\n    } else {\n    // Odd indexes
are placeholders (elements and sub-templates)\n    // At this point value is something like: `/#1:2` (originally coming
from `/#1:2`)\n    const isClosing = value.charCodeAt(0) === CharCode.SLASH;\n    const type =
value.charCodeAt(isClosing ? 1 : 0);\n    ngDevMode && assertOneOf(type, CharCode.STAR,
CharCode.HASH);\n    const index = HEADER_OFFSET + Number.parseInt(value.substring((isClosing ? 2 :
1)));\n    if (isClosing) {\n    existingTNodeStack.shift();\n    setCurrentTNode(getCurrentParentTNode()!,
false);\n    } else {\n    const tNode = createTNodePlaceholder(tView, existingTNodeStack[0], index);\n
existingTNodeStack.unshift([]);\n    setCurrentTNode(tNode, true);\n    }\n    }\n    tView.data[index] =
<TNode>{\n    create: createOpCodes,\n    update: updateOpCodes,\n    };}\n\n**\n * Allocate space in i18n Range
add create OpCode instruction to create a text or comment node.\n * @param tView Current `TView` needed to
allocate space in i18n range.\n * @param rootTNode Root `TNode` of the i18n block. This node determines if the
new TNode will be\n * added as part of the `i18nStart` instruction or as part of the `TNode.insertBeforeIndex`.\n
* @param existingTNodes internal state for `addTNodeAndUpdateInsertBeforeIndex`.\n * @param IView Current
`LView` needed to allocate space in i18n range.\n * @param createOpCodes Array storing `I18nCreateOpCodes`
where new opCodes will be added.\n * @param text Text to be added when the `Text` or `Comment` node will be
created.\n * @param isICU true if a `Comment` node for ICU (instead of `Text`) node should be created.\n
*\nfunction createTNodeAndAddOpCode(\n tView: TView, rootTNode: TNode|null, existingTNodes: TNode[],
IView: LView,\n createOpCodes: I18nCreateOpCodes, text: string|null, isICU: boolean): TNode {\n const
i18nNodeIdx = allocExpando(tView,
IView, 1, null);\n let opCode = i18nNodeIdx << I18nCreateOpCode.SHIFT;\n let parentTNode =
getCurrentParentTNode();\n\n if (rootTNode === parentTNode) {\n // FIXME(misko): A null `parentTNode`
should represent when we fall of the `LView` boundary.\n // (there is no parent), but in some circumstances
(because we are inconsistent about how we set\n // `previousOrParentTNode`) it could point to `rootTNode` So
this is a work around.\n parentTNode = null;\n }\n\n if (parentTNode === null) {\n // If we don't have a parent
that means that we can eagerly add nodes.\n // If we have a parent than these nodes can't be added now (as the
parent has not been created\n // yet) and instead the `parentTNode` is responsible for adding it. See\n //
`TNode.insertBeforeIndex`\n opCode |= I18nCreateOpCode.APPEND_EAGERLY;\n }\n\n if (isICU) {\n
opCode |= I18nCreateOpCode.COMMENT;\n ensureIcuContainerVisitorLoaded(loadIcuContainerVisitor);\n }\n\n
createOpCodes.push(opCode,

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text === null ? " : text);\n // We store `{{?}}` so that when looking at debug `TNodeType.template` we can see
where the\n // bindings are.\n const tNode = createTNodeAtIndex(\n    tView, i18nNodeIdx, isICU ?
TNodeType.Icu : TNodeType.Text,\n    text === null ? (ngDevMode ? '{{?}}' : " : text, null);\n
addTNodeAndUpdateInsertBeforeIndex(existingTNodes, tNode);\n const tNodeIdx = tNode.index;\n
setCurrentTNode(tNode, false /* Text nodes are self closing */);\n if (parentTNode !== null && rootTNode !==
parentTNode) {\n // We are a child of deeper node (rather than a direct child of `i18nStart` instruction.)\n // We
have to make sure to add ourselves to the parent.\n    setTNodeInsertBeforeIndex(parentTNode, tNodeIdx);\n }\n
return tNode;\n}\n\n/**\n * Processes text node in i18n block.\n * \n * Text nodes can have:\n * - Create instruction
in `createOpCodes` for creating the text node.\n * - Allocate spec for text node in i18n range of `LView`\n * - If
contains
binding:\n * - bindings => allocate space in i18n range of `LView` to store the binding value.\n * - populate
`updateOpCodes` with update instructions.\n * \n * @param tView Current `TView`\n * @param rootTNode Root
`TNode` of the i18n block. This node determines if the new TNode will\n * be added as part of the `i18nStart`
instruction or as part of the\n * `TNode.insertBeforeIndex`.\n * @param existingTNodes internal state for
`addTNodeAndUpdateInsertBeforeIndex`.\n * @param createOpCodes Location where the creation OpCodes will
be stored.\n * @param IView Current `LView`\n * @param text The translated text (which may contain binding)\n
*/\nfunction i18nStartFirstCreatePassProcessTextNode(\n    tView: TView, rootTNode: TNode|null,\n    existingTNodes: TNode[], createOpCodes: I18nCreateOpCodes,\n    updateOpCodes: I18nUpdateOpCodes, IView:
LView, text: string): void {\n    const hasBinding = text.match(BINDING_REGEX);\n    const tNode =
createTNodeAndAddOpCode(\n        tView,\n        rootTNode, existingTNodes, IView, createOpCodes, hasBinding ? null : text, false);\n    if (hasBinding) {\n
generateBindingUpdateOpCodes(updateOpCodes, text, tNode.index, null, 0, null);\n    }\n}\n\n/**\n * See
`i18nAttributes` above.\n */\nexport function i18nAttributesFirstPass(tView: TView, index: number, values:
string[]) {\n    const previousElement = getCurrentTNode(!);\n    const previousElementIndex =
previousElement.index;\n    const updateOpCodes: I18nUpdateOpCodes = [] as any;\n    if (ngDevMode) {\n
attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n    }\n    if (tView.firstCreatePass &&
tView.data[index] === null) {\n        for (let i = 0; i < values.length; i += 2) {\n            const attrName = values[i];\n
const message = values[i + 1];\n            if (message !== "") {\n                // Check if attribute value contains an ICU and
throw an error if that's the case.\n                // ICUs in element attributes are not supported.\n                // Note: we intentionally
retain the error here
by not using `ngDevMode`, because\n                // the `value` can change based on the locale and users aren't guaranteed
to hit\n                // an invalid string while they're developing.\n                if (ICU_REGEX.test(message)) {\n                    throw
new Error(\n                        `ICU expressions are not supported in attributes. Message: "${message}`);\n                }\n            }\n
// i18n attributes that hit this code path are guaranteed to have bindings, because\n            // the compiler treats static
i18n attributes as regular attribute bindings.\n            // Since this may not be the first i18n attribute on this element we
need to pass in how\n            // many previous bindings there have already been.\n            generateBindingUpdateOpCodes(\n                updateOpCodes, message, previousElementIndex, attrName,
countBindings(updateOpCodes),\n                null);\n        }\n    }\n    tView.data[index] = updateOpCodes;\n
}\n}\n\n/**\n * Generate the OpCodes to update the bindings of a string.\n * \n * @param
updateOpCodes Place where the update opcodes will be stored.\n * @param str The string containing the
bindings.\n * @param destinationNode Index of the destination node which will receive the binding.\n * @param
attrName Name of the attribute, if the string belongs to an attribute.\n * @param sanitizeFn Sanitization function
used to sanitize the string after update, if necessary.\n * @param bindingStart The IView index of the next
expression that can be bound via an opCode.\n * @returns The mask value for these bindings\n */\nfunction
generateBindingUpdateOpCodes(\n    updateOpCodes: I18nUpdateOpCodes, str: string, destinationNode: number,\n    attrName: string|null,\n    bindingStart: number, sanitizeFn: SanitizerFn|null): number {\n    ngDevMode &&\n
assertGreaterThanOrEqual(\n        destinationNode, HEADER_OFFSET, 'Index must be in absolute LView
offset');\n    const maskIndex = updateOpCodes.length; // Location of mask\n    const sizeIndex = maskIndex + 1;

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// location of size
for skipping\n updateOpCodes.push(null, null); // Alloc space for mask and size\n const startIndex =
maskIndex + 2; // location of first allocation.\n if (ngDevMode) {\n attachDebugGetter(updateOpCodes,
i18nUpdateOpCodesToString);\n }\n const textParts = str.split(BINDING_REGEXP);\n let mask = 0;\n for (let
j = 0; j < textParts.length; j++) {\n const textValue = textParts[j];\n if (j & 1) {\n // Odd indexes are
bindings\n const bindingIndex = bindingStart + parseInt(textValue, 10);\n updateOpCodes.push(-1 -
bindingIndex);\n mask = mask | toMaskBit(bindingIndex);\n } else if (textValue !== '') {\n // Even indexes
are text\n updateOpCodes.push(textValue);\n }\n }\n updateOpCodes.push(\n destinationNode <<
I18nUpdateOpCode.SHIFT_REF |\n (attrName ? I18nUpdateOpCode.Attr : I18nUpdateOpCode.Text));\n if
(attrName) {\n updateOpCodes.push(attrName, sanitizeFn);\n }\n updateOpCodes[maskIndex] = mask;\n
updateOpCodes[sizeIndex] = updateOpCodes.length - startIndex;\n return mask;\n}\n\n/**\n * Count the number
of bindings in the given `opCodes`.\n * It could be possible to speed this up, by passing the number of bindings
found back from\n * `generateBindingUpdateOpCodes()` to `i18nAttributesFirstPass()` but this would then require
more\n * complexity in the code and/or transient objects to be created.\n * Since this function is only called once
when the template is instantiated, is trivial in the\n * first instance (since `opCodes` will be an empty array), and it is
not common for elements to\n * contain multiple i18n bound attributes, it seems like this is a reasonable
compromise.\n */\nfunction countBindings(opCodes: I18nUpdateOpCodes): number {\n let count = 0;\n for (let i =
0; i < opCodes.length; i++) {\n const opCode = opCodes[i];\n // Bindings are negative numbers.\n if (typeof
opCode === 'number' && opCode < 0) {\n count++;\n }\n }\n return count;\n}\n\n/**\n * Convert binding index to mask bit.\n * Each index represents a single bit on the bit-mask. Because bit-mask
only has 32 bits, we make\n * the 32nd bit share all masks for all bindings higher than 32. Since it is extremely rare
to\n * have more than 32 bindings this will be hit very rarely. The downside of hitting this corner\n * case is that we
will execute binding code more often than necessary. (penalty of performance)\n */\nfunction
toMaskBit(bindingIndex: number): number {\n return 1 << Math.min(bindingIndex, 31);\n}\n\nexport function
isRootTemplateMessage(subTemplateIndex: number): subTemplateIndex is - 1 {\n return subTemplateIndex === -
1;\n}\n\n/**\n * Removes everything inside the sub-templates of a message.\n */\nfunction
removeInnerTemplateTranslation(message: string): string {\n let match;\n let res = '';\n let index = 0;\n let
inTemplate = false;\n let tagMatched;\n\n while ((match = SUBTEMPLATE_REGEXP.exec(message)) !== null)
{\n if (!inTemplate)
{\n res += message.substring(index, match.index + match[0].length);\n tagMatched = match[1];\n
inTemplate = true;\n } else {\n if (match[0] === `${MARKER}/${tagMatched}${MARKER}`) {\n index
= match.index;\n inTemplate = false;\n }\n }\n }\n\n ngDevMode &&\n assertEquals(\n
inTemplate, false,\n `Tag mismatch: unable to find the end of the sub-template in the translation "${message}"`);\n
res += message.slice(index);\n return res;\n}\n\n/**\n * Extracts a part of a message and
removes the rest.\n * This method is used for extracting a part of the message associated with a template. A\n *
translated message can span multiple templates.\n * Example:\n * ```\n * <div i18n>Translate <span
*ngIf>me</span>!</div>\n * ```\n * @param message The message to crop\n * @param subTemplateIndex
Index of the sub-template to extract. If undefined it returns the\n * external template and removes
all sub-templates.\n */\nexport function getTranslationForTemplate(message: string, subTemplateIndex: number)
{\n if (isRootTemplateMessage(subTemplateIndex)) {\n // We want the root template message, ignore all sub-
templates\n return removeInnerTemplateTranslation(message);\n } else {\n // We want a specific sub-template\n
const start =\n message.indexOf(`${subTemplateIndex}${MARKER}`) + 2 +
subTemplateIndex.toString().length;\n const end = message.search(new
RegExp(`${MARKER}\\\\\\\\\\\\\\\\*\\\\\\\\d+:${subTemplateIndex}${MARKER}`));\n return
removeInnerTemplateTranslation(message.substring(start, end));\n }\n}\n\n/**\n * Generate the OpCodes for ICU
expressions.\n * @param icuExpression\n * @param index Index where the anchor is stored and an optional
`TicuContainerNode`\n * - `View[anchorIdx]` points to a `Comment` node representing the anchor for the ICU.\n
* - `View.data[anchorIdx]` points to the `TicuContainerNode` if ICU is root (`null` otherwise)\n

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*^nextport function icuStart(\n  tView: TView, lView: LView, updateOpCodes: I18nUpdateOpCodes, parentIdx:
number,\n  icuExpression: IcuExpression, anchorIdx: number) {\n  ngDevMode && assertDefined(icuExpression,
'ICU expression must be defined');\n  let bindingMask = 0;\n  const tIcu: TIcu = {\n  type: icuExpression.type,\n  currentCaseLViewIndex: allocExpando(tView, lView, 1, null),\n  anchorIdx,\n  cases: [],\n  create: [],\n  remove: [],\n  update: []\n  };\n  addUpdateIcuSwitch(updateOpCodes, icuExpression, anchorIdx);\n  setTIcu(tView, anchorIdx, tIcu);\n  const values = icuExpression.values;\n  for (let i = 0; i < values.length; i++) {\n  // Each value is an array of strings & other ICU expressions\n  const valueArr = values[i];\n  const nestedIcus:
IcuExpression[] = [];\n  for (let j = 0; j < valueArr.length; j++) {\n  const value = valueArr[j];\n  if (typeof
value !== 'string') {\n  // It is an nested ICU expression\n  const
icuIndex = nestedIcus.push(value as IcuExpression) - 1;\n  // Replace nested ICU expression by a comment
node\n  valueArr[j] = `<!--${icuIndex}-->`;\n  }\n  }\n  bindingMask = parseIcuCase(\n  tView,
tIcu, lView, updateOpCodes, parentIdx, icuExpression.cases[i],\n  valueArr.join(""), nestedIcus) |\n
bindingMask;\n  }\n  if (bindingMask) {\n  addUpdateIcuUpdate(updateOpCodes, bindingMask, anchorIdx);\n
}\n  }\n  }\n  * Parses text containing an ICU expression and produces a JSON object for it.\n  * Original code from
closure library, modified for Angular.\n  * @param pattern Text containing an ICU expression that needs to be
parsed.\n  * @^nextport function parseICUBlock(pattern: string): IcuExpression {\n  const cases = [];\n  const
values: (string|IcuExpression)[][] = [];\n  let icuType = IcuType.plural;\n  let mainBinding = 0;\n  pattern =
pattern.replace(ICU_BLOCK_REGEXP, function(str: string, binding: string,
type: string) {\n  if (type === 'select') {\n  icuType = IcuType.select;\n  } else {\n  icuType =
IcuType.plural;\n  }\n  mainBinding = parseInt(binding.slice(1), 10);\n  return `<!-->`;\n  });\n  const parts =
i18nParseTextIntoPartsAndICU(pattern) as string[];\n  // Looking for (key block)+ sequence. One of the keys has to
be `other`.\n  for (let pos = 0; pos < parts.length;) {\n  let key = parts[pos++].trim();\n  if (icuType ===
IcuType.plural) {\n  // Key can be `=x`, we just want `x`\n  key = key.replace(/\\s*(?:=)?(\\w+)\\s*/, '$1');\n
}\n  if (key.length) {\n  cases.push(key);\n  }\n  }\n  const blocks =
i18nParseTextIntoPartsAndICU(parts[pos++]) as string[];\n  if (cases.length > values.length) {\n
values.push(blocks);\n  }\n  }\n  // TODO(ocombe): support ICU expressions in attributes, see #21615\n  return
{type: icuType, mainBinding: mainBinding, cases, values};\n  }\n  }\n  * Breaks pattern into strings and top level
{...}
blocks.\n  * Can be used to break a message into text and ICU expressions, or to break an ICU expression\n  * into
keys and cases. Original code from closure library, modified for Angular.\n  * @param pattern (sub)Pattern to be
broken.\n  * @returns An `Array<string|IcuExpression>` where:\n  * - odd positions: `string` => text between ICU
expressions\n  * - even positions: `ICUExpression` => ICU expression parsed into `ICUExpression` record.\n
*^nextport function i18nParseTextIntoPartsAndICU(pattern: string): (string|IcuExpression)[] {\n  if (!pattern) {\n
return [];\n  }\n  let prevPos = 0;\n  const braceStack = [];\n  const results: (string|IcuExpression)[] = [];\n  const
braces = /[{ }]/g;\n  // lastIndex doesn't get set to 0 so we have to.\n  braces.lastIndex = 0;\n  let match;\n  while
(match = braces.exec(pattern)) {\n  const pos = match.index;\n  if (match[0] === '}') {\n  braceStack.pop();\n
}\n  if (braceStack.length === 0) {\n  // End of the block.\n
const block = pattern.substring(prevPos, pos);\n  if (ICU_BLOCK_REGEXP.test(block)) {\n
results.push(parseICUBlock(block));\n  } else {\n  results.push(block);\n  }\n  prevPos = pos +
1;\n  }\n  } else {\n  if (braceStack.length === 0) {\n  const substring = pattern.substring(prevPos, pos);\n
results.push(substring);\n  prevPos = pos + 1;\n  }\n  braceStack.push('{');\n  }\n  }\n  const substring =
pattern.substring(prevPos);\n  results.push(substring);\n  return results;\n  }\n  }\n  * Parses a node, its children
and its siblings, and generates the mutate & update OpCodes.\n  * @^nextport function parseIcuCase(\n  tView:
TView, tIcu: TIcu, lView: LView, updateOpCodes: I18nUpdateOpCodes, parentIdx: number,\n  caseName: string,
unsafeCaseHtml: string, nestedIcus: IcuExpression[]): number {\n  const create: IcuCreateOpCodes = [] as any;\n
const remove: I18nRemoveOpCodes = [] as any;\n  const
update: I18nUpdateOpCodes = [] as any;\n  if (ngDevMode) {\n  attachDebugGetter(create,
icuCreateOpCodesToString);\n  attachDebugGetter(remove, i18nRemoveOpCodesToString);\n
}

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attachDebugGetter(update, I18nUpdateOpCodesToString);\n }\n tIcu.cases.push(caseName);\n
tIcu.create.push(create);\n tIcu.remove.push(remove);\n tIcu.update.push(update);\n\n const inertBodyHelper =
getInertBodyHelper(getDocument());\n const inertBodyElement =
inertBodyHelper.getInertBodyElement(unsafeCaseHtml);\n ngDevMode && assertDefined(inertBodyElement,
'Unable to generate inert body element');\n const inertRootNode = getTemplateContent(inertBodyElement!) as
Element || inertBodyElement;\n if (inertRootNode) {\n return walkIcuTree(\n tView, tIcu, IView,
updateOpCodes, create, remove, update, inertRootNode, parentIdx,\n nestedIcus, 0);\n } else {\n return 0;\n
}\n\nfunction walkIcuTree(\n tView: TView, tIcu: TIcu, IView: LView, sharedUpdateOpCodes:
I18nUpdateOpCodes,\n
create: IcuCreateOpCodes, remove: I18nRemoveOpCodes, update: I18nUpdateOpCodes,\n parentNode:
Element, parentIdx: number, nestedIcus: IcuExpression[], depth: number): number {\n let bindingMask = 0;\n let
currentNode = parentNode.firstChild;\n while (currentNode) {\n const newIndex = allocExpando(tView, IView,
1, null);\n switch (currentNode.nodeType) {\n case Node.ELEMENT_NODE:\n const element =
currentNode as Element;\n const tagName = element.tagName.toLowerCase();\n if
(VALID_ELEMENTS.hasOwnProperty(tagName)) {\n addCreateNodeAndAppend(create,
ELEMENT_MARKER, tagName, parentIdx, newIndex);\n tView.data[newIndex] = tagName;\n const
elAttrs = element.attributes;\n for (let i = 0; i < elAttrs.length; i++) {\n const attr = elAttrs.item(i);\n
const lowerAttrName = attr.name.toLowerCase();\n const hasBinding =
!!attr.value.match(BINDING_REGEXP);\n // we assume the
input string is safe, unless it's using a binding\n if (hasBinding) {\n if
(VALID_ATTRS.hasOwnProperty(lowerAttrName)) {\n if (URI_ATTRS[lowerAttrName]) {\n
generateBindingUpdateOpCodes(\n update, attr.value, newIndex, attr.name, 0, _sanitizeUrl);\n
}\n } else {\n generateBindingUpdateOpCodes(update, attr.value, newIndex, attr.name, 0, null);\n
}\n } else {\n ngDevMode &&\n console.warn(\n `WARNING: ignoring
unsafe attribute value ` +\n ` ${lowerAttrName} on element ${tagName} ` +\n `(see
https://g.co/ng/security#xss));\n } else {\n addCreateAttribute(create, newIndex, attr);\n
}\n }\n // Parse the children of this node (if any)\n bindingMask = walkIcuTree(\n
tView, tIcu, IView, sharedUpdateOpCodes, create, remove, update,\n currentNode as
Element, newIndex, nestedIcus, depth + 1) |\n bindingMask;\n addRemoveNode(remove, newIndex,
depth);\n }\n break;\n case Node.TEXT_NODE:\n const value = currentNode.textContent || '';\n
const hasBinding = value.match(BINDING_REGEXP);\n addCreateNodeAndAppend(create, null, hasBinding
? ` ` : value, parentIdx, newIndex);\n addRemoveNode(remove, newIndex, depth);\n if (hasBinding) {\n
bindingMask =\n generateBindingUpdateOpCodes(update, value, newIndex, null, 0, null) | bindingMask;\n
}\n break;\n case Node.COMMENT_NODE:\n // Check if the comment node is a placeholder for a
nested ICU\n const isNestedIcu = NESTED_ICU.exec(currentNode.textContent || '');\n if (isNestedIcu) {\n
const nestedIcuIndex = parseInt(isNestedIcu[1], 10);\n
const icuExpression: IcuExpression = nestedIcus[nestedIcuIndex];\n // Create the comment node that
will anchor the ICU expression\n addCreateNodeAndAppend(\n create, ICU_MARKER, ngDevMode
? `nested ICU ${nestedIcuIndex} ` : ", parentIdx,\n newIndex);\n icuStart(tView, IView,
sharedUpdateOpCodes, parentIdx, icuExpression, newIndex);\n addRemoveNestedIcu(remove, newIndex,
depth);\n }\n break;\n }\n currentNode = currentNode.nextSibling;\n }\n return
bindingMask;\n }\n\nfunction addRemoveNode(remove: I18nRemoveOpCodes, index: number, depth: number) {\n
if (depth === 0) {\n remove.push(index);\n }\n\nfunction addRemoveNestedIcu(remove:
I18nRemoveOpCodes, index: number, depth: number) {\n if (depth === 0) {\n remove.push(~index); // remove
ICU at `index`\n remove.push(index); // remove ICU comment at `index`\n }\n\nfunction
addUpdateIcuSwitch(\n update: I18nUpdateOpCodes, icuExpression:
IcuExpression, index: number) {\n update.push(\n toMaskBit(icuExpression.mainBinding), 2, -1 -
icuExpression.mainBinding,\n index << I18nUpdateOpCode.SHIFT_REF |

```

```

I18nUpdateOpCode.IcuSwitch);\n}\n\nfunction addUpdateIcuUpdate(update: I18nUpdateOpCodes, bindingMask:
number, index: number) {\n  update.push(bindingMask, 1, index << I18nUpdateOpCode.SHIFT_REF |
I18nUpdateOpCode.IcuUpdate);\n}\n\nfunction addCreateNodeAndAppend(\n  create: IcuCreateOpCodes,
marker: null|ICU_MARKER|ELEMENT_MARKER, text: string,\n  appendToParentIdx: number, createAtIdx:
number) {\n  if (marker !== null) {\n    create.push(marker);\n  }\n  create.push(\n    text, createAtIdx,\n    icuCreateOpCode.IcuCreateOpCode.AppendChild, appendToParentIdx, createAtIdx);\n}\n\nfunction
addCreateAttribute(create: IcuCreateOpCodes, newIndex: number, attr: Attr) {\n  create.push(newIndex <<
IcuCreateOpCode.SHIFT_REF | IcuCreateOpCode.Attr, attr.name, attr.value);\n}\n}\n"/**\n * @license\n *
Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n// i18nPostprocess consts\nconst
ROOT_TEMPLATE_ID = 0;\nconst PP_MULTI_VALUE_PLACEHOLDERS_REGEXP = /\[(.+?)\]/;\nconst
PP_PLACEHOLDERS_REGEXP = /\[(.+?)\]|(\|\/?*\d+:\d+)/g;\nconst PP_ICU_VARS_REGEXP =
/(\{s*)(VAR_(PLURAL|SELECT)_\d+?)(\|s*,)/g;\nconst PP_ICU_PLACEHOLDERS_REGEXP = /{([A-Z0-
9_]+)}/g;\nconst PP_ICUS_REGEXP = /I18N_EXP_(ICU_\d+)/g;\nconst PP_CLOSE_TEMPLATE_REGEXP
= /\|\/?*/;\nconst PP_TEMPLATE_ID_REGEXP = /\d+:\d+:/;\n\n// Parsed placeholder structure used in
postprocessing (within `i18nPostprocess` function)\n// Contains the following fields: [templateId,
isCloseTemplateTag, placeholder]\ntype PostprocessPlaceholder = [number, boolean, string];\n\n/**\n * Handles
message string post-processing for internationalization.\n *\n * Handles message string post-processing
by transforming it from intermediate\n * format (that might contain some markers that we need to replace) to the
final\n * form, consumable by i18nStart instruction. Post processing steps include:\n *\n * 1. Resolve all multi-value
cases (like [*1:1#2:1#4:1#5])\n *\n * 2. Replace all ICU vars (like "VAR_PLURAL")\n *\n * 3. Replace all placeholders
used inside ICUs in a form of {PLACEHOLDER}\n *\n * 4. Replace all ICU references with corresponding values (like
ICU_EXP_ICU_1)\n *\n * in case multiple ICUs have the same placeholder name\n *\n * @param message Raw
translation string for post processing\n * @param replacements Set of replacements that should be applied\n *\n *
@return Transformed string that can be consumed by i18nStart instruction\n *\n * @codeGenApi\n */\nexport
function i18nPostprocess(\n  message: string, replacements: {[key: string]: (string|string[])} = {}): string {\n  /**\n
* Step 1: resolve all multi-value placeholders like [#5*1:1#2:1#4:1]\n
*\n * Note: due to the way we process nested templates (BFS), multi-value placeholders are typically\n *
grouped by templates, for example: [#5|#6|#1:1#3:2] where #5 and #6 belong to root\n * template, #1:1 belong to
nested template with index 1 and #1:2 - nested template with index\n * 3. However in real templates the order
might be different: i.e. #1:1 and/or #3:2 may go in\n * front of #6. The post processing step restores the right order
by keeping track of the\n * template id stack and looks for placeholders that belong to the currently active
template.\n *\n let result: string = message;\n if
(PP_MULTI_VALUE_PLACEHOLDERS_REGEXP.test(message)) {\n  const matches: {[key: string]:
PostprocessPlaceholder[]} = {};\n  const templateIdsStack: number[] = [ROOT_TEMPLATE_ID];\n  result =
result.replace(PP_PLACEHOLDERS_REGEXP, (m: any, phs: string, tpl: string): string => {\n    const content =
phs || tpl;\n    const placeholders: PostprocessPlaceholder[]
= matches[content] || [];\n    if (!placeholders.length) {\n      content.split('|').forEach((placeholder: string) => {\n
const match = placeholder.match(PP_TEMPLATE_ID_REGEXP);\n      const templateId = match ?
parseInt(match[1], 10) : ROOT_TEMPLATE_ID;\n      const isCloseTemplateTag =
PP_CLOSE_TEMPLATE_REGEXP.test(placeholder);\n      placeholders.push([templateId, isCloseTemplateTag,
placeholder]);\n    });\n    matches[content] = placeholders;\n  })\n  if (!placeholders.length) {\n
throw new Error(`i18n postprocess: unmatched placeholder - ${content}`);\n  }\n  const currentTemplateId =
templateIdsStack[templateIdsStack.length - 1];\n  let idx = 0;\n  // find placeholder index that matches current
template id\n  for (let i = 0; i < placeholders.length; i++) {\n    if (placeholders[i][0] === currentTemplateId)
{\n      idx = i;\n      break;\n    }\n  }\n  // update

```

```

    template id stack based on the current tag extracted\n    const [templateId, isCloseTemplateTag, placeholder] =
    placeholders[idx];\n    if (isCloseTemplateTag) {\n        templateIdsStack.pop();\n    } else if (currentTemplateId
    !== templateId) {\n        templateIdsStack.push(templateId);\n    }\n    // remove processed tag from the list\n    placeholders.splice(idx, 1);\n    return placeholder;\n });\n }\n\n // return current result if no replacements
    specified\n    if (!Object.keys(replacements).length) {\n        return result;\n    }\n\n /**\n     * Step 2: replace all ICU vars
    (like \"VAR_PLURAL\")\n     *\n     result = result.replace(PP_ICU_VARS_REGEXP, (match, start, key, _type, _idx,
    end): string => {\n        return replacements.hasOwnProperty(key) ? `${start}${replacements[key]}${end}` : match;\n
    });\n\n /**\n     * Step 3: replace all placeholders used inside ICUs in a form of {PLACEHOLDER}\n     *\n     result =
    result.replace(PP_ICU_PLACEHOLDERS_REGEXP, (match, key): string
    => {\n        return replacements.hasOwnProperty(key) ? replacements[key] as string : match;\n    });\n\n /**\n     * Step
    4: replace all ICU references with corresponding values (like ICU_EXP_ICU_1) in case\n     * multiple ICUs have
    the same placeholder name\n     *\n     result = result.replace(PP_ICUS_REGEXP, (match, key): string => {\n        if
    (replacements.hasOwnProperty(key)) {\n            const list = replacements[key] as string[];\n            if (!list.length) {\n
    throw new Error(`i18n postprocess: unmatched ICU - ${match} with key: ${key}`);\n            }\n            return list.shift(!);\n
    }\n        return match;\n    });\n\n    return result;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights
    Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
    LICENSE file at https://angular.io/license\n */\nimport './../util/ng_dev_mode';\nimport
    './../util/ng_i18n_closure_mode';\nimport {assertDefined} from './../util/assert';\nimport {bindingUpdated}
    from './bindings';\nimport {applyCreateOpCodes, applyI18n, setMaskBit} from './i18n/i18n_apply';\nimport
    {i18nAttributesFirstPass, i18nStartFirstCreatePass} from './i18n/i18n_parse';\nimport {i18nPostprocess} from
    './i18n/i18n_postprocess';\nimport {TI18n} from './interfaces/i18n';\nimport {TElementNode, TNodeType} from
    './interfaces/node';\nimport {HEADER_OFFSET, T_HOST} from './interfaces/view';\nimport
    {getClosestRElement} from './node_manipulation';\nimport {getCurrentParentTNode, getLView, getTView,
    nextBindingIndex, setInI18nBlock} from './state';\nimport {getConstant} from './util/view_utils';\n\n/**\n * Marks
    a block of text as translatable.\n *\n * The instructions `i18nStart` and `i18nEnd` mark the translation block in the
    template.\n *\n * The translation `message` is the value which is locale specific. The translation string may\n *
    contain placeholders which associate inner elements and sub-templates within the translation.\n *\n * The translation
    `message` placeholders
    are:\n * - `{index}({block})`: *Binding Placeholder*: Marks a location where an expression will be\n *
    interpolated into. The placeholder `index` points to the expression binding index. An optional\n * `block` that
    matches the sub-template in which it was declared.\n * - `#{index}({block})`/`/#{index}({block})`: *Element
    Placeholder*: Marks the beginning\n * and end of DOM element that were embedded in the original translation
    block. The placeholder\n * `index` points to the element index in the template instructions set. An optional `block`
    that\n * matches the sub-template in which it was declared.\n * - `*{index}({block})`/`*{index}({block})`: *Sub-
    template Placeholder*: Sub-templates must be\n * split up and translated separately in each angular template
    function. The `index` points to the\n * `template` instruction index. A `block` that matches the sub-template in
    which it was declared.\n *\n * @param index A unique index of the translation in the
    static block.\n *\n * @param messageIndex An index of the translation message from the `def.consts` array.\n *\n
    * @param subTemplateIndex Optional sub-template index in the `message`.\n *\n * @codeGenApi\n */\nexport
    function i18nStart(\n    index: number, messageIndex: number, subTemplateIndex: number = -1): void {\n    const
    tView = getTView();\n    const lView = getLView();\n    const adjustedIndex = HEADER_OFFSET + index;\n    ngDevMode
    && assertDefined(tView, `tView should be defined`);\n    const message =
    getConstant<string>(tView.consts, messageIndex);\n    const parentTNode = getCurrentParentTNode() as
    TElementNode | null;\n    if (tView.firstCreatePass) {\n        i18nStartFirstCreatePass(\n            tView, parentTNode ===
    null ? 0 : parentTNode.index, lView, adjustedIndex, message,\n            subTemplateIndex);\n    }\n    const tI18n =
    tView.data[adjustedIndex] as TI18n;\n    const sameViewParentTNode = parentTNode === lView[T_HOST] ? null :
    parentTNode;\n    const parentRNode = getClosestRElement(tView,

```



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This file re-exports all symbols contained in this directory.

Why is this file not `index.ts`? There seems to be an inconsistent path resolution of an `index.ts` file when only the parent directory is referenced. This could be due to the node module resolution configuration differing from rollup and/or typescript.

With commit <https://github.com/angular/angular/commit/d5e3f2c64bd13ce83e7c70788b7fc514ca4a9918> the `instructions.ts` file was moved to `instructions/instructions.ts` and an `index.ts` file was used to re-export everything. Having had file names that were importing from `instructions` directly (not the from the sub file or the `index.ts` file) caused strange CI issues. `index.ts` had to be renamed to `all.ts` for this to work. Jira Issue = FW-1184

```

export * from './attribute';
export * from './attribute_interpolation';
export * from './change_detection';
export * from './template';
export * from './storage';
export * from './di';
export * from './di_attr';
export * from './element';
export * from './element_container';
export * from './get_current_view';
export * from './listener';
export * from './namespace';
export * from './next_context';
export * from './projection';
export * from './property';
export * from './property_interpolation';
export * from './advance';
export * from './styling';
export * from './text';
export * from './text_interpolation';
export * from './class_map_interpolation';
export * from './style_map_interpolation';
export * from './style_prop_interpolation';
export * from './host_property';
export * from './i18n';
export {
  getUnknownElementStrictMode,
  setUnknownElementStrictMode,
  getUnknownPropertyStrictMode,
  setUnknownPropertyStrictMode
} from './element_validation';

```

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```

import {
  resolveForwardRef
} from './di/forward_ref';
import {
  ClassProvider,
  Provider
} from './di/interface/provider';
import {
  isClassProvider,
  isTypeProvider
} from './di/provider_collection';
import {
  providerToFactory
} from './di/r3_injector';
import {
  assertDefined
} from './util/assert';
import {
  diPublicInInjector,
  getNodeInjectable,
  getOrCreateNodeInjectorForNode
} from './di';
import {
  directiveInject
} from './instructions/all';
import {
  DirectiveDef
} from './interfaces/definition';
import {
  NodeInjectorFactory
} from './interfaces/injector';
import {
  TContainerNode,
  TDirectiveHostNode,
  TElementContainerNode,
  TElementNode,
  TNodeProviderIndexes
} from './interfaces/node';
import {
  isComponentDef
} from './interfaces/type_checks';
import {
  DestroyHookData,
  LView,
  TData,
  TVIEW,
  TView
} from './interfaces/view';
import {
  getCurrentTNode,
  getLView,
  getTView
} from './state';

```

Resolves the providers which are defined in the `DirectiveDef`.

When inserting the tokens and the factories in their respective arrays, we can assume that this method is called first for the component (if any), and then for other directives on the same node.

As a consequence, the providers are always processed in that order:

- 1) The view providers of the component
- 2) The providers of the component
- 3) The providers of the other directives

This matches the structure of the injectables arrays of a view (for each node). So the tokens and the factories can be pushed at the end of the arrays, except in one case for multi providers.

```

@param def the directive definition
@param providers: Array of `providers`
@param viewProviders: Array of `viewProviders`
^
export function providersResolver<T>(
  def: DirectiveDef<T>,
  providers: Provider[],
  viewProviders: Provider[]): void {
  const tView = getTView();
  if (tView.firstCreatePass) {
    const isComponent = isComponentDef(def);
    // The list of view providers is processed first, and the flags
    // are updated
    resolveProvider(viewProviders, tView.data, tView.blueprint, isComponent, true);
    // Then, the list of providers is processed, and the flags are updated
    resolveProvider(providers, tView.data, tView.blueprint, isComponent, false);
  }
}

```

Resolves a provider and publishes it to the DI system.

```

function
resolveProvider(
  provider: Provider,
  tInjectables: TData,
  tInjectablesBlueprint: NodeInjectorFactory[],
  isComponent: boolean,
  isViewProvider: boolean): void {
  provider = resolveForwardRef(provider);
  if (Array.isArray(provider)) {
    // Recursively call `resolveProvider`
    // Recursion is OK in this case because this
    // code will not be in hot-path once we implement
    // cloning of the initial

```

```

state.\n  for (let i = 0; i < provider.length; i++) {\n    resolveProvider(\n      provider[i], tInjectables,
IInjectablesBlueprint, isComponent, isViewProvider);\n  }\n } else {\n  const tView = getTView();\n  const
IView = getLView();\n  let token: any = isTypeProvider(provider) ? provider :
resolveForwardRef(provider.provider);\n  let providerFactory: () => any = providerToFactory(provider);\n\n  const
tNode = getCurrentTNode();\n  const beginIndex = tNode.providerIndexes &
TNodeProviderIndexes.ProvidersStartIndexMask;\n  const endIndex = tNode.directiveStart;\n  const
cptViewProvidersCount =\n    tNode.providerIndexes >>
TNodeProviderIndexes.CptViewProvidersCountShift;\n\n  if (isTypeProvider(provider) || !provider.multi) {\n    //
Single provider case: the factory is created and pushed immediately\n    const factory = new
NodeInjectorFactory(providerFactory, isViewProvider, directiveInject);\n    const existingFactoryIndex =
indexOf(\n
      token, tInjectables, isViewProvider ? beginIndex : beginIndex + cptViewProvidersCount,\n      endIndex);\n
    if (existingFactoryIndex === -1) {\n      diPublicInInjector(\n        getOrCreateNodeInjectorForNode(\n
          tNode as TElementNode | TContainerNode | TElementContainerNode, IView),\n          tView, token);\n
      registerDestroyHooksIfSupported(tView, provider, tInjectables.length);\n      tInjectables.push(token);\n
      tNode.directiveStart++;\n      tNode.directiveEnd++;\n      if (isViewProvider) {\n        tNode.providerIndexes +=
TNodeProviderIndexes.CptViewProvidersCountShifter;\n      }\n      IInjectablesBlueprint.push(factory);\n
      IView.push(factory);\n    } else {\n      IInjectablesBlueprint[existingFactoryIndex] = factory;\n
      IView[existingFactoryIndex] = factory;\n    }\n  } else {\n    // Multi provider case:\n    // We create a multi
factory which is going to aggregate all the values.\n
    // Since the output of such a factory depends on content or view injection,\n    // we create two of them, which
are linked together.\n    // The first one (for view providers) is always in the first block of the injectables
array,\n    // and the second one (for providers) is always in the second block.\n    // This is important because
view providers have higher priority. When a multi token\n    // is being looked up, the view providers should be
found first.\n    // Note that it is not possible to have a multi factory in the third block (directive block).\n    // The algorithm to process multi providers is as follows:\n    // 1) If the multi provider comes from the
`viewProviders` of the component:\n    // a) If the special view providers factory doesn't exist, it is created and
pushed.\n    // b) Else, the multi provider is added to the existing multi factory.\n    // 2) If the multi provider
comes from the `providers` of the component
or of another\n    // directive:\n    // a) If the multi factory doesn't exist, it is created and provider pushed into
it.\n    // It is also linked to the multi factory for view providers, if it exists.\n    // b) Else, the multi provider is
added to the existing multi factory.\n\n    const existingProvidersFactoryIndex =\n      indexOf(token,
tInjectables, beginIndex + cptViewProvidersCount, endIndex);\n    const existingViewProvidersFactoryIndex =\n
      indexOf(token, tInjectables, beginIndex, beginIndex + cptViewProvidersCount);\n    const
doesProvidersFactoryExist = existingProvidersFactoryIndex >= 0 &&\n
IInjectablesBlueprint[existingProvidersFactoryIndex];\n    const doesViewProvidersFactoryExist =
existingViewProvidersFactoryIndex >= 0 &&\n
IInjectablesBlueprint[existingViewProvidersFactoryIndex];\n\n    if (isViewProvider &&
!doesViewProvidersFactoryExist ||\n      !isViewProvider && !doesProvidersFactoryExist) {\n
      // Cases 1.a and 2.a\n      diPublicInInjector(\n        getOrCreateNodeInjectorForNode(\n          tNode as
TElementNode | TContainerNode | TElementContainerNode, IView),\n          tView, token);\n      const factory =
multiFactory(\n        isViewProvider ? multiViewProvidersFactoryResolver : multiProvidersFactoryResolver,\n
        IInjectablesBlueprint.length, isViewProvider, isComponent, providerFactory);\n      if (!isViewProvider &&
doesViewProvidersFactoryExist) {\n
IInjectablesBlueprint[existingViewProvidersFactoryIndex].providerFactory = factory;\n      }\n
      registerDestroyHooksIfSupported(tView, provider, tInjectables.length, 0);\n      tInjectables.push(token);\n
      tNode.directiveStart++;\n      tNode.directiveEnd++;\n      if (isViewProvider) {\n        tNode.providerIndexes +=
TNodeProviderIndexes.CptViewProvidersCountShifter;\n      }\n      IInjectablesBlueprint.push(factory);\n

```



```

IView.push(factory);\n
    } else {\n    // Cases 1.b and 2.b\n    const indexInFactory = multiFactoryAdd(\n
@InjectablesBlueprint!\n    [isViewProvider ? existingViewProvidersFactoryIndex :\n
existingProvidersFactoryIndex],\n    providerFactory, !isViewProvider && isComponent);\n
registerDestroyHooksIfSupported(\n    tView, provider,\n    existingProvidersFactoryIndex > -1 ?\n
existingProvidersFactoryIndex :\n    existingViewProvidersFactoryIndex,\n
indexInFactory);\n    }\n    if (!isViewProvider && isComponent && doesViewProvidersFactoryExist) {\n
@InjectablesBlueprint[existingViewProvidersFactoryIndex].componentProviders!++;\n    }\n    }\n}\n\n/**\n * Registers the `ngOnDestroy` hook of a provider, if the provider supports destroy hooks.\n * @param tView `TView`\n * in which to register the hook.\n * @param provider Provider whose hook should\n * be registered.\n * @param contextIndex Index under which to find the context for the hook when it's being\n * invoked.\n * @param indexInFactory Only required for `multi` providers. Index of the provider in the multi\n * provider factory.\n */\nfunction registerDestroyHooksIfSupported(\n    tView: TView, provider: Exclude<Provider,\n
any[]>, contextIndex: number,\n    indexInFactory?: number) {\n    const providerIsTypeProvider =\n
isTypeProvider(provider);\n    const providerIsClassProvider = isClassProvider(provider);\n\n    if\n
(providerIsTypeProvider || providerIsClassProvider) {\n    // Resolve forward references as `useClass` can hold a\n
forward reference.\n    const classToken = providerIsClassProvider ? resolveForwardRef(provider.useClass) :\n
provider;\n    const prototype = classToken.prototype;\n    const ngOnDestroy = prototype.ngOnDestroy;\n\n    if\n
(ngOnDestroy) {\n    const hooks = tView.destroyHooks || (tView.destroyHooks = []);\n\n    if\n
(!providerIsTypeProvider && ((provider\n
as ClassProvider)).multi) {\n    ngDevMode &&\n    assertDefined(\n    indexInFactory,\n
'indexInFactory when registering multi factory destroy hook');\n    const existingCallbacksIndex =\n
hooks.indexOf(contextIndex);\n\n    if (existingCallbacksIndex === -1) {\n    hooks.push(contextIndex,\n
[indexInFactory, ngOnDestroy]);\n    } else {\n    (hooks[existingCallbacksIndex + 1] as\n
DestroyHookData).push(indexInFactory!, ngOnDestroy);\n    }\n    } else {\n    hooks.push(contextIndex,\n
ngOnDestroy);\n    }\n    }\n}\n\n/**\n * Add a factory in a multi factory.\n * @returns Index at which the\n * factory was inserted.\n */\nfunction multiFactoryAdd(\n    multiFactory: NodeInjectorFactory, factory: () => any,\n
isComponentProvider: boolean): number {\n    if (isComponentProvider) {\n
multiFactory.componentProviders!++;\n    }\n    return multiFactory.multi!.push(factory) - 1;\n}\n\n/**\n * Returns the\n * index of item in the array, but only in\n * the begin to end range.\n */\nfunction indexOf(item: any, arr: any[], begin: number, end: number) {\n    for (let i =\n
begin; i < end; i++) {\n    if (arr[i] === item) return i;\n    }\n    return -1;\n}\n\n/**\n * Use this with `multi`\n * `providers`.\n */\nfunction multiProvidersFactoryResolver(\n    this: NodeInjectorFactory, _: undefined, tData:\n
TData, lData: LView,\n    tNode: TDirectiveHostNode): any[] {\n    return multiResolve(this.multi!, []);\n}\n\n/**\n * Use this with `multi` `viewProviders`.\n */\nfunction multiViewProvidersFactoryResolver(\n    this: NodeInjectorFactory, _: undefined, tData:\n
TData, IView: LView,\n    tNode: TDirectiveHostNode): any[] {\n    const factories = this.multi!;\n    let result:\n
any[];\n    if (this.providerFactory) {\n    const componentCount = this.providerFactory.componentProviders!;\n
const multiProviders =\n    getNodeInjectable(IView, IView[TVIEW], this.providerFactory!.index!,\n
tNode);\n    // Copy the section of the array which contains `multi` `providers` from the component\n    result =\n
multiProviders.slice(0, componentCount);\n    // Insert the `viewProvider` instances.\n    multiResolve(factories,\n
result);\n    // Copy the section of the array which contains `multi` `providers` from other directives\n    for (let i =\n
componentCount; i < multiProviders.length; i++) {\n    result.push(multiProviders[i]);\n    }\n    } else {\n    result =\n
[];\n    // Insert the `viewProvider` instances.\n    multiResolve(factories, result);\n    }\n    return result;\n}\n\n/**\n * Maps an array of factories into an array of values.\n */\nfunction multiResolve(factories: Array<() => any>, result:\n
any[]): any[] {\n    for (let i = 0; i < factories.length; i++) {\n    const factory = factories[i]! as () => null;\n
result.push(factory());\n    }\n    return result;\n}\n\n/**\n * Creates a multi factory.\n */\nfunction multiFactory(\n
factoryFn: (\n    this: NodeInjectorFactory,
```

```

_: undefined, tData: TData, lData: LView,\n      tNode: TDirectiveHostNode) => any,\n  index: number,\n  isViewProvider: boolean, isComponent: boolean,\n  f: () => any): NodeInjectorFactory {\n  const factory = new\n  NodeInjectorFactory(factoryFn, isViewProvider, directiveInject);\n  factory.multi = [];\n  factory.index = index;\n  factory.componentProviders = 0;\n  multiFactoryAdd(factory, f, isComponent && !isViewProvider);\n  return\n  factory;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is\n  governed by an MIT-style license that can be\n  found in the LICENSE file at https://angular.io/license\n */\nimport {ProcessProvidersFunction, Provider} from '../di/interface/provider';\nimport {providersResolver}\n  from '../di_setup';\nimport {DirectiveDef} from '../interfaces/definition';\n\n/**\n * This feature resolves the\n  providers of a directive (or component),\n * and publish them into the DI system, making it\n  visible to others for injection.\n * For example:\n * ```\n * class ComponentWithProviders {\n *   constructor(private greeter: GreeterDE) {\n *     static cmp = defineComponent({\n *       type:\n        ComponentWithProviders,\n *       selectors: [['component-with-providers']],\n *       factory: () => new\n        ComponentWithProviders(directiveInject(GreeterDE as any)),\n *       decls: 1,\n *       vars: 1,\n *       template:\n        function(fs: RenderFlags, ctx: ComponentWithProviders) {\n *         if (fs & RenderFlags.Create) {\n *           text(0);\n *         }\n *         if (fs & RenderFlags.Update) {\n *           textInterpolate(ctx.greeter.greet());\n *         }\n *       },\n *       features: [ProvidersFeature([GreeterDE])]\n *     });\n *   }\n * }\n * ```\n * @param definition\n * @codeGenApi\n */\nexport function ProvidersFeature<T>(providers: Provider[], viewProviders: Provider[] = []) {\n  return\n  (definition: DirectiveDef<T>) => {\n    definition.providersResolver =\n      (def: DirectiveDef<T>,\n        processProvidersFn?:\n          ProcessProvidersFunction) => {\n      return providersResolver(\n        def,\n        /\n        processProvidersFn ? processProvidersFn(providers) : providers, /\n        viewProviders);\n    };\n  };\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is\n  governed by an MIT-style license that can be\n  found in the LICENSE file at https://angular.io/license\n */\nimport {Injector} from '../di/injector';\nimport {EnvironmentInjector} from '../di/r3_injector';\nimport {Type}\n  from '../interface/type';\nimport {ComponentFactoryResolver} from './component_factory_resolver';\n\n/**\n * Represents an instance of an `NgModule` created by an `NgModuleFactory`.\n * Provides access to the `NgModule`\n  instance and related objects.\n * @publicApi\n */\nexport abstract class NgModuleRef<T> {\n  /**\n   * The\n    injector that contains all of the providers\n    of the `NgModule`.\n   */\n  abstract get injector(): EnvironmentInjector;\n\n  /**\n   * The resolver that can retrieve\n    component factories in a context of this module.\n   * Note: since v13, dynamic component creation via\n   * `ViewContainerRef.createComponent` (api/core/ViewContainerRef#createComponent)\n   * does not require\n    resolving component factory: component class can be used directly.\n   * @deprecated Angular no longer\n    requires Component factories. Please use other APIs where\n   * Component class can be used directly.\n   */\n  abstract get componentFactoryResolver(): ComponentFactoryResolver;\n\n  /**\n   * The `NgModule` instance.\n   */\n  abstract get instance(): T;\n\n  /**\n   * Destroys the module instance and all of the data structures associated\n    with it.\n   */\n  abstract destroy(): void;\n\n  /**\n   * Registers a callback to be executed when the module is\n    destroyed.\n   */\n  abstract onDestroy(callback: () => void): void;\n}\n\nexport\n  interface InternalNgModuleRef<T> extends NgModuleRef<T> {\n  // Note: we are using the prefix _ as\n  NgModuleData is an NgModuleRef and therefore directly\n  // exposed to the user.\n  _bootstrapComponents:\n    Type<any>[];\n}\n\n/**\n * @publicApi\n * @deprecated\n * This class was mostly used as a part of\n  ViewEngine-based JIT API and is no longer needed in Ivy\n * JIT mode. See [JIT API changes due to ViewEngine\n  deprecation](guide/deprecations#jit-api-changes)\n * for additional context. Angular provides APIs that accept\n  NgModule classes directly (such as\n * [PlatformRef.bootstrapModule](api/core/PlatformRef#bootstrapModule)\n  and\n * [createNgModule](api/core/createNgModule)), consider switching to those APIs instead of\n * using\n  factory-based ones.\n */\nexport abstract class NgModuleFactory<T> {\n  abstract get moduleType(): Type<T>;\n  abstract create(parentInjector: Injector|null): NgModuleRef<T>;\n}\n"/**\n * @license\n * Copyright Google LLC\n  All Rights Reserved.\n * Use of

```

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```

import { createInjectorWithoutInjectorInstances } from
'./di/create_injector';
import { Injector } from './di/injector';
import { INJECTOR } from
'./di/injector_token';
import { InjectFlags } from './di/interface/injector';
import { ImportedNgModuleProviders,
Provider } from './di/interface/provider';
import { EnvironmentInjector, getNullInjector, R3Injector } from
'./di/r3_injector';
import { Type } from './interface/type';
import { ComponentFactoryResolver as
viewEngine_ComponentFactoryResolver } from './linker/component_factory_resolver';
import
{ InternalNgModuleRef, NgModuleFactory as viewEngine_NgModuleFactory, NgModuleRef as
viewEngine_NgModuleRef } from './linker/ng_module_factory';
import { assertDefined } from
'./util/assert';
import { stringify } from './util/stringify';
import { ComponentFactoryResolver } from
'/component_ref';
import { getNgModuleDef }
from './definition';
import { maybeUnwrapFn } from './util/misc_utils';

Returns a new NgModuleRef
instance based on the NgModule class and parent injector provided.
@param NgModule NgModule class.
@param parentInjector Optional injector instance to use as a parent for the module injector. If
not provided,
`NullInjector` will be used instead.
@returns NgModuleRef that represents an NgModule instance.
@publicApi
export function createNgModule<T>(
  NgModule: Type<T>, parentInjector?: Injector):
viewEngine_NgModuleRef<T> {
  return new NgModuleRef<T>(NgModule, parentInjector ?? null);
}

The `createNgModule` function alias for backwards-compatibility. Please avoid using it directly and use
`createNgModule` instead.
@deprecated Use `createNgModule` instead.
export const
createNgModuleRef = createNgModule;
export class NgModuleRef<T> extends viewEngine_NgModuleRef<T>
implements InternalNgModuleRef<T>
{
  // tslint:disable-next-line:require-internal-with-underscore
  _bootstrapComponents: Type<any>[] = [];
  //
  tslint:disable-next-line:require-internal-with-underscore
  _r3Injector: R3Injector;
  override instance: T;
  destroyCbs: (() => void)[] | null = [];
  // When bootstrapping a module we have a dependency graph that looks
  like this:
  // ApplicationRef -> ComponentFactoryResolver -> NgModuleRef. The problem is that if the
  // module being resolved tries to inject the ComponentFactoryResolver, it'll create a
  // circular dependency which
  will result in a runtime error, because the injector doesn't
  // exist yet. We work around the issue by creating the
  ComponentFactoryResolver ourselves
  // and providing it, rather than letting the injector resolve it.
  override
  readonly componentFactoryResolver: ComponentFactoryResolver =
    new
  ComponentFactoryResolver(this);
  constructor(ngModuleType: Type<T>, public _parent: Injector | null) {
    super();
    const
    ngModuleDef = getNgModuleDef(ngModuleType);
    ngDevMode &&
    assertDefined(
ngModuleDef,
    `NgModule '${stringify(ngModuleType)}' is not a subtype of 'NgModuleType.'`);
    this._bootstrapComponents = maybeUnwrapFn(ngModuleDef!.bootstrap);
    this._r3Injector =
createInjectorWithoutInjectorInstances(
ngModuleType, _parent,
[
  { provide: viewEngine_NgModuleRef, useValue: this },
  { provide:
viewEngine_ComponentFactoryResolver,
useValue: this.componentFactoryResolver,
},
],
stringify(ngModuleType), new Set(['environment'])) as
R3Injector;
  // We need to resolve the injector types separately from the injector creation, because
  // the module might be trying to use this ref in its constructor for DI which will
  cause a
  // circular error that will eventually error out, because the injector isn't created yet.
  this._r3Injector.resolveInjectorInitializers();
  this.instance = this._r3Injector.get(ngModuleType);
}

override get injector(): EnvironmentInjector {
  return this._r3Injector;
}

override destroy(): void {
  ngDevMode && assertDefined(this.destroyCbs, 'NgModule already destroyed');
  const injector =
this._r3Injector;
  !injector.destroyed && injector.destroy();
  this.destroyCbs!.forEach(fn => fn());
  this.destroyCbs = null;
}

override onDestroy(callback: () => void): void {
  ngDevMode &&
assertDefined(this.destroyCbs, 'NgModule already destroyed');
  this.destroyCbs!.push(callback);
}
}

export class NgModuleFactory<T> extends viewEngine_NgModuleFactory<T> {
  constructor(public

```

```

moduleType: Type<T> {\n  super();\n }\n\n override create(parentInjector: Injector|null):
viewEngine_NgModuleRef<T> {\n  return new NgModuleRef(this.moduleType,
  parentInjector);\n }\n}\n\nclass EnvironmentNgModuleRefAdapter extends viewEngine_NgModuleRef<null> {\n
  override readonly injector: EnvironmentInjector;\n  override readonly componentFactoryResolver:
ComponentFactoryResolver =\n    new ComponentFactoryResolver(this);\n  override readonly instance = null;\n\n  constructor(\n    providers: Array<Provider|ImportedNgModuleProviders>, parent: EnvironmentInjector|null,\n    source: string|null) {\n    super();\n    const injector = new R3Injector(\n      [\n        ...providers,\n        {provide:
viewEngine_NgModuleRef, useValue: this},\n        {provide: viewEngine_ComponentFactoryResolver, useValue:
this.componentFactoryResolver},\n      ],\n      parent || getNullInjector(), source, new Set(['environment']));\n    this.injector = injector;\n    injector.resolveInjectorInitializers();\n  }\n\n  override destroy(): void {\n
this.injector.destroy();\n }\n\n  override onDestroy(callback: () =>
void): void {\n    this.injector.onDestroy(callback);\n  }\n}\n\n/**\n * Create a new environment injector.\n *\n *
Learn more about environment injectors in\n * [this guide](guide/standalone-components#environment-injectors).\n
*\n * @param providers An array of providers.\n * @param parent A parent environment injector.\n * @param
debugName An optional name for this injector instance, which will be used in error\n *   messages.\n *\n *
@publicApi\n * @developerPreview\n */\nexport function createEnvironmentInjector(\n  providers:
Array<Provider|ImportedNgModuleProviders>, parent: EnvironmentInjector,\n  debugName: string|null = null):
EnvironmentInjector {\n  const adapter = new EnvironmentNgModuleRefAdapter(providers, parent, debugName);\n
  return adapter.injector;\n }\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport
{inject as inject} from '../di/injector_compatibility';\nimport {defineInjectable as defineInjectable} from
'../di/interface/defs';\nimport {internalImportProvidersFrom} from '../di/provider_collection';\nimport
{EnvironmentInjector} from '../di/r3_injector';\nimport {OnDestroy} from '../di/interface/lifecycle_hooks';\nimport
{ComponentDef} from '../di/interfaces/definition';\nimport {createEnvironmentInjector} from
'../ng_module_ref';\n\n/**\n * A service used by the framework to create instances of standalone injectors. Those
injectors are\n * created on demand in case of dynamic component instantiation and contain ambient providers\n *
collected from the imports graph rooted at a given standalone component.\n */\n\nclass StandaloneService implements
OnDestroy {\n  cachedInjectors = new Map<string, EnvironmentInjector|null>();\n\n  constructor(private _injector:
EnvironmentInjector) {\n  }\n\n  getOrCreateStandaloneInjector(componentDef: ComponentDef<unknown>):
EnvironmentInjector|null
  {\n    if (!componentDef.standalone) {\n      return null;\n    }\n\n    if (!this.cachedInjectors.has(componentDef.id))
{\n      const providers = internalImportProvidersFrom(false, componentDef.type);\n      const standaloneInjector =
providers.length > 0 ?\n        createEnvironmentInjector(\n          [providers], this._injector,
`Standalone[${componentDef.type.name}]`)\n          : null;\n      this.cachedInjectors.set(componentDef.id,
standaloneInjector);\n    }\n\n    return this.cachedInjectors.get(componentDef.id)!;\n  }\n\n  ngOnDestroy() {\n
  try\n  {\n    for (const injector of this.cachedInjectors.values()) {\n      if (injector !== null) {\n        injector.destroy();\n
      }\n    }\n  } finally {\n    this.cachedInjectors.clear();\n  }\n }\n\n /** @nocollapse */\n static prov = /**
@pureOrBreakMyCode */ defineInjectable({\n  token: StandaloneService,\n  providedIn: 'environment',\n
  factory: () => new StandaloneService(inject(EnvironmentInjector)),\n
  });\n}\n\n/**\n * A feature that acts as a setup code for the {@link StandaloneService}.\n *\n * The most important
responsibility of this feature is to expose the \"getStandaloneInjector\"\n * function (an entry points to a standalone
injector creation) on a component definition object. We\n * go through the features infrastructure to make sure that
the standalone injector creation logic\n * is tree-shakable and not included in applications that don't use standalone
components.\n *\n * @codeGenApi\n */\nexport function StandaloneFeature(definition:
ComponentDef<unknown>) {\n  definition.getStandaloneInjector = (parentInjector: EnvironmentInjector) => {\n
  return parentInjector.get(StandaloneService).getOrCreateStandaloneInjector(definition);\n }\n}\n\n", /**\n *
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```

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```

*^import {ChangeDetectionStrategy} from '../change_detection/constants';import {Injector} from
'../di/injector';import {ViewEncapsulation} from '../metadata/view';import {assertEqual} from
'../util/assert';import {assertLView} from '../assert';import {discoverLocalRefs, getComponentAtNodeIndex,
getDirectivesAtNodeIndex, getLContext, readPatchedLView} from './context_discovery';import
{getComponentDef, getDirectiveDef} from './definition';import {NodeInjector} from './di';import
{buildDebugNode} from './instructions/lview_debug';import {DirectiveDef} from
'./interfaces/definition';import {TElementNode, TNode, TNodeProviderIndexes} from './interfaces/node';import
{isLView} from './interfaces/type_checks';import {CLEANUP, CONTEXT, DebugNode, FLAGS, LView,
LViewFlags, T_HOST, TVIEW, TViewType} from './interfaces/view';import {getLViewParent,
getRootContext} from './view_traversal_utils';import {getTNode, unwrapRNode} from './view_utils';

```

**\* Retrieves the component instance associated with a given DOM element.**

**@usageNotes** Given the following DOM structure:

```

`html`
<app-root>
  <div>
    <child-comp>
  </div>
</app-root>

```

Calling `getComponent` on `<child-comp>` will return the instance of `ChildComponent` associated with this DOM element. Calling the function on `<app-root>` will return the `MyApp` instance.

**@param** element DOM element from which the component should be retrieved.

**@returns** Component instance associated with the element or `null` if there is no component associated with it.

```

@publicApi
@globalApi ng
export function getComponent<T>(element: Element): T|null {
  ngDevMode && assertDomElement(element);
  const context = getLContext(element);
  if (context === null)
    return null;
  if (context.component === undefined) {
    const IView = context.IView;
    if (IView === null)
      return null;
    context.component = getComponentAtNodeIndex(context.nodeIndex, IView);
  }
  return context.component as unknown as T;
}

```

**\* If inside an embedded view (e.g. `\*ngIf` or `\*ngFor`), retrieves the context of the embedded view that the element is part of. Otherwise retrieves the instance of the component whose view owns the element (in this case, the result is the same as calling `getOwningComponent`).**

**@param** element Element for which to get the surrounding component instance.

**@returns** Instance of the component that is around the element or null if the element isn't inside any component.

```

@publicApi
@globalApi ng
export function getContext<T extends {}>(element: Element): T|null {
  assertDomElement(element);
  const context = getLContext(element)!;
  const IView = context ? context.IView : null;
  return IView === null ? null : IView[CONTEXT] as T;
}

```

**\* Retrieves the component instance whose view contains the DOM element.**

**For example,** if `<child-comp>` is used in the template of `<app-comp>` (i.e. a `ViewChild` of `<app-comp>`), calling `getOwningComponent` on `<child-comp>` would return `<app-comp>`.

**@param** elementOrDir DOM element, component or directive instance for which to retrieve the root components.

**@returns** Component instance whose view owns the DOM element or null if the element is not part of a component view.

```

@publicApi
@globalApi ng
export function getOwningComponent<T>(elementOrDir: Element|{}): T|null {
  const context = getLContext(elementOrDir)!;
  let IView = context ? context.IView : null;
  if (IView === null)
    return null;
  let parent: LView|null;
  while (IView[TVIEW].type === TViewType.Embedded && (parent = getLViewParent(IView!)))
    IView = parent;
  return IView[FLAGS] & LViewFlags.IsRoot ? null : IView[CONTEXT] as unknown as T;
}

```

**\* Retrieves all root components associated with a DOM element, directive or component instance.**

**Root components** are those which have been bootstrapped by Angular.

**@param** elementOrDir DOM element, component or directive instance for which to retrieve the root components.

**@returns** Root components associated with the target object.

```

@publicApi
@globalApi ng
export function getRootComponents(elementOrDir: Element|{}): {}[] {
  const IView = readPatchedLView<{}>(elementOrDir);
  return IView !== null ? [getLViewParent(IView)] : [];
}

```

**\* Retrieves an `Injector` associated with an element, component or directive instance.**

**@param** elementOrDir DOM element, component or directive instance for which to retrieve the injector.

**@returns** Injector associated with the element, component or directive instance.

```

@publicApi\n * @globalApi ng\n *^\nexport function getInjector(elementOrDir: Element|{}): Injector {\n const
context = getLContext(elementOrDir)!;\n
const IView = context ? context.IView : null;\n if (IView === null) return Injector.NULL;\n\n const tNode =
IView[TVIEW].data[context.nodeIndex] as TElementNode;\n return new NodeInjector(tNode, IView);\n}\n\n/**\n
* Retrieve a set of injection tokens at a given DOM node.\n *\n * @param element Element for which the injection
tokens should be retrieved.\n *\n *^\nexport function getInjectionTokens(element: Element): any[] {\n const context =
getLContext(element)!;\n const IView = context ? context.IView : null;\n if (IView === null) return [];\n const
tView = IView[TVIEW];\n const tNode = tView.data[context.nodeIndex] as TNode;\n const providerTokens: any[]
= [];\n const startIndex = tNode.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n const
endIndex = tNode.directiveEnd;\n for (let i = startIndex; i < endIndex; i++) {\n let value = tView.data[i];\n if
(isDirectiveDefHack(value)) {\n // The fact that we sometimes store Type and
sometimes DirectiveDef in this location is a\n // design flaw. We should always store same type so that we can
be monomorphic. The issue\n // is that for Components/Directives we store the def instead the type. The correct
behavior\n // is that we should always be storing injectable type in this location.\n value = value.type;\n }\n
providerTokens.push(value);\n }\n return providerTokens;\n}\n\n/**\n
* Retrieves directive instances associated with a given DOM node. Does not include\n * component instances.\n *\n * @usageNotes\n * Given the following
DOM structure:\n *\n * ``html\n * <app-root>\n * <button my-button></button>\n * <my-comp></my-comp>\n
* </app-root>\n * ``\n *\n * Calling `getDirectives` on `<button>` will return an array with an instance of the
`MyButton`\n * directive that is associated with the DOM node.\n *\n * Calling `getDirectives` on `<my-comp>`
will return an empty array.\n *\n * @param node DOM node for which to get the directives.\n
* @returns Array of directives associated with the node.\n *\n * @publicApi\n * @globalApi ng\n *^\nexport
function getDirectives(node: Node): {}[] {\n // Skip text nodes because we can't have directives associated with
them.\n if (node instanceof Text) {\n return [];\n }\n\n const context = getLContext(node)!;\n const IView =
context ? context.IView : null;\n if (IView === null) {\n return [];\n }\n\n const tView = IView[TVIEW];\n
const nodeIndex = context.nodeIndex;\n if (!tView?.data[nodeIndex]) {\n return [];\n }\n if (context.directives
=== undefined) {\n context.directives = getDirectivesAtNodeIndex(nodeIndex, IView, false);\n }\n\n // The
`directives` in this case are a named array called `LComponentView`. Clone the\n // result so we don't expose an
internal data structure in the user's console.\n return context.directives === null ? [] :
[...context.directives];\n}\n\n/**\n
* Partial metadata for a given directive instance.\n * This information
might be useful for debugging purposes or tooling.\n * Currently only `inputs` and `outputs` metadata is
available.\n *\n * @publicApi\n *^\nexport interface DirectiveDebugMetadata {\n inputs: Record<string, string>;\n
outputs: Record<string, string>;\n}\n\n/**\n
* Partial metadata for a given component instance.\n * This information
might be useful for debugging purposes or tooling.\n * Currently the following fields are available:\n * - inputs\n *
- outputs\n * - encapsulation\n * - changeDetection\n *\n * @publicApi\n *^\nexport interface
ComponentDebugMetadata extends DirectiveDebugMetadata {\n encapsulation: ViewEncapsulation;\n
changeDetection: ChangeDetectionStrategy;\n}\n\n/**\n
* Returns the debug (partial) metadata for a particular
directive or component instance.\n * The function accepts an instance of a directive or component and returns the
corresponding\n * metadata.\n *\n * @param directiveOrComponentInstance Instance of a directive or component\n
* @returns
metadata of the passed directive or component\n *\n * @publicApi\n * @globalApi ng\n *^\nexport function
getDirectiveMetadata(directiveOrComponentInstance: any): ComponentDebugMetadata|\n
DirectiveDebugMetadata|null {\n const {constructor} = directiveOrComponentInstance;\n if (!constructor) {\n
throw new Error('Unable to find the instance constructor');\n }\n // In case a component inherits from a directive,
we may have component and directive metadata\n // To ensure we don't get the metadata of the directive, we want
to call `getComponentDef` first.\n const componentDef = getComponentDef(constructor);\n if (componentDef) {\n
return {\n inputs: componentDef.inputs,\n outputs: componentDef.outputs,\n encapsulation:
componentDef.encapsulation,\n changeDetection: componentDef.onPush ? ChangeDetectionStrategy.OnPush :\n
ChangeDetectionStrategy.Default\n };\n }\n const directiveDef =

```

```

getDirectiveDef(constructor);\n
  if (directiveDef) {\n  return {inputs: directiveDef.inputs, outputs: directiveDef.outputs};\n } \n return
null;\n}\n\n/**\n * Retrieve map of local references.\n *\n * The references are retrieved as a map of local reference
name to element or directive instance.\n *\n * @param target DOM element, component or directive instance for
which to retrieve\n * the local references.\n */\n\nexport function getLocalRefs(target: {}): {[key: string]: any} {\n
const context = getLContext(target);\n if (context === null) return {};\n\n if (context.localRefs === undefined) {\n
const IView = context.IView;\n if (IView === null) {\n  return {};\n }\n context.localRefs =
discoverLocalRefs(IView, context.nodeIndex);\n }\n\n return context.localRefs || {};\n}\n\n/**\n * Retrieves the
host element of a component or directive instance.\n * The host element is the DOM element that matched the
selector of the directive.\n *\n * @param componentOrDirective Component or directive
instance for which the host\n * element should be retrieved.\n * @returns Host element of the target.\n *\n *
@publicApi\n * @globalApi ng\n */\n\nexport function getHostElement(componentOrDirective: {}): Element {\n
return getLContext(componentOrDirective)!.native as unknown as Element;\n}\n\n/**\n * Retrieves the rendered
text for a given component.\n *\n * This function retrieves the host element of a component and\n * and then returns
the `textContent` for that element. This implies\n * that the text returned will include re-projected content of\n * the
component as well.\n *\n * @param component The component to return the content text for.\n */\n\nexport function
getRenderedText(component: any): string {\n  const hostElement = getHostElement(component);\n  return
hostElement.textContent || '';\n}\n\n/**\n * Event listener configuration returned from `getListeners`.\n *\n *
@publicApi\n */\n\nexport interface Listener {\n  /** Name of the event listener. */\n  name: string;\n  /**
Element that the listener is bound to. */\n  element: Element;\n  /** Callback that is invoked when the event is
triggered. */\n  callback: (value: any) => any;\n  /** Whether the listener is using event capturing. */\n  useCapture:
boolean;\n  /**\n * Type of the listener (e.g. a native DOM event or a custom @Output).\n */\n  type:
'dom'|'output';\n}\n\n/**\n * Retrieves a list of event listeners associated with a DOM element. The list does
include host\n * listeners, but it does not include event listeners defined outside of the Angular context\n * (e.g.
through `addEventListener`).\n *\n * @usageNotes\n * Given the following DOM structure:\n *\n * ```html\n *
<app-root>\n * <div (click)=\"doSomething()\"></div>\n * </app-root>\n * ```\n *\n * Calling `getListeners` on
`<div>` will return an object that looks as follows:\n *\n * ```ts\n * {\n *   name: 'click',\n *   element: <div>,\n *
callback: () => doSomething(),\n *   useCapture: false\n * }\n * ```\n *\n * @param element
Element for which the DOM listeners should be retrieved.\n * @returns Array of event listeners on the DOM
element.\n *\n * @publicApi\n * @globalApi ng\n */\n\nexport function getListeners(element: Element): Listener[]
{\n  ngDevMode && assertDomElement(element);\n  const IContext = getLContext(element);\n  const IView =
IContext === null ? null : IContext.IView;\n  if (IView === null) return [];\n  const tView = IView[TVIEW];\n  const
ICleanup = IView[CLEANUP];\n  const tCleanup = tView.cleanup;\n  const listeners: Listener[] = [];\n  if
(tCleanup && ICleanup) {\n    for (let i = 0; i < tCleanup.length; ) {\n      const firstParam = tCleanup[i++];\n
const secondParam = tCleanup[i++];\n      if (typeof firstParam === 'string') {\n        const name: string =
firstParam;\n        const listenerElement = unwrapRNode(IView[secondParam]) as any as Element;\n        const
callback: (value: any) => any = ICleanup[tCleanup[i++];\n        const useCaptureOrIndx = tCleanup[i++];\n
        // if useCaptureOrIndx is boolean then report it as is.\n        // if useCaptureOrIndx is positive number then it in
unsubscribe method\n        // if useCaptureOrIndx is negative number then it is a Subscription\n        const type =\n
        (typeof useCaptureOrIndx === 'boolean' || useCaptureOrIndx >= 0) ? 'dom' : 'output';\n        const useCapture =
        typeof useCaptureOrIndx === 'boolean' ? useCaptureOrIndx : false;\n        if (element === listenerElement) {\n
listeners.push({element, name, callback, useCapture, type});\n        }\n      }\n    }\n  }\n  listeners.sort(sortListeners);\n  return listeners;\n}\n\nfunction sortListeners(a: Listener, b: Listener) {\n  if (a.name
=== b.name) return 0;\n  return a.name < b.name ? -1 : 1;\n}\n\n/**\n * This function should not exist because it is
megamorphic and only mostly correct.\n *\n * See call site for more info.\n */\n\nfunction isDirectiveDefHack(obj:
any): obj is DirectiveDef<any> {\n  return obj.type !== undefined
&& obj.template !== undefined && obj.declaredInputs !== undefined;\n}\n\n/**\n * Returns the attached
`DebugNode` instance for an element in the DOM.\n *\n * @param element DOM element which is owned by an

```

```

existing component's view.\n */\nexport function getDebugNode(element: Element): DebugNode|null {\n if
(ngDevMode && !(element instanceof Node)) {\n throw new Error('Expecting instance of DOM Element');\n
}\n\n const lContext = getLContext(element!);\n const lView = lContext ? lContext.lView : null;\n\n if (lView ===
null) {\n return null;\n }\n\n const nodeIndex = lContext.nodeIndex;\n if (nodeIndex !== -1) {\n const
valueInLView = lView[nodeIndex];\n // this means that value in the lView is a component with its own\n // data.
In this situation the TNode is not accessed at the same spot.\n const tNode =\n isLView(valueInLView) ?
(valueInLView[T_HOST] as TNode) : getTNode(lView[TVIEW], nodeIndex);\n ngDevMode &&\n
assertEqual(tNode.index,
nodeIndex, 'Expecting that TNode at index is same as index');\n return buildDebugNode(tNode, lView);\n }\n\n
return null;\n}\n\n/**\n * Retrieve the component `LView` from component/element.\n *\n * NOTE: `LView` is a
private and should not be leaked outside.\n *\n * Don't export this method to `ng.*` on window.\n *\n * @param
target DOM element or component instance for which to retrieve the LView.\n */\nexport function
getComponentLView(target: any): LView {\n const lContext = getLContext(target!);\n const nodeIndx =
lContext.nodeIndex;\n const lView = lContext.lView!;\n ngDevMode && assertLView(lView);\n const
componentLView = lView[nodeIndx];\n ngDevMode && assertLView(componentLView);\n return
componentLView;\n}\n\n/** Asserts that a value is a DOM Element. */\nfunction assertDomElement(value: any)
{\n if (typeof Element !== 'undefined' && !(value instanceof Element)) {\n throw new Error('Expecting instance
of DOM Element');\n }\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {Type} from './interface/type';\nimport
{noSideEffects} from './util/closure';\n\ninterface TypeWithMetadata extends Type<any> {\n decorators?: any[];\n
ctorParameters?: () => any[];\n propDecorators?: {[field: string]: any};\n}\n\n/**\n * Adds decorator, constructor,
and property metadata to a given type via static metadata fields\n * on the type.\n *\n * These metadata fields can
later be read with Angular's `ReflectionCapabilities` API.\n *\n * Calls to `setClassMetadata` can be guarded by
ngDevMode, resulting in the metadata assignments\n * being tree-shaken away during production builds.\n
*/\nexport function setClassMetadata(\n type: Type<any>, decorators: any[]|null, ctorParameters: () =>
any[]|null,\n propDecorators: {[field: string]: any}|null): void {\n return noSideEffects(()
=> {\n const clazz = type as TypeWithMetadata;\n\n if (decorators !== null) {\n if
(clazz.hasOwnProperty('decorators') && clazz.decorators !== undefined) {\n
clazz.decorators.push(...decorators);\n } else {\n clazz.decorators = decorators;\n }\n
}\n\n if (ctorParameters !== null) {\n // Rather than merging, clobber the existing parameters. If other
projects exist which\n // use tsickle-style annotations and reflect over them in the same way, this could\n
// cause issues, but that is vanishingly unlikely.\n clazz.ctorParameters = ctorParameters;\n }\n\n
if (propDecorators !== null) {\n // The property decorator objects are merged as it is possible different fields
have\n // different decorator types. Decorators on individual fields are not merged, as it's\n // also
incredibly unlikely
that a field will be decorated both with an Angular\n // decorator and a non-Angular decorator that's also
been downleveled.\n if (clazz.hasOwnProperty('propDecorators') && clazz.propDecorators !== undefined)
{\n clazz.propDecorators = [...clazz.propDecorators, ...propDecorators];\n } else {\n
clazz.propDecorators = propDecorators;\n }\n\n }) as never;\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {assertIndexInRange} from
'./util/assert';\nimport {bindingUpdated, bindingUpdated2, bindingUpdated3, bindingUpdated4, getBinding,
updateBinding} from './bindings';\nimport {LView} from './interfaces/view';\nimport {getBindingRoot, getLView}
from './state';\nimport {NO_CHANGE} from './tokens';\n\n/**\n * Bindings for
pure functions are stored after regular bindings.\n *\n * |-----decls-----|-----vars-----| |-----
hostVars (dir1) -----|\n * -----|\n * |
nodes/refs/pipes | bindings | fn slots | injector | dir1 | host bindings | host slots |\n * -----

```



```

-----\n *      ^      ^\n *      TView.bindingStartIndex
TView.expandoStartIndex\n * \n * Pure function instructions are given an offset from the binding root. Adding the
offset to the\n * binding root gives the first index where the bindings are stored. In component views, the binding\n
* root is the bindingStartIndex. In host bindings, the binding root is the expandoStartIndex +\n * any directive
instances + any hostVars in directives evaluated before it.\n * \n * See VIEW_DATA.md for more information about
host binding resolution.\n
*\n\n/**\n * If the value hasn't been saved, calls the pure function to store and return the\n * value. If it has been
saved, returns the saved value.\n * \n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn Function that returns a value\n * @param thisArg Optional calling context of pureFn\n * @returns
value\n * \n * @codeGenApi\n * \nexport function pureFunction0<T>(slotOffset: number, pureFn: () => T,
thisArg?: any): T {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const IView = getLView();\n  return
IView[bindingIndex] === NO_CHANGE ?\n    updateBinding(IView, bindingIndex, thisArg ?
pureFn.call(thisArg) : pureFn()) :\n    getBinding(IView, bindingIndex);}\n\n/**\n * If the value of the provided
exp has changed, calls the pure function to return\n * an updated value. Or if the value has not changed, returns
cached value.\n * \n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn
Function
that returns an updated value\n * @param exp Updated expression value\n * @param thisArg Optional calling
context of pureFn\n * @returns Updated or cached value\n * \n * @codeGenApi\n * \nexport function
pureFunction1(\n  slotOffset: number, pureFn: (v: any) => any, exp: any, thisArg?: any): any {\n  return
pureFunction1Internal(getLView(), getBindingRoot(), slotOffset, pureFn, exp, thisArg);\n}\n\n/**\n * If the value
of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have
changed, returns cached value.\n * \n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn\n * @param exp1\n * @param exp2\n * @param thisArg Optional calling context of pureFn\n *
@returns Updated or cached value\n * \n * @codeGenApi\n * \nexport function pureFunction2(\n  slotOffset:
number, pureFn: (v1: any, v2: any) => any, exp1: any, exp2: any,\n  thisArg?: any): any {\n  return
pureFunction2Internal(\n    getLView(),
getBindingRoot(), slotOffset, pureFn, exp1, exp2, thisArg);\n}\n\n/**\n * If the value of any provided exp has
changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached
value.\n * \n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param
exp1\n * @param exp2\n * @param exp3\n * @param thisArg Optional calling context of pureFn\n * @returns
Updated or cached value\n * \n * @codeGenApi\n * \nexport function pureFunction3(\n  slotOffset: number,
pureFn: (v1: any, v2: any, v3: any) => any, exp1: any, exp2: any, exp3: any,\n  thisArg?: any): any {\n  return
pureFunction3Internal(\n    getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, exp3,
thisArg);\n}\n\n/**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated
value. Or if no values have changed, returns cached value.\n * \n * @param slotOffset the offset from binding root to the
reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param
thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n * \n * @codeGenApi\n
*\nexport function pureFunction4(\n  slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any) => any,
exp1: any, exp2: any,\n  exp3: any, exp4: any, thisArg?: any): any {\n  return pureFunction4Internal(\n
getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, exp3, exp4, thisArg);\n}\n\n/**\n * If the value of
any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed,
returns cached value.\n * \n * @param slotOffset the offset from binding root to the reserved slot\n * @param
pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n * @param
thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n * \n * @codeGenApi\n
*\nexport function pureFunction5(\n
slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any) => any, exp1: any,\n  exp2: any, exp3:
any, exp4: any, exp5: any, thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const

```

```

IView = getLView();\n const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n return
bindingUpdated(IView, bindingIndex + 4, exp5) || different ?\n updateBinding(\n IView, bindingIndex +
5,\n thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5) :\n pureFn(exp1, exp2, exp3,
exp4, exp5)) :\n getBinding(IView, bindingIndex + 5);\n}\n\n/**\n * If the value of any provided exp has
changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached
value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param
exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n
* @param exp6\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n
*\n * @codeGenApi\n */\nexport function pureFunction6(\n slotOffset: number, pureFn: (v1: any, v2: any, v3:
any, v4: any, v5: any, v6: any) => any,\n exp1: any, exp2: any, exp3: any, exp4: any, exp5: any, exp6: any,
thisArg?: any): any {\n const bindingIndex = getBindingRoot() + slotOffset;\n const IView = getLView();\n const
different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n return bindingUpdated2(IView,
bindingIndex + 4, exp5, exp6) || different ?\n updateBinding(\n IView, bindingIndex + 6,\n thisArg ?
pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6) :\n pureFn(exp1, exp2, exp3, exp4, exp5,
exp6)) :\n getBinding(IView, bindingIndex + 6);\n}\n\n/**\n * If the value of any provided exp has changed,
calls the pure function to return\n * an updated value. Or if no values have changed, returns
cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n *
@param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n * @param exp6\n *
@param exp7\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n
*\n * @codeGenApi\n */\nexport function pureFunction7(\n slotOffset: number,\n pureFn: (v1: any, v2: any, v3:
any, v4: any, v5: any, v6: any, v7: any) => any, exp1: any,\n exp2: any, exp3: any, exp4: any, exp5: any, exp6:
any, exp7: any, thisArg?: any): any {\n const bindingIndex = getBindingRoot() + slotOffset;\n const IView =
getLView();\n let different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n return
bindingUpdated3(IView, bindingIndex + 4, exp5, exp6, exp7) || different ?\n updateBinding(\n IView,
bindingIndex + 7,\n thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6, exp7) :\n
pureFn(exp1, exp2, exp3, exp4, exp5, exp6, exp7)) :\n getBinding(IView, bindingIndex + 7);\n}\n\n/**\n * If
the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values
have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n *
@param exp6\n * @param exp7\n * @param exp8\n * @param thisArg Optional calling context of pureFn\n *
@param exp9\n * @returns Updated or cached value\n *\n * @codeGenApi\n */\nexport function pureFunction8(\n slotOffset:
number,\n pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any, v6: any, v7: any, v8: any) => any,\n exp1: any,
exp2: any, exp3: any, exp4: any, exp5: any, exp6: any, exp7: any, exp8: any,\n thisArg?: any): any {\n const
bindingIndex = getBindingRoot() + slotOffset;\n const IView = getLView();\n const different =
bindingUpdated4(IView,
bindingIndex, exp1, exp2, exp3, exp4);\n return bindingUpdated4(IView, bindingIndex + 4, exp5, exp6, exp7,
exp8) || different ?\n updateBinding(\n IView, bindingIndex + 8,\n thisArg ? pureFn.call(thisArg,
exp1, exp2, exp3, exp4, exp5, exp6, exp7, exp8) :\n pureFn(exp1, exp2, exp3, exp4, exp5, exp6, exp7,
exp8)) :\n getBinding(IView, bindingIndex + 8);\n}\n\n/**\n * pureFunction instruction that can support any
number of bindings.\n *\n * If the value of any provided exp has changed, calls the pure function to return\n * an
updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from
binding root to the reserved slot\n * @param pureFn A pure function that takes binding values and builds an object
or array\n * containing those values.\n * @param exps An array of binding values\n * @param thisArg Optional
calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n */\nexport
function pureFunctionV(\n slotOffset: number, pureFn: (...v: any[]) => any, exps: any[], thisArg?: any): any {\n
return pureFunctionVInternal(getLView(), getBindingRoot(), slotOffset, pureFn, exps, thisArg);\n}\n\n/**\n *
Results of a pure function invocation are stored in LView in a dedicated slot that is initialized\n * to NO_CHANGE.
In rare situations a pure pipe might throw an exception on the very first\n * invocation and not produce any valid

```

results. In this case LView would keep holding the NO\_CHANGE value. The NO\_CHANGE is not something that we can use in expressions / bindings thus we convert it to `undefined`.

```

function
getPureFunctionReturnValue(IView: LView, returnValueIndex: number) {
  ngDevMode &&
  assertIndexInRange(IView, returnValueIndex);
  const lastReturnValue = IView[returnValueIndex];
  return
  lastReturnValue === NO_CHANGE ? undefined : lastReturnValue;
}

```

If the value of the provided exp has changed, calls the pure function to return an updated value. Or if the value has not changed, returns cached value.

**@param IView LView** in which the function is being executed.

**@param bindingRoot** Binding root index.

**@param slotOffset** the offset from binding root to the reserved slot

**@param pureFn** Function that returns an updated value

**@param exp** Updated expression value

**@param thisArg** Optional calling context of pureFn

**@returns** Updated or cached value

```

export function pureFunction1Internal(
  IView: LView, bindingRoot: number, slotOffset:
  number, pureFn: (v: any) => any, exp: any,
  thisArg?: any): any {
  const bindingIndex = bindingRoot +
  slotOffset;
  return bindingUpdated(IView, bindingIndex, exp) ?
  updateBinding(IView, bindingIndex + 1,
  thisArg ? pureFn.call(thisArg, exp) : pureFn(exp)) :
  getPureFunctionReturnValue(IView, bindingIndex +
  1);
}

```

If the value of any provided exp has changed, calls the pure function to return an updated value. Or if no values have changed, returns cached value.

**@param IView LView** in which the function is being executed.

**@param bindingRoot** Binding root index.

**@param slotOffset** the offset from binding root to the reserved slot

**@param pureFn**

**@param exp1**

**@param exp2**

**@param thisArg** Optional calling context of pureFn

**@returns** Updated or cached value

```

export function pureFunction2Internal(
  IView:
  LView, bindingRoot: number, slotOffset: number, pureFn: (v1: any, v2: any) => any,
  exp1: any, exp2: any,
  thisArg?: any): any {
  const bindingIndex = bindingRoot + slotOffset;
  return bindingUpdated2(IView,
  bindingIndex, exp1, exp2) ?
  updateBinding(
  IView, bindingIndex + 2,
  thisArg ?
  pureFn.call(thisArg, exp1, exp2) : pureFn(exp1, exp2)) :
  getPureFunctionReturnValue(IView, bindingIndex +
  2);
}

```

If the value of any provided exp has changed, calls the pure function to return an updated value. Or

if no values have changed, returns cached value.

**@param IView LView** in which the function is being executed.

**@param bindingRoot** Binding root index.

**@param slotOffset** the offset from binding root to the reserved slot

**@param pureFn**

**@param exp1**

**@param exp2**

**@param exp3**

**@param thisArg** Optional calling context of pureFn

**@returns** Updated or cached value

```

export function pureFunction3Internal(
  IView: LView, bindingRoot: number, slotOffset: number,
  pureFn: (v1: any, v2: any,
  v3: any) => any, exp1: any, exp2: any, exp3: any,
  thisArg?: any): any {
  const bindingIndex = bindingRoot +
  slotOffset;
  return bindingUpdated3(IView, bindingIndex, exp1, exp2, exp3) ?
  updateBinding(
  IView,
  bindingIndex + 3,
  thisArg ? pureFn.call(thisArg, exp1, exp2, exp3) : pureFn(exp1, exp2, exp3)) :
  getPureFunctionReturnValue(IView, bindingIndex + 3);
}

```

If the value of any provided exp has changed, calls the

pure function to return an updated value. Or if no values have changed, returns cached value.

**@param IView LView** in which the function is being executed.

**@param bindingRoot** Binding root index.

**@param slotOffset** the offset from binding root to the reserved slot

**@param pureFn**

**@param exp1**

**@param exp2**

**@param exp3**

**@param exp4**

**@param thisArg** Optional calling context of pureFn

**@returns** Updated or cached value

```

export function pureFunction4Internal(
  IView: LView, bindingRoot: number,
  slotOffset: number,
  pureFn: (v1: any, v2: any, v3: any, v4: any) => any, exp1: any, exp2: any, exp3: any, exp4:
  any,
  thisArg?: any): any {
  const bindingIndex = bindingRoot + slotOffset;
  return bindingUpdated4(IView,
  bindingIndex, exp1, exp2, exp3, exp4) ?
  updateBinding(
  IView, bindingIndex + 4,
  thisArg ?
  pureFn.call(thisArg, exp1, exp2, exp3, exp4) : pureFn(exp1, exp2, exp3, exp4)) :
  getPureFunctionReturnValue(IView,
  bindingIndex + 4);
}

```

pureFunction instruction that can support any number of bindings.

If the value of any provided exp has changed, calls the pure function to return an updated value. Or if no values have changed, returns cached value.

**@param IView LView** in which the function is being executed.

**@param**

```

bindingRoot Binding root index.\n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn A pure function that takes binding values and builds an object or array\n * containing those
values.\n * @param exps An array of binding values\n * @param thisArg Optional calling context of pureFn\n *
@returns Updated or cached value\n */\nexport function pureFunctionVInternal(\n  IView: LView, bindingRoot:
number, slotOffset: number, pureFn: (...v: any[]) => any,\n  exps: any[], thisArg?: any): any {\n  let bindingIndex =
bindingRoot + slotOffset;\n  let different = false;\n  for (let i = 0; i < exps.length; i++)
  {\n    bindingUpdated(IView, bindingIndex++, exps[i]) && (different = true);\n  }\n  return different ?
updateBinding(IView, bindingIndex, pureFn.apply(thisArg, exps)) :\n  getPureFunctionReturnValue(IView, bindingIndex);\n}\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {PipeTransform} from
'./change_detection/pipe_transform';\nimport {setInjectImplementation} from './di/inject_switch';\nimport
{RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from './interface/type';\nimport
{getFactoryDef} from './definition_factory';\nimport {setIncludeViewProviders} from './di';\nimport {store,
directiveInject} from './instructions/all';\nimport {isHostComponentStandalone} from
'./instructions/element_validation';\nimport {PipeDef, PipeDefList} from './interfaces/definition';\nimport
{CONTEXT, DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LView, TVIEW} from
'./interfaces/view';\nimport {pureFunction1Internal, pureFunction2Internal, pureFunction3Internal,
pureFunction4Internal, pureFunctionVInternal} from './pure_function';\nimport {getBindingRoot, getLView,
getTView} from './state';\nimport {load} from './util/view_utils';\n\n\n/**\n * Create a pipe.\n *\n * @param index
Pipe index where the pipe will be stored.\n *\n * @param pipeName The name of the pipe\n *\n * @returns T the instance
of the pipe.\n *\n * @codeGenApi\n */\nexport function pipe(index: number, pipeName: string): any {\n  const
tView = getTView();\n  let pipeDef: PipeDef<any>;\n  const adjustedIndex = index + HEADER_OFFSET;\n  if
(tView.firstCreatePass) {\n    // The `getPipeDef` throws if a pipe with a given name is not found\n    // (so we use
non-null assertion below).\n    pipeDef = getPipeDef(pipeName, tView.pipeRegistry)!;\n  }\n  tView.data[adjustedIndex] = pipeDef;\n  if (pipeDef.onDestroy) {\n
  (tView.destroyHooks || (tView.destroyHooks = [])).push(adjustedIndex, pipeDef.onDestroy);\n  }\n } else {\n
  pipeDef = tView.data[adjustedIndex] as PipeDef<any>;\n }\n\n  const pipeFactory = pipeDef.factory ||
(pipeDef.factory = getFactoryDef(pipeDef.type, true));\n  const previousInjectImplementation =
setInjectImplementation(directiveInject);\n  try {\n    // DI for pipes is supposed to behave like directives when
placed on a component\n    // host node, which means that we have to disable access to `viewProviders`\n    const
previousIncludeViewProviders = setIncludeViewProviders(false);\n    const pipeInstance = pipeFactory();\n
setIncludeViewProviders(previousIncludeViewProviders);\n    store(tView, getLView(), adjustedIndex,
pipeInstance);\n    return pipeInstance;\n  } finally {\n    // we have to restore the injector implementation in finally,
just in case the creation of the\n    // pipe throws an error.\n    setInjectImplementation(previousInjectImplementation);\n
  }\n}\n\n\n/**\n * Searches the pipe registry for a pipe with the given name. If one is found,\n * returns the pipe.
Otherwise, an error is thrown because the pipe cannot be resolved.\n *\n * @param name Name of pipe to resolve\n
*\n * @param registry Full list of available pipes\n *\n * @returns Matching PipeDef\n */\nfunction getPipeDef(name:
string, registry: PipeDefList|null): PipeDef<any>|undefined {\n  if (registry) {\n    for (let i = registry.length - 1; i >=
0; i--) {\n      const pipeDef = registry[i];\n      if (name === pipeDef.name) {\n        return pipeDef;\n      }\n    }\n  }\n  if (ngDevMode) {\n    throw new RuntimeError(RuntimeErrorCode.PIPE_NOT_FOUND,
getPipeNotFoundErrorMessage(name));\n  }\n}\n\n\n/**\n * Generates a helpful error message for the user when a
pipe is not found.\n *\n * @param name Name of the missing pipe\n *\n * @returns The error message\n */\nfunction
getPipeNotFoundErrorMessage(name: string) {\n  const IView = getLView();\n  const declarationLView =
IView[DECLARATION_COMPONENT_VIEW]
as LView<Type<unknown>>;\n  const context = declarationLView[CONTEXT];\n  const hostIsStandalone =
isHostComponentStandalone(IView);\n  const componentInfoMessage = context ? ` in the

```





```

return (value: unknown) => {
  setTimeout(fn, undefined, value);
};
}

/**
 * @publicApi
 * ^\nexport
const EventEmitter: {
  new (isAsync?: boolean): EventEmitter<any>;
  new<T>(isAsync?: boolean):
  EventEmitter<T>;
  readonly prototype: EventEmitter<any>;
} = EventEmitter_ as any;

"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license
that can be found in the LICENSE file at https://angular.io/license
 */
import { Observable } from
'rxjs';
import { EventEmitter } from './event_emitter';
import { arrayEquals, flatten } from
'./util/array_utils';
import { getSymbolIterator } from './util/symbol';
function symbolIterator<T>(this:
QueryList<T>): Iterator<T> {
  return ((this as any as { _results: Array<T> })._results as
any)[getSymbolIterator()];
}

/**
 * An unmodifiable list of items that Angular keeps up to date when the
state of the application changes.
 * The type of object
that { @link ViewChildren }, { @link ContentChildren }, and { @link QueryList }
 * provide.
 * Implements an
iterable interface, therefore it can be used in both ES6 javascript `for (var i of items)` loops as well as in Angular
templates with `*ngFor`="let i of myList".
 * Changes can be observed by subscribing to the changes
`Observable`.
 * NOTE: In the future this class will implement an `Observable` interface.
 *
 * @usageNotes
 * ### Example
 * ```typescript
 * @Component({ ... })
 * class Container {
 *   @ViewChildren(Item) items: QueryList<Item>;
 * }
 *
 * @publicApi
 * ^\nexport class QueryList<T>
implements Iterable<T> {
  public readonly dirty = true;
  private _results: Array<T> = [];
  private
  _changesDetected: boolean = false;
  private _changes: EventEmitter<QueryList<T>> | null = null;
  readonly
  length: number = 0;
  readonly first: T = undefined!;
  readonly last: T = undefined!;
  /**
   * Returns
   `Observable` of `QueryList`
notifying the subscriber of changes.
 *
 * ^\n get changes(): Observable<any> {
  return this._changes ||
(this._changes = new EventEmitter());
}

/**
 * @param emitDistinctChangesOnly Whether
`QueryList.changes` should fire only when actual change
 * has occurred. Or if it should fire when query is
recomputed. (recomputing could resolve in
 * the same result)
 * ^\n constructor(private
  _emitDistinctChangesOnly: boolean = false) {
  // This function should be declared on the prototype, but doing so
there will cause the class
  // declaration to have side-effects and become not tree-shakable. For this reason we do
it in
  // the constructor.
  [getSymbolIterator()]: Iterator<T> { ... }
  const symbol =
getSymbolIterator();
  const proto = QueryList.prototype as any;
  if (!proto[symbol]) proto[symbol] =
symbolIterator;
}

/**
 * Returns the QueryList entry at `index`.
 * ^\n get(index: number): T | undefined
{
  return this._results[index];
}

/**
 * See
 * [Array.map](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/map)
 * ^\n map<U>(fn: (item: T, index: number,
array: T[]) => U): U[] {
  return this._results.map(fn);
}

/**
 * See
 * [Array.filter](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/filter)
 * ^\n filter(fn: (item: T, index: number, array: T[]) => boolean): T[] {
  return this._results.filter(fn);
}

/**
 * See
 * [Array.find](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/find)
 * ^\n find(fn: (item: T, index: number, array:
T[]) => boolean): T | undefined {
  return this._results.find(fn);
}

/**
 * See
 * [Array.reduce](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/reduce)
 * ^\n reduce<U>(fn: (prevValue: U, curValue:
T, curIndex: number, array:
T[]) => U, init: U): U {
  return this._results.reduce(fn, init);
}

/**
 * See
 * [Array.forEach](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/forEach)
 * ^\n forEach(fn: (item: T, index: number,
array: T[]) => void): void {
  this._results.forEach(fn);
}

/**
 * See
 * [Array.some](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/some)
 * ^\n some(fn: (value: T, index: number, array: T[]) => boolean): boolean {
  return this._results.some(fn);
}

/**
 * Returns a copy of the internal results list as an Array.
 * ^\n toArray(): T[] {
  return

```

this.\_results.slice();\n }\n\n toString(): string {\n return this.\_results.toString();\n }\n\n /\*\*\n \* Updates the stored data of the query list, and resets the `dirty` flag to `false`, so that\n \* on change detection, it will not notify of changes to the queries, unless a new change\n \* occurs.\n

\*\n \* @param resultsTree The query results to store\n \* @param identityAccessor Optional function for extracting stable object identity from a value\n \* in the array. This function is executed for each element of the query result list while\n \* comparing current query list with the new one (provided as a first argument of the `reset`\n \* function) to detect if the lists are different. If the function is not provided, elements\n \* are compared as is (without any pre-processing).\n \*\n reset(resultsTree: Array<T|any[]>, identityAccessor?: (value: T) => unknown): void {\n // Cast to `QueryListInternal` so that we can mutate fields which are readonly for the usage of\n // QueryList (but not for QueryList itself.)\n const self = this as QueryListInternal<T>;\n (self as {dirty: boolean}).dirty = false;\n const newResultFlat = flatten(resultsTree);\n if (this.\_changesDetected = !arrayEquals(self.\_results, newResultFlat, identityAccessor)) {\n

self.\_results = newResultFlat;\n self.length = newResultFlat.length;\n self.last = newResultFlat[this.length - 1];\n self.first = newResultFlat[0];\n }\n }\n\n /\*\*\n \* Triggers a change event by emitting on the `changes` {@link EventEmitter}.\n \*\n notifyOnChanges(): void {\n if (this.\_changes && (this.\_changesDetected || !this.\_emitDistinctChangesOnly))\n this.\_changes.emit(this);\n }\n\n /\*\* internal \*\n setDirty() {\n (this as {dirty: boolean}).dirty = true;\n }\n\n /\*\* internal \*\n destroy(): void {\n (this.changes as EventEmitter<any>).complete();\n (this.changes as EventEmitter<any>).unsubscribe();\n }\n\n // The implementation of `Symbol.iterator` should be declared here, but this would cause\n // tree-shaking issues with `QueryList`. So instead, it's added in the constructor (see comments\n // there) and this declaration is left here to ensure that TypeScript considers QueryList to\n // implement the Iterable interface.\n

This is required for template type-checking of NgFor loops\n // over QueryLists to work correctly, since QueryList must be assignable to NgIterable.\n [Symbol.iterator]!: () => Iterator<T>;\n\n\n /\*\*\n \* Internal set of APIs used by the framework. (not to be made public)\n \*\n interface QueryListInternal<T> extends QueryList<T> {\n reset(a: any[]): void;\n notifyOnChanges(): void;\n length: number;\n last: T;\n first: T;\n }\n\n\n /\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*\n\n import {Injector} from './di/injector';\n import {assertLContainer} from './render3/assert';\n import {createLView, renderView} from './render3/instructions/shared';\n import {TContainerNode, TNode, TNodeType} from './render3/interfaces/node';\n import {DECLARATION\_LCONTAINER, LView, LViewFlags, QUERIES, TView} from './render3/interfaces/view';\n import

{getCurrentTNode, getLView} from './render3/state';\n import {ViewRef as R3\_ViewRef} from './render3/view\_ref';\n import {assertDefined} from './util/assert';\n import {createElementRef, ElementRef} from './element\_ref';\n import {EmbeddedViewRef} from './view\_ref';\n\n\n /\*\*\n \* Represents an embedded template that can be used to instantiate embedded views.\n \* To instantiate embedded views based on a template, use the `ViewContainerRef`\n \* method `createEmbeddedView()`. \n \* Access a `TemplateRef` instance by placing a directive on an ``\n \* element (or directive prefixed with `\*`). The `TemplateRef` for the embedded view\n \* is injected into the constructor of the directive,\n \* using the `TemplateRef` token.\n \* You can also use a `Query` to find a `TemplateRef` associated with\n \* a component or a directive.\n \*\n \* @see `ViewContainerRef`\n \* @see [Navigate the Component Tree with DI](guide/dependency-injection-navtree)\n \*\n \* @publicApi\n \*\n export abstract

class TemplateRef<C> {\n /\*\*\n \* The anchor element in the parent view for this embedded view.\n \*\n \* The data-binding and injection contexts of embedded views created from this `TemplateRef`\n \* inherit from the contexts of this location.\n \*\n \* Typically new embedded views are attached to the view container of this location, but in\n \* advanced use-cases, the view can be attached to a different container while keeping the\n \* data-binding and injection context from the original location.\n \*\n \* // TODO(i): rename to anchor or location\n abstract readonly elementRef: ElementRef;\n\n /\*\*\n \* Instantiates an unattached embedded view based on this template.\n \* @param context The data-binding context of the embedded view, as declared\n \* in



```

the `<ng-template>` usage.\n * @param injector Injector to be used within the embedded view.\n * @returns The
new embedded view object.\n */\n abstract createEmbeddedView(context: C, injector?: Injector):
EmbeddedViewRef<C>;\n\n /**\n * @internal\n * @nocollapse\n */\n static __NG_ELEMENT_ID__: () =>
TemplateRef<any>| null = injectTemplateRef;\n}\n\nconst ViewEngineTemplateRef = TemplateRef;\n\n//
TODO(alxhub): combine interface and implementation. Currently this is challenging since something\n// in g3
depends on them being separate.\nconst R3TemplateRef = class TemplateRef<T> extends
ViewEngineTemplateRef<T> {\n  constructor(\n    private _declarationLView: LView, private
_declarationTContainer: TContainerNode,\n    public override elementRef: ElementRef) {\n    super();\n  }\n\n  override createEmbeddedView(context: T, injector?: Injector): EmbeddedViewRef<T> {\n    const embeddedTView
= this._declarationTContainer.tViews as TView;\n    const embeddedLView = createLView(\n
this._declarationLView, embeddedTView, context, LViewFlags.CheckAlways, null,\n
embeddedTView.declTNode, null, null, null, null, injector || null);\n    const declarationLContainer =
this._declarationLView[this._declarationTContainer.index];\n    ngDevMode &&
assertLContainer(declarationLContainer);\n    embeddedLView[DECLARATION_LCONTAINER] =
declarationLContainer;\n\n    const declarationViewLQueries = this._declarationLView[QUERIES];\n    if
(declarationViewLQueries !== null) {\n      embeddedLView[QUERIES] =
declarationViewLQueries.createEmbeddedView(embeddedTView);\n    }\n\n    renderView(embeddedTView,
embeddedLView, context);\n    return new R3_ViewRef<T>(embeddedLView);\n  }\n};\n\n/**\n * Creates a
TemplateRef given a node.\n */\n * @returns The TemplateRef instance to use\n */\nexport function
injectTemplateRef<T>(): TemplateRef<T>|null {\n  return createTemplateRef<T>(getCurrentTNode()!,
getLView());\n}\n\n/**\n * Creates a TemplateRef and stores it on the injector.\n */\n * @param hostTNode The
node on which a TemplateRef is requested\n * @param hostLView The `LView` to which the node belongs\n *
@returns The TemplateRef instance or null if we can't create
a TemplateRef on a given node type\n */\nexport function createTemplateRef<T>(hostTNode: TNode, hostLView:
LView): TemplateRef<T>|null {\n  if (hostTNode.type & TNodeType.Container) {\n    ngDevMode &&
assertDefined(hostTNode.tViews, 'TView must be allocated');\n    return new R3TemplateRef(\n      hostLView,
hostTNode as TContainerNode, createElementRef(hostTNode, hostLView));\n  }\n  return null;\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Injector} from
'./di/injector';\nimport {EnvironmentInjector} from './di/r3_injector';\nimport {isType, Type} from
'./interface/type';\nimport {assertNodeInjector} from './render3/assert';\nimport {ComponentFactory as
R3ComponentFactory} from './render3/component_ref';\nimport {getComponentDef} from
'./render3/definition';\nimport {getParentInjectorLocation,
NodeInjector} from './render3/di';\nimport {addToViewTree, createLContainer} from
'./render3/instructions/shared';\nimport {CONTAINER_HEADER_OFFSET, LContainer, NATIVE, VIEW_REFS}
from './render3/interfaces/container';\nimport {NodeInjectorOffset} from './render3/interfaces/injector';\nimport
{TContainerNode, TDirectiveHostNode, TElementContainerNode, TElementNode, TNodeType} from
'./render3/interfaces/node';\nimport {RComment, RElement} from './render3/interfaces/rendered_dom';\nimport
{isLContainer} from './render3/interfaces/type_checks';\nimport {LView, PARENT, RENDERER, T_HOST,
TVIEW} from './render3/interfaces/view';\nimport {assertTNodeType} from './render3/node_assert';\nimport
{addViewToContainer, destroyLView, detachView, getBeforeNodeForView, insertView, nativeInsertBefore,
nativeNextSibling, nativeParentNode} from './render3/node_manipulation';\nimport {getCurrentTNode, getLView}
from './render3/state';\nimport {getParentInjectorIndex, getParentInjectorView, hasParentInjector}
from './render3/util/injector_utils';\nimport {getNativeByTNode, unwrapRNode, viewAttachedToContainer} from
'./render3/util/view_utils';\nimport {ViewRef as R3ViewRef} from './render3/view_ref';\nimport {addToArray,
removeFromArray} from './util/array_utils';\nimport {assertDefined, assertEquals, assertGreaterThan,
assertLessThan, throwError} from './util/assert';\nimport {ComponentFactory, ComponentRef} from
'./component_factory';\nimport {createElementRef, ElementRef} from './element_ref';\nimport {NgModuleRef}

```

from './ng\_module\_factory';\nimport {TemplateRef} from './template\_ref';\nimport {EmbeddedViewRef, ViewRef} from './view\_ref';\n/\*\*\n \* Represents a container where one or more views can be attached to a component.\n \*\n \* Can contain \*host views\* (created by instantiating a\n \* component with the `createComponent()` method), and \*embedded views\*\n \* (created by instantiating a `TemplateRef` with the `createEmbeddedView()` method).\n \*\n \* A view container instance can contain other view containers,\n \* creating a [view hierarchy](guide/glossary#view-tree).\n \*\n \* @see `ComponentRef`\n \* @see `EmbeddedViewRef`\n \*\n \* @publicApi\n \*/\nexport abstract class ViewContainerRef {\n /\*\*\n \* Anchor element that specifies the location of this container in the containing view.\n \*\n \* Each view container can have only one anchor element, and each anchor element\n \* can have only a single view container.\n \*\n \* Root elements of views attached to this container become siblings of the anchor element in\n \* the rendered view.\n \*\n \* Access the `ViewContainerRef` of an element by placing a `Directive` injected\n \* with `ViewContainerRef` on the element, or use a `ViewChild` query.\n \*\n \* <!-- TODO: rename to anchorElement -->\n \*/\n abstract get element(): ElementRef;\n\n /\*\*\n \* The [dependency injector](guide/glossary#injector) for this view container.\n \*/\n abstract get injector(): Injector;\n\n /\*\* @deprecated\n \* No replacement\n \*/\n abstract get parentInjector(): Injector;\n\n /\*\*\n \* Destroys all views in this container.\n \*/\n abstract clear(): void;\n\n /\*\*\n \* Retrieves a view from this container.\n \*\n \* @param index The 0-based index of the view to retrieve.\n \*\n \* @returns The `ViewRef` instance, or null if the index is out of range.\n \*/\n abstract get(index: number): ViewRef|null;\n\n /\*\*\n \* Reports how many views are currently attached to this container.\n \*\n \* @returns The number of views.\n \*/\n abstract get length(): number;\n\n /\*\*\n \* Instantiates an embedded view and inserts it\n \* into this container.\n \*\n \* @param templateRef The HTML template that defines the view.\n \*\n \* @param context The data-binding context of the embedded view, as declared\n \* in the `` usage.\n \*\n \* @param options Extra configuration for the created view. Includes:\n \* \* index: The 0-based index at which to insert the new view into this container.\n \* \* If not specified, appends the new view as the last entry.\n \* \* injector: Injector to be used within the embedded view.\n \*\n \* @returns The `ViewRef` instance for the newly created view.\n \*/\n abstract createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, options?: {\n index?: number,\n injector?: Injector\n }): EmbeddedViewRef<C>;\n\n /\*\*\n \* Instantiates an embedded view and inserts it\n \* into this container.\n \*\n \* @param templateRef The HTML template that defines the view.\n \*\n \* @param context The data-binding context of the embedded view, as declared\n \* in the `` usage.\n \*\n \* @param index The 0-based index at which to insert the new view into this container.\n \*\n \* If not specified, appends the new view as the last entry.\n \*\n \* @returns The `ViewRef` instance for the newly created view.\n \*/\n abstract createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, index?: number):\n EmbeddedViewRef<C>;\n\n /\*\*\n \* Instantiates a single component and inserts its host view into this container.\n \*\n \* @param componentType Component Type to use.\n \*\n \* @param options An object that contains extra parameters:\n \* \* index: the index at which to insert the new component's host view into this container.\n \* \* If not specified, appends the new view as the last entry.\n \* \* injector: the injector to use as the parent for the new component.\n \* \* ngModuleRef: an NgModuleRef of the component's NgModule, you should almost always provide\n \* this to ensure that all expected providers are available for the component\n \* instantiation.\n \* \* environmentInjector: an EnvironmentInjector which will provide the component's environment.\n \* you should almost always provide this to ensure that all expected providers\n \* are available for the component instantiation. This option is intended to\n \* replace the `ngModuleRef` parameter.\n \* \* projectableNodes: list of DOM nodes that should be projected through\n \* the [ `<ng-content>` ](api/core/ng-content) of the new component instance.\n \*\n \* @returns The new `ComponentRef` which contains the component instance and the host view.\n \*/\n abstract createComponent<C>(componentType: Type<C>, options?: {\n index?: number,\n injector?: Injector,\n ngModuleRef?: NgModuleRef<unknown>,\n environmentInjector?: EnvironmentInjector|NgModuleRef<unknown>,\n projectableNodes?: Node[]|Node[]\n }): ComponentRef<C>;\n\n

```

/**\n * Instantiates a single component and inserts its host view into this container.\n *\n * @param
componentFactory Component factory to use.\n * @param index The index at which to insert the new component's
host view into this container.\n * If not specified, appends the new view as the last entry.\n * @param injector
The injector to use as the parent for the new component.\n * @param
projectableNodes List of DOM nodes that should be projected through\n * [<ng-content>](api/core/ng-
content) of the new component instance.\n * @param ngModuleRef An instance of the NgModuleRef that
represent an NgModule.\n * This information is used to retrieve corresponding NgModule injector.\n *\n *
@return The new `ComponentRef` which contains the component instance and the host view.\n *\n *
@deprecated Angular no longer requires component factories to dynamically create components.\n * Use
different signature of the `createComponent` method, which allows passing\n * Component class directly.\n
*/\n abstract createComponent<C>(\n componentFactory: ComponentFactory<C>, index?: number, injector?:
Injector,\n projectableNodes?: any[][],\n environmentInjector?: EnvironmentInjector|NgModuleRef<any>):
ComponentRef<C>;\n\n /**\n * Inserts a view into this container.\n * @param viewRef The view to insert.\n *
@param index The 0-based
index at which to insert the view.\n * If not specified, appends the new view as the last entry.\n * @returns The
inserted `ViewRef` instance.\n *\n */\n abstract insert(viewRef: ViewRef, index?: number): ViewRef;\n\n /**\n
* Moves a view to a new location in this container.\n * @param viewRef The view to move.\n * @param index
The 0-based index of the new location.\n * @returns The moved `ViewRef` instance.\n */\n abstract
move(viewRef: ViewRef, currentIndex: number): ViewRef;\n\n /**\n * Returns the index of a view within the
current container.\n * @param viewRef The view to query.\n * @returns The 0-based index of the view's position
in this container,\n * or -1 if this container doesn't contain the view.\n */\n abstract indexOf(viewRef:
ViewRef): number;\n\n /**\n * Destroys a view attached to this container\n * @param index The 0-based index
of the view to destroy.\n * If not specified, the last view in the container is removed.\n */\n
abstract remove(index?: number): void;\n\n /**\n * Detaches a view from this container without destroying it.\n
* Use along with `insert()` to move a view within the current container.\n * @param index The 0-based index of
the view to detach.\n * If not specified, the last view in the container is detached.\n */\n abstract detach(index?:
number): ViewRef|null;\n\n /**\n * @internal\n * @nocollapse\n */\n static __NG_ELEMENT_ID__: () =>
ViewContainerRef = injectViewContainerRef;\n\n /**\n * Creates a ViewContainerRef and stores it on the
injector. Or, if the ViewContainerRef\n * already exists, retrieves the existing ViewContainerRef.\n *\n * @returns
The ViewContainerRef instance to use\n */\n export function injectViewContainerRef(): ViewContainerRef {\n
const previousTNode = getCurrentTNode() as TElementNode | TElementContainerNode | TContainerNode;\n
return createContainerRef(previousTNode, getLView());\n}\n\nconst VE_ViewContainerRef =
ViewContainerRef;\n\n//
TODO(alxhub): cleaning up this indirection triggers a subtle bug in Closure in g3. Once the fix\n// for that lands,
this can be cleaned up.\nconst R3ViewContainerRef = class ViewContainerRef extends VE_ViewContainerRef {\n
constructor(\n private _lContainer: LContainer,\n private _hostTNode:
TElementNode|TContainerNode|TElementContainerNode,\n private _hostLView: LView) {\n super();\n }\n\n
override get element(): ElementRef {\n return createElementRef(this._hostTNode, this._hostLView);\n }\n\n
override get injector(): Injector {\n return new NodeInjector(this._hostTNode, this._hostLView);\n }\n\n /**
@deprecated No replacement */\n override get parentInjector(): Injector {\n const parentLocation =
getParentInjectorLocation(this._hostTNode, this._hostLView);\n if (hasParentInjector(parentLocation)) {\n
const parentView = getParentInjectorView(parentLocation, this._hostLView);\n const injectorIndex =
getParentInjectorIndex(parentLocation);\n
ngDevMode && assertNodeInjector(parentView, injectorIndex);\n const parentTNode =\n
parentView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] as TElementNode;\n return new
NodeInjector(parentTNode, parentView);\n } else {\n return new NodeInjector(null, this._hostLView);\n }\n
}\n\n override clear(): void {\n while (this.length > 0) {\n this.remove(this.length - 1);\n }\n }\n\n
override get(index: number): ViewRef|null {\n const viewRefs = getViewRefs(this._lContainer);\n return viewRefs !=

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null && viewRefs[index] || null;\n } \n\n override get length(): number {\n return this._Container.length -
CONTAINER_HEADER_OFFSET;\n } \n\n override createEmbeddedView<C>(templateRef: TemplateRef<C>,
context?: C, options?: {\n index?: number,\n injector?: Injector\n }): EmbeddedViewRef<C>;\n override
createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, index?: number):\n
EmbeddedViewRef<C>;\n override
createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, indexOrOptions?: number|{\n index?:
number,\n injector?: Injector\n }): EmbeddedViewRef<C> {\n let index: number|undefined;\n let injector:
Injector|undefined;\n\n if (typeof indexOrOptions === 'number') {\n index = indexOrOptions;\n } else if
(indexOrOptions !== null) {\n index = indexOrOptions.index;\n injector = indexOrOptions.injector;\n } \n\n
const viewRef = templateRef.createEmbeddedView(context || <any> {}, injector);\n this.insert(viewRef, index);\n
return viewRef;\n } \n\n override createComponent<C>(componentType: Type<C>, options?: {\n index?:
number,\n injector?: Injector,\n projectableNodes?: Node[][],\n ngModuleRef?: NgModuleRef<unknown>,\n
}): ComponentRef<C>;\n /**\n * @deprecated Angular no longer requires component factories to dynamically
create components.\n * Use different signature of the `createComponent` method, which allows passing\n
* Component class directly.\n */\n override createComponent<C>(\n componentFactory:
ComponentFactory<C>, index?: number|undefined,\n injector?: Injector|undefined, projectableNodes?:
any[][]|undefined,\n environmentInjector?: EnvironmentInjector|NgModuleRef<any>|undefined):
ComponentRef<C>;\n override createComponent<C>(\n componentFactoryOrType:
ComponentFactory<C>|Type<C>, indexOrOptions?: number|undefined|{\n index?: number,\n injector?:
Injector,\n ngModuleRef?: NgModuleRef<unknown>,\n environmentInjector?:
EnvironmentInjector|NgModuleRef<unknown>,\n projectableNodes?: Node[][],\n },\n injector?:
Injector|undefined, projectableNodes?: any[][]|undefined,\n environmentInjector?:
EnvironmentInjector|NgModuleRef<any>|undefined): ComponentRef<C> {\n const isComponentFactory =
componentFactoryOrType && !isType(componentFactoryOrType);\n let index: number|undefined;\n\n // This
function supports
2 signatures and we need to handle options correctly for both:\n // 1. When first argument is a Component type.
This signature also requires extra\n // options to be provided as as object (more ergonomic option).\n // 2.
First argument is a Component factory. In this case extra options are represented as\n // positional arguments.
This signature is less ergonomic and will be deprecated.\n if (isComponentFactory) {\n if (ngDevMode) {\n
assertEqual(\n typeof indexOrOptions !== 'object', true,\n 'It looks like Component factory was
provided as the first argument ' +\n 'and an options object as the second argument. This combination of
arguments ' +\n 'is incompatible. You can either change the first argument to provide Component ' +\n
'type or change the second argument to be a number (representing an index at ' +\n 'which to insert the
new component\\'s host view
into this container)');\n } \n index = indexOrOptions as number | undefined;\n } else {\n if (ngDevMode)
{\n assertDefined(\n getComponentDef(componentFactoryOrType),\n `Provided Component class
doesn't contain Component definition. ` +\n `Please check whether provided class has @Component
decorator.`);\n } \n assertEquals(\n typeof indexOrOptions !== 'number', true,\n 'It looks like
Component type was provided as the first argument ' +\n 'and a number (representing an index at which to
insert the new component\\'s ' +\n 'host view into this container as the second argument. This combination
of arguments ' +\n 'is incompatible. Please use an object as the second argument instead.`);\n } \n
const options = (indexOrOptions || {}) as {\n index?: number,\n injector?: Injector,\n ngModuleRef?:
NgModuleRef<unknown>,\n environmentInjector?:
EnvironmentInjector | NgModuleRef<unknown>,\n projectableNodes?: Node[][],\n }; \n if (ngDevMode
&& options.environmentInjector && options.ngModuleRef) {\n throwError(\n `Cannot pass both
environmentInjector and ngModuleRef options to createComponent().`);\n } \n index = options.index;\n
injector = options.injector;\n projectableNodes = options.projectableNodes;\n environmentInjector =
options.environmentInjector || options.ngModuleRef;\n } \n\n const componentFactory: ComponentFactory<C>

```

```

= isComponentFactory ?\n    componentFactoryOrType as ComponentFactory<C>:\n    new
R3ComponentFactory(getComponentDef(componentFactoryOrType)!);\n    const contextInjector = injector ||
this.parentInjector;\n\n    // If an `NgModuleRef` is not provided explicitly, try retrieving it from the DI tree.\n    if
(!environmentInjector && (componentFactory as any).ngModule == null) {\n    // For the `ComponentFactory`
case,
    entering this logic is very unlikely, since we expect that\n    // an instance of a `ComponentFactory`, resolved via
`ComponentFactoryResolver` would have an\n    // `ngModule` field. This is possible in some test scenarios and
potentially in some JIT-based\n    // use-cases. For the `ComponentFactory` case we preserve backwards-
compatibility and try\n    // using a provided injector first, then fall back to the parent injector of this\n    //
`ViewContainerRef` instance.\n    //\n    // For the factory-less case, it's critical to establish a connection with the
module\n    // injector tree (by retrieving an instance of an `NgModuleRef` and accessing its injector),\n    // so
that a component can use DI tokens provided in MgModules. For this reason, we can not\n    // rely on the provided
injector, since it might be detached from the DI tree (for example, if\n    // it was created via `Injector.create`
without specifying a parent injector, or if an\n    // injector
is retrieved from an `NgModuleRef` created via `createNgModule` using an\n    // NgModule outside of a module
tree). Instead, we always use `ViewContainerRef`'s parent\n    // injector, which is normally connected to the DI
tree, which includes module injector\n    // subtree.\n    const _injector = isComponentFactory ? contextInjector :
this.parentInjector;\n\n    // DO NOT REFACTOR. The code here used to have a `injector.get(NgModuleRef, null)
||\n    // undefined` expression which seems to cause internal google apps to fail. This is documented\n    // in the
following internal bug issue: go/b/142967802\n    const result = _injector.get(EnvironmentInjector, null);\n    if
(result) {\n    environmentInjector = result;\n    }\n\n    const componentRef =\n    componentFactory.create(contextInjector, projectableNodes, undefined, environmentInjector);\n
this.insert(componentRef.hostView, index);\n    return componentRef;\n    }\n\n    override insert(viewRef:
ViewRef, index?: number): ViewRef {\n    const IView = (viewRef as R3ViewRef<any>)._IView!;\n    const tView
= IView[TVIEW];\n\n    if (ngDevMode && viewRef.destroyed) {\n    throw new Error('Cannot insert a destroyed
View in a ViewContainer!');\n    }\n\n    if (viewAttachedToContainer(IView)) {\n    // If view is already attached,
detach it first so we clean up references appropriately.\n    const prevIdx = this.indexOf(viewRef);\n\n    // A
view might be attached either to this or a different container. The `prevIdx` for\n    // those cases will be:\n    //
equal to -1 for views attached to this ViewContainerRef\n    // >= 0 for views attached to a different
ViewContainerRef\n    if (prevIdx !== -1) {\n    this.detach(prevIdx);\n    } else {\n    const prevLContainer =
IView[PARENT] as LContainer;\n    ngDevMode &&\n    assertEquals(\n
isLContainer(prevLContainer), true,\n    'An attached view should have its
PARENT point to a container.);\n\n    // We need to re-create a R3ViewContainerRef instance since those are
not stored on\n    // LView (nor anywhere else).\n    const prevVContainerRef = new R3ViewContainerRef(\n
prevLContainer, prevLContainer[T_HOST] as TDirectiveHostNode, prevLContainer[PARENT]);\n\n    prevVContainerRef.detach(prevVContainerRef.indexOf(viewRef));\n    }\n\n    // Logical operation of adding `LView` to
`LContainer`\n    const adjustedIdx = this._adjustIndex(index);\n    const lContainer = this._lContainer;\n
insertView(tView, IView, lContainer, adjustedIdx);\n\n    // Physical operation of adding the DOM nodes.\n    const
beforeNode = getBeforeNodeForView(adjustedIdx, lContainer);\n    const renderer = IView[RENDERER];\n
const parentRNode = nativeParentNode(renderer, lContainer[NATIVE] as RElement | RComment);\n    if
(parentRNode !== null) {\n    addViewToContainer(tView, lContainer[T_HOST], renderer, IView, parentRNode,
beforeNode);\n    }\n\n    (viewRef as R3ViewRef<any>).attachToViewContainerRef();\n
addToArray(getOrCreateViewRefs(lContainer), adjustedIdx, viewRef);\n    return viewRef;\n    }\n\n    override
move(viewRef: ViewRef, newIndex: number): ViewRef {\n    if (ngDevMode && viewRef.destroyed) {\n    throw
new Error('Cannot move a destroyed View in a ViewContainer!');\n    }\n    return this.insert(viewRef, newIndex);\n
}\n\n    override indexOf(viewRef: ViewRef): number {\n    const viewRefsArr = getViewRefs(this._lContainer);\n
return viewRefsArr !== null ? viewRefsArr.indexOf(viewRef) : -1;\n    }\n\n    override remove(index?: number): void

```

```

{\n  const adjustedIdx = this._adjustIndex(index, -1);\n  const detachedView = detachView(this._lContainer,\n  adjustedIdx);\n\n  if (detachedView) {\n    // Before destroying the view, remove it from the container's array of\n  `ViewRef`s.\n    // This ensures the view container length is updated before calling\n    // `destroyLView`, which\n  could recursively call\n  view container methods that\n    // rely on an accurate container length.\n    // (e.g. a method on this view\n  container being called by a child directive's OnDestroy\n    // lifecycle hook)\n  removeFromArray(getOrCreateViewRefs(this._lContainer), adjustedIdx);\n  destroyLView(detachedView[TVIEW], detachedView);\n  }\n}\n\noverride detach(index?: number):\n  ViewRef|null {\n  const adjustedIdx = this._adjustIndex(index, -1);\n  const view = detachView(this._lContainer,\n  adjustedIdx);\n\n  const wasDetached =\n    view &&\n  removeFromArray(getOrCreateViewRefs(this._lContainer), adjustedIdx) != null;\n  return wasDetached ? new\n  R3ViewRef(view!) : null;\n}\n\nprivate _adjustIndex(index?: number, shift: number = 0) {\n  if (index == null)\n  {\n    return this.length + shift;\n  }\n  if (ngDevMode) {\n    assertGreaterThan(index, -1, `ViewRef index must\n  be positive, got ${index}`);\n    // +1 because it's legal to insert at the end.\n    assertLessThan(index,\n  this.length + 1 + shift, 'index');\n  }\n  return index;\n}\n}\n\nfunction getViewRefs(lContainer: LContainer):\n  ViewRef[]|null {\n  return lContainer[VIEW_REFS] as ViewRef[];\n}\n\nfunction\n  getOrCreateViewRefs(lContainer: LContainer): ViewRef[] {\n  return (lContainer[VIEW_REFS] ||\n  (lContainer[VIEW_REFS] = [])) as ViewRef[];\n}\n\n/**\n * Creates a ViewContainerRef and stores it on the\n  injector.\n * @param ViewContainerRefToken The ViewContainerRef type\n * @param ElementRefToken The\n  ElementRef type\n * @param hostTNode The node that is requesting a ViewContainerRef\n * @param hostLView\n  The view to which the node belongs\n * @returns The ViewContainerRef instance to use\n */\n\nexport function\n  createContainerRef(\n  hostTNode: TElementNode|TContainerNode|TElementContainerNode,\n  hostLView:\n  LView): ViewContainerRef {\n  ngDevMode && assertTNodeType(hostTNode, TNodeType.AnyContainer |  
  TNodeType.AnyRNode);\n\n  let lContainer: LContainer;\n  const slotValue = hostLView[hostTNode.index];\n\n  if (isLContainer(slotValue)) {\n    // If the host is a container, we don't need to create a new LContainer\n  lContainer = slotValue;\n  } else {\n    let commentNode: RComment;\n    // If the host is an element container, the\n  native host element is guaranteed to be a\n    // comment and we can reuse that comment as anchor element for the\n  new LContainer.\n    // The comment node in question is already part of the DOM structure so we don't need to\n  append\n    // it again.\n    if (hostTNode.type & TNodeType.ElementContainer) {\n      commentNode =\n  unwrapRNode(slotValue) as RComment;\n    } else {\n      // If the host is a regular element, we have to insert a\n  comment node manually which will\n    // be used as an anchor when inserting elements. In this specific case we\n  use low-level DOM\n    // manipulation to insert it.\n    const renderer = hostLView[RENDERER];\n    ngDevMode && ngDevMode.rendererCreateComment++;\n    commentNode =\n  renderer.createComment(ngDevMode\n  ? 'container': '');\n\n    const hostNative = getNativeByTNode(hostTNode, hostLView!);\n    const\n  parentOfHostNative = nativeParentNode(renderer, hostNative);\n    nativeInsertBefore(\n      renderer,\n  parentOfHostNative!, commentNode, nativeNextSibling(renderer, hostNative),\n      false);\n  }\n\n  hostLView[hostTNode.index] = lContainer =\n    createLContainer(slotValue, hostLView, commentNode,\n  hostTNode);\n\n  addToViewTree(hostLView, lContainer);\n  }\n}\n\nreturn new R3ViewContainerRef(lContainer,\n  hostTNode, hostLView);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of\n  this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n  https://angular.io/license\n */\n\nimport {ProcessProvidersFunction} from '../di/interface/provider';\nimport\n  {EnvironmentInjector} from '../di/r3_injector';\nimport {Type} from '../interface/type';\nimport\n  {SchemaMetadata} from '../metadata/schema';\nimport\n  {ViewEncapsulation} from '../metadata/view';\nimport {FactoryFn} from '../definition_factory';\nimport\n  {TAttributes, TConstantsOrFactory} from './node';\nimport {CssSelectorList} from './projection';\nimport\n  {TView}\n  from './view';\n\n/**\n * Definition of what a template rendering function should look like for a component.\n */\n\nexport type ComponentTemplate<T> = {\n  // Note: the ctx parameter is typed as T|U, as using only U would

```

prevent a template with `// e.g. ctx: {}` from being assigned to `ComponentTemplate<any>` as TypeScript won't infer `U = any` in that scenario. By including `T` this incompatibility is resolved.

```

<U extends T>(rf:
RenderFlags, ctx: T|U): void;

```

**Definition of what a view queries function should look like.**

```

export type ViewQueriesFunction<T> = <U extends T>(rf: RenderFlags, ctx: U) => void;

```

**Definition of what a content queries function should look like.**

```

export type ContentQueriesFunction<T>
= <U extends T>(rf: RenderFlags, ctx: U, directiveIndex: number) => void;

```

**Flags passed into template functions to determine which blocks (i.e. creation, update) should be executed.** Typically, a template runs both the creation block and the update block on initialization and subsequent runs only execute the update block. However, dynamically created views require that the creation block be executed separately from the update block (for backwards compat).

```

export const enum RenderFlags {
  /* Whether to run the creation block (e.g. create elements and directives)
  Create = 0b01,
  /* Whether to run the update block (e.g. refresh bindings)
  Update = 0b10
}

```

**A subclass of `Type` which has a static `cmp`: `ComponentDef` field making it consumable for rendering.**

```

export interface ComponentType<T> extends Type<T> {
  cmp: unknown;
}

```

**A subclass of `Type` which has a static `dir`: `DirectiveDef` field making it consumable for rendering.**

```

export interface DirectiveType<T> extends Type<T> {
  dir: unknown;
  fac: unknown;
}

```

**A subclass of `Type` which has a static `pipe`: `PipeDef` field making it consumable for rendering.**

```

export interface PipeType<T> extends Type<T> {
  pipe: unknown;
}

```

**Runtime link information for Directives.** This is an internal data structure used by the render to link directives into templates.

**NOTE:** Always use `defineDirective` function to create this object, never create the object directly since the shape of this object can change between versions.

**@param Selector type metadata specifying the selector of the directive or component** See: `{@link defineDirective}`

```

export interface DirectiveDef<T> {
  /** A dictionary mapping the inputs' minified property names to their public API names, which are their aliases if any, or their original unminified property names (as in '@Input('alias') propertyName: any;').
  readonly inputs: {[P in keyof T]: string};
  /** @deprecated This is only here because `NgOnChanges` incorrectly uses declared name instead of public or minified name.
  readonly declaredInputs: {[P in keyof T]: string};
  /** A dictionary mapping the outputs' minified property names to their public API names, which are their aliases if any, or their original unminified property names (as in '@Output('alias') propertyName: any;').
  readonly outputs: {[P in keyof T]: string};
  /** Function to create and refresh content queries associated with a given directive.
  contentQueries: ContentQueriesFunction<T>|null;
  /** Query-related instructions for a directive. Note that while directives don't have a view and as such view queries won't necessarily do anything, there might be components that extend the directive.
  viewQuery: ViewQueriesFunction<T>|null;
  /** Refreshes host bindings on the associated directive.
  readonly hostBindings: HostBindingsFunction<T>|null;
  /** The number of bindings in this directive `hostBindings` (including pure fn bindings).
  /** Used to calculate the length of the component's LView array, so we can pre-fill the array and set the host binding start index.
  readonly hostVars: number;
  /** Assign static attribute values to a host element. This property will assign static attribute values as well as class and style values to a host element. Since attribute values can consist of different types of values, the `hostAttrs` array must include the values in the following format:
  attrs = [
    // static attributes (like `title`, `name`, `id`...)
    attr1, value1, attr2, value,
    // a single namespace value (like `x:id`)
    NAMESPACE_MARKER, namespaceUri1, name1, value1,
    // another single namespace value (like `x:name`)
    NAMESPACE_MARKER, namespaceUri2, name2, value2,
    // a series of CSS classes that will be applied to the element (no spaces)
    CLASSES_MARKER, class1, class2, class3,
    // a series of CSS styles (property + value) that will be applied to the element
    STYLES_MARKER, prop1, value1, prop2, value2
  ]
  /** All non-class and non-style attributes must be defined at the start of the list first before all class and style values are set. When there is a change in value type (like when classes and styles are introduced) a marker must be used to separate the entries. The marker values themselves are set via entries found in the [AttributeMarker]

```

```

enum.\n *\n readonly hostAttrs: TAttributes|null;\n\n /** Token representing the directive. Used by DI. *\n
readonly type: Type<T>;\n\n /** Function that resolves providers and publishes them into
the DI system. *\n providersResolver:\n (<U extends T>(def: DirectiveDef<U>, processProvidersFn?:
ProcessProvidersFunction) =>\n void)|null;\n\n /** The selectors that will be used to match nodes to this
directive. *\n readonly selectors: CssSelectorList;\n\n /**\n * Name under which the directive is exported (for
use with local references in template)\n *\n readonly exportAs: string[]|null;\n\n /**\n * Whether this directive
(or component) is standalone.\n *\n readonly standalone: boolean;\n\n /**\n * Factory function used to create a
new directive instance. Will be null initially.\n * Populated when the factory is first requested by directive
instantiation logic.\n *\n readonly factory: FactoryFn<T>|null;\n\n /**\n * The features applied to this
directive\n *\n readonly features: DirectiveDefFeature[]|null;\n\n setInput:\n (<U extends T>(\n this:
DirectiveDef<U>, instance: U, value: any, publicName: string,\n
privateName: string) => void)|null;\n}\n\n/**\n * Runtime link information for Components.\n *\n * This is an
internal data structure used by the render to link\n * components into templates.\n *\n * NOTE: Always use
`defineComponent` function to create this object,\n * never create the object directly since the shape of this object\n
* can change between versions.\n *\n * See: { @link defineComponent }\n *\n\nexport interface ComponentDef<T>
extends DirectiveDef<T> {\n /**\n * Unique ID for the component. Used in view encapsulation and\n * to keep
track of the injector in standalone components.\n *\n readonly id: string;\n\n /**\n * The View template of the
component.\n *\n readonly template: ComponentTemplate<T>;\n\n /**\n * Constants associated with the
component's view. *\n readonly consts: TConstantsOrFactory|null;\n\n /**\n * An array of `ngContent[selector]`
values that were found in the template.\n *\n readonly ngContentSelectors?: string[];\n\n /**\n
* A set of styles that the component needs to be present for component to render correctly.\n *\n readonly styles:
string[];\n\n /**\n * The number of nodes, local refs, and pipes in this component template.\n *\n * Used to
calculate the length of the component's LView array, so we\n * can pre-fill the array and set the binding start
index.\n *\n // TODO(kara): remove queries from this count\n readonly decls: number;\n\n /**\n * The number
of bindings in this component template (including pure fn bindings).\n *\n * Used to calculate the length of the
component's LView array, so we\n * can pre-fill the array and set the host binding start index.\n *\n readonly
vars: number;\n\n /**\n * Query-related instructions for a component.\n *\n viewQuery:
ViewQueriesFunction<T>|null;\n\n /**\n * The view encapsulation type, which determines how styles are applied
to\n * DOM elements. One of\n * - `Emulated` (default): Emulate native scoping of styles.\n
* - `Native`: Use the native encapsulation mechanism of the renderer.\n * - `ShadowDom`: Use modern
[ShadowDOM](https://w3c.github.io/webcomponents/spec/shadow/) and\n * create a ShadowRoot for
component's host element.\n * - `None`: Do not provide any template or style encapsulation.\n *\n\nreadonly
encapsulation: ViewEncapsulation;\n\n /**\n * Defines arbitrary developer-defined data to be stored on a renderer
instance.\n * This is useful for renderers that delegate to other renderers.\n *\n\nreadonly data: {[kind: string]:
any};\n\n /**\n * Whether or not this component's ChangeDetectionStrategy is OnPush *\n\nreadonly onPush:
boolean;\n\n /**\n * Registry of directives and components that may be found in this view.\n *\n * The property
is either an array of `DirectiveDef`s or a function which returns the array of\n * `DirectiveDef`s. The function is
necessary to be able to support forward declarations.\n *\n\ndirectiveDefs: DirectiveDefListOrFactory|null;\n\n
/**\n * Registry of pipes that may be found in this view.\n *\n * The property is either an array of `PipeDef`s
or a function which returns the array of\n * `PipeDef`s. The function is necessary to be able to support forward
declarations.\n *\n\npipeDefs: PipeDefListOrFactory|null;\n\n /**\n * Unfiltered list of all dependencies of a
component, or `null` if none.\n *\n\ndependencies: TypeOrFactory<DependencyTypeList>|null;\n\n /**\n * The
set of schemas that declare elements to be allowed in the component's template.\n *\n\nschemas:
SchemaMetadata[]|null;\n\n /**\n * Ivy runtime uses this place to store the computed tView for the component.
This gets filled on\n * the first run of component.\n *\n\n tView: TView|null;\n\n /**\n * A function added by
the { @link StandaloneFeature } and used by the framework to create\n * standalone injectors.\n *\n\ngetStandaloneInjector: ((parentInjector: EnvironmentInjector) => EnvironmentInjector |

```



```

null)|null;\n\n /**\n * Used to store the result of `noSideEffects` function so that it is not removed by closure\n * compiler. The property should never be read.\n * ^\n readonly _?: unknown;\n}\n\n/**\n * Runtime link information for Pipes.\n * ^\n * This is an internal data structure used by the renderer to link\n * pipes into templates.\n * ^\n * NOTE: Always use `definePipe` function to create this object,\n * never create the object directly since the shape of this object\n * can change between versions.\n * ^\n * See: { @link definePipe }\n * ^\n export interface PipeDef<T> {\n /** Token representing the pipe. */\n type: Type<T>;\n\n /**\n * Pipe name.\n * ^\n * Used to resolve pipe in templates.\n * ^\n readonly name: string;\n\n /**\n * Factory function used to create a new pipe instance. Will be null initially.\n * ^\n * Populated when the factory is first requested by pipe instantiation logic.\n * ^\n factory: FactoryFn<T>|null;\n\n /**\n * Whether or not the pipe is pure.\n * ^\n * Pure pipes result only depends on the pipe input and not on internal\n * state of the pipe.\n * ^\n readonly pure: boolean;\n\n /**\n * Whether this pipe is standalone.\n * ^\n readonly standalone: boolean;\n\n /**\n * The following are lifecycle hooks for this pipe\n * ^\n onDestroy: (() => void)|null;\n}\n\nexport interface DirectiveDefFeature {\n <T>(directiveDef: DirectiveDef<T>): void;\n\n /**\n * Marks a feature as something that { @link InheritDefinitionFeature } will execute\n * during inheritance.\n * ^\n * NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers\n * identifying the change as a side effect, and the feature will be included in\n * every bundle.\n * ^\n ngInherit?: true;\n}\n\nexport interface ComponentDefFeature {\n <T>(componentDef: ComponentDef<T>): void;\n\n /**\n * Marks a feature as something that { @link InheritDefinitionFeature } will execute\n * during inheritance.\n * ^\n * NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers\n * identifying the change as a side effect, and the feature will be included in\n * every bundle.\n * ^\n ngInherit?: true;\n}\n\n\n/**\n * Type used for directiveDefs on component definition.\n * ^\n * The function is necessary to be able to support forward declarations.\n * ^\n export type DirectiveDefListOrFactory = (() => DirectiveDefList)|DirectiveDefList;\n\n export type DirectiveDefList = (DirectiveDef<any>|ComponentDef<any>)[];\n\n export type DirectiveTypesOrFactory = (() => DirectiveTypeList)|DirectiveTypeList;\n\n export type DirectiveTypeList =\n (DirectiveType<any>|ComponentType<any>)\n |Type<any> /* Type as workaround for: Microsoft/TypeScript/issues/4881 */\n);\n\n export type DependencyTypeList =\n (DirectiveType<any>|ComponentType<any>|PipeType<any>|Type<any>)\n [];\n\n export type TypeOrFactory<T> = T|(() => T);\n\n export type HostBindingsFunction<T> = <U extends T>(rf: RenderFlags, ctx: U) => void;\n\n /**\n * Type used for PipeDefs on component definition.\n * ^\n * The function is necessary to be able to support forward declarations.\n * ^\n export type PipeDefListOrFactory = (() => PipeDefList)|PipeDefList;\n\n export type PipeDefList = PipeDef<any>[];\n\n export type PipeTypesOrFactory = (() => PipeTypeList)|PipeTypeList;\n\n export type PipeTypeList =\n (PipeType<any>|Type<any> /* Type as workaround for: Microsoft/TypeScript/issues/4881 */)\n [];\n\n\n// Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n";\n\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * ^\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport { ProviderToken } from '../di/provider_token';\nimport { QueryList } from '../linker/query_list';\nimport { TNode } from '../node';\nimport { TView } from '../view';\n\n /**\n * An object representing query metadata extracted from query annotations.\n * ^\n export interface TQueryMetadata {\n predicate: ProviderToken<unknown>|string[];\n read: any;\n flags: QueryFlags;\n}\n\n /**\n * A set of flags to be used with Queries.\n * ^\n * NOTE: Ensure changes here are reflected in `packages/compiler/src/render3/view/compiler.ts`\n * ^\n export const enum QueryFlags {\n /**\n * No flags\n * ^\n none = 0b0000,\n\n /**\n * Whether or not the query should descend into children.\n * ^\n descendants = 0b0001,\n\n /**\n * The query can be computed statically and hence can be assigned eagerly.\n * ^\n * NOTE: Backwards compatibility with ViewEngine.\n * ^\n isStatic = 0b0010,\n\n /**\n * If the `QueryList` should fire change event only if actual change to query was computed (vs old\n * behavior where the change was fired whenever the query was recomputed, even if the recomputed\n * query resulted in the same list.)\n * ^\n emitDistinctChangesOnly

```

= 0b0100, \n } \n /\*\* \n \* TQuery objects represent all the query-related data that remain the same from one view instance \n \* to another and can be determined on the very first template pass. Most notably TQuery holds all \n \* the matches for a given view. \n \*/ \n export interface TQuery { \n /\*\* \n \* Query metadata extracted from query annotations. \n \*/ \n metadata: TQueryMetadata; \n /\*\* \n \* Index of a query in a declaration view in case of queries propagated to an embedded view, -1 \n \* for queries declared in a given view. We are storing this index so we can find a parent query \n \* to clone for an embedded view (when an embedded view is created). \n \*/ \n indexInDeclarationView: number; \n /\*\* \n \* Matches collected on the first template pass. Each match is a pair of: \n \* - TNode index; \n \* - match index; \n \* \n \* A TNode index can be either: \n \* - a positive number (the most common case) to indicate a matching TNode; \n \* - a negative number to indicate that a given query is crossing a <ng-template> element and \n \* results from views created based on TemplateRef should be inserted at this place. \n \* \n \* A match index is a number used to find an actual value (for a given node) when query results \n \* are materialized. This index can have one of the following values: \n \* - -2 - indicates that we need to read a special token (TemplateRef, ViewContainerRef etc.); \n \* - -1 - indicates that we need to read a default value based on the node type (TemplateRef for \n \* ng-template and ElementRef for other elements); \n \* - a positive number - index of an injectable to be read from the element injector. \n \*/ \n matches: number[] | null; \n /\*\* \n \* A flag indicating if a given query crosses an <ng-template> element. This flag exists for \n \* performance reasons: we can notice that queries not crossing any <ng-template> elements will \n \* have matches from a given view only (and adapt processing accordingly). \n \*/ \n crossesNgTemplate: boolean; \n /\*\* \n \* A method call when a given query is crossing an element (or element container). This is where a \n \* given TNode is matched against a query predicate. \n \*/ \n @param tView \n \* @param tNode \n \*/ \n elementStart(tView: TView, tNode: TNode): void; \n /\*\* \n \* A method called when processing the elementEnd instruction - this is mostly useful to determine \n \* if a given content query should match any nodes past this point. \n \*/ \n @param tNode \n \*/ \n elementEnd(tNode: TNode): void; \n /\*\* \n \* A method called when processing the template instruction. This is where a \n \* given TContainerNode is matched against a query predicate. \n \*/ \n @param tView \n \* @param tNode \n \*/ \n template(tView: TView, tNode: TNode): void; \n /\*\* \n \* A query-related method called when an embedded TView is created based on the content of a \n \* <ng-template> element. We call this method to determine if a given query should be propagated \n \* to the embedded view and if so - return a cloned TQuery for this embedded view. \n \*/ \n @param tNode \n \* @param childQueryIndex \n \*/ \n embeddedTView(tNode: TNode, childQueryIndex: number): TQuery | null; \n } \n /\*\* \n \* TQueries represent a collection of individual TQuery objects tracked in a given view. Most of the \n \* methods on this interface are simple proxy methods to the corresponding functionality on TQuery. \n \*/ \n export interface TQueries { \n /\*\* \n \* Adds a new TQuery to a collection of queries tracked in a given view. \n \*/ \n @param tQuery \n \*/ \n track(tQuery: TQuery): void; \n /\*\* \n \* Returns a TQuery instance for at the given index in the queries array. \n \*/ \n @param index \n \*/ \n getByIndex(index: number): TQuery; \n /\*\* \n \* Returns the number of queries tracked in a given view. \n \*/ \n length: number; \n /\*\* \n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding \n \* `elementStart` on each and every TQuery. \n \*/ \n @param tView \n \* @param tNode \n \*/ \n elementStart(tView: TView, tNode: TNode): void; \n /\*\* \n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding \n \* `elementEnd` on each and every TQuery. \n \*/ \n @param tNode \n \*/ \n elementEnd(tNode: TNode): void; \n /\*\* \n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding \n \* `template` on each and every TQuery. \n \*/ \n @param tView \n \* @param tNode \n \*/ \n template(tView: TView, tNode: TNode): void; \n /\*\* \n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding \n \* `embeddedTView` on each and every TQuery. \n \*/ \n @param tNode \n \*/ \n embeddedTView(tNode: TNode): TQueries | null; \n } \n /\*\* \n \* An interface that represents query-related information specific to a view instance. Most notably \n \* it contains: \n \* - materialized query matches; \n \* - a pointer to a QueryList where materialized query results should be reported. \n \*/ \n export interface LQuery<T> { \n /\*\* \n \* Materialized query matches for a given view only (!). Results are initialized lazily so the \n \* array of matches is set to `null` initially. \n \*/ \n matches: (T | null)[] | null; \n } \n

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/**\n * A QueryList where materialized query results should be reported.\n */\n queryList: QueryList<T>;\n\n /**\n * Clones an LQuery for an embedded view. A cloned query shares the same `QueryList` but has a\n * separate collection of materialized matches.\n */\n clone(): LQuery<T>;\n\n /**\n * Called when an embedded view, impacting results of this query, is inserted or removed.\n */\n setDirty(): void;\n}\n\n/**\n * LQueries represent a collection of individual LQuery objects tracked in a given view.\n */\nexport interface LQueries {\n\n /**\n * A collection of queries tracked in a given view.\n */\n queries: LQuery<any>[];\n\n /**\n * A method called when a new embedded view is created. As a result a set of LQueries\n * applicable\n * for a new embedded view is instantiated (cloned) from the declaration view.\n * @param tView\n */\n createEmbeddedView(tView: TView): LQueries|null;\n\n /**\n * A method called when an embedded view is inserted into a container. As a result all impacted\n * `LQuery` objects (and associated `QueryList`) are marked as dirty.\n * @param tView\n */\n insertView(tView: TView): void;\n\n /**\n * A method called when an embedded view is detached from a container. As a result all impacted\n * `LQuery` objects (and associated `QueryList`) are marked as dirty.\n * @param tView\n */\n detachView(tView: TView): void;\n}\n\n// Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\n// We are temporarily importing the existing viewEngine_from core so we can be sure we are\n// correctly implementing its interfaces for backwards compatibility.\nimport {ProviderToken} from './di/provider_token';\nimport {createElementRef, ElementRef as ViewEngine_ElementRef, unwrapElementRef} from './linker/element_ref';\nimport {QueryList} from './linker/query_list';\nimport {createTemplateRef, TemplateRef as ViewEngine_TemplateRef} from './linker/template_ref';\nimport {createContainerRef, ViewContainerRef} from './linker/view_container_ref';\nimport {assertDefined, assertIndexInRange, assertNumber, throwError} from './util/assert';\nimport {stringify} from './util/stringify';\nimport {assertFirstCreatePass, assertLContainer} from './assert';\nimport {getNodeInjectable, locateDirectiveOrProvider} from './di';\nimport {storeCleanupWithContext} from './instructions/shared';\nimport {CONTAINER_HEADER_OFFSET, LContainer, MOVED_VIEWS} from './interfaces/container';\nimport {unusedValueExportToPlacateAjd as unused1} from './interfaces/definition';\nimport {unusedValueExportToPlacateAjd as unused2} from './interfaces/injector';\nimport {TContainerNode, TElementContainerNode, TElementNode, TNode, TNodeType, unusedValueExportToPlacateAjd as unused3} from './interfaces/node';\nimport {LQueries, LQuery, QueryFlags, TQueries, TQuery, TQueryMetadata, unusedValueExportToPlacateAjd as unused4} from './interfaces/query';\nimport {DECLARATION_LCONTAINER, LView, PARENT, QUERIES, TVIEW, TView} from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {getCurrentQueryIndex, getCurrentTNode, getLView, getTView, setCurrentQueryIndex} from './state';\nimport {isCreationMode} from './util/view_utils';\n\nconst unusedValueToPlacateAjd = unused1 + unused2 + unused3 + unused4;\n\nclass LQuery_<T> implements LQuery<T> {\n matches: (T|null)[]|null = null;\n constructor(public queryList: QueryList<T>) {} \n clone(): LQuery<T> {\n return new LQuery_(this.queryList);\n }\n setDirty(): void {\n this.queryList.setDirty();\n }\n}\n\nclass LQueries_ implements LQueries {\n constructor(public queries: LQuery<any>[] = []) {} \n\n createEmbeddedView(tView: TView): LQueries|null {\n const tQueries = tView.queries;\n if (tQueries !== null) {\n const noOfInheritedQueries =\n tView.contentQueries !== null ? tView.contentQueries[0] :\n tQueries.length;\n const viewLQueries: LQuery<any>[] = [];\n // An embedded view has queries propagated from a declaration view at the beginning of the\n // TQueries collection and up until a first content query declared in the embedded view. Only\n // propagated LQueries are created at this point (LQuery corresponding to declared content\n // queries will be instantiated from the content query instructions for each directive).\n for (let i = 0; i < noOfInheritedQueries; i++) {\n const tQuery = tQueries.getByIndex(i);\n const parentLQuery = this.queries[tQuery.indexInDeclarationView];\n viewLQueries.push(parentLQuery.clone());\n }\n return new LQueries_(viewLQueries);\n }\n return

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null;\n }\n\n insertView(tView: TView): void {\n  this.dirtyQueriesWithMatches(tView);\n }\n\n detachView(tView: TView): void {\n  this.dirtyQueriesWithMatches(tView);\n }\n\n private
dirtyQueriesWithMatches(tView: TView) {\n  for (let i = 0; i < this.queries.length; i++) {\n    if
(getTQuery(tView, i).matches !== null) {\n      this.queries[i].setDirty();\n    }\n  }\n}\n\n\nclass
TQueryMetadata_ implements TQueryMetadata {\n  constructor(\n    public predicate:
ProviderToken<unknown>|string[], public flags: QueryFlags,\n    public read: any = null) {} }\n\n\nclass TQueries_
implements TQueries {\n  constructor(private queries: TQuery[] = []) {} }\n\n  elementStart(tView: TView, tNode:
TNode): void {\n    ngDevMode &&\n      assertFirstCreatePass(\n
tView, 'Queries should collect results on the first template pass only');\n    for (let i = 0; i < this.queries.length;
i++) {\n      this.queries[i].elementStart(tView, tNode);\n    }\n  }\n  elementEnd(tNode: TNode): void {\n    for (let i
= 0; i < this.queries.length; i++) {\n      this.queries[i].elementEnd(tNode);\n    }\n  }\n  embeddedTView(tNode:
TNode): TQueries|null {\n    let queriesForTemplateRef: TQuery[]|null = null;\n    for (let i = 0; i < this.length;
i++) {\n      const childQueryIndex = queriesForTemplateRef !== null ? queriesForTemplateRef.length : 0;\n      const
tqueryClone = this.getByIndex(i).embeddedTView(tNode, childQueryIndex);\n      if (tqueryClone) {\n
tqueryClone.indexInDeclarationView = i;\n      if (queriesForTemplateRef !== null) {\n
queriesForTemplateRef.push(tqueryClone);\n      } else {\n        queriesForTemplateRef = [tqueryClone];\n      }\n    }\n  }\n  return queriesForTemplateRef !== null ? new TQueries_(queriesForTemplateRef)
: null;\n }\n\n  template(tView: TView, tNode: TNode): void {\n    ngDevMode &&\n      assertFirstCreatePass(\n
tView, 'Queries should collect results on the first template pass only');\n    for (let i = 0; i < this.queries.length;
i++) {\n      this.queries[i].template(tView, tNode);\n    }\n  }\n\n  getByIndex(index: number): TQuery {\n    ngDevMode
&& assertIndexInRange(this.queries, index);\n    return this.queries[index];\n  }\n\n  get length():
number {\n    return this.queries.length;\n  }\n\n  track(tquery: TQuery): void {\n    this.queries.push(tquery);\n  }\n}\n\n\nclass TQuery_ implements TQuery {\n  matches: number[]|null = null;\n  indexInDeclarationView = -1;\n  crossesNgTemplate = false;\n\n  /**\n   * A node index on which a query was declared (-1 for view queries and ones
inherited from the\n   * declaration template). We use this index (alongside with _appliesToNextNode flag) to
know\n   * when to apply content queries to elements in
a template.\n   */\n  private _declarationNodeIndex: number;\n\n  /**\n   * A flag indicating if a given query still
applies to nodes it is crossing. We use this flag\n   * (alongside with _declarationNodeIndex) to know when to stop
applying content queries to\n   * elements in a template.\n   */\n  private _appliesToNextNode = true;\n\n  constructor(public metadata: TQueryMetadata, nodeIndex: number = -1) {\n    this._declarationNodeIndex =
nodeIndex;\n  }\n\n  elementStart(tView: TView, tNode: TNode): void {\n    if (this.isApplyingToNode(tNode)) {\n
this.matchTNode(tView, tNode);\n    }\n  }\n\n  elementEnd(tNode: TNode): void {\n    if
(this._declarationNodeIndex === tNode.index) {\n      this._appliesToNextNode = false;\n    }\n  }\n\n  template(tView: TView, tNode: TNode): void {\n    this.elementStart(tView, tNode);\n  }\n\n  embeddedTView(tNode: TNode, childQueryIndex: number): TQuery|null {\n    if (this.isApplyingToNode(tNode))
{\n      this.crossesNgTemplate = true;\n
      // A marker indicating a `` element (a placeholder for query results from\n      // embedded views
created based on this ``).\n      this.addMatch(-tNode.index, childQueryIndex);\n      return new
TQuery_(this.metadata);\n    }\n    return null;\n  }\n\n  private isApplyingToNode(tNode: TNode): boolean {\n    if
(this._appliesToNextNode &&\n      (this.metadata.flags & QueryFlags.descendants) !== QueryFlags.descendants)\n    {\n      const declarationNodeIdx = this._declarationNodeIndex;\n      let parent = tNode.parent;\n      // Determine if
a given TNode is a "direct" child of a node on which a content query was\n      // declared (only direct children of
query's host node can match with the descendants: false\n      // option). There are 3 main use-case / conditions to
consider here:\n      // - <needs-target><i #target></i></needs-target>: here <i #target> parent node is a query\n      //
host node;\n      // - <needs-target><ng-template [ngIf]="true"><i
#target></i></ng-template></needs-target>: here <i #target> parent node is null;\n      // - <needs-
target><ng-container><i #target></i></ng-container></needs-target>: here we need\n      // to go past `` to determine <i #target> parent node (but we shouldn't traverse\n      // up past the query's host node!).\n    }\n  }\n}

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    while (parent !== null && (parent.type & TNodeType.ElementContainer) && parent.index !==
declarationNodeIdx) {\n    parent = parent.parent;\n    }\n    return declarationNodeIdx === (parent !== null ?
parent.index : -1);\n    }\n    return this._appliesToNextNode;\n    }\n\n    private matchTNode(tView: TView, tNode:
TNode): void {\n    const predicate = this.metadata.predicate;\n    if (Array.isArray(predicate)) {\n    for (let i = 0; i
< predicate.length; i++) {\n    const name = predicate[i];\n    this.matchTNodeWithReadOption(tView, tNode,
getIdxOfMatchingSelector(tNode, name));\n    // Also try matching the
name to a provider since strings can be used as DI tokens too.\n    this.matchTNodeWithReadOption(\n
tView, tNode, locateDirectiveOrProvider(tNode, tView, name, false, false));\n    }\n    } else {\n    if ((predicate as
any) === ViewEngine_TemplateRef) {\n    if (tNode.type & TNodeType.Container) {\n
this.matchTNodeWithReadOption(tView, tNode, -1);\n    }\n    } else {\n
this.matchTNodeWithReadOption(\n    tView, tNode, locateDirectiveOrProvider(tNode, tView, predicate,
false, false);\n    }\n    }\n\n    private matchTNodeWithReadOption(tView: TView, tNode: TNode,
nodeMatchIdx: number|null): void {\n    if (nodeMatchIdx !== null) {\n    const read = this.metadata.read;\n    if
(read !== null) {\n    if (read === ViewEngine_ElementRef || read === ViewContainerRef ||\n    read ===
ViewEngine_TemplateRef && (tNode.type & TNodeType.Container)) {\n    this.addMatch(tNode.index, -2);\n
    } else {\n
const directiveOrProviderIdx =\n    locateDirectiveOrProvider(tNode, tView, read, false, false);\n    if
(directiveOrProviderIdx !== null) {\n    this.addMatch(tNode.index, directiveOrProviderIdx);\n    }\n
}\n    } else {\n    this.addMatch(tNode.index, nodeMatchIdx);\n    }\n    }\n\n    private addMatch(tNodeIdx:
number, matchIdx: number) {\n    if (this.matches === null) {\n    this.matches = [tNodeIdx, matchIdx];\n    } else
{\n    this.matches.push(tNodeIdx, matchIdx);\n    }\n    }\n\n    /**\n    * Iterates over local names for a given node
and returns directive index\n    * (or -1 if a local name points to an element).\n    * @param tNode static data of a
node to check\n    * @param selector selector to match\n    * @returns directive index, -1 or null if a selector didn't
match any of the local names\n    */\n    function getIdxOfMatchingSelector(tNode: TNode, selector: string): number|null
{\n    const localNames = tNode.localNames;\n    if (localNames
!== null) {\n    for (let i = 0; i < localNames.length; i += 2) {\n    if (localNames[i] === selector) {\n    return
localNames[i + 1] as number;\n    }\n    }\n    }\n    return null;\n    }\n\n    function createResultByTNodeType(tNode:
TNode, currentView: LView): any {\n    if (tNode.type & (TNodeType.AnyRNode | TNodeType.ElementContainer))
{\n    return createElementRef(tNode, currentView);\n    } else if (tNode.type & TNodeType.Container) {\n    return
createTemplateRef(tNode, currentView);\n    }\n    return null;\n    }\n\n    function createResultForNode(IView: LView,
tNode: TNode, matchingIdx: number, read: any): any {\n    if (matchingIdx === -1) {\n    // if read token and / or
strategy is not specified, detect it using appropriate tNode type\n    return createResultByTNodeType(tNode,
IView);\n    } else if (matchingIdx === -2) {\n    // read a special token from a node injector\n    return
createSpecialToken(IView, tNode, read);\n    } else {\n    // read a token\n    return getNodeInjectable(IView,
IView[TVIEW], matchingIdx, tNode as TElementNode);\n    }\n    }\n\n    function createSpecialToken(IView: LView,
tNode: TNode, read: any): any {\n    if (read === ViewEngine_ElementRef) {\n    return createElementRef(tNode,
IView);\n    } else if (read === ViewEngine_TemplateRef) {\n    return createTemplateRef(tNode, IView);\n    } else if
(read === ViewContainerRef) {\n    ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode |
TNodeType.AnyContainer);\n    return createContainerRef(\n    tNode as TElementNode | TContainerNode |
TElementContainerNode, IView);\n    } else {\n    ngDevMode &&\n    throwError(\n    `Special token to read
should be one of ElementRef, TemplateRef or ViewContainerRef but got ${\n    stringify(read)}.`);\n    }\n    }\n\n    /**\n    * A helper function that creates query results for a given view. This function is meant to do the\n    * processing once and only once for a given view instance (a set of results for a given view\n    * doesn't change).\n    */\n    function materializeViewResults<T>(\n    tView: TView, IView: LView, tQuery: TQuery, queryIndex:
number): (T|null)[] {\n    const IQuery = IView[QUERIES]!.queries![queryIndex];\n    if (IQuery.matches === null)
{\n    const tViewData = tView.data;\n    const tQueryMatches = tQuery.matches!;\n    const result: T|null[] = [];\n    for (let i = 0; i < tQueryMatches.length; i += 2) {\n    const matchedNodeIdx = tQueryMatches[i];\n    if
(matchedNodeIdx < 0) {\n    // we at the <ng-template> marker which might have results in views created based

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on this\n    // <ng-template> - those results will be in separate views though, so here we just leave\n    // null as
a placeholder\n    result.push(null);\n    } else {\n    ngDevMode && assertIndexInRange(tViewData,
matchedNodeIdx);\n    const tNode = tViewData[matchedNodeIdx] as TNode;\n
result.push(createResultForNode(IView, tNode, tQueryMatches[i + 1], tQuery.metadata.read));\n    }\n    }\n
IQuery.matches
= result;\n    }\n\n    return IQuery.matches;\n}\n\n/**\n * A helper function that collects (already materialized) query
results from a tree of views,\n * starting with a provided LView.\n */\nfunction collectQueryResults<T>(tView:
TView, IView: LView, queryIndex: number, result: T[]): T[] {\n    const tQuery =
tView.queries!.getByIndex(queryIndex);\n    const tQueryMatches = tQuery.matches;\n    if (tQueryMatches !== null)
{\n    const IViewResults = materializeViewResults<T>(tView, IView, tQuery, queryIndex);\n    for (let i = 0; i <
tQueryMatches.length; i += 2) {\n    const tNodeIdx = tQueryMatches[i];\n    if (tNodeIdx > 0) {\n
result.push(IViewResults[i / 2] as T);\n    } else {\n    const childQueryIndex = tQueryMatches[i + 1];\n\n
const declarationLContainer = IView[-tNodeIdx] as LContainer;\n    ngDevMode &&
assertLContainer(declarationLContainer);\n    // collect matches for views inserted in this container\n    for
(let i = CONTAINER_HEADER_OFFSET;
i < declarationLContainer.length; i++) {\n    const embeddedLView = declarationLContainer[i];\n    if
(embeddedLView[DECLARATION_LCONTAINER] === embeddedLView[PARENT]) {\n
collectQueryResults(embeddedLView[TVIEW], embeddedLView, childQueryIndex, result);\n    }\n    }\n\n
// collect matches for views created from this declaration container and inserted into\n    // different containers\n
if (declarationLContainer[MOVED_VIEWS] !== null) {\n    const embeddedLViews =
declarationLContainer[MOVED_VIEWS];\n    for (let i = 0; i < embeddedLViews.length; i++) {\n    const
embeddedLView = embeddedLViews[i];\n    collectQueryResults(embeddedLView[TVIEW],
embeddedLView, childQueryIndex, result);\n    }\n    }\n    }\n    }\n    return result;\n}\n\n/**\n *
Refreshes a query by combining matches from all active views and removing matches from deleted\n * views.\n *
@returns `true` if a query
got dirty during change detection or if this is a static query\n * resolving in creation mode, `false` otherwise.\n *
@codeGenApi\n */\nexport function queryRefresh(queryList: QueryList<any>): boolean {\n    const IView =
getLView();\n    const tView = getTView();\n    const queryIndex = getCurrentQueryIndex();\n\n
setCurrentQueryIndex(queryIndex + 1);\n\n    const tQuery = getTQuery(tView, queryIndex);\n    if (queryList.dirty
&&\n    (isCreationMode(IView) ===\n    ((tQuery.metadata.flags & QueryFlags.isStatic) ===
QueryFlags.isStatic))) {\n    if (tQuery.matches === null) {\n    queryList.reset([]);\n    } else {\n    const result =
tQuery.crossesNgTemplate ?\n    collectQueryResults(tView, IView, queryIndex, []) :\n    materializeViewResults(tView, IView, tQuery, queryIndex);\n    queryList.reset(result, unwrapElementRef);\n
queryList.notifyOnChanges();\n    }\n    return true;\n    }\n    return false;\n}\n\n/**\n * Creates new QueryList,
stores the reference
in LView and returns QueryList.\n *
@param predicate The type for which the query will search\n *
@param flags Flags associated with the query\n *
@param read What to save in the query\n *
@codeGenApi\n */\nexport function viewQuery<T>(\n    predicate: ProviderToken<unknown>|string[], flags: QueryFlags, read?:
any): void {\n    ngDevMode && assertNumber(flags, 'Expecting flags');\n    const tView = getTView();\n    if
(tView.firstCreatePass) {\n    createTQuery(tView, new TQueryMetadata_(predicate, flags, read), -1);\n    if ((flags
& QueryFlags.isStatic) === QueryFlags.isStatic) {\n    tView.staticViewQueries = true;\n    }\n    }\n
createLQuery<T>(tView, getLView(), flags);\n}\n\n/**\n * Registers a QueryList, associated with a content query,
for later refresh (part of a view\n * refresh).\n *
@param directiveIndex Current directive index\n *
@param predicate The type for which the query will search\n *
@param flags Flags associated with the query\n *
@param read What
to save in the query\n *
@returns QueryList<T>\n *
@codeGenApi\n */\nexport function contentQuery<T>(\n    directiveIndex: number, predicate: ProviderToken<unknown>|string[], flags: QueryFlags,\n    read?: any): void {\n    ngDevMode && assertNumber(flags, 'Expecting flags');\n    const tView = getTView();\n    if (tView.firstCreatePass)

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{\n  const tNode = getCurrentTNode();\n  createTQuery(tView, new TQueryMetadata_(predicate, flags, read),
tNode.index);\n  saveContentQueryAndDirectiveIndex(tView, directiveIndex);\n  if ((flags &
QueryFlags.isStatic) === QueryFlags.isStatic) {\n    tView.staticContentQueries = true;\n  }\n}\n\n
createLQuery<T>(tView, getLView(), flags);\n}\n\n/**\n * Loads a QueryList corresponding to the current view or
content query.\n *\n * @codeGenApi\n */\nexport function loadQuery<T>(): QueryList<T> {\n  return
loadQueryInternal<T>(getLView(), getCurrentQueryIndex());\n}\n\nfunction loadQueryInternal<T>(IView: LView,
queryIndex: number): QueryList<T>
{\n  ngDevMode &&\n    assertDefined(IView[QUERIES], 'LQueries should be defined when trying to load a
query');\n  ngDevMode && assertIndexInRange(IView[QUERIES]!.queries, queryIndex);\n  return
IView[QUERIES]!.queries[queryIndex].queryList;\n}\n\nfunction createLQuery<T>(tView: TView, IView: LView,
flags: QueryFlags) {\n  const queryList = new QueryList<T>(\n    (flags & QueryFlags.emitDistinctChangesOnly)
=== QueryFlags.emitDistinctChangesOnly);\n  storeCleanupWithContext(tView, IView, queryList,
queryList.destroy);\n  if (IView[QUERIES] === null) IView[QUERIES] = new LQueries_();\n  IView[QUERIES]!.queries.push(new LQuery_(queryList));\n}\n\nfunction createTQuery(tView: TView, metadata:
TQueryMetadata, nodeIndex: number): void {\n  if (tView.queries === null) tView.queries = new TQueries_();\n  tView.queries.track(new TQuery_(metadata, nodeIndex));\n}\n\nfunction
saveContentQueryAndDirectiveIndex(tView: TView, directiveIndex: number) {\n  const tViewContentQueries =
tView.contentQueries
  || (tView.contentQueries = []);\n  const lastSavedDirectiveIndex =\n    tViewContentQueries.length ?
tViewContentQueries[tViewContentQueries.length - 1] : -1;\n  if (directiveIndex !== lastSavedDirectiveIndex) {\n
tViewContentQueries.push(tView.queries!.length - 1, directiveIndex);\n  }\n}\n\nfunction getTQuery(tView:
TView, index: number): TQuery {\n  ngDevMode && assertDefined(tView.queries, 'TQueries must be defined to
retrieve a TQuery');\n  return tView.queries!.getByIndex(index);\n}\n\n",/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\nimport {createTemplateRef, TemplateRef} from
'./linker/template_ref';\nimport {TNode} from './interfaces/node';\nimport {LView} from
'./interfaces/view';\n\n/**\n * Retrieves `TemplateRef` instance from `Injector` when a local reference is placed on
the\n * ``
element.\n *\n * @codeGenApi\n */\nexport function templateRefExtractor(tNode: TNode, IView: LView):
TemplateRef<any>|null {\n  return createTemplateRef(tNode, IView);\n}\n\n",/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\nimport {LifecycleHooksFeature} from
'./component_ref';\nimport {defineComponent, defineDirective, defineNgModule, definePipe, setComponentScope,
setNgModuleScope} from './definition';\nimport {CopyDefinitionFeature} from
'./features/copy_definition_feature';\nimport {InheritDefinitionFeature} from
'./features/inherit_definition_feature';\nimport {NgOnChangesFeature} from
'./features/ng_onchanges_feature';\nimport {ProvidersFeature} from './features/providers_feature';\nimport
{StandaloneFeature} from './features/standalone_feature';\nimport {ComponentDef, ComponentTemplate,
ComponentType, DirectiveDef, DirectiveType, PipeDef} from './interfaces/definition';\nimport
{ComponentDeclaration, DirectiveDeclaration, FactoryDeclaration, InjectorDeclaration, NgModuleDeclaration,
PipeDeclaration} from './interfaces/public_definitions';\nimport {ComponentDebugMetadata,
DirectiveDebugMetadata, getComponent, getDirectiveMetadata, getDirectives, getHostElement, getRenderedText}
from './util/discovery_utils';\nexport {NgModuleType} from './metadata/ng_module_def';\nexport
{ComponentFactory, ComponentFactoryResolver, ComponentRef, injectComponentFactoryResolver} from
'./component_ref';\nexport {getInheritedFactory} from './di';\nexport {getLocaleId, setLocaleId} from
'./i18n/i18n_locale_id';\n// clang-format off\nexport {\n  detectChanges,\n  store,\n  advance,\n  attribute,\n
attributeInterpolate1,\n  attributeInterpolate2,\n  attributeInterpolate3,\n  attributeInterpolate4,\n
attributeInterpolate5,\n  attributeInterpolate6,\n  attributeInterpolate7,\n

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attributeInterpolate8,\n attributeInterpolateV,\n\n classMap,\n classMapInterpolate1,\n classMapInterpolate2,\n
classMapInterpolate3,\n classMapInterpolate4,\n classMapInterpolate5,\n classMapInterpolate6,\n
classMapInterpolate7,\n classMapInterpolate8,\n classMapInterpolateV,\n\n classProp,\n\n directiveInject,\n\n
element,\n\n elementContainer,\n elementContainerEnd,\n elementContainerStart,\n elementEnd,\n
elementStart,\n\n getCurrentView,\n hostProperty,\n injectAttribute,\n invalidFactory,\n\n listener,\n\n
namespaceHTML,\n namespaceMathML,\n namespaceSVG,\n\n\n nextContext,\n\n projection,\n projectionDef,\n
property,\n propertyInterpolate,\n propertyInterpolate1,\n propertyInterpolate2,\n propertyInterpolate3,\n
propertyInterpolate4,\n propertyInterpolate5,\n propertyInterpolate6,\n propertyInterpolate7,\n
propertyInterpolate8,\n propertyInterpolateV,\n\n
reference,\n\n\n styleMap,\n styleMapInterpolate1,\n styleMapInterpolate2,\n styleMapInterpolate3,\n
styleMapInterpolate4,\n styleMapInterpolate5,\n styleMapInterpolate6,\n styleMapInterpolate7,\n
styleMapInterpolate8,\n styleMapInterpolateV,\n\n\n styleProp,\n stylePropInterpolate1,\n stylePropInterpolate2,\n
stylePropInterpolate3,\n stylePropInterpolate4,\n stylePropInterpolate5,\n stylePropInterpolate6,\n
stylePropInterpolate7,\n stylePropInterpolate8,\n stylePropInterpolateV,\n\n\n syntheticHostListener,\n
syntheticHostProperty,\n\n\n template,\n\n\n text,\n textInterpolate,\n textInterpolate1,\n textInterpolate2,\n
textInterpolate3,\n textInterpolate4,\n textInterpolate5,\n textInterpolate6,\n textInterpolate7,\n textInterpolate8,\n
textInterpolateV,\n getUnknownElementStrictMode,\n setUnknownElementStrictMode,\n
getUnknownPropertyStrictMode,\n setUnknownPropertyStrictMode\n}
from './instructions/all';\nexport {i18n, i18nApply, i18nAttributes, i18nEnd, i18nExp, i18nPostprocess, i18nStart}
from './instructions/i18n';\nexport {RenderFlags} from './interfaces/definition';\nexport {\n AttributeMarker\n} from
 './interfaces/node';\nexport {CssSelectorList, ProjectionSlots} from './interfaces/projection';\nexport {\n
setClassMetadata,\n} from './metadata';\nexport {NgModuleFactory, NgModuleRef, createEnvironmentInjector}
from './ng_module_ref';\nexport {\n pipe,\n pipeBind1,\n pipeBind2,\n pipeBind3,\n pipeBind4,\n pipeBindV,\n}
from './pipe';\nexport {\n pureFunction0,\n pureFunction1,\n pureFunction2,\n pureFunction3,\n pureFunction4,\n
pureFunction5,\n pureFunction6,\n pureFunction7,\n pureFunction8,\n pureFunctionV,\n} from
 './pure_function';\nexport {\n contentQuery,\n loadQuery,\n queryRefresh,\n viewQuery\n} from './query';\nexport
{\n disableBindings,\n\n enableBindings,\n\n
resetView,\n restoreView,\n} from './state';\nexport {NO_CHANGE} from './tokens';\nexport { resolveBody,
resolveDocument, resolveWindow} from './util/misc_utils';\nexport { templateRefExtractor} from
 './view_engine_compatibility_prebound';\n// clang-format on\n\nexport {\n ComponentDebugMetadata,\n
ComponentDef,\n ComponentTemplate,\n ComponentType,\n DirectiveDebugMetadata,\n DirectiveDef,\n
DirectiveType,\n getComponent,\n getDirectiveMetadata,\n getDirectives,\n getHostElement,\n
getRenderedText,\n LifecycleHooksFeature,\n PipeDef,\n ComponentDeclaration,\n CopyDefinitionFeature,\n
defineComponent,\n defineDirective,\n defineNgModule,\n definePipe,\n DirectiveDeclaration,\n
FactoryDeclaration,\n InheritDefinitionFeature,\n InjectorDeclaration,\n NgModuleDeclaration,\n
NgOnChangesFeature,\n PipeDeclaration,\n ProvidersFeature,\n setComponentScope,\n setNgModuleScope,\n
StandaloneFeature,\n};\n";\n\n\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport
{forwardRef, resolveForwardRef} from '../di/forward_ref';\nimport {inject, invalidFactoryDep} from
 '../di/injector_compatibility';\nimport {defineInjectable, defineInjector} from '../di/interface/defs';\nimport
{registerNgModuleType} from '../linker/ng_module_registration';\nimport * as iframe_attrs_validation from
 '../sanitization/iframe_attrs_validation';\nimport * as sanitization from '../sanitization/sanitization';\nimport *
as r3 from './index';\n\n\n/**\n * A mapping of the @angular/core API surface used in generated expressions to the
actual symbols.\n *\n * This should be kept up to date with the public exports of @angular/core.\n *\nexport const
angularCoreEnv: {[name: string]: Function} =\n  (() => ({\n    'attribute': r3.attribute,\n
    'attributeInterpolate1': r3.attributeInterpolate1,\n    'attributeInterpolate2': r3.attributeInterpolate2,\n
    'attributeInterpolate3': r3.attributeInterpolate3,\n    'attributeInterpolate4': r3.attributeInterpolate4,\n

```



'attributeInterpolate5': r3.attributeInterpolate5,\n 'attributeInterpolate6': r3.attributeInterpolate6,\n  
'attributeInterpolate7': r3.attributeInterpolate7,\n 'attributeInterpolate8': r3.attributeInterpolate8,\n  
'attributeInterpolateV': r3.attributeInterpolateV,\n 'defineComponent': r3.defineComponent,\n  
'defineDirective': r3.defineDirective,\n 'defineInjectable': defineInjectable,\n 'defineInjector':  
defineInjector,\n 'defineNgModule': r3.defineNgModule,\n 'definePipe': r3.definePipe,\n 'directiveInject':  
r3.directiveInject,\n 'getInheritedFactory': r3.getInheritedFactory,\n 'inject': inject,\n  
'injectAttribute': r3.injectAttribute,\n 'invalidFactory': r3.invalidFactory,\n 'invalidFactoryDep':  
invalidFactoryDep,\n 'templateRefExtractor': r3.templateRefExtractor,\n 'resetView': r3.resetView,\n  
'NgOnChangesFeature': r3.NgOnChangesFeature,\n 'ProvidersFeature': r3.ProvidersFeature,\n  
'CopyDefinitionFeature': r3.CopyDefinitionFeature,\n 'InheritDefinitionFeature': r3.InheritDefinitionFeature,\n  
'StandaloneFeature': r3.StandaloneFeature,\n 'nextContext': r3.nextContext,\n 'namespaceHTML':  
r3.namespaceHTML,\n 'namespaceMathML': r3.namespaceMathML,\n 'namespaceSVG':  
r3.namespaceSVG,\n 'enableBindings': r3.enableBindings,\n 'disableBindings': r3.disableBindings,\n  
'elementStart': r3.elementStart,\n 'elementEnd': r3.elementEnd,\n 'element': r3.element,\n  
'elementContainerStart': r3.elementContainerStart,\n  
'elementContainerEnd': r3.elementContainerEnd,\n 'elementContainer': r3.elementContainer,\n  
'pureFunction0': r3.pureFunction0,\n 'pureFunction1': r3.pureFunction1,\n 'pureFunction2':  
r3.pureFunction2,\n 'pureFunction3': r3.pureFunction3,\n 'pureFunction4': r3.pureFunction4,\n  
'pureFunction5': r3.pureFunction5,\n 'pureFunction6': r3.pureFunction6,\n 'pureFunction7':  
r3.pureFunction7,\n 'pureFunction8': r3.pureFunction8,\n 'pureFunctionV': r3.pureFunctionV,\n  
'getCurrentView': r3.getCurrentView,\n 'restoreView': r3.restoreView,\n 'listener': r3.listener,\n  
'projection': r3.projection,\n 'syntheticHostProperty': r3.syntheticHostProperty,\n 'syntheticHostListener':  
r3.syntheticHostListener,\n 'pipeBind1': r3.pipeBind1,\n 'pipeBind2': r3.pipeBind2,\n 'pipeBind3':  
r3.pipeBind3,\n 'pipeBind4': r3.pipeBind4,\n 'pipeBindV': r3.pipeBindV,\n 'projectionDef':  
r3.projectionDef,\n 'hostProperty': r3.hostProperty,\n 'property': r3.property,\n 'propertyInterpolate':  
r3.propertyInterpolate,\n 'propertyInterpolate1': r3.propertyInterpolate1,\n 'propertyInterpolate2':  
r3.propertyInterpolate2,\n 'propertyInterpolate3': r3.propertyInterpolate3,\n 'propertyInterpolate4':  
r3.propertyInterpolate4,\n 'propertyInterpolate5': r3.propertyInterpolate5,\n 'propertyInterpolate6':  
r3.propertyInterpolate6,\n 'propertyInterpolate7': r3.propertyInterpolate7,\n 'propertyInterpolate8':  
r3.propertyInterpolate8,\n 'propertyInterpolateV': r3.propertyInterpolateV,\n 'pipe': r3.pipe,\n  
'queryRefresh': r3.queryRefresh,\n 'viewQuery': r3.viewQuery,\n 'loadQuery': r3.loadQuery,\n  
'contentQuery':  
r3.contentQuery,\n 'reference': r3.reference,\n 'classMap': r3.classMap,\n 'classMapInterpolate1':  
r3.classMapInterpolate1,\n 'classMapInterpolate2': r3.classMapInterpolate2,\n 'classMapInterpolate3':  
r3.classMapInterpolate3,\n 'classMapInterpolate4': r3.classMapInterpolate4,\n 'classMapInterpolate5':  
r3.classMapInterpolate5,\n 'classMapInterpolate6': r3.classMapInterpolate6,\n 'classMapInterpolate7':  
r3.classMapInterpolate7,\n 'classMapInterpolate8': r3.classMapInterpolate8,\n 'classMapInterpolateV':  
r3.classMapInterpolateV,\n 'styleMap': r3.styleMap,\n 'styleMapInterpolate1': r3.styleMapInterpolate1,\n  
'styleMapInterpolate2': r3.styleMapInterpolate2,\n 'styleMapInterpolate3': r3.styleMapInterpolate3,\n  
'styleMapInterpolate4': r3.styleMapInterpolate4,\n 'styleMapInterpolate5': r3.styleMapInterpolate5,\n  
'styleMapInterpolate6': r3.styleMapInterpolate6,\n 'styleMapInterpolate7': r3.styleMapInterpolate7,\n  
'styleMapInterpolate8': r3.styleMapInterpolate8,\n 'styleMapInterpolateV': r3.styleMapInterpolateV,\n  
'styleProp': r3.styleProp,\n 'stylePropInterpolate1': r3.stylePropInterpolate1,\n 'stylePropInterpolate2':  
r3.stylePropInterpolate2,\n 'stylePropInterpolate3': r3.stylePropInterpolate3,\n 'stylePropInterpolate4':  
r3.stylePropInterpolate4,\n 'stylePropInterpolate5': r3.stylePropInterpolate5,\n 'stylePropInterpolate6':  
r3.stylePropInterpolate6,\n 'stylePropInterpolate7': r3.stylePropInterpolate7,\n 'stylePropInterpolate8':  
r3.stylePropInterpolate8,\n 'stylePropInterpolateV': r3.stylePropInterpolateV,\n 'classProp': r3.classProp,\n  
'advance': r3.advance,\n 'template': r3.template,\n 'text': r3.text,\n 'textInterpolate':



```

    {assertDefined} from '././util/assert';\nimport {EMPTY_ARRAY} from '././util/empty';\nimport
    {getComponentDef, getDirectiveDef, getNgModuleDef, getPipeDef, isStandalone} from './definition';\nimport
    {NG_COMP_DEF, NG_DIR_DEF, NG_FACTORY_DEF, NG_MOD_DEF, NG_PIPE_DEF} from
    './fields';\nimport {ComponentDef} from './interfaces/definition';\nimport {maybeUnwrapFn} from
    './util/misc_utils';\nimport {stringifyForError} from './util/stringify_utils';\n\nimport {angularCoreEnv} from
    './environment';\nimport {patchModuleCompilation} from './module_patch';\nimport {isModuleWithProviders,
    isNgModule} from './util';\n\ninterface ModuleQueueItem {\n  moduleType: Type<any>;\n  ngModule:
    NgModule;\n}\n\nconst moduleQueue: ModuleQueueItem[] = [];\n\n/**\n * Enqueues moduleDef to be checked
    later to see if scope can be set on its\n * component declarations.\n */\nfunction
    enqueueModuleForDelayedScoping(moduleType: Type<any>, ngModule: NgModule) {\n
    moduleQueue.push({moduleType, ngModule});\n}\n\nlet
    flushingModuleQueue = false;\n\n/**\n * Loops over queued module definitions, if a given module definition has all
    of its\n * declarations resolved, it dequeues that module definition and sets the scope on\n * its declarations.\n
    */\n\nexport function flushModuleScopingQueueAsMuchAsPossible() {\n  if (!flushingModuleQueue) {\n
    flushingModuleQueue = true;\n    try {\n      for (let i = moduleQueue.length - 1; i >= 0; i--) {\n        const
        {moduleType, ngModule} = moduleQueue[i];\n\n        if (ngModule.declarations &&
        ngModule.declarations.every(isResolvedDeclaration)) {\n          // dequeue\n          moduleQueue.splice(i, 1);\n
          setScopeOnDeclaredComponents(moduleType, ngModule);\n        }\n      }\n    } finally {\n
    flushingModuleQueue = false;\n  }\n}\n\n/**\n * Returns truthy if a declaration has resolved. If the declaration
    happens to be\n * an array of declarations, it will recurse to check each declaration in that array\n * (which may also
    be arrays).\n */\n\nfunction isResolvedDeclaration(declaration: any[]|Type<any>): boolean {\n  if
    (Array.isArray(declaration)) {\n    return declaration.every(isResolvedDeclaration);\n  }\n  return
    !!resolveForwardRef(declaration);\n}\n\n/**\n * Compiles a module in JIT mode.\n */\n\n * This function
    automatically gets called when a class has a `@NgModule` decorator.\n */\n\nexport function
    compileNgModule(moduleType: Type<any>, ngModule: NgModule = {}): void {\n  patchModuleCompilation();\n
    compileNgModuleDefs(moduleType as NgModuleType, ngModule);\n  if (ngModule.id !== undefined) {\n
    registerNgModuleType(moduleType as NgModuleType, ngModule.id);\n  }\n\n  // Because we don't know if all
    declarations have resolved yet at the moment the\n  // NgModule decorator is executing, we're enqueueing the
    setting of module scope\n  // on its declarations to be run at a later time when all declarations for the module,\n  //
    including forward refs, have resolved.\n  enqueueModuleForDelayedScoping(moduleType,
    ngModule);\n}\n\n/**\n * Compiles and adds the `mod`, `fac` and `inj` properties to the module class.\n */\n\n * It's
    possible to compile a module via this API which will allow duplicate declarations in its\n * root.\n */\n\nexport
    function compileNgModuleDefs(\n  moduleType: NgModuleType, ngModule: NgModule,\n
    allowDuplicateDeclarationsInRoot: boolean = false): void {\n  ngDevMode && assertDefined(moduleType,
    'Required value moduleType');\n  ngDevMode && assertDefined(ngModule, 'Required value ngModule');\n  const
    declarations: Type<any>[] = flatten(ngModule.declarations || EMPTY_ARRAY);\n  let ngModuleDef: any = null;\n
    Object.defineProperty(moduleType, NG_MOD_DEF, {\n    configurable: true,\n    get: () => {\n      if
    (ngModuleDef === null) {\n        if (ngDevMode && ngModule.imports &&
        ngModule.imports.indexOf(moduleType) > -1) {\n          // We need to assert this immediately, because allowing it
        to continue will cause it to\n          // go into an infinite loop\n          before we've reached the point where we throw all the errors.\n          throw new
        Error(`${stringifyForError(moduleType)}' module can't import itself`);\n        }\n        const compiler =
        getCompilerFacade(\n          {usage: JitCompilerUsage.Decorator, kind: 'NgModule', type: moduleType});\n
        ngModuleDef = compiler.compileNgModule(angularCoreEnv, `ng:///${moduleType.name}/mod.js`, {\n          type:
        moduleType,\n          bootstrap: flatten(ngModule.bootstrap || EMPTY_ARRAY).map(resolveForwardRef),\n
        declarations: declarations.map(resolveForwardRef),\n          imports: flatten(ngModule.imports ||
        EMPTY_ARRAY)\n          .map(resolveForwardRef)\n          .map(expandModuleWithProviders),\n
        exports: flatten(ngModule.exports || EMPTY_ARRAY)\n          .map(resolveForwardRef)\n
      }\n    });\n  }\n  return ngModuleDef;\n}\n
  
```

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.map(expandModuleWithProviders),\n      schemas: ngModule.schemas ? flatten(ngModule.schemas) : null,\n      id:\n      ngModule.id || null,\n    });\n    // Set `schemas` on ngModuleDef to an empty array in JIT mode to indicate that\n    runtime\n    // should verify that there are no unknown elements in a template. In AOT mode, that check\n    // happens at compile time and `schemas` information is not present on Component and Module\n    // defs after\n    compilation (so the check doesn't happen the second time at runtime).\n    if (!ngModuleDef.schemas) {\n      ngModuleDef.schemas = [];\n    }\n    return ngModuleDef;\n  }\n  let ngFactoryDef: any =\n    null;\n  Object.defineProperty(moduleType, NG_FACTORY_DEF, {\n    get: () => {\n      if (ngFactoryDef ===\n        null) {\n        const compiler = getCompilerFacade(\n          {\n            usage: JitCompilerUsage.Decorator, kind:\n            'NgModule', type: moduleType});\n        ngFactoryDef = compiler.compileFactory(angularCoreEnv,\n          `ng://${moduleType.name}/fac.js`, {\n            name: moduleType.name,\n            type: moduleType,\n            deps: reflectDependencies(moduleType),\n            target: compiler.FactoryTarget.NgModule,\n            typeArgumentCount: 0,\n          });\n        return ngFactoryDef;\n      },\n    } // Make the property configurable in\n    dev mode to allow overriding in tests\n    configurable: !!ngDevMode,\n  });\n  let ngInjectorDef: any = null;\n  Object.defineProperty(moduleType, NG_INJ_DEF, {\n    get: () => {\n      if (ngInjectorDef === null) {\n        ngDevMode &&\n          verifySemanticsOfNgModuleDef(\n            moduleType as any as NgModuleType,\n            allowDuplicateDeclarationsInRoot);\n        const meta: R3InjectorMetadataFacade = {\n          name:\n          moduleType.name,\n          type: moduleType,\n          providers: ngModule.providers || EMPTY_ARRAY,\n          imports: [\n            (ngModule.imports || EMPTY_ARRAY).map(resolveForwardRef),\n            (ngModule.exports ||\n              EMPTY_ARRAY).map(resolveForwardRef),\n          ],\n        }; \n        const compiler = getCompilerFacade(\n          {\n            usage: JitCompilerUsage.Decorator, kind: 'NgModule', type: moduleType});\n        ngInjectorDef =\n          compiler.compileInjector(angularCoreEnv, `ng://${moduleType.name}/inj.js`, meta);\n      }\n      return\n      ngInjectorDef;\n    },\n    // Make the property configurable in dev mode to allow overriding in tests\n    configurable: !!ngDevMode,\n  });\n  \n  export function generateStandaloneInDeclarationsError(type: Type<any>,\n    location: string) {\n    const prefix = `Unexpected "${stringifyForError(type)}" found in the "declarations" array of\n    the`;\n    const suffix = `"${stringifyForError(type)}" is marked as standalone and can't be declared` +\n      ` in any\n    NgModule - did you intend to import it instead (by adding it to the "imports" array)?`;\n    return `${prefix}\n    ${location}, ${suffix}`;\n  }\n  \n  function verifySemanticsOfNgModuleDef(\n    moduleType: NgModuleType,\n    allowDuplicateDeclarationsInRoot: boolean,\n    importingModule?: NgModuleType): void\n    {\n      if (verifiedNgModule.get(moduleType)) return;\n      // skip verifications of standalone components, directives,\n      and pipes\n      if (isStandalone(moduleType)) return;\n      verifiedNgModule.set(moduleType, true);\n      moduleType =\n        resolveForwardRef(moduleType);\n      let ngModuleDef: NgModuleDef<any>;\n      if (importingModule) {\n        ngModuleDef = getNgModuleDef(moduleType)!;\n        if (!ngModuleDef) {\n          throw new Error(`Unexpected value\n          '${moduleType.name}' imported by the module '${\n            importingModule.name}'. Please add an @NgModule\n          annotation.`);\n        }\n      } else {\n        ngModuleDef = getNgModuleDef(moduleType, true);\n      }\n      const errors: string[]\n        = [];\n      const declarations = maybeUnwrapFn(ngModuleDef.declarations);\n      const imports =\n        maybeUnwrapFn(ngModuleDef.imports);\n      flatten(imports).map(unwrapModuleWithProvidersImports).forEach(modOrStandaloneCmpt => {\n        verifySemanticsOfNgModuleImport(modOrStandaloneCmpt, moduleType);\n        verifySemanticsOfNgModuleDef(modOrStandaloneCmpt,\n          false, moduleType);\n      });\n      const exports = maybeUnwrapFn(ngModuleDef.exports);\n      declarations.forEach(verifyDeclarationsHaveDefinitions);\n      declarations.forEach(verifyDirectivesHaveSelector);\n      declarations.forEach((declarationType) => verifyNotStandalone(declarationType, moduleType));\n      const\n        combinedDeclarations: Type<any>[] = [\n        ...declarations.map(resolveForwardRef),\n        ...flatten(imports.map(computeCombinedExports)).map(resolveForwardRef),\n      ];\n      exports.forEach(verifyExportsAreDeclaredOrReExported);\n      declarations.forEach(decl =>\n        verifyDeclarationIsUnique(decl, allowDuplicateDeclarationsInRoot));\n      declarations.forEach(verifyComponentEntryComponentsIsPartOfNgModule);\n      const ngModule =

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    dir => dir.hasOwnProperty(NG_COMP_DEF) ? getComponentDef(dir) : getDirectiveDef(dir)!;
  }.filter(def => !!def);
  componentDef.pipeDefs = () =>
  Array.from(transitiveScopes.compilation.pipes).map(pipe => getPipeDef(pipe)!);
  componentDef.schemas
  = transitiveScopes.schemas;
  // Since we avoid Components/Directives/Pipes recompiling in case there are no
  // overrides, we // may face a problem where previously compiled defs available to a given Component/Directive
  // are cached in TView and may become stale (in case any of these defs gets recompiled). In // order to avoid this
  // problem, we force fresh TView to be created.
  componentDef.tView = null;
  // Compute the pair of
  // transitive scopes (compilation scope and exported scope) for a given type
  // (either a NgModule or a standalone
  // component / directive / pipe).
  // export function transitiveScopesFor<T>(type: Type<T>):
  NgModuleTransitiveScopes {
    if (isNgModule(type)) {
      return transitiveScopesForNgModule(type);
    } else if
    (isStandalone(type)) {
      const directiveDef = getComponentDef(type) || getDirectiveDef(type);
      if
      (directiveDef !== null) {
        return {
          schemas: null,
          compilation: {
            directives:
            new Set<any>(),
            pipes: new Set<any>(),
          },
          exported: {
            directives: new
            Set<any>([type]),
            pipes: new Set<any>(),
          },
        };
      }
      const pipeDef = getPipeDef(type);
      if (pipeDef !== null) {
        return {
          schemas: null,
          compilation: {
            directives: new Set<any>(),
            pipes: new Set<any>(),
          },
          exported: {
            directives: new Set<any>(),
            pipes: new
            Set<any>([type]),
          },
        };
      }
      // TODO: change the error message to be more user-facing and
      // take standalone into account
      throw new Error(`${type.name} does not have a module def (mod
      property)`);
    }
    // Compute the pair of transitive scopes (compilation scope and exported scope) for a given
    // module.
    // This operation is memoized and the result is cached on the module's definition. This function can
    // be called on modules with components that have not fully
    // compiled yet, but the result should not
    // be used until they have.
    // @param moduleType module that
    // transitive scope should be calculated for.
    // export function transitiveScopesForNgModule<T>(moduleType:
    // Type<T>): NgModuleTransitiveScopes {
    const def = getNgModuleDef(moduleType, true);
    if
    (def.transitiveCompileScopes !== null) {
      return def.transitiveCompileScopes;
    }
    const scopes:
    NgModuleTransitiveScopes = {
      schemas: def.schemas || null,
      compilation: {
        directives: new
        Set<any>(),
        pipes: new Set<any>(),
      },
      exported: {
        directives: new Set<any>(),
        pipes: new
        Set<any>(),
      },
    };
    maybeUnwrapFn(def.imports).forEach(<I>(imported: Type<I>) => {
      // When this
      // module imports another, the imported module's exported directives and pipes are
      // added to the compilation
      // scope of this module.
      const importedScope = transitiveScopesFor(imported);
      importedScope.exported.directives.forEach(entry
      => scopes.compilation.directives.add(entry));
      importedScope.exported.pipes.forEach(entry =>
      scopes.compilation.pipes.add(entry));
    });
    maybeUnwrapFn(def.declarations).forEach(declared => {
      const
      declaredWithDefs = declared as Type<any>& {
        pipe?: any;
      };
      if (getPipeDef(declaredWithDefs)) {
        scopes.compilation.pipes.add(declared);
      } else {
        // Either declared has a cmp or dir, or it's a component
        // which hasn't
        // had its template compiled yet. In either case, it gets added to the compilation's
        // directives.
        scopes.compilation.directives.add(declared);
      }
    });
    maybeUnwrapFn(def.exports).forEach(<E>(exported: Type<E>) => {
      const exportedType = exported as
      Type<E>& {
        // Components, Directives, NgModules, and Pipes can all be exported.
        cmp?: any;
        dir?:
        any;
        mod?: NgModuleDef<E>;
        pipe?: any;
      };
      // Either the type is a module, a pipe, or a
      // component/directive
      // (which may not have a
      // cmp as it might be compiled asynchronously).
      if (isNgModule(exportedType)) {
        // When this module exports another, the exported module's exported directives and pipes are
        // added to both
        // the compilation and exported scopes of this module.
        const exportedScope =
        transitiveScopesFor(exportedType);
        exportedScope.exported.directives.forEach(entry => {
          scopes.compilation.directives.add(entry);
          scopes.exported.directives.add(entry);
        });
        exportedScope.exported.pipes.forEach(entry => {
          scopes.compilation.pipes.add(entry);
          scopes.exported.pipes.add(entry);
        });
      } else if (getPipeDef(exportedType)) {

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scopes.exported.pipes.add(exportedType);\n  } else {\n    scopes.exported.directives.add(exportedType);\n  }\n});\n\n def.transitiveCompileScopes = scopes;\n return scopes;\n}\n\nfunction expandModuleWithProviders(value:
Type<any>|ModuleWithProviders<{}>):
Type<any> {\n  if (isModuleWithProviders(value)) {\n    return value.ngModule;\n  }\n  return value;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{getCompilerFacade, JitCompilerUsage, R3DirectiveMetadataFacade} from
'./././compiler/compiler_facade';\nimport {R3ComponentMetadataFacade, R3QueryMetadataFacade} from
'./././compiler/compiler_facade_interface';\nimport {isForwardRef, resolveForwardRef} from
'./././di/forward_ref';\nimport {getReflect, reflectDependencies} from './././di/jit/util';\nimport {Type} from
'./././interface/type';\nimport {Query} from './././metadata/di';\nimport {Component, Directive, Input} from
'./././metadata/directives';\nimport {componentNeedsResolution, maybeQueueResolutionOfComponentResources}
from './././metadata/resource_loading';\nimport {ViewEncapsulation} from './././metadata/view';\nimport
{flatten} from './././util/array_utils';\nimport {EMPTY_ARRAY, EMPTY_OBJ} from './././util/empty';\nimport
{initNgDevMode} from './././util/ng_dev_mode';\nimport {getComponentDef, getDirectiveDef, getNgModuleDef,
getPipeDef} from './././definition';\nimport {NG_COMP_DEF, NG_DIR_DEF, NG_FACTORY_DEF} from
'./././fields';\nimport {ComponentDef, ComponentType, DirectiveDefList, PipeDefList} from
'./././interfaces/definition';\nimport {stringifyForError} from './././util/stringify_utils';\nimport {angularCoreEnv} from
'./././environment';\nimport {getJitOptions} from './././jit_options';\nimport
{flushModuleScopingQueueAsMuchAsPossible, patchComponentDefWithScope, transitiveScopesFor} from
'./././module';\nimport {isModuleWithProviders} from './././util';\n\n/**\n * Keep track of the compilation depth to avoid
reentrancy issues during JIT compilation. This\n * matters in the following scenario:\n * Consider a component
'A' that extends component 'B', both declared in module 'M'. During\n * the
compilation of 'A' the definition of 'B' is requested to capture the inheritance chain,\n * potentially triggering
compilation of 'B'. If this nested compilation were to trigger\n * `flushModuleScopingQueueAsMuchAsPossible` it
may happen that module 'M' is still pending in the\n * queue, resulting in 'A' and 'B' to be patched with the
NgModule scope. As the compilation of\n * 'A' is still in progress, this would introduce a circular dependency on its
compilation. To avoid\n * this issue, the module scope queue is only flushed for compilations at the depth 0, to
ensure\n * all compilations have finished.\n */\nlet compilationDepth = 0;\n\n/**\n * Compile an Angular
component according to its decorator metadata, and patch the resulting\n * component def (cmp) onto the
component type.\n * Compilation may be asynchronous (due to the need to resolve URLs for the component
template or\n * other resources, for example). In the event that compilation is not immediate, `compileComponent`\n
* will enqueue resource resolution into a global queue and will fail to return the `cmp`\n * until the global queue
has been resolved with a call to `resolveComponentResources`.\n */\n\nexport function compileComponent(type:
Type<any>, metadata: Component): void {\n  // Initialize ngDevMode. This must be the first statement in
compileComponent.\n  // See the `initNgDevMode` docstring for more information.\n  (typeof ngDevMode ===
'undefined' || ngDevMode) && initNgDevMode();\n\n  let ngComponentDef: ComponentDef<unknown>|null =
null;\n\n  // Metadata may have resources which need to be resolved.\n  maybeQueueResolutionOfComponentResources(type, metadata);\n\n  // Note that we're using the same function as
`Directive`, because that's only subset of metadata\n  // that we need to create the ngFactoryDef. We're avoiding
using the component metadata\n  // because we'd have to resolve the asynchronous templates.\n  addDirectiveFactoryDef(type, metadata);\n\n  Object.defineProperty(type, NG_COMP_DEF,
{\n    get: () => {\n      if (ngComponentDef === null) {\n        const compiler =\ngetCompilerFacade({usage: JitCompilerUsage.Decorator, kind: 'component', type: type});\n        if
(componentNeedsResolution(metadata)) {\n          const error = [`Component '${type.name}' is not resolved:`];\n
          if (metadata.templateUrl) {\n            error.push(` - templateUrl: ${metadata.templateUrl}`);\n          }\n
          if (metadata.styleUrls && metadata.styleUrls.length) {\n            error.push(` - styleUrls:
${JSON.stringify(metadata.styleUrls)}`);\n          }\n          error.push(`Did you run and wait for

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'resolveComponentResources('?');\n      throw new Error(error.join('\n'));\n    }\n\n    // This const was called `jitOptions` previously but had to be renamed to `options` because\n    // of a bug with Terser that caused optimized JIT builds to throw a `ReferenceError`.\n    // This bug was investigated in https://github.com/angular/angular-cli/issues/17264.\n\n    // We should not rename it back until https://github.com/terser/terser/issues/615 is fixed.\n    const options = getJitOptions();\n    let preserveWhitespaces = metadata.preserveWhitespaces;\n    if (preserveWhitespaces === undefined) {\n      if (options !== null && options.preserveWhitespaces !== undefined) {\n        preserveWhitespaces = options.preserveWhitespaces;\n      } else {\n        preserveWhitespaces = false;\n      }\n    }\n    let encapsulation = metadata.encapsulation;\n    if (encapsulation === undefined) {\n      if (options !== null && options.defaultEncapsulation !== undefined) {\n        encapsulation = options.defaultEncapsulation;\n      } else {\n        encapsulation = ViewEncapsulation.Emulated;\n      }\n    }\n\n    const templateUrl = metadata.templateUrl || `ng:///${type.name}/template.html`;\n    const meta: R3ComponentMetadataFacade = {\n      ...directiveMetadata(type, metadata),\n      typeSourceSpan: compiler.createParseSourceSpan('Component', type.name, templateUrl),\n      template: metadata.template || '',\n      preserveWhitespaces,\n      styles: metadata.styles || EMPTY_ARRAY,\n      animations: metadata.animations,\n      // JIT components are always compiled against an empty set of `declarations`. Instead, the\n      // `directiveDefs` and `pipeDefs` are updated at a later point:\n      // * for NgModule-based components, they're set when the NgModule which declares the\n      // component resolves in the module scoping queue\n      // * for standalone components, they're set just below, after `compileComponent`.\n      declarations: [],\n      changeDetection: metadata.changeDetection,\n      encapsulation,\n      interpolation: metadata.interpolation,\n      viewProviders: metadata.viewProviders || null,\n      isStandalone: !!metadata.standalone,\n    };\n\n    compilationDepth++;\n    try {\n      if (meta.usesInheritance) {\n        addDirectiveDefToUndecoratedParents(type);\n      }\n      ngComponentDef =\n        compiler.compileComponent(angularCoreEnv, templateUrl, meta) as ComponentDef<unknown>;\n      if (metadata.standalone) {\n        // Patch the component definition for standalone components with `directiveDefs` and\n        // `pipeDefs` functions which lazily compute the directives/pipes available in the\n        // standalone component. Also set `dependencies` to the lazily resolved list of imports.\n        const imports: Type<any>[] = flatten(metadata.imports || EMPTY_ARRAY);\n        const {directiveDefs, pipeDefs} = getStandaloneDefFunctions(type, imports);\n        ngComponentDef.directiveDefs = directiveDefs;\n        ngComponentDef.pipeDefs = pipeDefs;\n        ngComponentDef.dependencies = () => imports.map(resolveForwardRef);\n      }\n    } finally {\n      // Ensure that the compilation depth is decremented even when the compilation failed.\n      compilationDepth--;\n    }\n\n    if (compilationDepth === 0) {\n      // When NgModule decorator executed, we enqueued the module definition such that\n      // it would only dequeue and add itself as module scope to all of its declarations,\n      // but only if if all of its declarations had resolved. This call runs the check\n      // to see if any modules that are in the queue can be dequeued and add scope to\n      // their declarations.\n      flushModuleScopingQueueAsMuchAsPossible();\n    }\n\n    // If component compilation is async, then the @NgModule annotation which declares the\n    // component may execute and set an ngSelectorScope property on the component type. This\n    // allows the component to patch itself with directiveDefs from the module after it\n    // finishes compiling.\n    if (hasSelectorScope(type)) {\n      const scopes = transitiveScopesFor(type.ngSelectorScope);\n      patchComponentDefWithScope(ngComponentDef, scopes);\n    }\n\n    if (metadata.schemas) {\n      if (metadata.standalone) {\n        ngComponentDef.schemas = metadata.schemas;\n      } else {\n        throw new Error(`The 'schemas' was specified for the ${stringifyForError(type)} but is only valid on a component that is standalone.`);\n      }\n    } else if (metadata.standalone) {\n      ngComponentDef.schemas = [];\n    }\n\n    return ngComponentDef;\n  },\n  // Make the property configurable in dev mode to allow overriding in tests\n  configurable: !!ngDevMode,\n});\n\nfunction getDependencyTypeErrorForError(type:

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Type<any>) {\n  if (getComponentDef(type)) return 'component';\n  if (getDirectiveDef(type)) return 'directive';\n  if (getPipeDef(type)) return 'pipe';\n  return 'type';\n}\n\nfunction
  verifyStandaloneImport(depType: Type<unknown>, importingType: Type<unknown>) {\n  if
(isForwardRef(depType)) {\n    depType = resolveForwardRef(depType);\n    if (!depType) {\n      throw new
Error(`Expected forwardRef function, imported from \"${\n      stringifyForError(importingType)}\"`, to return a
standalone entity or NgModule but got \"${\n      stringifyForError(depType) || depType}\".`);\n    }\n  }\n  if
(getNgModuleDef(depType) == null) {\n    const def = getComponentDef(depType) || getDirectiveDef(depType) ||
getPipeDef(depType);\n    if (def != null) {\n      // if a component, directive or pipe is imported make sure that it is
standalone\n      if (!def.standalone) {\n        throw new Error(`The \"${stringifyForError(depType)}\" \"${\n
getDependencyTypeForError(depType)}\", imported from \"${\n      stringifyForError(\n
importingType)}\"\", is not standalone. Did you forget to add the standalone: true flag?`);\n      }\n
    } else {\n      // it can be either a module with provider or an unknown (not annotated) type\n      if
(isModuleWithProviders(depType)) {\n        throw new Error(`A module with providers was imported from \"${\n
stringifyForError(\n      importingType)}\". Modules with providers are not supported in standalone
components imports.`);\n      } else {\n        throw new Error(`The \"${stringifyForError(depType)}\" type, imported
from \"${\n      stringifyForError(\n      importingType)}\"\", must be a standalone component / directive /
pipe or an NgModule. Did you forget to add the required @Component / @Directive / @Pipe or @NgModule
annotation?`);\n      }\n    }\n  }\n}\n\n/**\n * Build memoized `directiveDefs` and `pipeDefs` functions for the
component definition of a\n * standalone component, which process `imports` and filter out directives and pipes.
The use of\n * memoized functions here allows for the delayed resolution of any `forwardRef`s
present in the\n * component's `imports`.\n */\nfunction getStandaloneDefFunctions(type: Type<any>, imports:
Type<any>[]): {\n  directiveDefs: () => DirectiveDefList,\n  pipeDefs: () => PipeDefList,\n} {\n  let
cachedDirectiveDefs: DirectiveDefList|null = null;\n  let cachedPipeDefs: PipeDefList|null = null;\n  const
directiveDefs = () => {\n    if (cachedDirectiveDefs === null) {\n      // Standalone components are always able to
self-reference, so include the component's own\n      // definition in its `directiveDefs`.\n      cachedDirectiveDefs =
[getComponentDef(type)!];\n      const seen = new Set<Type<unknown>>();\n      for (const rawDep of imports)
{\n        ngDevMode && verifyStandaloneImport(rawDep, type);\n        const dep =
resolveForwardRef(rawDep);\n        if (seen.has(dep)) {\n          continue;\n        }\n        seen.add(dep);\n        if
(!getNgModuleDef(dep)) {\n          const scope = transitiveScopesFor(dep);\n          for (const dir of
scope.exported.directives)
{\n            const def = getComponentDef(dir) || getDirectiveDef(dir);\n            if (def && !seen.has(dir)) {\n
              seen.add(dir);\n              cachedDirectiveDefs.push(def);\n            }\n          }\n        } else {\n          const def =
getComponentDef(dep) || getDirectiveDef(dep);\n          if (def) {\n            cachedDirectiveDefs.push(def);\n          }\n        }\n      }\n      return cachedDirectiveDefs;\n    }\n  };\n  const pipeDefs = () => {\n    if (cachedPipeDefs
=== null) {\n      cachedPipeDefs = [];\n      const seen = new Set<Type<unknown>>();\n      for (const rawDep of
imports) {\n        const dep = resolveForwardRef(rawDep);\n        if (seen.has(dep)) {\n          continue;\n        }\n
        seen.add(dep);\n        if (!getNgModuleDef(dep)) {\n          const scope = transitiveScopesFor(dep);\n          for
(const pipe of scope.exported.pipes) {\n            const def = getPipeDef(pipe);\n            if (def && !seen.has(pipe))
{\n              seen.add(pipe);\n              cachedPipeDefs.push(def);\n            }\n          }\n        } else {\n          const
def = getPipeDef(dep);\n          if (def) {\n            cachedPipeDefs.push(def);\n          }\n        }\n      }\n      return cachedPipeDefs;\n    }\n  };\n  return {\n    directiveDefs,\n    pipeDefs,\n  };\n}\n\nfunction
hasSelectorScope<T>(component: Type<T>): component is Type<T>&\n  {\n    ngSelectorScope: Type<any> }\n  {\n    return (component as {ngSelectorScope?: any}).ngSelectorScope !== undefined;\n  }\n}\n\n/**\n * Compile an Angular
directive according to its decorator metadata, and patch the resulting\n * directive def onto the component type.\n
*\n * In the event that compilation is not immediate, `compileDirective` will return a `Promise` which\n * will
resolve when compilation completes and the directive becomes usable.\n */\nexport function compileDirective(type:
Type<any>, directive: Directive|null): void {\n  let ngDirectiveDef: any

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= null;\n\n addDirectiveFactoryDef(type, directive || {});\n\n Object.defineProperty(type, NG_DIR_DEF, {\n
get: () => {\n    if (ngDirectiveDef === null) {\n        // `directive` can be null in the case of abstract directives as a\n
base class\n        // that use `@Directive()` with no selector. In that case, pass empty object to the\n        //\n
`directiveMetadata` function instead of null.\n        const meta = getDirectiveMetadata(type, directive || {});\n
const compiler =\n            getCompilerFacade({ usage: JitCompilerUsage.Decorator, kind: 'directive', type });\n
ngDirectiveDef =\n            compiler.compileDirective(angularCoreEnv, meta.sourceMapUrl, meta.metadata);\n
}\n    return ngDirectiveDef;\n    },\n    // Make the property configurable in dev mode to allow overriding in tests\n
configurable: !!ngDevMode,\n    });\n\n\nfunction getDirectiveMetadata(type: Type<any>, metadata: Directive)\n
{\n    const name = type && type.name;\n    const sourceMapUrl\n
= `ng://${name}/dir.js`;\n    const compiler = getCompilerFacade({ usage: JitCompilerUsage.Decorator, kind:\n
'directive', type });\n    const facade = directiveMetadata(type as ComponentType<any>, metadata);\n
facade.typeSourceSpan = compiler.createParseSourceSpan('Directive', name, sourceMapUrl);\n    if\n
(facade.usesInheritance) {\n        addDirectiveDefToUndecoratedParents(type);\n    }\n    return { metadata: facade,\n
sourceMapUrl };\n}\n\nfunction addDirectiveFactoryDef(type: Type<any>, metadata: Directive|Component) {\n
let\n
ngFactoryDef: any = null;\n\n Object.defineProperty(type, NG_FACTORY_DEF, {\n    get: () => {\n        if\n
(ngFactoryDef === null) {\n            const meta = getDirectiveMetadata(type, metadata);\n            const compiler =\n
getCompilerFacade({ usage: JitCompilerUsage.Decorator, kind: 'directive', type });\n            ngFactoryDef =\n
compiler.compileFactory(angularCoreEnv, `ng://${type.name}/fac.js`, {\n                name: meta.metadata.name,\n
type: meta.metadata.type,\n
                typeArgumentCount: 0,\n                deps: reflectDependencies(type),\n                target:\n
compiler.FactoryTarget.Directive\n            });\n        }\n        return ngFactoryDef;\n    },\n    // Make the property\n
configurable in dev mode to allow overriding in tests\n    configurable: !!ngDevMode,\n    });\n}\n\n\nexport function\n
extendsDirectlyFromObject(type: Type<any>): boolean {\n    return Object.getPrototypeOf(type.prototype) ===\n
Object.prototype;\n}\n\n\n/**\n * Extract the `R3DirectiveMetadata` for a particular directive (either a `Directive` or\n
a\n * `Component`).\n * ^\nexport function directiveMetadata(type: Type<any>, metadata: Directive):\n
R3DirectiveMetadataFacade {\n    // Reflect inputs and outputs.\n    const reflect = getReflect();\n    const propMetadata\n
= reflect.ownPropMetadata(type);\n\n    return {\n        name: type.name,\n        type: type,\n        selector: metadata.selector\n
!== undefined ? metadata.selector : null,\n        host: metadata.host || EMPTY_OBJ,\n        propMetadata:\n
propMetadata,\n
        inputs: metadata.inputs || EMPTY_ARRAY,\n        outputs: metadata.outputs || EMPTY_ARRAY,\n        queries:\n
extractQueriesMetadata(type, propMetadata, isContentQuery),\n        lifecycle: { usesOnChanges:\n
reflect.hasLifecycleHook(type, 'ngOnChanges') },\n        typeSourceSpan: null!,\n        usesInheritance:\n
!extendsDirectlyFromObject(type),\n        exportAs: extractExportAs(metadata.exportAs),\n        providers:\n
metadata.providers || null,\n        viewQueries: extractQueriesMetadata(type, propMetadata, isViewQuery),\n
isStandalone: !!metadata.standalone,\n    };}\n\n\n/**\n * Adds a directive definition to all parent classes of a type\n
that don't have an Angular decorator.\n * ^\nfunction addDirectiveDefToUndecoratedParents(type: Type<any>) {\n
const objPrototype = Object.prototype;\n    let parent = Object.getPrototypeOf(type.prototype).constructor;\n\n    // Go\n
up the prototype until we hit `Object`.\n    while (parent && parent !== objPrototype) {\n        // Since inheritance works\n
if the class was annotated\n        already, we only need to add\n        // the def if there are no annotations and the def hasn't been created already.\n        if\n
(!getDirectiveDef(parent) && !getComponentDef(parent) &&\n            shouldAddAbstractDirective(parent)) {\n            \n
compileDirective(parent, null);\n        }\n        parent = Object.getPrototypeOf(parent);\n    }\n}\n\n\nfunction\n
convertToR3QueryPredicate(selector: any): any|string[] {\n    return typeof selector === 'string' ?\n
splitByComma(selector) : resolveForwardRef(selector);\n}\n\n\nexport function\n
convertToR3QueryMetadata(propertyName: string, ann: Query): R3QueryMetadataFacade {\n    return {\n        \n
propertyName: propertyName,\n        predicate: convertToR3QueryPredicate(ann.selector),\n        descendants:\n
ann.descendants,\n        first: ann.first,\n        read: ann.read ? ann.read : null,\n        static: !!ann.static,\n
emitDistinctChangesOnly: !!ann.emitDistinctChangesOnly,\n    };}\n\n\nfunction extractQueriesMetadata(\n    type:

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Type<any>, propMetadata: {[key: string]: any[]},\n  isQueryAnn:
(ann: any) => ann is Query): R3QueryMetadataFacade[] {\n  const queriesMeta: R3QueryMetadataFacade[] = [];\n
for (const field in propMetadata) {\n  if (propMetadata.hasOwnProperty(field)) {\n  const annotations =
propMetadata[field];\n  annotations.forEach(ann => {\n  if (isQueryAnn(ann)) {\n  if (!ann.selector) {\n
throw new Error(\n      `Can't construct a query for the property \"${field}\" of ` +\n
`\"${stringifyForError(type)}\" since the query selector wasn't defined.`);\n  } \n  if
(annotations.some(isInputAnnotation)) {\n  throw new Error(`Cannot combine @Input decorators with query
decorators`);\n  } \n  queriesMeta.push(convertToR3QueryMetadata(field, ann));\n  } \n  });\n } \n
}\n return queriesMeta;\n}\n\nfunction extractExportAs(exportAs: string|undefined): string[]|null {\n return
exportAs === undefined ? null : splitByComma(exportAs);\n}\n\nfunction isContentQuery(value:
any): value is Query {\n const name = value.ngMetadataName;\n return name === 'ContentChild' || name ===
'ContentChildren';\n}\n\nfunction isViewQuery(value: any): value is Query {\n const name =
value.ngMetadataName;\n return name === 'ViewChild' || name === 'ViewChildren';\n}\n\nfunction
isInputAnnotation(value: any): value is Input {\n return value.ngMetadataName === 'Input';\n}\n\nfunction
splitByComma(value: string): string[] {\n return value.split(',').map(piece => piece.trim());\n}\n\nconst
LIFECYCLE_HOOKS = [\n 'ngOnChanges', 'ngOnInit', 'ngOnDestroy', 'ngDoCheck', 'ngAfterViewInit',
'ngAfterViewChecked',\n 'ngAfterContentInit', 'ngAfterContentChecked'];\n\nfunction
shouldAddAbstractDirective(type: Type<any>): boolean {\n const reflect = getReflect();\n if
(LIFECYCLE_HOOKS.some(hookName => reflect.hasLifecycleHook(type, hookName))) {\n return true;\n } \n\n
const propMetadata = reflect.propMetadata(type);\n\n for (const field in propMetadata)
{\n  const annotations = propMetadata[field];\n\n  for (let i = 0; i < annotations.length; i++) {\n  const current =
annotations[i];\n  const metadataName = current.ngMetadataName;\n\n  if (isInputAnnotation(current) ||
isContentQuery(current) || isViewQuery(current) ||\n      metadataName === 'Output' || metadataName ===
'HostBinding' ||\n      metadataName === 'HostListener') {\n  return true;\n  } \n  } \n\n return
false;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {getCompilerFacade, JitCompilerUsage, R3PipeMetadataFacade} from
'./../compiler/compiler_facade';\nimport {reflectDependencies} from './../di/jit/util';\nimport {Type} from
'./../interface/type';\nimport {Pipe} from './../metadata/directives';\nimport {NG_FACTORY_DEF,
NG_PIPE_DEF} from './fields';\n\nimport
{angularCoreEnv} from './environment';\n\nexport function compilePipe(type: Type<any>, meta: Pipe): void {\n
let ngPipeDef: any = null;\n let ngFactoryDef: any = null;\n\n Object.defineProperty(type, NG_FACTORY_DEF,
{\n  get: () => {\n  if (ngFactoryDef === null) {\n  const metadata = getPipeMetadata(type, meta);\n
const compiler = getCompilerFacade(\n      {usage: JitCompilerUsage.Decorator, kind: 'pipe', type:
metadata.type});\n  ngFactoryDef = compiler.compileFactory(angularCoreEnv, `ng://${metadata.name}/fac.js`,
{\n  name: metadata.name,\n  type: metadata.type,\n  typeArgumentCount: 0,\n  deps:
reflectDependencies(type),\n  target: compiler.FactoryTarget.Pipe\n  });\n } \n\n return ngFactoryDef;\n
},\n // Make the property configurable in dev mode to allow overriding in tests\n configurable: !!ngDevMode,\n
});\n\n Object.defineProperty(type, NG_PIPE_DEF, {\n  get: () =>
{\n  if (ngPipeDef === null) {\n  const metadata = getPipeMetadata(type, meta);\n  const compiler =
getCompilerFacade(\n      {usage: JitCompilerUsage.Decorator, kind: 'pipe', type: metadata.type});\n
ngPipeDef =\n      compiler.compilePipe(angularCoreEnv, `ng://${metadata.name}/pipe.js`, metadata);\n  } \n\n
return ngPipeDef;\n  },\n // Make the property configurable in dev mode to allow overriding in tests\n
configurable: !!ngDevMode,\n });\n}\n\nfunction getPipeMetadata(type: Type<any>, meta: Pipe):
R3PipeMetadataFacade {\n return {\n  type: type,\n  name: type.name,\n  pipeName: meta.name,\n  pure:
meta.pure !== undefined ? meta.pure : true,\n  isStandalone: !!meta.standalone,\n };}\n\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {ChangeDetectionStrategy}

```



event-bound output properties.

- When an output property emits an event, an event handler attached to that event in the template is invoked.
- The `outputs` property defines a set of `DirectiveProperty` to `bindingProperty` configuration.
- `DirectiveProperty` specifies the component property that emits events.
- `bindingProperty` specifies the DOM property the event handler is attached to.

```

@usageNotes
```typescript
@Component({
  selector: 'child-dir',
  outputs: [
    'bankNameChange'
  ]
  template: `<input (input)="bankNameChange.emit($event.target.value)"
/>`)
class ChildDir {
  bankNameChange: EventEmitter<string> = new EventEmitter<string>();
}
@Component({
  selector: 'main',
  template: `
{{ bankName }} <child-dir
(bankNameChange)="onBankNameChange($event)"></child-dir>`
})
class MainComponent {
  bankName: string;
  onBankNameChange(bankName: string) {
    this.bankName = bankName;
  }
}
```

```

`outputs?: string[];` Configures the `[injector](guide/glossary#injector)` of this directive or component with a `[token](guide/glossary#di-token)` that maps to a `[provider](guide/glossary#provider)` of a dependency.

`providers?: Provider[];` Defines the name that can be used in the template to assign this directive to a variable.

```

@Directive({
  selector: 'child-dir',
  exportAs:
'child'
})
class ChildDir {
}
@Component({
  selector: 'main',
  template:
`<child-dir #c="child"></child-dir>`
})
class MainComponent {
}
```

```

`exportAs?: string;` Configures the queries that will be injected into the directive.

Content queries are set before the `ngAfterContentInit` callback is called.

View queries are set before the `ngAfterViewInit` callback is called.

`@usageNotes` The following example shows how queries are defined and when their results are available in lifecycle hooks:

```

@Component({
  selector: 'someDir',
  queries: {
    contentChildren: new ContentChildren(ChildDirective),
    viewChildren: new
ViewChildren(ChildDirective)
  },
  template: '<child-directive></child-directive>'
})
class
SomeDir {
  contentChildren: QueryList<ChildDirective>;
  viewChildren: QueryList<ChildDirective>;
  ngAfterContentInit() {
    // contentChildren is set
  }
  ngAfterViewInit() {
    // viewChildren is set
  }
}
```

```

`@Annotation` `queries?: {[key: string]: any};` Maps class properties to host element bindings for properties, attributes, and events, using a set of key-value pairs.

Angular automatically checks host property bindings during change detection.

If a binding changes, Angular updates the directive's host element.

When the key is a property of the host element, the property value is propagated to the specified DOM property.

When the key is a static attribute in the DOM, the attribute value is propagated to the specified property in the host element.

For event handling:

- The key is the DOM event that the directive listens to.

To listen to global events,

- add the target to the event name.
- The target can be `window`, `document` or `body`.
- The value is the statement to execute when the event occurs. If the statement evaluates to `false`, then `preventDefault` is applied on the DOM event. A handler method can refer to the `$event` local variable.

`host?: {[key: string]: string};` When present, this directive/component is ignored by the AOT compiler. It remains in distributed code, and the JIT compiler attempts to compile it at run time, in the browser.

To ensure the correct behavior, the app must import `@angular/compiler`.

```

jit?: true;
```

```

Angular directives marked as `standalone` do not need to be declared in an `NgModule`. Such directives don't depend on any "intermediate context" of an `NgModule` (ex. configured providers).

More information about standalone components, directives, and pipes can be found in [this guide](#) (`guide/standalone-components`).

```

@developerPreview
standalone?: boolean;
}
```

```

Type of the Directive metadata.

```

@publicApi
export const Directive: DirectiveDecorator = makeDecorator(
  'Directive',
  (dir: Directive = {}) => dir,
  undefined,
  undefined,
  (type: Type<any>, meta: Directive) => compileDirective(type, meta));
```

```

Component decorator interface

```

@publicApi
export interface ComponentDecorator {
}
```

```

Decorator that marks a class as an Angular component and provides configuration metadata that determines how the component should be processed, instantiated, and used at runtime.

Components are the most

basic UI building block of an Angular app.

- An Angular app contains a tree of Angular components.
- Angular components are a subset of directives, always associated with a template.
- Unlike other directives, only one component can be instantiated for a given element in a template.
- A component must belong to an NgModule in order for it to be available to another component or application. To make it a member of an NgModule, list it in the `declarations` field of the `NgModule` metadata.
- Note that, in addition to these options for configuring a directive, you can control a component's runtime behavior by implementing life-cycle hooks. For more information, see the [Lifecycle Hooks](guide/lifecycle-hooks) guide.
- @usageNotes
- ### Setting component inputs
- The following example creates a component with two data-bound properties, specified by the `inputs` value.
- <code-example path="core/ts/metadata/directives.ts" region="component-input"></code-example>
- ### Setting component outputs
- The following example shows two event emitters that emit on an interval. One emits an output every second, while the other emits every five seconds.
- {@example core/ts/metadata/directives.ts region='component-output-interval'}
- ### Injecting a class with a view provider
- The following simple example injects a class into a component using the view provider specified in component metadata:
- ts
- class Greeter {
 greet(name:string) {
 return 'Hello ' + name + '!';
 }
}
@Directive({
 selector: 'needs-greeter'
})
class NeedsGreeter {
 greeter:Greeter;

 constructor(greeter:Greeter) {
 this.greeter = greeter;
 }
}
@Component({
 selector: 'greet',
 viewProviders: [
 Greeter
 ],
 template: `<needs-greeter></needs-greeter>`
})
class HelloWorld {
}
- ### Preserving whitespace
- Removing whitespace can greatly reduce AOT-generated code size and speed up view creation.
- As of Angular 6, the default for `preserveWhitespaces` is false (whitespace is removed).
- To change the default setting for all components in your application, set the `preserveWhitespaces` option of the AOT compiler.
- By default, the AOT compiler removes whitespace characters as follows:

  - Trims all whitespaces at the beginning and the end of a template.
  - Removes whitespace-only text nodes. For example, `html <button>Action 1</button> <button>Action 2</button>` becomes `html <button>Action 1</button><button>Action 2</button>`
  - Replaces a series of whitespace characters in text nodes with a single space. For example, `<span>\n some text\n</span>` becomes `<span> some text </span>`
  - Does NOT alter text nodes inside HTML tags such as `<pre>` or `<textarea>`, where whitespace characters are significant.

- Note that these transformations can influence DOM nodes layout, although impact should be minimal.
- You can override the default behavior to preserve whitespace characters in certain fragments of a template. For example, you can exclude an entire DOM sub-tree by using the `ngPreserveWhitespaces` attribute:
- html
- <div ngPreserveWhitespaces>
 whitespaces are preserved here
 <span> and here </span>
</div>
- You can force a single space to be preserved in a text node by using `&nbsp;`, which is replaced with a space character by Angular's template compiler:
- html
- <a>Spaces</a>&nbsp;<a>between</a>&nbsp;<a>links.</a>
- <!-- compiled to be equivalent to: <a>Spaces</a> <a>between</a> <a>links.</a> -->
- Note that sequences of `&nbsp;` are still collapsed to just one space character when the `preserveWhitespaces` option is set to `false`.
- html
- <a>before</a>&nbsp;&nbsp;&nbsp;<a>after</a>
- <!-- compiled to be equivalent to: <a>before</a> <a>after</a> -->
- To preserve sequences of whitespace characters, use the `ngPreserveWhitespaces` attribute.
- @Annotation
 ^/n (obj: Component): TypeDecorator;
 /\*\*
 See the `Component` decorator.
 ^/n new(obj: Component): Component;
 }
 /\*\*
 Supplies configuration metadata for an Angular component.
 ^/n @publicApi
 ^/n export interface Component extends Directive {
 /\*\*
 The change-detection strategy to use for this component.
 ^/n \* When a component is instantiated, Angular creates a change detector, which is responsible for propagating the component's bindings.
 ^/n \* The strategy is one of:
 ^/n \* - `ChangeDetectionStrategy#OnPush` sets the strategy to `CheckOnce` (on demand).
 ^/n \* - `ChangeDetectionStrategy#Default` sets the strategy to `CheckAlways`.
 ^/n changeDetection?:

ChangeDetectionStrategy; \n\n /\*\* \n \* Defines the set of injectable objects that are visible to its view DOM children. \n \* See [example](#injecting-a-class-with-a-view-provider). \n \* \n \* \n viewProviders?: Provider[]; \n\n /\*\* \n \* The module ID of the module that contains the component. \n \* The component must be able to resolve relative URLs for templates and styles. \n \* SystemJS exposes the `\_\_moduleName` variable within each module. \n\n \* In CommonJS, this can be set to `module.id`. \n \* \n \* \n moduleId?: string; \n\n /\*\* \n \* The relative path or absolute URL of a template file for an Angular component. \n \* If provided, do not supply an inline template using `template`. \n \* \n \* \n templateUrl?: string; \n\n /\*\* \n \* An inline template for an Angular component. If provided, \n \* do not supply a template file using `templateUrl`. \n \* \n \* \n template?: string; \n\n /\*\* \n \* One or more relative paths or absolute URLs for files containing CSS stylesheets to use \n \* in this component. \n \* \n \* \n styleUrls?: string[]; \n\n /\*\* \n \* One or more inline CSS stylesheets to use \n \* in this component. \n \* \n \* \n styles?: string[]; \n\n /\*\* \n \* One or more animation `trigger()` calls, containing \n \* `[state()](api/animations/state)` and `transition()` definitions. \n \* See the [Animations guide](/guide/animations) and animations API documentation. \n \* \n \* \n animations?: any[]; \n\n /\*\* \n \* An encapsulation policy for the component's styling. \n \* Possible values: \n \* - `ViewEncapsulation.Emulated`: Apply modified component styles in order to emulate \n \* a native Shadow DOM CSS encapsulation behavior. \n \* - `ViewEncapsulation.None`: Apply component styles globally without any sort of encapsulation. \n \* - `ViewEncapsulation.ShadowDom`: Use the browser's native Shadow DOM API to encapsulate styles. \n \* \n \* \n If not supplied, the value is taken from the `CompilerOptions` \n \* which defaults to `ViewEncapsulation.Emulated`. \n \* \n \* \n If the policy is `ViewEncapsulation.Emulated` and the component has no \n \* {@link Component#styles styles} nor {@link Component#styleUrls styleUrls}, \n \* the policy is automatically switched to `ViewEncapsulation.None`. \n \* \n \* \n encapsulation?: ViewEncapsulation; \n\n /\*\* \n \* Overrides the default interpolation start and end delimiters (`{{` and `}}`). \n \* \n \* \n interpolation?: [string, string]; \n\n /\*\* \n \* A set of components that should be compiled along with \n \* this component. For each component listed here, \n \* Angular creates a {@link ComponentFactory} and stores it in the \n \* {@link ComponentFactoryResolver}. \n \* @deprecated Since 9.0.0. With Ivy, this property is no longer necessary. \n \* \n \* \n entryComponents?: Array<Type<any>|any[]>; \n\n /\*\* \n \* True to preserve or false to remove potentially superfluous whitespace characters \n \* from the compiled template. Whitespace characters are those matching the `\\s` \n\n \* character class in JavaScript regular expressions. Default is false, unless \n \* overridden in compiler options. \n\n \* \n \* \n preserveWhitespaces?: boolean; \n\n /\*\* \n \* Angular components marked as `standalone` do not need to be declared in an NgModule. Such \n \* components directly manage their own template dependencies (components, directives, and pipes \n \* used in a template) via the imports property. \n \* \n \* \n More information about standalone components, directives, and pipes can be found in [this \n \* guide](guide/standalone-components). \n \* \n \* \n @developerPreview \n \* \n \* \n standalone?: boolean; \n\n /\*\* \n \* The imports property specifies the standalone component's template dependencies — those \n \* directives, components, and pipes that can be used within its template. Standalone components \n \* can import other standalone components, directives, and pipes as well as existing NgModules. \n \* \n \* \n This property is only available for standalone components - specifying it for components \n \* declared in an NgModule generates a compilation error. \n \* \n \* \n More information about standalone components, directives, and pipes can be found in [this \n \* guide](guide/standalone-components). \n \* \n \* \n @developerPreview \n \* \n \* \n imports?: (Type<any>|any[])[]; \n\n /\*\* \n \* The set of schemas that declare elements to be allowed in a standalone component. Elements and \n \* properties that are neither Angular components nor directives must be declared in a schema. \n \* \n \* \n This property is only available for standalone components - specifying it for components \n \* declared in an NgModule generates a compilation error. \n \* \n \* \n More information about standalone components, directives, and pipes can be found in [this \n \* guide](guide/standalone-components). \n \* \n \* \n schemas?: SchemaMetadata[]; \n\n /\*\* \n \* Component decorator and metadata. \n \* \n \* \n @Annotation \n \* \n \* \n @publicApi \n \* \n \* \n export const Component: ComponentDecorator = makeDecorator(\n



```

'Component', (c: Component = {}) => ({ changeDetection: ChangeDetectionStrategy.Default, ...c}),\n Directive,
undefined, (type: Type<any>, meta: Component) => compileComponent(type, meta));\n\n/**\n * Type of the Pipe
decorator / constructor function.\n *\n * @publicApi\n */\nexport interface PipeDecorator {\n /**\n *\n *
Decorator that marks a class as pipe and supplies configuration metadata.\n *\n * A pipe class must implement the
`PipeTransform` interface.\n * For example, if the name is `myPipe`, use a template binding expression\n * such
as the following:\n *\n * ```\n * {{ exp | myPipe }}\n * ```\n *\n * The result of the expression is passed to
the pipe's `transform()` method.\n *\n * A pipe must belong to an NgModule in order for it to be available\n *
to a template. To make it a member of an NgModule,\n * list it in the `declarations` field of the `NgModule`
metadata.\n *\n * @see [Style Guide: Pipe Names](guide/styleguide#02-09)\n
*\n */\n (obj: Pipe): TypeDecorator;\n\n /**\n *\n * See the `Pipe` decorator.\n */\n new(obj: Pipe):
Pipe;\n}\n\n/**\n * Type of the Pipe metadata.\n *\n * @publicApi\n */\nexport interface Pipe {\n /**\n *\n * The
pipe name to use in template bindings.\n * Typically uses [lowerCamelCase](guide/glossary#case-types)\n *
because the name cannot contain hyphens.\n */\n name: string;\n\n /**\n *\n * When true, the pipe is pure, meaning
that the\n * `transform()` method is invoked only when its input arguments\n * change. Pipes are pure by
default.\n *\n * If the pipe has internal state (that is, the result\n * depends on state other than its arguments), set
`pure` to false.\n *\n * In this case, the pipe is invoked on each change-detection cycle,\n * even if the arguments have
not changed.\n */\n pure?: boolean;\n\n /**\n *\n * Angular pipes marked as `standalone` do not need to be declared
in an NgModule. Such\n * pipes don't depend on any `intermediate
context` of an NgModule (ex. configured providers).\n *\n * More information about standalone components,
directives, and pipes can be found in [this\n * guide](guide/standalone-components).\n */\n standalone?:
boolean;\n}\n\n/**\n * @Annotation\n * @publicApi\n */\nexport const Pipe: PipeDecorator = makeDecorator(\n
'Pipe', (p: Pipe) => ({pure: true, ...p}), undefined, undefined,\n (type: Type<any>, meta: Pipe) =>
compilePipe(type, meta));\n\n/**\n * @publicApi\n */\nexport interface InputDecorator {\n /**\n *\n * Decorator
that marks a class field as an input property and supplies configuration metadata.\n * The input property is bound
to a DOM property in the template. During change detection,\n * Angular automatically updates the data property
with the DOM property's value.\n *\n * @usageNotes\n *\n * You can supply an optional name to use in
templates when the\n * component is instantiated, that maps to the\n * name of the bound property. By
default, the original\n * name of the bound property is used for input binding.\n *\n * The following example
creates a component with two input properties,\n * one of which is given a special binding name.\n *\n *
```\n * @Component({\n * selector: 'bank-account',\n * template: `\n * Bank Name:\n * {{bankName}}\n * Account Id: {{id}}\n * `)\n * class BankAccount {\n * // This property is bound
using its original name.\n * @Input() bankName: string;\n * // this property value is bound to a different
property name\n * // when this component is instantiated in a template.\n * @Input('account-id') id: string;\n
*\n * // this property is not bound, and is not automatically updated by Angular\n * normalizedBankName:
string;\n * }\n *\n * @Component({\n * selector: 'app',\n * template: `\n * <bank-account
bankName="RBC" account-id="4747"></bank-account>\n * `)\n * class
App {\n * ```\n *\n * @see [Input and Output properties](guide/inputs-outputs)\n */\n (bindingPropertyName?: string): any;\n new(bindingPropertyName?: string): any;\n}\n\n/**\n * Type of metadata
for an `Input` property.\n *\n * @publicApi\n */\nexport interface Input {\n /**\n *\n * The name of the DOM
property to which the input property is bound.\n */\n bindingPropertyName?: string;\n}\n\n/**\n * @Annotation\n * @publicApi\n */\nexport const Input: InputDecorator =\n makePropDecorator('Input', (bindingPropertyName?:
string) => ({bindingPropertyName}));\n\n/**\n * Type of the Output decorator / constructor function.\n *\n *
@publicApi\n */\nexport interface OutputDecorator {\n /**\n *\n * Decorator that marks a class field as an output
property and supplies configuration metadata.\n * The DOM property bound to the output property is automatically
updated during change detection.\n *\n * @usageNotes\n *\n * You can supply an optional name to use in
templates when\n
the\n * component is instantiated, that maps to the\n * name of the bound property. By default, the original\n *
name of the bound property is used for output binding.\n *\n * See `Input` decorator for an example of providing

```

a binding name. `@see [Input and Output properties](guide/inputs-outputs)`

(bindingPropertyName?: string): any; new(bindingPropertyName?: string): any; }  
 \* Type of the Output metadata.  
`@publicApi` `export interface Output {` `bindingPropertyName?: string;` `}`  
`@Annotation` `@publicApi` `export const Output: OutputDecorator =` `makePropDecorator('Output', (bindingPropertyName?: string) =>` `({bindingPropertyName}));`  
 \* Type of the HostBinding decorator / constructor function.  
`@publicApi` `export interface HostBindingDecorator {` `bindingPropertyName?: string;` `metadata: Metadata;` `Angular automatically checks host` `property bindings during change detection, and` `if a binding changes it updates the host element of the` `directive.` `@usageNotes` `The following example creates a directive that sets the `valid` and` ``invalid`` `properties on the DOM element that has an `ngModel` directive on it.` `typescript`  
`@Directive({selector: '[ngModel]'})` `class NgModelStatus {` `constructor(public control: NgModel) {` `@HostBinding('class.valid') get valid() { return this.control.valid; }` `@HostBinding('class.invalid') get` `invalid() { return this.control.invalid; }` `}` `@Component({` `selector: 'app',` `template:` `<input [(ngModel)]="prop">` `}` `class App {` `prop;` `}`  
 (hostPropertyName?: string): any; new(hostPropertyName?: string): any; }  
 \* Type of the HostBinding metadata.  
`@publicApi` `export interface HostBinding {` `bindingPropertyName?: string;` `}`  
`@Annotation` `@publicApi` `export const HostBinding: HostBindingDecorator =` `makePropDecorator('HostBinding',` `(hostPropertyName?: string) =>` `({hostPropertyName}));`  
 \* Type of the HostListener decorator / constructor function.  
`@publicApi` `export interface HostListenerDecorator {` `eventName: string;` `handler: (event: KeyboardEvent) =>` `any;` `Angular invokes the supplied handler method when the host element emits the specified event,` `and updates the` `bound element with the result.` `If the handler method returns false, applies `preventDefault` on the bound` `element.` `(eventName: string, args?: string[]): any; new(eventName: string, args?: string[]):` `any;` `}`  
 \* Type of the HostListener metadata.  
`@publicApi` `export interface HostListener {` `eventName: string;` `args?: string[];` `}`  
 \* A set of arguments to pass to the handler method when the event occurs.  
 \* Decorator that binds a DOM event to a host listener and supplies configuration metadata.  
 \* Angular invokes the supplied handler method when the host element emits the specified event, and updates the bound element with the result.  
 \* If the handler method returns false, applies `preventDefault` on the bound element.  
`@usageNotes` `The following example declares a` `directive` `that attaches a click listener to a button and counts clicks.` `ts`  
`@Directive({selector: 'button[counting]'})` `class CountClicks {` `numberOfClicks = 0;` `@HostListener('click', ['$event.target'])` `onClick(btn) {` `console.log('button', btn, 'number` `of clicks:', this.numberOfClicks++);` `}` `@Component({` `selector: 'app',` `template:` `<button counting>Increment</button>` `}` `class App {` `}`  
 \* The following example registers another DOM event handler that listens for `Enter` key-press events on the global `window`.  
`import { HostListener, Component } from '@angular/core';` `@Component({` `selector: 'app',` `template:` `<h1>Hello, you have pressed enter {{ counter }} number of times!</h1> Press enter key` `to increment the` `counter.` `<button (click)="resetCounter()">Reset Counter</button>` `}` `class AppComponent {` `counter = 0;` `@HostListener('window:keydown.enter', ['$event'])` `handleKeyDown(event: KeyboardEvent) {` `this.counter++;` `resetCounter() {` `this.counter = 0;` `}` `}`  
 \* The list of valid key names for `keydown` and `keyup` events can be found here: <https://www.w3.org/TR/DOM-Level-3-Events-key/#named-key-attribute-values>  
 \* Note that keys can also be combined, e.g. `@HostListener('keydown.shift.a')`.  
 \* The global target names that can be used to prefix an event name are `document:`, `window:` and `body:`.  
`@Annotation` `@publicApi` `export const HostListener: HostListenerDecorator =` `makePropDecorator('HostListener',`

```

(eventName?: string, args?: string[]) => ({eventName, args});\n", "/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {ModuleWithProviders, Provider} from
'./di/interface/provider';\nimport {Type} from './interface/type';\nimport {SchemaMetadata} from
'./metadata/schema';\nimport {compileNgModule} from './render3/jit/module';\nimport {makeDecorator,
TypeDecorator} from './util/decorators';\n\n/**\n * Type of the NgModule decorator /
constructor function.\n *\n * @publicApi\n */\nexport interface NgModuleDecorator {\n /**\n * Decorator that
marks a class as an NgModule and supplies configuration metadata.\n */\n (obj?: NgModule): TypeDecorator;\n
new(obj?: NgModule): NgModule;\n}\n\n/**\n * Type of the NgModule metadata.\n *\n * @publicApi\n */\nexport
interface NgModule {\n /**\n * The set of injectable objects that are available in the injector\n */\n * of this
module.\n */\n * @see [Dependency Injection guide](guide/dependency-injection)\n */\n * @see [NgModule
guide](guide/providers)\n */\n * @usageNotes\n */\n * Dependencies whose providers are listed here become
available for injection\n */\n * into any component, directive, pipe or service that is a child of this injector.\n */\n * The
NgModule used for bootstrapping uses the root injector, and can provide dependencies\n */\n * to any part of the app.\n\n
*\n * A lazy-loaded module has its own injector, typically a child of the app root injector.\n\n
*\n * Lazy-loaded services are scoped to the lazy-loaded module's injector.\n */\n * If a lazy-loaded module also provides
the `UserService`, any component created\n */\n * within that module's context (such as by router navigation) gets the
local instance\n */\n * of the service, not the instance in the root injector.\n */\n * Components in external modules
continue to receive the instance provided by their injectors.\n *\n * ### Example\n *\n * The following
example defines a class that is injected in\n */\n * the HelloWorld NgModule:\n *\n * ```\n */\n * class Greeter {\n */\n *
greet(name:string) {\n */\n *     return 'Hello ' + name + '!';\n */\n * } \n */\n * }\n *\n * @NgModule({\n */\n * providers:
[\n */\n * Greeter\n */\n * ]\n */\n * })\n */\n * class HelloWorld {\n */\n * greeter:Greeter;\n */\n * }\n */\n *
constructor(greeter:Greeter) {\n */\n *     this.greeter = greeter;\n */\n * } \n */\n * }\n */\n * ```\n */\n * /\n */\n * providers?:
Provider[];\n\n /**\n * The set of components, directives, and pipes ([declarables](guide/glossary#declarable))\n\n
*\n * that belong to this module.\n *\n * @usageNotes\n */\n * The set of selectors that are available to a template
include those declared here, and\n */\n * those that are exported from imported NgModules.\n *\n * Declarables must
belong to exactly one module.\n */\n * The compiler emits an error if you try to declare the same class in more than one
module.\n */\n * Be careful not to declare a class that is imported from another module.\n *\n * ### Example\n *\n\n
*\n * The following example allows the CommonModule to use the `NgFor`\n */\n * directive.\n *\n * ```javascript\n */\n *
@NgModule({\n */\n * declarations: [NgFor]\n */\n * })\n */\n * class CommonModule {\n */\n * }\n */\n * ```\n */\n * /\n */\n *
declarations?: Array<Type<any>|any[]>;\n\n /**\n * The set of NgModules whose exported
[declarables](guide/glossary#declarable)\n\n
*\n * are available to templates in this module.\n *\n * @usageNotes\n\n
*\n * A template can use exported declarables from any\n\n
*\n * imported module, including those from modules that are imported indirectly\n */\n * and re-exported.\n */\n * For
example, `ModuleA` imports `ModuleB`, and also exports\n */\n * it, which makes the declarables from `ModuleB`
available\n */\n * wherever `ModuleA` is imported.\n *\n * ### Example\n *\n\n
*\n * The following example allows
MainModule to use anything exported by\n */\n * `CommonModule`:\n *\n * ```javascript\n */\n * @NgModule({\n */\n *
imports: [CommonModule]\n */\n * })\n */\n * class MainModule {\n */\n * }\n */\n * ```\n */\n * /\n */\n * imports?:
Array<Type<any>|ModuleWithProviders<{}>|any[]>;\n\n /**\n * The set of components, directives, and pipes
declared in this\n */\n * NgModule that can be used in the template of any component that is part of an\n */\n * NgModule
that imports this NgModule. Exported declarations are the module's public API.\n *\n * A declarable belongs to
one and only one NgModule.\n *\n * A module can list another module among its exports, in which case all of that
module's\n */\n * public declaration are exported.\n *\n * @usageNotes\n */\n * Declarations are private by
default.\n */\n * If this ModuleA does not export UserComponent, then only the components within this\n */\n * ModuleA
can use UserComponent.\n *\n * ModuleA can import ModuleB and also export it, making exports from
ModuleB\n */\n * available to an NgModule that imports ModuleA.\n *\n * ### Example\n *\n\n
*\n * The following
example exports the `NgFor` directive from CommonModule.\n *\n * ```javascript\n */\n * @NgModule({\n */\n *
exports: [NgFor]\n */\n * })\n */\n * class CommonModule {\n */\n * }\n */\n * ```\n */\n * /\n */\n * exports?:

```



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This file exists to support compilation of @angular/core in Ivy mode.

When the Angular compiler processes a compilation unit, it normally writes imports to @angular/core. When compiling the core package itself this strategy isn't usable. Instead, the compiler writes imports to this file.

Only a subset of such imports are supported - core is not allowed to declare components or pipes.

A check in ngts's `R3SymbolsImportRewriter` validates this condition. The rewriter is only used when compiling @angular/core and is responsible for translating an external name (prefixed with `__`) to the internal symbol name as exported below.

The below symbols are used for @Injectable and @NgModule compilation.

```

export {inject} from './di/injector_compatibility';
export {defineInjectable, defineInjector, InjectableDeclaration} from './di/interface/defs';
export {NgModuleDef} from './metadata/ng_module_def';
export {defineNgModule} from './render3/definition';
export {FactoryDeclaration, InjectorDeclaration, NgModuleDeclaration} from './render3/interfaces/public_definitions';
export {setClassMetadata} from './render3/metadata';
export {NgModuleFactory} from './render3/ng_module_ref';
export {noSideEffects as noSideEffects} from './util/closure';

```

The existence of this constant (in this particular file) informs the Angular compiler that the current program is actually @angular/core, which needs to be compiled specially.

```

export const ITS_JUST_ANGULAR = true;

```

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```

import {Observable} from 'rxjs';
import {Inject, Injectable, InjectionToken, Optional} from './di';
import {isObservable, isPromise} from './util/lang';
import {noop} from './util/noop';

```

A [DI token](guide/glossary#di-token "DI token definition") that you can use to provide one or more initialization functions.

The provided functions are injected at application startup and executed during app initialization. If any of these functions returns a Promise or an Observable, initialization does not complete until the Promise is resolved or the Observable is completed.

You can, for example, create a factory function that loads language data or an external configuration, and provide that function to the `APP_INITIALIZER` token.

The function is executed during the application bootstrap process, and the needed data is available on startup.

See `ApplicationInitStatus` and `usageNotes`.

The following example illustrates how to configure a multi-provider using `APP_INITIALIZER` token and a function returning a promise.

```

function initializeApp(): Promise<any> {
  return new Promise((resolve, reject) => {
    // Do some asynchronous stuff
    resolve();
  });
}

@NgModule({
  imports: [BrowserModule],
  declarations: [AppComponent],
  bootstrap: [AppComponent],
  providers: [
    {
      provide: APP_INITIALIZER,
      useFactory: () => initializeApp,
      multi: true
    }
  ]
})
export class AppModule {
}

```

It's also possible to configure a multi-provider using `APP_INITIALIZER` token and a function returning an observable, see an example below.

Note: the `HttpClient` in this example is used for demo purposes to illustrate how the factory function can work with other providers available through DI.

```

function initializeAppFactory(httpClient: HttpClient): () => Observable<any> {
  return () => httpClient.get("https://someUrl.com/api/user").pipe(
    tap(user => { ... })
  );
}

@NgModule({
  imports: [BrowserModule, HttpClientModule],
  declarations: [AppComponent],
  bootstrap: [AppComponent],
  providers: [
    {
      provide: APP_INITIALIZER,
      useFactory: initializeAppFactory,
      deps: [HttpClient],
      multi: true
    }
  ]
})
export class AppModule {
}

```

@publicApi

```

export
const APP_INITIALIZER = new InjectionToken<ReadonlyArray<() => Observable<unknown>| Promise<unknown>| void>>(
  'Application Initializer'
);

```

A class that reflects the state of running `APP_INITIALIZER` functions.

```

@publicApi
@Injectable({providedIn: 'root'})
export class ApplicationInitStatus {
  private resolve = noop;
  private reject = noop;
  private initialized = false;
  public readonly donePromise: Promise<any>;
  public readonly done = false;

  constructor(
    @Inject(APP_INITIALIZER) @Optional() private readonly appInits:
      ReadonlyArray<() => Observable<unknown>| Promise<unknown>| void>
  ) {
    this.donePromise = new Promise((res, rej) => {
      this.resolve = res;
      this.reject = rej;
    });
  }

  /** @internal */
  runInitializers() {
    if (this.initialized) {
      return;
    }
    const asyncInitPromises: Promise<any>[] = [];
    const complete = () => {
      (this as

```

```

{done:
  boolean}).done = true;\n  this.resolve();\n  };\n\n  if (this.appInits) {\n    for (let i = 0; i < this.appInits.length;\n  i++) {\n    const initResult = this.appInits[i];\n    if (isPromise(initResult)) {\n  asyncInitPromises.push(initResult);\n    } else if (isObservable(initResult)) {\n    const observableAsPromise\n  = new Promise<void>(resolve, reject) => {\n    initResult.subscribe({complete: resolve, error: reject});\n  });\n    asyncInitPromises.push(observableAsPromise);\n    }\n  }\n}\n\nPromise.all(asyncInitPromises)\n  .then(() => {\n    complete();\n  })\n  .catch(e => {\n  this.reject(e);\n  });\n\n  if (asyncInitPromises.length === 0) {\n    complete();\n  }\n  this.initialized =\n  true;\n  }\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is\n  governed by an MIT-style license that can be\n * found in the\n  LICENSE file at https://angular.io/license\n */\n\nimport {InjectionToken} from './di';\nimport {ComponentRef}\n  from './linker/component_factory';\n\n/**\n * A [DI token](guide/glossary#di-token \"DI token definition\")\n  representing a unique string ID, used\n * primarily for prefixing application attributes and CSS styles when\n *\n  {@link ViewEncapsulation#Emulated ViewEncapsulation.Emulated} is being used.\n * \n * BY default, the value is\n  randomly generated and assigned to the application by Angular.\n * To provide a custom ID value, use a DI provider\n  <!-- TODO: provider --> to configure\n * the root {@link Injector} that uses this token.\n * \n * @publicApi\n */\nexport const APP_ID = new InjectionToken<string>('AppId', {\n  providedIn: 'root',\n  factory:\n    _appIdRandomProviderFactory,\n});\n\nexport function _appIdRandomProviderFactory() {\n  return\n  `${_randomChar()}${_randomChar()}${_randomChar()}`;\n}\n\n/**\n * Providers that generate a random\n  `APP_ID_TOKEN`.\n * \n * @publicApi\n */\nexport\n  const APP_ID_RANDOM_PROVIDER = {\n  provide: APP_ID,\n  useFactory: _appIdRandomProviderFactory,\n  deps: <any[]>[],\n};\n\nfunction _randomChar(): string {\n  return String.fromCharCode(97 +\n  Math.floor(Math.random() * 25));\n}\n\n/**\n * A function that is executed when a platform is initialized.\n * \n * @publicApi\n */\nexport const PLATFORM_INITIALIZER = new InjectionToken<Array<() => void>>('Platform\n  Initializer');\n\n/**\n * A token that indicates an opaque platform ID.\n * \n * @publicApi\n */\nexport const\n  PLATFORM_ID = new InjectionToken<Object>('Platform ID', {\n  providedIn: 'platform',\n  factory: () =>\n  'unknown', // set a default platform name, when none set explicitly\n});\n\n/**\n * A [DI token](guide/glossary#di-\n  token \"DI token definition\") that provides a set of callbacks to\n * be called for every component that is\n  bootstrapped.\n * \n * Each callback must take a `ComponentRef` instance and return nothing.\n * \n * @publicApi\n */\n(componentRef: ComponentRef) => void\n * \n * @publicApi\n */\nexport const APP_BOOTSTRAP_LISTENER =\n  new InjectionToken<Array<(compRef:\n  ComponentRef<any>) => void>>('appBootstrapListener');\n\n/**\n * A [DI token](guide/glossary#di-token \"DI\n  token definition\") that indicates the root directory of\n * the application\n * \n * @publicApi\n */\nexport const\n  PACKAGE_ROOT_URL = new InjectionToken<string>('Application Packages Root URL');\n\n// We keep this\n  token here, rather than the animations package, so that modules that only care\n// about which animations module is\n  loaded (e.g. the CDK) can retrieve it without having to\n// include extra dependencies. See #44970 for more\n  context.\n\n/**\n * A [DI token](guide/glossary#di-token \"DI\n  token definition\") that indicates which animations\n * module has been loaded.\n * \n * @publicApi\n */\nexport const ANIMATION_MODULE_TYPE =\n  new\n  InjectionToken<'NoopAnimations'|'BrowserAnimations'>('AnimationModuleType');\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this\n  source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n  https://angular.io/license\n */\n\nimport {Injectable} from './di';\n\n@Injectable({providedIn: 'platform'})\nexport\n  class Console {\n  log(message: string): void {\n    // tslint:disable-next-line:no-console\n    console.log(message);\n  }\n  // Note: for reporting errors use `DOM.logError()` as it is platform specific\n  warn(message: string): void {\n    // tslint:disable-next-line:no-console\n    console.warn(message);\n  }\n}\n", "/*\n * @license\n * Copyright Google\n  LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style\n  license that can be\n * found\n  in the LICENSE file at https://angular.io/license\n */\n\nimport {InjectionToken} from\n  './di/injection_token';\nimport {inject} from './di/injector_compatibility';\nimport {InjectFlags} from

```

```

./di/interface/injector';\n\nimport {DEFAULT_LOCALE_ID, USD_CURRENCY_CODE} from
'/localization';\n\ndeclare const $localize:
{locale?: string};\n\n/**\n * Work out the locale from the potential global properties.\n *\n * * Closure Compiler:
use `goog.LOCALE`.\n * * Ivy enabled: use `$localize.locale`\n *^\nexport function getGlobalLocale(): string {\n if
(typeof ngI18nClosureMode !== 'undefined' && ngI18nClosureMode &&\n   typeof goog !== 'undefined' &&
goog.LOCALE !== 'en') {\n   // * The default `goog.LOCALE` value is `en`, while Angular used `en-US`.\n   // *
In order to preserve backwards compatibility, we use Angular default value over\n   // Closure Compiler's one.\n   return goog.LOCALE;\n } else {\n   // KEEP `typeof $localize !== 'undefined' && $localize.locale` IN SYNC
WITH THE LOCALIZE\n   // COMPILE-TIME INLINER.\n   //^\n   // * During compile time inlining of
translations the expression will be replaced\n   // with a string literal that is the current locale. Other forms of this
expression are not\n   // guaranteed to be replaced.\n   //^\n   // * During runtime translation
evaluation, the developer is required to set `$localize.locale`\n   // if required, or just to provide their own
`LOCALE_ID` provider.\n   return (typeof $localize !== 'undefined' && $localize.locale) ||
DEFAULT_LOCALE_ID;\n } }\n\n/**\n * Provide this token to set the locale of your application.\n * It is used
for i18n extraction, by i18n pipes (DatePipe, I18nPluralPipe, CurrencyPipe,\n * DecimalPipe and PercentPipe) and
by ICU expressions.\n *\n * See the [i18n guide](guide/i18n-common-locale-id) for more information.\n *\n *
@usageNotes\n * ### Example\n *\n * ```typescript\n * import { LOCALE_ID } from '@angular/core';\n * import {
platformBrowserDynamic } from '@angular/platform-browser-dynamic';\n * import { AppModule } from
'/app/app.module';\n *\n * platformBrowserDynamic().bootstrapModule(AppModule, {\n *   providers: [{provide:
LOCALE_ID, useValue: 'en-US'}]\n * });\n *\n * @publicApi\n *^\nexport const LOCALE_ID:
InjectionToken<string> = new InjectionToken('LocaleId',
{\n  providedIn: 'root',\n  factory: () =>\n    inject(LOCALE_ID, InjectFlags.Optional | InjectFlags.SkipSelf) ||
getGlobalLocale(),\n});\n\n/**\n * Provide this token to set the default currency code your application uses for\n *
CurrencyPipe when there is no currency code passed into it. This is only used by\n * CurrencyPipe and has no
relation to locale currency. Defaults to USD if not configured.\n *\n * See the [i18n guide](guide/i18n-common-
locale-id) for more information.\n *\n * <div class="alert is-helpful">\n *\n * **Deprecation notice:**\n *\n * The
default currency code is currently always `USD` but this is deprecated from v9.\n *\n * **In v10 the default
currency code will be taken from the current locale.**\n *\n * If you need the previous behavior then set it by
creating a `DEFAULT_CURRENCY_CODE` provider in\n * your application `NgModule`:\n *\n * ```ts\n *
{provide: DEFAULT_CURRENCY_CODE, useValue: 'USD'}\n * ```\n *\n * </div>\n *\n * @usageNotes\n *
### Example\n *\n * ```typescript\n * import { platformBrowserDynamic } from '@angular/platform-browser-
dynamic';\n * import { AppModule } from './app/app.module';\n *\n *
platformBrowserDynamic().bootstrapModule(AppModule, {\n *   providers: [{provide:
DEFAULT_CURRENCY_CODE, useValue: 'EUR'}]\n * });\n *\n * ```\n *\n * @publicApi\n *^\nexport const
DEFAULT_CURRENCY_CODE = new InjectionToken<string>('DefaultCurrencyCode', {\n  providedIn: 'root',\n  factory: () =>
USD_CURRENCY_CODE,\n});\n\n/**\n * Use this token at bootstrap to provide the content of your
translation file (`xtb`,\n * `xlf` or `xlf2`) when you want to translate your application in another language.\n *\n *
See the [i18n guide](guide/i18n-common-merge) for more information.\n *\n * @usageNotes\n * ### Example\n *\n *
```typescript\n * import { TRANSLATIONS } from '@angular/core';\n * import { platformBrowserDynamic }
from '@angular/platform-browser-dynamic';\n * import { AppModule } from './app/app.module';\n *\n * //
content of your translation file\n * const translations = '...';\n *\n *
platformBrowserDynamic().bootstrapModule(AppModule, {\n *   providers: [{provide: TRANSLATIONS,
useValue: translations }]\n * });\n *\n * ```\n *\n * @publicApi\n *^\nexport const TRANSLATIONS = new
InjectionToken<string>('Translations');\n\n/**\n * Provide this token at bootstrap to set the format of your { @link
TRANSLATIONS}: `xtb`,\n * `xlf` or `xlf2`.\n *\n * See the [i18n guide](guide/i18n-common-merge) for more
information.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * import { TRANSLATIONS_FORMAT
} from '@angular/core';\n * import { platformBrowserDynamic } from '@angular/platform-browser-dynamic';\n *
import { AppModule } from './app/app.module';\n *\n * platformBrowserDynamic().bootstrapModule(AppModule,

```

```

{\n * providers: [{provide: TRANSLATIONS_FORMAT, useValue: 'xlf' }]\n * });\n * ``\n *\n * @publicApi\n *^\nexport const TRANSLATIONS_FORMAT = new InjectionToken<string>('TranslationsFormat');\n *\n *\n * Use this enum at bootstrap as an option of `bootstrapModule` to define the strategy\n * that the compiler should use in case of missing translations:\n * - Error: throw if you have missing translations.\n * - Warning (default): show a warning in the console and/or shell.\n * - Ignore: do nothing.\n *\n * See the [i18n guide](guide/i18n-common-merge#report-missing-translations) for more information.\n *\n * @usageNotes\n * ### Example\n * ``typescript\n * import { MissingTranslationStrategy } from '@angular/core';\n * import { platformBrowserDynamic } from '@angular/platform-browser-dynamic';\n * import { AppModule } from './app/app.module';\n *\n * platformBrowserDynamic().bootstrapModule(AppModule, {\n *   missingTranslation: MissingTranslationStrategy.Error\n * });\n * ``\n *\n * @publicApi\n *^\nexport enum MissingTranslationStrategy {\n *   Error = 0,\n *   Warning = 1,\n *   Ignore = 2,\n *}\n *"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {Injectable} from './di/injectable';\nimport {InjectionToken} from './di/injection_token';\nimport {StaticProvider} from './di/interface/provider';\nimport {MissingTranslationStrategy} from './i18n/tokens';\nimport {Type} from './interface/type';\nimport {ViewEncapsulation} from './metadata/view';\nimport {ComponentFactory as ComponentFactoryR3} from './render3/component_ref';\nimport {getComponentDef, getNgModuleDef} from './render3/definition';\nimport {NgModuleFactory as NgModuleFactoryR3} from './render3/ng_module_ref';\nimport {maybeUnwrapFn} from './render3/util/misc_utils';\nimport {ComponentFactory} from './component_factory';\nimport {NgModuleFactory} from './ng_module_factory';\n\n/**\n * Combination of NgModuleFactory and ComponentFactories.\n *\n * @publicApi\n *\n * @deprecated\n * Ivy JIT mode doesn't require accessing this symbol.\n * See [JIT API changes due to ViewEngine deprecation](guide/deprecations#jit-api-changes) for\n * additional context.\n */\nexport class ModuleWithComponentFactories<T> {\n *   constructor(\n *     public ngModuleFactory: NgModuleFactory<T>,\n *     public componentFactories: ComponentFactory<any>[])\n *   }\n *}\n\n/**\n * Low-level service for running the angular compiler during runtime\n * to create {@link ComponentFactory}s, which\n * can later be used to create and render a Component instance.\n *\n * Each `@NgModule` provides an own `Compiler` to its injector,\n * that will use the directives/pipes of the ng module for compilation\n * of components.\n *\n * @publicApi\n *\n * @deprecated\n * Ivy JIT mode doesn't require accessing this symbol.\n * See [JIT API changes due to ViewEngine deprecation](guide/deprecations#jit-api-changes) for\n * additional context.\n */\n@Injectable({providedIn: 'root'})\nexport class Compiler {\n *\n * Compiles the given NgModule and all of its components. All templates of the components listed\n * in `entryComponents` have to be inlined.\n *\n * compileModuleSync<T>(moduleType: Type<T>): NgModuleFactory<T> {\n *   return new NgModuleFactoryR3(moduleType);\n * }\n\n /**\n * Compiles the given NgModule and all of its components\n */\n * compileModuleAsync<T>(moduleType: Type<T>): Promise<NgModuleFactory<T>> {\n *   return Promise.resolve(this.compileModuleSync(moduleType));\n * }\n\n /**\n * Same as {@link #compileModuleSync} but also creates ComponentFactories for all components.\n */\n * compileModuleAndAllComponentsSync<T>(moduleType: Type<T>): ModuleWithComponentFactories<T> {\n *   const ngModuleFactory = this.compileModuleSync(moduleType);\n *   const moduleDef = getNgModuleDef(moduleType)!;\n *   const componentFactories =\n *     maybeUnwrapFn(moduleDef.declarations)\n *       .reduce((factories: ComponentFactory<any>[], declaration: Type<any>) => {\n *         const componentDef = getComponentDef(declaration);\n *         componentDef && factories.push(new ComponentFactoryR3(componentDef));\n *       }, [] as ComponentFactory<any>[]);\n *   return new ModuleWithComponentFactories(ngModuleFactory, componentFactories);\n * }\n\n /**\n * Same as {@link #compileModuleAsync} but also creates ComponentFactories for all components.\n */\n * compileModuleAndAllComponentsAsync<T>(moduleType: Type<T>):\n
```



```

Promise<ModuleWithComponentFactories<T>> {\n  return
Promise.resolve(this.compileModuleAndAllComponentsSync(moduleType));\n }\n\n/**\n * Clears all caches.\n
*/\n clearCache(): void {\n\n /**\n * Clears the cache for the given component/ngModule.\n */\n
clearCacheFor(type: Type<any>) {\n\n /**\n * Returns the id for a given NgModule, if one is defined and known
to the compiler.\n */\n getModuleId(moduleType: Type<any>): string|undefined {\n  return undefined;\n
}\n}\n\n/**\n * Options for creating a compiler.\n */\n * Note: the
`useJit` and `missingTranslation` config options are not used in Ivy, passing them has\n * no effect. Those config
options are deprecated since v13.\n */\n * @publicApi\n */\nexport type CompilerOptions = {\n /**\n *
@deprecated not used at all in Ivy, providing this config option has no effect.\n */\n useJit?: boolean,\n
defaultEncapsulation?: ViewEncapsulation,\n providers?: StaticProvider[],\n /**\n * @deprecated not used at all
in Ivy, providing this config option has no effect.\n */\n missingTranslation?: MissingTranslationStrategy,\n
preserveWhitespaces?: boolean,\n};\n\n/**\n * Token to provide CompilerOptions in the platform injector.\n */\n
* @publicApi\n */\nexport const COMPILER_OPTIONS = new
InjectionToken<CompilerOptions>('compilerOptions');\n\n/**\n * A factory for creating a Compiler\n */\n
* @publicApi\n */\n * @deprecated\n */\n Ivy JIT mode doesn't require accessing this symbol.\n * See [JIT API changes
due to ViewEngine deprecation](guide/deprecations#jit-api-changes)
for\n * additional context.\n */\nexport abstract class CompilerFactory {\n  abstract createCompiler(options?:
CompilerOptions[]): Compiler;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n
* Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {assertDefined} from '../util/assert';\nimport
{getComponentViewByInstance} from '../context_discovery';\nimport {detectChanges} from
'../instructions/change_detection';\nimport {markViewDirty} from '../instructions/shared';\n\nimport
{getRootComponents} from './discovery_utils';\n\n/**\n * Marks a component for check (in case of OnPush
components) and synchronously\n * performs change detection on the application this component belongs to.\n */\n
* @param component Component to { @link ChangeDetectorRef#markForCheck mark for check}.\n */\n
* @publicApi\n */\n * @globalApi ng\n */\nexport function applyChanges(component:
{}): void {\n  ngDevMode && assertDefined(component, 'component');\n
markViewDirty(getComponentViewByInstance(component));\n
getRootComponents(component).forEach(rootComponent => detectChanges(rootComponent));\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n */\n
* Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {assertDefined}
from '../util/assert';\nimport {global} from '../util/global';\nimport {setProfiler} from './profiler';\nimport
{applyChanges} from './change_detection_utils';\nimport {getComponent, getContext, getDirectiveMetadata,
getDirectives, getHostElement, getInjector, getListeners, getOwningComponent, getRootComponents} from
'./discovery_utils';\n\n\n/**\n * This file introduces series of globally accessible debug tools\n * to allow for the
Angular debugging story to function.\n */\n
* To see this in action run the following command:\n */\n
* bazel run //packages/core/test/bundling/todo:devserver\n */\n
* Then load `localhost:5432` and start using the
console tools.\n */\n\n/**\n * This value reflects the property on the window where the dev\n * tools are patched
(window.ng).\n */\n\nexport const GLOBAL_PUBLISH_EXPANDO_KEY = 'ng';\n\nlet _published = false;\n\n/**\n
* Publishes a collection of default debug tools onto `window.ng`.\n */\n
* These functions are available globally
when Angular is in development\n * mode and are automatically stripped away from prod mode is on.\n */\n
* @nextport
function publishDefaultGlobalUtils() {\n  if (!_published) {\n    _published = true;\n\n /**\n
* Warning: this
function is *INTERNAL* and should not be relied upon in application's code.\n
* The contract of the function
might be changed in any release and/or the function can be\n
* removed completely.\n
*/\n
publishGlobalUtil('setProfiler', setProfiler);\n  publishGlobalUtil('getDirectiveMetadata', getDirectiveMetadata);\n
publishGlobalUtil('getComponent', getComponent);\n  publishGlobalUtil('getContext', getContext);\n
publishGlobalUtil('getListeners', getListeners);\n  publishGlobalUtil('getOwningComponent',
getOwningComponent);\n  publishGlobalUtil('getHostElement', getHostElement);\n

```

```

publishGlobalUtil('getInjector', getInjector);\n  publishGlobalUtil('getRootComponents', getRootComponents);\n
publishGlobalUtil('getDirectives', getDirectives);\n  publishGlobalUtil('applyChanges', applyChanges);\n
}\n}\n\nexport declare type GlobalDevModeContainer = {\n  [GLOBAL_PUBLISH_EXPANDO_KEY]: {\n    [fnName: string]: Function\n  }\n};\n\n/**\n * Publishes the given function to `window.ng` so that it can be\n * used from the browser console when an application is not in production.\n */\nexport function publishGlobalUtil(name: string, fn: Function): void {\n  if (typeof COMPILED === 'undefined' || !COMPILED) {\n    // Note: we can't export `ng` when using closure enhanced optimization as:\n
    // - closure declares globals itself for minified names, which sometimes clobber our `ng` global\n    // - we can't declare a closure extern as the namespace `ng` is already used within Google\n    // for typings for AngularJS (via `goog.provide('ng...')`).\n    const w = global as any as GlobalDevModeContainer;\n    ngDevMode && assertDefined(fn, 'function not defined');\n    if (w) {\n      let container = w[GLOBAL_PUBLISH_EXPANDO_KEY];\n      if (!container) {\n        container = w[GLOBAL_PUBLISH_EXPANDO_KEY] = {};\n      }\n      container[name] = fn;\n    }\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nconst promise: Promise<any> = (() => Promise.resolve(0));\n\nexport declare const Zone: any;\n\nexport function scheduleMicroTask(fn: Function) {\n  if (typeof Zone === 'undefined') {\n    // use promise to schedule microTask instead of use Zone\n    promise.then(() => {\n      fn && fn.apply(null, null);\n    });\n  } else {\n    Zone.current.scheduleMicroTask('scheduleMicroTask', fn);\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {global} from './global';\n\nexport function getNativeRequestAnimationFrame() {\n  let nativeRequestAnimationFrame: (callback: FrameRequestCallback) => number =\n    global['requestAnimationFrame'];\n  let nativeCancelAnimationFrame: (handle: number) => void =\n    global['cancelAnimationFrame'];\n  if (typeof Zone !== 'undefined' && nativeRequestAnimationFrame! && nativeCancelAnimationFrame!) {\n    // use unpatched version of requestAnimationFrame(native delegate) if possible\n    // to avoid another Change detection\n    const unpatchedRequestAnimationFrame =\n      (nativeRequestAnimationFrame as any)[(Zone as any).__symbol__('OriginalDelegate')];\n    if (unpatchedRequestAnimationFrame) {\n      nativeRequestAnimationFrame = unpatchedRequestAnimationFrame;\n    }\n    const unpatchedCancelAnimationFrame =\n      (nativeCancelAnimationFrame as any)[(Zone as any).__symbol__('OriginalDelegate')];\n    if (unpatchedCancelAnimationFrame) {\n      nativeCancelAnimationFrame = unpatchedCancelAnimationFrame;\n    }\n  }\n  return {nativeRequestAnimationFrame, nativeCancelAnimationFrame};\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport {EventEmitter} from './event_emitter';\nimport {global} from './util/global';\nimport {noop} from './util/noop';\nimport {getNativeRequestAnimationFrame} from './util/raf';\n\n/**\n * An injectable service for executing work inside or outside of the Angular zone.\n * The most common use of this service is to optimize performance when starting a work consisting of\n * one or more asynchronous tasks that don't require UI updates or error handling to be handled by\n * Angular. Such tasks can be kicked off via {@link #runOutsideAngular} and if needed, these tasks\n * can reenter the Angular zone via {@link #run}.\n * <!--\n * TODO: add/fix links to:\n * - docs explaining zones and the use of zones in Angular and change-detection\n * - link to runOutsideAngular/run (throughout this file!)\n * -->\n */\n\n@usageNotes\n * ### Example\n * ```\n * import {Component, NgZone} from '@angular/core';\n * import {NgIf} from '@angular/common';\n * @Component({\n *   selector: 'ng-zone-demo',\n *   template: `\n *     <h2>Demo: NgZone</h2>\n *     <p>Progress: {{progress}}</p>\n *     <p *ngIf="progress >= 100">Done processing {{label}} of Angular zone!</p>\n *   `

```

```

<button (click)="processWithinAngularZone()">Process within Angular zone</button>\n * <button
(click)="processOutsideOfAngularZone()">Process outside of Angular zone</button>\n * `,\n * })\n * export
class NgZoneDemo {\n *   progress: number = 0;\n *   label: string;\n *   constructor(private _ngZone: NgZone)
{\n *     \n *     // Loop inside the Angular zone\n *     // so the UI DOES refresh after each setTimeout cycle\n *
processWithinAngularZone() {\n *       this.label = 'inside';\n *       this.progress = 0;\n *       this._increaseProgress() =>
console.log('Inside Done!');\n *     }\n *     // Loop outside of the Angular zone\n *     // so the UI DOES NOT
refresh after each setTimeout cycle\n *     processOutsideOfAngularZone() {\n *       this.label = 'outside';\n *
this.progress = 0;\n *       this._ngZone.runOutsideAngular() => {\n *         this._increaseProgress() => {\n *           //
reenter the Angular zone and display done\n *           this._ngZone.run(() => { console.log('Outside
Done!'); });\n *         });\n *       });\n *     }\n *     _increaseProgress(doneCallback: () => void) {\n *       this.progress
+= 1;\n *       console.log(`Current progress: ${this.progress}%`);\n *       if (this.progress < 100) {\n *
window.setTimeout(() => this._increaseProgress(doneCallback), 10);\n *     } else {\n *       doneCallback();\n *
}\n *     }\n *   }\n *   @publicApi\n *   ^\n *   export class NgZone {\n *     readonly hasPendingMacrotasks: boolean
= false;\n *     readonly hasPendingMicrotasks: boolean = false;\n *     /**\n *      * Whether there are no outstanding
microtasks or macrotasks.\n *     ^\n *     readonly isStable: boolean = true;\n *     /**\n *      * Notifies when code enters
Angular Zone. This gets fired first on VM Turn.\n *     ^\n *     readonly onUnstable: EventEmitter<any> = new
EventEmitter(false);\n *     /**\n *      * Notifies when there is no more microtasks enqueued in the current VM Turn.\n *
This is a hint for Angular to do change detection, which may enqueue more microtasks.\n *
* For this reason this event can fire multiple times per VM Turn.\n *     ^\n *     readonly onMicrotaskEmpty:
EventEmitter<any> = new EventEmitter(false);\n *     /**\n *      * Notifies when the last `onMicrotaskEmpty` has run
and there are no more microtasks, which\n *     * implies we are about to relinquish VM turn.\n *     * This event gets
called just once.\n *     ^\n *     readonly onStable: EventEmitter<any> = new EventEmitter(false);\n *     /**\n *      * Notifies
that an error has been delivered.\n *     ^\n *     readonly onError: EventEmitter<any> = new EventEmitter(false);\n *     \n *
constructor({\n *       enableLongStackTrace = false,\n *       shouldCoalesceEventChangeDetection = false,\n *
shouldCoalesceRunChangeDetection = false\n *     }) {\n *       if (typeof Zone === 'undefined') {\n *         throw new
RuntimeError(\n *           RuntimeErrorCode.MISSING_ZONEJS,\n *           ngDevMode && `In this configuration
Angular requires Zone.js`);\n *       }\n *       Zone.assertZonePatched();\n *       const self = this as any as NgZonePrivate;\n *
self._nesting = 0;\n *       self._outer = self._inner = Zone.current;\n *       if ((Zone as
any)['AsyncStackTaggingZoneSpec']) {\n *         const AsyncStackTaggingZoneSpec = (Zone as
any)['AsyncStackTaggingZoneSpec'];\n *         self._inner = self._inner.fork(new
AsyncStackTaggingZoneSpec('Angular'));\n *       }\n *       if ((Zone as any)['TaskTrackingZoneSpec']) {\n *         self._inner
= self._inner.fork(new ((Zone as any)['TaskTrackingZoneSpec'] as any));\n *       }\n *       if (enableLongStackTrace &&
(Zone as any)['longStackTraceZoneSpec']) {\n *         self._inner = self._inner.fork((Zone as
any)['longStackTraceZoneSpec']);\n *       }\n *       // if shouldCoalesceRunChangeDetection is true, all tasks including
event tasks will be\n *       // coalesced, so shouldCoalesceEventChangeDetection option is not necessary and can be
skipped.\n *       self.shouldCoalesceEventChangeDetection =\n *         !shouldCoalesceRunChangeDetection &&
shouldCoalesceEventChangeDetection;\n *       self.shouldCoalesceRunChangeDetection =
shouldCoalesceRunChangeDetection;\n *
self.lastRequestAnimationFrameId = -1;\n *       self.nativeRequestAnimationFrame =
getNativeRequestAnimationFrame().nativeRequestAnimationFrame;\n *
forkInnerZoneWithAngularBehavior(self);\n *     }\n *     static isInAngularZone(): boolean {\n *       // Zone needs to be
checked, because this method might be called even when NoopNgZone is used.\n *       return typeof Zone !==
'undefined' && Zone.current.get('isAngularZone') === true;\n *     }\n *     static assertInAngularZone(): void {\n *       if
(!NgZone.isInAngularZone()) {\n *         throw new RuntimeError(\n *
RuntimeErrorCode.UNEXPECTED_ZONE_STATE,\n *           ngDevMode && `Expected to be in Angular Zone, but
it is not!`);\n *       }\n *     }\n *     static assertNotInAngularZone(): void {\n *       if (NgZone.isInAngularZone()) {\n *
throw new RuntimeError(\n *         RuntimeErrorCode.UNEXPECTED_ZONE_STATE,\n *         ngDevMode &&
`Expected to not be in Angular Zone, but it is!`);\n *       }\n *     }\n *     /**\n *      * Executes the `fn` function synchronously

```

within the Angular zone and returns value returned by the function. Running functions via `run` allows you to reenter Angular zone from a task that was executed outside of the Angular zone (typically started via `@link #runOutsideAngular`). Any future tasks or microtasks scheduled from within this function will continue executing from within the Angular zone. If a synchronous error happens it will be rethrown and not reported via `onError`.

```
run<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any[]): T {
  return (this as any as NgZonePrivate)._inner.run(fn, applyThis, applyArgs);
}
```

Executes the `fn` function synchronously within the Angular zone as a task and returns value returned by the function. Running functions via `run` allows you to reenter Angular zone from a task that was executed outside of the Angular zone (typically started via `@link #runOutsideAngular`).

Any future tasks or microtasks scheduled from within this function will continue executing from within the Angular zone. If a synchronous error happens it will be rethrown and not reported via `onError`.

```
runTask<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any[], name?: string): T {
  const zone = (this as any as NgZonePrivate)._inner;
  const task = zone.scheduleEventTask('NgZoneEvent: ' + name, fn, EMPTY_PAYLOAD, noop, noop);
  try {
    return zone.runTask(task, applyThis, applyArgs);
  } finally {
    zone.cancelTask(task);
  }
}
```

Same as `run`, except that synchronous errors are caught and forwarded via `onError` and not rethrown.

```
runGuarded<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any[]): T {
  return (this as any as NgZonePrivate)._inner.runGuarded(fn, applyThis, applyArgs);
}
```

Executes the `fn` function synchronously in Angular's parent zone and returns value returned by the function. Running functions via `@link #runOutsideAngular` allows you to escape Angular's zone and do work that doesn't trigger Angular change-detection or is subject to Angular's error handling. Any future tasks or microtasks scheduled from within this function will continue executing from outside of the Angular zone. Use `@link #run` to reenter the Angular zone and do work that updates the application model.

```
runOutsideAngular<T>(fn: (...args: any[]) => T): T {
  return (this as any as NgZonePrivate)._outer.run(fn);
}
```

```
const EMPTY_PAYLOAD = {};
```

```
interface NgZonePrivate extends NgZone {
  _outer: Zone;
  _inner: Zone;
  _nesting: number;
  _hasPendingMicrotasks: boolean;
  hasPendingMacrotasks: boolean;
  hasPendingMicrotasks: boolean;
  lastRequestAnimationFrameId: number;
}
```

A flag to indicate if `NgZone` is currently inside `checkStable`

and to prevent re-entry. The flag is needed because it is possible to invoke the change detection from within change detection leading to incorrect behavior. For detail, please refer here, <https://github.com/angular/angular/pull/40540>

```
isCheckStableRunning: boolean;
isStable: boolean;
```

Optionally specify coalescing event change detections or not. Consider the following case.

```
<div (click)="doSomething()">
  <button (click)="doSomethingElse()"></button>
</div>
```

When button is clicked, because of the event bubbling, both event handlers will be called and 2 change detections will be triggered. We can coalesce such kind of events to trigger change detection only once. By default, this option will be false. So the events will not be coalesced and the change detection will be triggered multiple times. And if this option be set to true, the change

detection will be triggered async by scheduling it in an animation frame. So in the case above, the change detection will only be triggered once.

```
shouldCoalesceEventChangeDetection: boolean;
```

Optionally specify if `NgZone#run()` method invocations should be coalesced into a single change detection. Consider the following case.

```
for (let i = 0; i < 10; i++) {
  ngZone.run(() => {
    // do something
  });
}
```

This case triggers the change detection multiple times. With `ngZoneRunCoalescing` options, all change detections in an event loops trigger only once. In addition, the change detection executes in `requestAnimationFrame`.

```
shouldCoalesceRunChangeDetection: boolean;
```

```
nativeRequestAnimationFrame: (callback: FrameRequestCallback) => number;
// Cache a "fake" top eventTask so you don't need to schedule a new task every time you run a `checkStable`.
fakeTopEventTask: Task;
```

```
function checkStable(zone: NgZonePrivate) {
  // TODO: @JiaLiPassion, should check zone.isCheckStableRunning to prevent re-entry. The case is:
  // @Component({...})
  // export class
```

```

AppComponent {\n // constructor(private ngZone: NgZone) {\n // this.ngZone.onStable.subscribe() => {\n //
this.ngZone.run(() => console.log('stable'));;\n // }};\n // }\n //\n // The onStable subscriber run another function
inside ngZone\n // which causes `checkStable()` re-entry.\n // But this fix causes some issues in g3, so this fix will
be\n // launched in another PR.\n // if (zone._nesting == 0 && !zone.hasPendingMicrotasks && !zone.isStable) {\n
try {\n zone._nesting++;\n zone.onMicrotaskEmpty.emit(null);\n } finally {\n zone._nesting--;\n if
(!zone.hasPendingMicrotasks) {\n try {\n zone.runOutsideAngular(() => zone.onStable.emit(null));\n
} finally {\n zone.isStable = true;\n }\n }\n }\n }\n }\n\nfunction delayChangeDetectionForEvents(zone: NgZonePrivate) {\n /**\n * We also need to
check _nesting here\n * Consider the following case with shouldCoalesceRunChangeDetection = true\n * \n *
ngZone.run(() => {});\n * ngZone.run(() => {});\n * \n * We want the two `ngZone.run()` only trigger one
change detection\n * when shouldCoalesceRunChangeDetection is true.\n * And because in this case, change
detection run in async way(requestAnimationFrame),\n * so we also need to check the _nesting here to prevent
multiple\n * change detections.\n * \n * if (zone.isCheckStableRunning || zone.lastRequestAnimationFrameId !== -
1) {\n return;\n }\n zone.lastRequestAnimationFrameId = zone.nativeRequestAnimationFrame.call(global, () =>
{\n // This is a work around for https://github.com/angular/angular/issues/36839.\n // The core issue is that when
event coalescing is enabled it is possible for microtasks\n // to get flushed too early
(As is the case with `Promise.then`) between the\n // coalescing eventTasks.\n //\n // To workaround this we
schedule a "fake" eventTask before we process the\n // coalescing eventTasks. The benefit of this is that the
"fake"\n // container eventTask\n // will prevent the microtasks queue from getting drained in between the
coalescing\n // eventTask execution.\n if (!zone.fakeTopEventTask) {\n zone.fakeTopEventTask =
Zone.root.scheduleEventTask('fakeTopEventTask', () => {\n zone.lastRequestAnimationFrameId = -1;\n
updateMicroTaskStatus(zone);\n zone.isCheckStableRunning = true;\n checkStable(zone);\n
zone.isCheckStableRunning = false;\n }, undefined, () => {}, () => {});\n }\n
zone.fakeTopEventTask.invoke();\n });\n updateMicroTaskStatus(zone);\n }\n\nfunction
forkInnerZoneWithAngularBehavior(zone: NgZonePrivate) {\n const delayChangeDetectionForEventsDelegate =
() => {\n delayChangeDetectionForEvents(zone);\n
};\n zone._inner = zone._inner.fork({\n name: 'angular',\n properties: <any>{'isAngularZone': true},\n
onInvokeTask:\n (delegate: ZoneDelegate, current: Zone, target: Zone, task: Task, applyThis: any,\n
applyArgs: any): any => {\n try {\n onEnter(zone);\n return delegate.invokeTask(target, task,
applyThis, applyArgs);\n } finally {\n if ((zone.shouldCoalesceEventChangeDetection && task.type
=== 'eventTask') ||\n zone.shouldCoalesceRunChangeDetection) {\n
delayChangeDetectionForEventsDelegate();\n }\n onLeave(zone);\n }\n },\n\n onInvoke:\n
(delegate: ZoneDelegate, current: Zone, target: Zone, callback: Function, applyThis: any,\n applyArgs?:
any[], source?: string): any => {\n try {\n onEnter(zone);\n return delegate.invoke(target,
callback, applyThis, applyArgs, source);\n } finally {\n
if (zone.shouldCoalesceRunChangeDetection) {\n delayChangeDetectionForEventsDelegate();\n
}\n onLeave(zone);\n }\n },\n\n onHasTask:\n (delegate: ZoneDelegate, current: Zone,
target: Zone, hasTaskState: HasTaskState) => {\n delegate.hasTask(target, hasTaskState);\n if (current
=== target) {\n // We are only interested in hasTask events which originate from our zone\n // (A child
hasTask event is not interesting to us)\n if (hasTaskState.change === 'microTask') {\n
zone._hasPendingMicrotasks = hasTaskState.microTask;\n updateMicroTaskStatus(zone);\n
checkStable(zone);\n } else if (hasTaskState.change === 'macroTask') {\n zone.hasPendingMacrotasks
= hasTaskState.macroTask;\n }\n },\n\n onHandleError: (delegate: ZoneDelegate, current:
Zone, target: Zone, error: any): boolean
=> {\n delegate.handleError(target, error);\n zone.runOutsideAngular(() => zone.onError.emit(error));\n
return false;\n }\n });\n }\n }\n\nfunction updateMicroTaskStatus(zone: NgZonePrivate) {\n if
(zone._hasPendingMicrotasks ||\n ((zone.shouldCoalesceEventChangeDetection ||\n
zone.shouldCoalesceRunChangeDetection) &&\n zone.lastRequestAnimationFrameId !== -1)) {\n

```

```

zone.hasPendingMicrotasks = true;\n } else {\n   zone.hasPendingMicrotasks = false;\n }\n}\n\nfunction
onEnter(zone: NgZonePrivate) {\n  zone._nesting++;\n  if (zone.isStable) {\n    zone.isStable = false;\n
zone.onUnstable.emit(null);\n  }\n}\n\nfunction onLeave(zone: NgZonePrivate) {\n  zone._nesting--;\n
checkStable(zone);\n}\n\n/**\n * Provides a noop implementation of `NgZone` which does nothing. This zone
requires explicit calls\n * to framework to perform rendering.\n */\nexport class NoopNgZone implements NgZone
{\n  readonly hasPendingMicrotasks: boolean = false;\n  readonly hasPendingMacrotasks:
boolean = false;\n  readonly isStable: boolean = true;\n  readonly onUnstable: EventEmitter<any> = new
EventEmitter();\n  readonly onMicrotaskEmpty: EventEmitter<any> = new EventEmitter();\n  readonly onStable:
EventEmitter<any> = new EventEmitter();\n  readonly onError: EventEmitter<any> = new EventEmitter();\n\n
run<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any): T {\n  return fn.apply(applyThis,
applyArgs);\n }\n\n runGuarded<T>(fn: (...args: any[]) => any, applyThis?: any, applyArgs?: any): T {\n
return fn.apply(applyThis, applyArgs);\n }\n\n runOutsideAngular<T>(fn: (...args: any[]) => T): T {\n
return fn();\n }\n\n runTask<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any, name?: string): T {\n
return fn.apply(applyThis, applyArgs);\n }\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Inject, Injectable, InjectionToken} from './di';\nimport
{scheduleMicroTask} from './util/microtask';\nimport {NgZone} from './zone/ng_zone';\n\n/**\n * Testability
API.\n * `declare` keyword causes tsickle to generate externs, so these methods are\n * not renamed by Closure
Compiler.\n * @publicApi\n */\nexport declare interface PublicTestability {\n  isStable(): boolean;\n
whenStable(callback: Function, timeout?: number, updateCallback?: Function): void;\n  findProviders(using: any,
provider: string, exactMatch: boolean): any[];\n}\n\n// Angular internal, not intended for public API.\nexport
interface PendingMacrotask {\n  source: string;\n  creationLocation: Error;\n  runCount?: number;\n  data?:
TaskData;\n}\n\nexport interface TaskData {\n  target?: XMLHttpRequest;\n  delay?: number;\n  isPeriodic?:
boolean;\n}\n\n// Angular internal, not intended for public API.\nexport type DoneCallback = (didWork: boolean,
tasks?: PendingMacrotask[])\n=> void;\nexport type UpdateCallback = (tasks: PendingMacrotask[]) => boolean;\n\ninterface WaitCallback {\n //
Needs to be 'any' - setTimeout returns a number according to ES6, but\n // on NodeJS it returns a Timer.\n
timeoutId: any;\n doneCb: DoneCallback;\n updateCb?: UpdateCallback;\n}\n\n/**\n * Internal injection token
that can be used to access an instance of a Testability class.\n *\n * This token acts as a bridge between the core
bootstrap code and the `Testability` class. This is\n * needed to ensure that there are no direct references to the
`Testability` class, so it can be\n * tree-shaken away (if not referenced). For the environments/setups when the
`Testability` class\n * should be available, this token is used to add a provider that references the `Testability`\n
* class. Otherwise, only this token is retained in a bundle, but the `Testability` class is not.\n */\nexport const
TESTABILITY = new InjectionToken<Testability>("");\n\n/**\n * Internal injection token
to retrieve Testability getter class instance.\n */\nexport const TESTABILITY_GETTER = new
InjectionToken<GetTestability>("");\n\n/**\n * The Testability service provides testing hooks that can be accessed
from\n * the browser.\n *\n * Angular applications bootstrapped using an NgModule (via `@NgModule.bootstrap`
field) will also\n * instantiate Testability by default (in both development and production modes).\n *\n * For
applications bootstrapped using the `bootstrapApplication` function, Testability is not\n * included by default. You
can include it into your applications by getting the list of necessary\n * providers using the
`provideProtractorTestingSupport` function and adding them into the\n * `options.providers` array. Example:\n *\n
* ```typescript\n * import {provideProtractorTestingSupport} from '@angular/platform-browser';\n *\n * await
bootstrapApplication(RootComponent, providers: [provideProtractorTestingSupport()]);\n * ```\n *\n
*/\n\n @publicApi\n @Injectable()\nexport
class Testability implements PublicTestability {\n  private _pendingCount: number = 0;\n  private _isZoneStable:
boolean = true;\n  /**\n * Whether any work was done since the last 'whenStable' callback. This is\n * useful to
detect if this could have potentially destabilized another\n * component while it is stabilizing.\n */\n @internal\n
private _didWork: boolean = false;\n  private _callbacks: WaitCallback[] = [];\n  private taskTrackingZone:

```

```

{macroTasks: Task[]}|null = null;\n\n constructor(\n   private _ngZone: NgZone, private registry:
TestabilityRegistry,\n   @Inject(TESTABILITY_GETTER) testabilityGetter: GetTestability) {\n   // If there was
no Testability logic registered in the global scope\n   // before, register the current testability getter as a global
one.\n   if (!_testabilityGetter) {\n     setTestabilityGetter(testabilityGetter);\n
testabilityGetter.addToWindow(registry);\n   }\n   this._watchAngularEvents();\n   _ngZone.run(() =>
{\n     this.taskTrackingZone =\n       typeof Zone == 'undefined' ? null : Zone.current.get('TaskTrackingZone');\n
});\n   }\n\n   private _watchAngularEvents(): void {\n     this._ngZone.onUnstable.subscribe({\n       next: () => {\n
this._didWork = true;\n       this._isZoneStable = false;\n     } });\n\n     this._ngZone.runOutsideAngular(() =>
{\n       this._ngZone.onStable.subscribe({\n         next: () => {\n           NgZone.assertNotInAngularZone();\n
scheduleMicroTask(() => {\n             this._isZoneStable = true;\n             this._runCallbacksIfReady();\n           });\n
        });\n     });\n   }\n\n   /**\n    * Increases the number of pending request\n    * @deprecated pending requests are
now tracked with zones.\n    */\n   increasePendingRequestCount(): number {\n     this._pendingCount += 1;\n
this._didWork = true;\n     return this._pendingCount;\n   }\n\n   /**\n    * Decreases the number of pending request\n
    * @deprecated pending requests
are now tracked with zones\n    */\n   decreasePendingRequestCount(): number {\n     this._pendingCount -= 1;\n     if
(this._pendingCount < 0) {\n       throw new Error('pending async requests below zero');\n     }\n
this._runCallbacksIfReady();\n     return this._pendingCount;\n   }\n\n   /**\n    * Whether an associated application is
stable\n    */\n   isStable(): boolean {\n     return this._isZoneStable && this._pendingCount === 0 &&
!this._ngZone.hasPendingMacrotasks;\n   }\n\n   private _runCallbacksIfReady(): void {\n     if (this.isStable()) {\n
// Schedules the call backs in a new frame so that it is always async.\n     scheduleMicroTask(() => {\n       while
(this._callbacks.length !== 0) {\n         let cb = this._callbacks.pop()!;\n         clearTimeout(cb.timeoutId);\n
cb.doneCb(this._didWork);\n       }\n       this._didWork = false;\n     });\n   } else {\n     // Still not stable, send
updates.\n     let pending = this.getPendingTasks();\n     this._callbacks
= this._callbacks.filter((cb) => {\n       if (cb.updateCb && cb.updateCb(pending)) {\n
clearTimeout(cb.timeoutId);\n         return false;\n       }\n     });\n     return true;\n   });\n\n   this._didWork = true;\n
}\n\n   private getPendingTasks(): PendingMacrotask[] {\n     if (!this.taskTrackingZone) {\n       return [];\n
}\n\n     // Copy the tasks data so that we don't leak tasks.\n     return this.taskTrackingZone.macroTasks.map((t: Task)
=> {\n       return {\n         source: t.source,\n         // From TaskTrackingZone:\n         //
https://github.com/angular/zone.js/blob/master/lib/zone-spec/task-tracking.ts#L40\n         creationLocation: (t as
any).creationLocation as Error,\n         data: t.data\n       };\n     });\n   }\n\n   private addCallback(cb: DoneCallback,
timeout?: number, updateCb?: UpdateCallback) {\n     let timeoutId: any = -1;\n     if (timeout && timeout > 0) {\n
timeoutId = setTimeout(() => {\n       this._callbacks = this._callbacks.filter((cb)
=> cb.timeoutId !== timeoutId);\n       cb(this._didWork, this.getPendingTasks());\n     }, timeout);\n   }\n
this._callbacks.push(<WaitCallback>{\n     doneCb: cb, timeoutId: timeoutId, updateCb: updateCb\n   });\n\n   /**\n    *
Wait for the application to be stable with a timeout. If the timeout is reached before that\n    * happens, the callback
receives a list of the macro tasks that were pending, otherwise null.\n    */\n   * @param doneCb The callback to
invoke when Angular is stable or the timeout expires\n    * whichever comes first.\n    * @param timeout Optional.
The maximum time to wait for Angular to become stable. If not\n    * specified, whenStable() will wait forever.\n
    * @param updateCb Optional. If specified, this callback will be invoked whenever the set of\n    * pending
macrotasks changes. If this callback returns true doneCb will not be invoked\n    * and no further updates will be
issued.\n    */\n   whenStable(doneCb: Function, timeout?: number, updateCb?:
Function): void {\n     if (updateCb && !this.taskTrackingZone) {\n       throw new Error(\n         "Task tracking zone
is required when passing an update callback to '+\n         'whenStable(). Is \"zone.js/plugins/task-tracking\"
loaded?');\n     }\n     // These arguments are 'Function' above to keep the public API simple.\n
this.addCallback(doneCb as DoneCallback, timeout, updateCb as UpdateCallback);\n
this._runCallbacksIfReady();\n   }\n\n   /**\n    * Get the number of pending requests\n    * @deprecated pending
requests are now tracked with zones\n    */\n   getPendingRequestCount(): number {\n     return this._pendingCount;\n
}\n\n   /**\n    * Registers an application with a testability hook so that it can be tracked.\n    * @param token token of

```

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application, root element\n * \n * @internal\n * \n registerApplication(token: any) {\n
this.registry.registerApplication(token, this);\n } \n\n /** \n * Unregisters an application.\n * @param token token
of application,
root element\n * \n * @internal\n * \n unregisterApplication(token: any) {\n
this.registry.unregisterApplication(token);\n } \n\n /** \n * Find providers by name\n * @param using The root
element to search from\n * @param provider The name of binding variable\n * @param exactMatch Whether
using exactMatch\n * \n findProviders(using: any, provider: string, exactMatch: boolean): any[] {\n //
TODO(juliemr): implement.\n return [];\n } \n\n\n /** \n * A global registry of { @link Testability } instances for
specific elements.\n * @publicApi\n * \n @Injectable({providedIn: 'platform'})\n export class TestabilityRegistry {\n
/** @internal\n * \n _applications = new Map<any, Testability>();\n\n /** \n * Registers an application with a
testability hook so that it can be tracked\n * @param token token of application, root element\n * @param
testability Testability hook\n * \n registerApplication(token: any, testability: Testability) {\n
this._applications.set(token,
testability);\n } \n\n /** \n * Unregisters an application.\n * @param token token of application, root element\n
* \n unregisterApplication(token: any) {\n this._applications.delete(token);\n } \n\n /** \n * Unregisters all
applications\n * \n unregisterAllApplications() {\n this._applications.clear();\n } \n\n /** \n * Get a testability
hook associated with the application\n * @param elem root element\n * \n getTestability(elem: any):
Testability|null {\n return this._applications.get(elem) || null;\n } \n\n /** \n * Get all registered testabilities\n
* \n getAllTestabilities(): Testability[] {\n return Array.from(this._applications.values());\n } \n\n /** \n * Get all
registered applications(root elements)\n * \n getAllRootElement(): any[] {\n return
Array.from(this._applications.keys());\n } \n\n /** \n * Find testability of a node in the Tree\n * @param elem
node\n * @param findInAncestors whether finding testability in ancestors
if testability was not found in\n * current node\n * \n findTestabilityInTree(elem: Node, findInAncestors:
boolean = true): Testability|null {\n return _testabilityGetter?.findTestabilityInTree(this, elem, findInAncestors) ??
null;\n } \n\n\n /** \n * Adapter interface for retrieving the `Testability` service associated for a\n * particular
context.\n * \n * @publicApi\n * \n export interface GetTestability {\n addToWorld(registry: TestabilityRegistry):
void;\n findTestabilityInTree(registry: TestabilityRegistry, elem: any, findInAncestors: boolean):\n
Testability|null;\n } \n\n\n /** \n * Set the { @link GetTestability } implementation used by the Angular testing
framework.\n * @publicApi\n * \n export function setTestabilityGetter(getter: GetTestability): void {\n
_testabilityGetter = getter;\n } \n\n\n let _testabilityGetter: GetTestability|undefined;\n\n /** \n * @license\n * Copyright
Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style
license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\n\n import
'./util/ng_jit_mode';\n\n import {merge, Observable, Observer, Subscription} from 'rxjs';\n\n import {share} from
'rxjs/operators';\n\n import {ApplicationInitStatus} from './application_init';\n\n import
{APP_BOOTSTRAP_LISTENER, PLATFORM_INITIALIZER} from './application_tokens';\n\n import
{getCompilerFacade, JitCompilerUsage} from './compiler/compiler_facade';\n\n import {Console} from
'./console';\n\n import {Injectable} from './di/injectable';\n\n import {InjectionToken} from './di/injection_token';\n\n import
{Injector} from './di/injector';\n\n import {ImportedNgModuleProviders, Provider, StaticProvider} from
'./di/interface/provider';\n\n import {EnvironmentInjector} from './di/r3_injector';\n\n import {INJECTOR_SCOPE} from
'./di/scope';\n\n import {ErrorHandler} from './error_handler';\n\n import {formatRuntimeError, RuntimeError,
RuntimeErrorCode} from './errors';\n\n import {DEFAULT_LOCALE_ID} from './i18n/localization';\n\n import
{LOCALE_ID} from './i18n/tokens';\n\n import {Type} from './interface/type';\n\n import {COMPILER_OPTIONS,
CompilerOptions} from './linker/compiler';\n\n import {ComponentFactory, ComponentRef} from
'./linker/component_factory';\n\n import {ComponentFactoryResolver} from
'./linker/component_factory_resolver';\n\n import {InternalNgModuleRef, NgModuleFactory, NgModuleRef} from
'./linker/ng_module_factory';\n\n import {InternalViewRef, ViewRef} from './linker/view_ref';\n\n import
{isComponentResourceResolutionQueueEmpty, resolveComponentResources} from
'./metadata/resource_loading';\n\n import {assertNgModuleType} from './render3/assert';\n\n import {ComponentFactory

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as R3ComponentFactory} from './render3/component_ref';\nimport {isStandalone} from
 './render3/definition';\nimport {assertStandaloneComponentType} from './render3/errors';\nimport {setLocaleId}
from './render3/i18n/i18n_locale_id';\nimport {setJitOptions} from './render3/jit/jit_options';\nimport
 {createEnvironmentInjector, NgModuleFactory
as R3NgModuleFactory} from './render3/ng_module_ref';\nimport {publishDefaultGlobalUtils as
 _publishDefaultGlobalUtils} from './render3/util/global_utils';\nimport {TESTABILITY} from
 './testability/testability';\nimport {isPromise} from './util/lang';\nimport {scheduleMicroTask} from
 './util/microtask';\nimport {stringify} from './util/stringify';\nimport {NgZone, NoopNgZone} from
 './zone/ng_zone';\n\nlet _platformInjector: Injector|null = null;\n\n/**\n * Internal token to indicate whether having
multiple bootstrapped platform should be allowed (only\n * one bootstrapped platform is allowed by default). This
token helps to support SSR scenarios.\n */\nexport const ALLOW_MULTIPLE_PLATFORMS = new
InjectionToken<boolean>('AllowMultipleToken');\n\n/**\n * Internal token that allows to register extra callbacks
that should be invoked during the\n * `PlatformRef.destroy` operation. This token is needed to avoid a direct
reference to the\n * `PlatformRef` class (i.e. register the callback via
`PlatformRef.onDestroy`), thus making the\n * entire class tree-shakeable.\n */\nconst
PLATFORM_DESTROY_LISTENERS =\n  new
InjectionToken<Set<VoidFunction>>('PlatformDestroyListeners');\n\nconst NG_DEV_MODE = typeof
ngDevMode === 'undefined' || ngDevMode;\n\nexport function compileNgModuleFactory<M>(\n  injector:
Injector, options: CompilerOptions,\n  moduleType: Type<M>): Promise<NgModuleFactory<M>> {\n
ngDevMode && assertNgModuleType(moduleType);\n\n  const moduleFactory = new
R3NgModuleFactory(moduleType);\n\n  // All of the logic below is irrelevant for AOT-compiled code.\n  if (typeof
ngJitMode !== 'undefined' && !ngJitMode) {\n    return Promise.resolve(moduleFactory);\n  }\n\n  const
compilerOptions = injector.get(COMPILER_OPTIONS, []).concat(options);\n\n  // Configure the compiler to use
the provided options. This call may fail when multiple modules\n  // are bootstrapped with incompatible options, as
a component can only be compiled according to\n  // a single set of
options.\n  setJitOptions({\n    defaultEncapsulation: _lastDefined(compilerOptions.map(opts =>
opts.defaultEncapsulation)),\n    preserveWhitespaces: _lastDefined(compilerOptions.map(opts =>
opts.preserveWhitespaces)),\n  });\n\n  if (isComponentResourceResolutionQueueEmpty()) {\n    return
Promise.resolve(moduleFactory);\n  }\n\n  const compilerProviders = _mergeArrays(compilerOptions.map(o =>
o.providers!));\n\n  // In case there are no compiler providers, we just return the module factory as\n  // there won't
be any resource loader. This can happen with Ivy, because AOT compiled\n  // modules can be still passed through
`bootstrapModule`. In that case we shouldn't\n  // unnecessarily require the JIT compiler.\n  if
(compilerProviders.length === 0) {\n    return Promise.resolve(moduleFactory);\n  }\n\n  const compiler =
getCompilerFacade({\n    usage: JitCompilerUsage.Decorator,\n    kind: 'NgModule',\n    type: moduleType,\n  });\n\n  const compilerInjector = Injector.create({providers:
compilerProviders});\n\n  const resourceLoader = compilerInjector.get(compiler.ResourceLoader);\n  // The resource
loader can also return a string while the `resolveComponentResources`\n  // always expects a promise. Therefore
we need to wrap the returned value in a promise.\n  return resolveComponentResources(url =>
Promise.resolve(resourceLoader.get(url))).then(() => moduleFactory);\n\n}\n\nexport function
publishDefaultGlobalUtils() {\n  ngDevMode && _publishDefaultGlobalUtils();\n}\n\nexport function
isBoundToModule<C>(cf: ComponentFactory<C>): boolean {\n  return (cf as
R3ComponentFactory<C>).isBoundToModule;\n}\n\n/**\n * A token for third-party components that can register
themselves with NgProbe.\n */\n * @publicApi\n */\nexport class NgProbeToken {\n  constructor(public name:
string, public token: any) {}\n}\n\n/**\n * Creates a platform.\n * Platforms must be created on launch using this
function.\n */\n * @publicApi\n */\nexport function createPlatform(injector: Injector):
PlatformRef {\n  if (_platformInjector && !_platformInjector.get(ALLOW_MULTIPLE_PLATFORMS, false)) {\n
throw new RuntimeError(\n    RuntimeErrorCode.MULTIPLE_PLATFORMS,\n    ngDevMode &&\n
'There can be only one platform. Destroy the previous one to create a new one.');

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createPlatformFactory(\n  parentPlatformFactory: ((extraProviders?: StaticProvider[]) => PlatformRef)|null, name:
string,\n  providers: StaticProvider[] = []): (extraProviders?: StaticProvider[]) => PlatformRef {\n  const desc =
`Platform: ${name}`;\n  const marker = new InjectionToken(desc);\n  return (extraProviders: StaticProvider[] = [])
=> {\n  let platform = getPlatform();\n  if (!platform ||
platform.injector.get(ALLOW_MULTIPLE_PLATFORMS, false)) {\n  const platformProviders: StaticProvider[]
= [\n  ...providers, //\n  ...extraProviders, //\n  {provide: marker, useValue: true}\n  ];\n  if
(parentPlatformFactory) {\n  parentPlatformFactory(platformProviders);\n  } else {\n
createPlatform(createPlatformInjector(platformProviders,
desc));\n  }\n  }\n  return assertPlatform(marker);\n  };\n}\n\n/**\n * Checks that there is currently a platform
that contains the given token as a provider.\n *\n * @publicApi\n */\nexport function assertPlatform(requiredToken:
any): PlatformRef {\n  const platform = getPlatform();\n  if (!platform) {\n  throw new
RuntimeError(RuntimeErrorCode.PLATFORM_NOT_FOUND, ngDevMode && 'No platform exists!');\n  }\n  if
((typeof ngDevMode === 'undefined' || ngDevMode) && !platform.injector.get(requiredToken, null)) {\n
throw new RuntimeError(\n  RuntimeErrorCode.MULTIPLE_PLATFORMS,\n  'A platform with a different
configuration has been created. Please destroy it first.);\n  }\n  return platform;\n}\n\n/**\n * Helper function to
create an instance of a platform injector (that maintains the 'platform'\n * scope).\n *\n */\nexport function
createPlatformInjector(providers: StaticProvider[] = [], name?: string): Injector {\n  return Injector.create({\n
name,\n  providers: [\n  {provide: INJECTOR_SCOPE, useValue: 'platform'},\n  {provide:
PLATFORM_DESTROY_LISTENERS, useValue: new Set(() => _platformInjector = null)},\n  ...providers\n
],\n  });\n}\n\n/**\n * Destroys the current Angular platform and all Angular applications on the page.\n * Destroys
all modules and listeners registered with the platform.\n *\n * @publicApi\n */\nexport function destroyPlatform():
void {\n  getPlatform()?.destroy();\n}\n\n/**\n * Returns the current platform.\n *\n * @publicApi\n */\nexport
function getPlatform(): PlatformRef|null {\n  return _platformInjector?.get(PlatformRef) ?? null;\n}\n\n/**\n *
Provides additional options to the bootstrapping process.\n *\n * @publicApi\n */\nexport interface
BootstrapOptions {\n  /**\n   * Optionally specify which `NgZone` should be used.\n   * - Provide your own
`NgZone` instance.\n   * - `zone.js` - Use default `NgZone` which requires `Zone.js`.\n   * - `noop` - Use
`NoopNgZone` which does nothing.\n   */\n  ngZone?: NgZone|'zone.js'|'noop';\n  /**\n   * Optionally specify
coalescing event change detections or not.\n   * Consider the following case.\n   */\n  <div
(click)="doSomething()">\n   * <button (click)="doSomethingElse()"></button>\n   * </div>\n   * When
button is clicked, because of the event bubbling, both\n   * event handlers will be called and 2 change detections will
be\n   * triggered. We can coalesce such kind of events to only trigger\n   * change detection only once.\n   */\n  By default, this option will be false. So the events will not be\n   * coalesced and the change detection will be
triggered multiple times.\n   * And if this option be set to true, the change detection will be\n   * triggered async by
scheduling a animation frame. So in the case above,\n   * the change detection will only be triggered once.\n   */\n  ngZoneEventCoalescing?: boolean;\n}\n\n/**\n * Optionally specify if `NgZone#run()` method
invocations should be coalesced\n * into a single change detection.\n * Consider the following case.\n */\n
for (let i = 0; i < 10; i++) {\n  * ngZone.run(() => {\n  * // do something\n  * });\n  * }\n  * This case
triggers the change detection multiple times.\n  * With ngZoneRunCoalescing options, all change detections in an
event loop trigger only once.\n  * In addition, the change detection executes in requestAnimationFrame.\n  */\n  ngZoneRunCoalescing?: boolean;\n}\n\n/**\n * The Angular platform is the entry point for Angular on a web
page.\n * Each page has exactly one platform. Services (such as reflection) which are common\n * to every Angular
application running on the page are bound in its scope.\n * A page's platform is initialized implicitly when a
platform is created using a platform\n * factory such as `PlatformBrowser`, or explicitly by calling the
`createPlatform()` function.\n *\n * @publicApi\n */\nexport class PlatformRef {\n  private _modules: NgModuleRef<any>[] = [];\n  private _destroyListeners: Array<() =>
void> = [];\n  private _destroyed: boolean = false;\n  /**\n   * @internal\n   */\n  constructor(private _injector: Injector)
{\n  }\n  /**\n   * Creates an instance of an `@NgModule` for the given platform.\n   *\n   * @deprecated Passing
NgModule factories as the `PlatformRef.bootstrapModuleFactory` function\n   * argument is deprecated. Use the

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PlatformRef.bootstrapModule` API instead.\n *
bootstrapModuleFactory<M>(moduleFactory:
NgModuleFactory<M>, options?: BootstrapOptions):\n Promise<NgModuleRef<M>> {\n // Note: We need to
create the NgZone _before_ we instantiate the module,\n // as instantiating the module creates some providers
eagerly.\n // So we create a mini parent injector that just contains the new NgZone and\n // pass that as parent to
the NgModuleFactory.\n const ngZone = getNgZone(options?.ngZone, getNgZoneOptions(options));\n
const providers: StaticProvider[] = [{provide: NgZone, useValue: ngZone}];\n // Note: Create ngZoneInjector
within ngZone.run so that all of the instantiated services are\n // created within the Angular zone\n // Do not try
to replace ngZone.run with ApplicationRef#run because ApplicationRef would then be\n // created outside of the
Angular zone.\n return ngZone.run(() => {\n const ngZoneInjector = Injector.create(\n {providers:
providers, parent: this.injector, name: moduleFactory.moduleType.name});\n const moduleRef =
<InternalNgModuleRef<M>>moduleFactory.create(ngZoneInjector);\n const exceptionHandler:
ErrorHandler|null = moduleRef.injector.get(ErrorHandler, null);\n if (!exceptionHandler) {\n throw new
RuntimeError(\n RuntimeErrorCode.ERROR_HANDLER_NOT_FOUND,\n ngDevMode && 'No
ErrorHandler. Is platform module (BrowserModule) included?');\n }\n ngZone!.runOutsideAngular() => {\n
const
subscription = ngZone!.onError.subscribe({\n next: (error: any) => {\n
exceptionHandler.handleError(error);\n }\n });\n moduleRef.onDestroy(() => {\n
remove(this._modules, moduleRef);\n subscription.unsubscribe();\n });\n });\n return
_callAndReportToErrorHandler(exceptionHandler, ngZone!, () => {\n const initState: ApplicationInitStatus =
moduleRef.injector.get(ApplicationInitStatus);\n initState.runInitializers();\n return
initStatus.donePromise.then(() => {\n // If the `LOCALE_ID` provider is defined at bootstrap then we set the
value for ivy\n const localeId = moduleRef.injector.get(LOCALE_ID, DEFAULT_LOCALE_ID);\n
setLocaleId(localeId || DEFAULT_LOCALE_ID);\n this._moduleDoBootstrap(moduleRef);\n return
moduleRef;\n });\n });\n });\n });\n }\n\n /**\n * Creates an instance of an `@NgModule` for a given
platform.\n *\n * @usageNotes\n * ### Simple Example\n *\n * ```typescript\n * @NgModule({\n * imports:
[BrowserModule]\n * })\n * class MyModule {\n *\n * let moduleRef =
platformBrowser().bootstrapModule(MyModule);\n * ```\n *\n */\n bootstrapModule<M>(\n moduleType:
Type<M>,\n compilerOptions: (CompilerOptions&BootstrapOptions)|\n
Array<CompilerOptions&BootstrapOptions> = []): Promise<NgModuleRef<M>> {\n const options =
optionsReducer({}, compilerOptions);\n return compileNgModuleFactory(this.injector, options, moduleType)\n
.then(moduleFactory => this.bootstrapModuleFactory(moduleFactory, options));\n }\n\n private
_moduleDoBootstrap(moduleRef: InternalNgModuleRef<any>): void {\n const appRef =
moduleRef.injector.get(ApplicationRef);\n if (moduleRef._bootstrapComponents.length > 0) {\n
moduleRef._bootstrapComponents.forEach(f => appRef.bootstrap(f);\n } else if
(moduleRef.instance.ngDoBootstrap) {\n moduleRef.instance.ngDoBootstrap(appRef);\n
} else {\n throw new RuntimeError(\n
RuntimeErrorCode.BOOTSTRAP_COMPONENTS_NOT_FOUND,\n ngDevMode &&\n `The
module ${stringify(moduleRef.instance.constructor)} was bootstrapped, ` +\n
`but it does not declare\n `"@NgModule.bootstrap" components nor a "ngDoBootstrap" method. ` +\n
`Please define one of
these.`);\n }\n this._modules.push(moduleRef);\n }\n\n /**\n * Registers a listener to be called when the
platform is destroyed.\n *\n */\n onDestroy(callback: () => void): void {\n this._destroyListeners.push(callback);\n
}\n\n /**\n * Retrieves the platform { @link Injector}, which is the parent injector for\n * every Angular
application on the page and provides singleton providers.\n *\n */\n get injector(): Injector {\n return this._injector;\n
}\n\n /**\n * Destroys the current Angular platform and all Angular applications on the page.\n * Destroys all
modules and
listeners registered with the platform.\n *\n */\n destroy() {\n if (this._destroyed) {\n throw new RuntimeError(\n
RuntimeErrorCode.PLATFORM_ALREADY_DESTROYED,\n ngDevMode && 'The platform has

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already been destroyed!);\n  }\n  this._modules.slice().forEach(module => module.destroy());\n  this._destroyListeners.forEach(listener => listener());\n  const destroyListeners =\n  this._injector.get(PLATFORM_DESTROY_LISTENERS, null);\n  if (destroyListeners) {\n  destroyListeners.forEach(listener => listener());\n  destroyListeners.clear();\n  }\n  this._destroyed = true;\n  }\n  /**\n   * Indicates whether this instance was destroyed.\n   *\n   * @returns {boolean} true if destroyed, false otherwise.\n   */\n  get destroyed() {\n    return this._destroyed;\n  }\n}\n\n// Set of options recognized by the NgZone.\ninterface NgZoneOptions {\n  enableLongStackTrace:\n  boolean;\n  shouldCoalesceEventChangeDetection: boolean;\n  shouldCoalesceRunChangeDetection:\n  boolean;\n}\n\n// Transforms a set of `BootstrapOptions`\n(supported by the NgModule-based bootstrap APIs) -> `NgZoneOptions` that are recognized by the NgZone\nconstructor. Passing no options will result in a set of default options returned.\nfunction\ngetNgZoneOptions(options?: BootstrapOptions): NgZoneOptions {\n  return {\n    enableLongStackTrace: typeof\n    ngDevMode === 'undefined' ? false : !!ngDevMode,\n    shouldCoalesceEventChangeDetection: !(options &&\n    options.ngZoneEventCoalescing) || false,\n    shouldCoalesceRunChangeDetection: !(options &&\n    options.ngZoneRunCoalescing) || false,\n  };\n}\n\nfunction getNgZone(ngZoneToUse:\nNgZone | 'zone.js' | 'noop' | undefined, options: NgZoneOptions): NgZone {\n  let ngZone: NgZone;\n  if\n  (ngZoneToUse === 'noop') {\n    ngZone = new NoopNgZone();\n  } else {\n    ngZone = (ngZoneToUse ===\n    'zone.js' ? undefined : ngZoneToUse) || new NgZone(options);\n  }\n  return ngZone;\n}\n\nfunction\n_callAndReportToErrorHandler(\n  errorHandler: ErrorHandler, ngZone: NgZone, callback: () => any): any\n{\n  try {\n    const result = callback();\n    if (isPromise(result)) {\n      return result.catch((e: any) => {\n        ngZone.runOutsideAngular(() => errorHandler.handleError(e));\n        // rethrow as the exception handler might not\n        do it\n        throw e;\n      });\n    }\n    return result;\n  } catch (e) {\n    ngZone.runOutsideAngular(() =>\n    errorHandler.handleError(e));\n    // rethrow as the exception handler might not do it\n    throw e;\n  }\n}\n\nfunction\noptionsReducer<T extends Object>(dst: any, objs: T[] | T): T {\n  if (Array.isArray(objs)) {\n    dst =\n    objs.reduce(optionsReducer, dst);\n  } else {\n    dst = {...dst, ...(objs as any)};\n  }\n  return dst;\n}\n\n/**\n * A\nreference to an Angular application running on a page.\n * @usageNotes\n * @a is-stable-examples\n * ### isStable examples and caveats\n * Note two important points about `isStable`, demonstrated in the examples\nbelow:\n * - the application will never be stable if you start any kind\n * of recurrent asynchronous task when the application starts\n * (for example for a polling process, started with a\n `setInterval`, a `setTimeout`\n * or using RxJS operators like `interval`);\n * - the `isStable` Observable runs outside\nof the Angular zone.\n * Let's imagine that you start a recurrent task\n * (here incrementing a counter, using\nRxJS `interval`),\n * and at the same time subscribe to `isStable`.\n * constructor(appRef:\nApplicationRef) {\n *   appRef.isStable.pipe(\n *     filter(stable => stable)\n *   ).subscribe(() => console.log('App\nis stable now'));\n *   interval(1000).subscribe(counter => console.log(counter));\n * }\n * In this example,\n `isStable` will never emit `true`,\n * and the trace `App is stable now` will never get logged.\n * If you want to\nexecute something when the app is stable,\n * you have to wait for the application to be stable\n * before starting\nyour polling process.\n * constructor(appRef: ApplicationRef)\n {\n *   appRef.isStable.pipe(\n *     first(stable => stable),\n *     tap(stable => console.log('App is stable now')),\n *     switchMap(() => interval(1000))\n *   ).subscribe(counter => console.log(counter));\n * }\n * In this\nexample, the trace `App is stable now` will be logged\n * and then the counter starts incrementing every second.\n *\n * Note also that this Observable runs outside of the Angular zone,\n * which means that the code in the\nsubscription\n * to this Observable will not trigger the change detection.\n * Let's imagine that instead of\nlogging the counter value,\n * you update a field of your component\n * and display it in its template.\n * constructor(appRef: ApplicationRef) {\n *   appRef.isStable.pipe(\n *     first(stable => stable),\n *     switchMap(()\n=> interval(1000))\n *   ).subscribe(counter => this.value = counter);\n * }\n * As the `isStable` Observable\nruns outside the zone,\n * the `value` field will be updated\nproperly,\n * but the template will not be refreshed!\n * You'll have to manually trigger the change detection to\nupdate the template.\n * constructor(appRef: ApplicationRef, cd: ChangeDetectorRef) {\n *   appRef.isStable.pipe(\n *     first(stable => stable),\n *     switchMap(() => interval(1000))\n *   ).subscribe(counter

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=> {\n *   this.value = counter;\n *   cd.detectChanges();\n * });\n * }\n * ``\n * \n * Or make the subscription
callback run inside the zone.\n * ``\n * constructor(appRef: ApplicationRef, zone: NgZone) {\n *
appRef.isStable.pipe(\n *   first(stable => stable),\n *   switchMap(() => interval(1000))\n * ).subscribe(counter
=> zone.run(() => this.value = counter));\n * }\n * ``\n * \n * @publicApi\n * \n * @Injectable({providedIn:
'root'})\n * \n * export class ApplicationRef {\n *   /** @internal */\n *   private _bootstrapListeners: ((compRef:
ComponentRef<any>) => void)[] = [];\n *   private _views: InternalViewRef[] = [];\n *   private _runningTick:
boolean = false;\n *   private _stable = true;\n *   private _onMicrotaskEmptySubscription: Subscription;\n *   private
_destroyed = false;\n *   private _destroyListeners: Array<() => void> = [];\n *   /**\n *    * Indicates whether this
instance was destroyed.\n *    */\n *   get destroyed() {\n *     return this._destroyed;\n *   }\n *   /**\n *    * Get a list of
component types registered to this application.\n *    * This list is populated even before the component is created.\n *    */\n *   public readonly componentTypes: Type<any>[] = [];\n *   /**\n *    * Get a list of components registered to this
application.\n *    */\n *   public readonly components: ComponentRef<any>[] = [];\n *   /**\n *    * Returns an Observable
that indicates when the application is stable or unstable.\n *    * \n *    * @see [Usage notes](#is-stable-examples) for
examples and caveats when using this API.\n *    * \n *    * // TODO(issue/24571): remove '!'.\n *    * public readonly isStable!:
Observable<boolean>;\n *   /**\n *    * The `EnvironmentInjector` used to create this
application.\n *    */\n *   get injector(): EnvironmentInjector {\n *     return this._injector;\n *   }\n *   /** @internal */\n *   constructor(\n *     private _zone: NgZone,\n *     private _injector: EnvironmentInjector,\n *     private
_exceptionHandler: ErrorHandler,\n *   ) {\n *     this._onMicrotaskEmptySubscription =
this._zone.onMicrotaskEmpty.subscribe({\n *       next: () => {\n *         this._zone.run(() => {\n *           this.tick();\n *
});\n *       }\n *     });\n *     const isCurrentlyStable = new Observable<boolean>((observer: Observer<boolean>) => {\n *
this._stable = this._zone.isStable && !this._zone.hasPendingMacrotasks &&\n *
!this._zone.hasPendingMicrotasks;\n *     this._zone.runOutsideAngular(() => {\n *       observer.next(this._stable);\n *
observer.complete();\n *     });\n *     const isStable = new Observable<boolean>((observer:
Observer<boolean>) => {\n *       // Create the subscription to onStable outside the Angular Zone so that\n *       // the
callback is run outside
the Angular Zone.\n *       let stableSub: Subscription;\n *       this._zone.runOutsideAngular(() => {\n *         stableSub =
this._zone.onStable.subscribe(() => {\n *           NgZone.assertNotInAngularZone();\n *           // Check whether there
are no pending macro/micro tasks in the next tick\n *           // to allow for NgZone to update the state.\n *           \n *
scheduleMicroTask(() => {\n *             if (!this._stable && !this._zone.hasPendingMacrotasks &&\n *
!this._zone.hasPendingMicrotasks) {\n *               this._stable = true;\n *               observer.next(true);\n *             }\n *
});\n *           });\n *           const unstableSub: Subscription = this._zone.onUnstable.subscribe(() => {\n *
NgZone.assertInAngularZone();\n *             if (this._stable) {\n *               this._stable = false;\n *
this._zone.runOutsideAngular(() => {\n *                 observer.next(false);\n *               });\n *             });\n *           \n *
return () => {\n *             stableSub.unsubscribe();\n *             unstableSub.unsubscribe();\n *           });\n *         });\n *       }\n *     });\n *     (this as {isStable: Observable<boolean>}).isStable =\n *
merge(isCurrentlyStable, isStable.pipe(share()));\n *   }\n *   /**\n *    * Bootstrap a component onto the element
identified by its selector or, optionally, to a\n *    * specified element.\n *    * \n *    * @usageNotes\n *    * ### Bootstrap
process\n *    * \n *    * When bootstrapping a component, Angular mounts it onto a target DOM element\n *    * and kicks
off automatic change detection. The target DOM element can be\n *    * provided using the `rootSelectorOrNode`
argument.\n *    * \n *    * If the target DOM element is not provided, Angular tries to find one on a page\n *    * using the
`selector` of the component that is being bootstrapped\n *    * (first matched element is used).\n *    * \n *    * ###
Example\n *    * \n *    * Generally, we define the component to bootstrap in the `bootstrap` array of `NgModule`,\n *    *
but it requires us to know the component while writing the application code.\n *    * \n *    * Imagine
a situation where we have to wait for an API call to decide about the component to\n *    * bootstrap. We can use the
`ngDoBootstrap` hook of the `NgModule` and call this method to\n *    * dynamically bootstrap a component.\n *    * \n *
{@example core/ts/platform/platform.ts region='componentSelector'}\n *    * \n *    * Optionally, a component can be
mounted onto a DOM element that does not match the\n *    * selector of the bootstrapped component.\n *    * \n *    * In the
following example, we are providing a CSS selector to match the target element.\n *    * \n *    * {@example

```

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core/ts/platform/platform.ts region='cssSelector'})\n * While in this example, we are providing reference to a
DOM node.\n * {@example core/ts/platform/platform.ts region='domNode'}}\n *\n
bootstrap<C>(component: Type<C>, rootSelectorOrNode?: string|any): ComponentRef<C>;\n\n /**\n * Bootstrap
a component onto the element identified by its selector or, optionally, to a\n * specified element.\n *\n *
@usageNotes\n
 * ### Bootstrap process\n *\n * When bootstrapping a component, Angular mounts it onto a target DOM
element\n * and kicks off automatic change detection. The target DOM element can be\n * provided using the
`rootSelectorOrNode` argument.\n *\n * If the target DOM element is not provided, Angular tries to find one on a
page\n * using the `selector` of the component that is being bootstrapped\n * (first matched element is used).\n
*\n * ### Example\n *\n * Generally, we define the component to bootstrap in the `bootstrap` array of
`NgModule`,\n * but it requires us to know the component while writing the application code.\n *\n * Imagine a
situation where we have to wait for an API call to decide about the component to\n * bootstrap. We can use the
`ngDoBootstrap` hook of the `NgModule` and call this method to\n * dynamically bootstrap a component.\n *\n *
{@example core/ts/platform/platform.ts region='componentSelector'}\n *\n * Optionally,
a component can be mounted onto a DOM element that does not match the\n * selector of the bootstrapped
component.\n *\n * In the following example, we are providing a CSS selector to match the target element.\n *
{@example core/ts/platform/platform.ts region='cssSelector'}\n *\n * While in this example, we are providing
reference to a DOM node.\n *\n * {@example core/ts/platform/platform.ts region='domNode'}}\n *\n *
@deprecated Passing Component factories as the `Application.bootstrap` function argument is\n * deprecated.
Pass Component Types instead.\n *\n bootstrap<C>(componentFactory: ComponentFactory<C>,
rootSelectorOrNode?: string|any):\n ComponentRef<C>;\n\n /**\n * Bootstrap a component onto the element
identified by its selector or, optionally, to a\n * specified element.\n *\n * @usageNotes\n * ### Bootstrap
process\n *\n * When bootstrapping a component, Angular mounts it onto a target DOM element\n * and kicks
off
automatic change detection. The target DOM element can be\n * provided using the `rootSelectorOrNode`
argument.\n *\n * If the target DOM element is not provided, Angular tries to find one on a page\n * using the
`selector` of the component that is being bootstrapped\n * (first matched element is used).\n *\n * ###
Example\n *\n * Generally, we define the component to bootstrap in the `bootstrap` array of `NgModule`,\n *
but it requires us to know the component while writing the application code.\n *\n * Imagine a situation where
we have to wait for an API call to decide about the component to\n * bootstrap. We can use the `ngDoBootstrap`
hook of the `NgModule` and call this method to\n * dynamically bootstrap a component.\n *\n * {@example
core/ts/platform/platform.ts region='componentSelector'}\n *\n * Optionally, a component can be mounted onto a
DOM element that does not match the\n * selector of the bootstrapped component.\n *\n * In the
following example, we are providing a CSS selector to match the target element.\n *\n * {@example
core/ts/platform/platform.ts region='cssSelector'}\n *\n * While in this example, we are providing reference to a
DOM node.\n *\n * {@example core/ts/platform/platform.ts region='domNode'}}\n *\n
bootstrap<C>(componentOrFactory: ComponentFactory<C>|Type<C>, rootSelectorOrNode?: string|any):\n
ComponentRef<C> {\n  NG_DEV_MODE && this.warnIfDestroyed();\n  const isComponentFactory =
componentOrFactory instanceof ComponentFactory;\n  const initState =
this._injector.get(ApplicationInitStatus);\n\n  if (!initState.done) {\n    const standalone = !isComponentFactory
&& isStandalone(componentOrFactory);\n    const errorMessage =\n      'Cannot bootstrap as there are still
asynchronous initializers running.' +\n      (standalone ? " : "\n      'Bootstrap components in the
`ngDoBootstrap` method of the root module.);\n    throw new RuntimeError(\n
RuntimeErrorCode.ASYNC_INITIALIZERS_STILL_RUNNING, NG_DEV_MODE && errorMessage);\n
}\n\n  let componentFactory: ComponentFactory<C>;\n  if (isComponentFactory) {\n    componentFactory =
componentOrFactory;\n  } else {\n    const resolver = this._injector.get(ComponentFactoryResolver);\n
componentFactory = resolver.resolveComponentFactory(componentOrFactory)!;\n  }\n  this.componentTypes.push(componentFactory.componentType);\n\n  // Create a factory associated with the current

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module if it's not bound to some other\n  const ngModule =\n    isBoundToModule(componentFactory) ?
undefined : this._injector.get(NgModuleRef);\n  const selectorOrNode = rootSelectorOrNode ||
componentFactory.selector;\n  const compRef = componentFactory.create(Injector.NULL, [], selectorOrNode,
ngModule);\n  const nativeElement = compRef.location.nativeElement;\n  const testability =
compRef.injector.get(TESTABILITY, null);\n  testability?.registerApplication(nativeElement);\n\n  compRef.onDestroy(() => {\n    this.detachView(compRef.hostView);\n    remove(this.components,
compRef);\n    testability?.unregisterApplication(nativeElement);\n  });\n\n  this._loadComponent(compRef);\n  if (typeof ngDevMode === 'undefined' || ngDevMode) {\n    const _console = this._injector.get(Console);\n    _console.log(\n      `Angular is running in development mode. Call enableProdMode() to enable production
mode.`);\n  }\n  return compRef;\n }\n\n /**\n  * Invoke this method to explicitly process change detection and
its side-effects.\n  * In development mode, `tick()` also performs a second change detection cycle to ensure
that no\n  * further changes are detected. If additional changes are picked up during this second cycle,\n  * bindings in the app have side-effects that cannot be resolved in a single change detection\n  * pass.\n  * In this case, Angular throws an error, since an Angular application can
only have one change\n  * detection pass during which all change detection must complete.\n  */\n  tick(): void {\n    NG_DEV_MODE && this.warnIfDestroyed();\n    if (this._runningTick) {\n      throw new RuntimeError(\n        RuntimeErrorCode.RECURSIVE_APPLICATION_REF_TICK,\n        ngDevMode && 'ApplicationRef.tick is
called recursively');\n    }\n\n    try {\n      this._runningTick = true;\n      for (let view of this._views) {\n        view.detectChanges();\n      }\n      if (typeof ngDevMode === 'undefined' || ngDevMode) {\n        for (let view of
this._views) {\n          view.checkNoChanges();\n        }\n      }\n    } catch (e) {\n      // Attention: Don't rethrow as it
could cancel subscriptions to Observables!\n      this._zone.runOutsideAngular(() =>
this._exceptionHandler.handleError(e));\n    } finally {\n      this._runningTick = false;\n    }\n  }\n\n  /**\n  * Attaches a view so that it will be dirty checked.\n  * The view will be automatically detached when
it is destroyed.\n  * This will throw if the view is already attached to a ViewContainer.\n  */\n  attachView(viewRef: ViewRef): void {\n    NG_DEV_MODE && this.warnIfDestroyed();\n    const view =
(viewRef as InternalViewRef);\n    this._views.push(view);\n    view.attachToAppRef(this);\n  }\n\n  /**\n  * Detaches a view from dirty checking again.\n  */\n  detachView(viewRef: ViewRef): void {\n    NG_DEV_MODE
&& this.warnIfDestroyed();\n    const view = (viewRef as InternalViewRef);\n    remove(this._views, view);\n    view.detachFromAppRef();\n  }\n\n  private _loadComponent(componentRef: ComponentRef<any>): void {\n    this.attachView(componentRef.hostView);\n    this.tick();\n    this.components.push(componentRef);\n    // Get the
listeners lazily to prevent DI cycles.\n    const listeners =\n      this._injector.get(APP_BOOTSTRAP_LISTENER,
[]).concat(this._bootstrapListeners);\n    listeners.forEach((listener) => listener(componentRef));\n  }\n\n  /**
@internal */\n  ngOnDestroy()\n  {\n    if (this._destroyed) return;\n\n    try {\n      // Call all the lifecycle hooks.\n      this._destroyListeners.forEach(listener => listener());\n\n      // Destroy all registered views.\n      this._views.slice().forEach((view) => view.destroy());\n      this._onMicrotaskEmptySubscription.unsubscribe();\n    } finally {\n      // Indicate that this instance is destroyed.\n      this._destroyed = true;\n\n      // Release all
references.\n      this._views = [];\n      this._bootstrapListeners = [];\n      this._destroyListeners = [];\n    }\n  }\n\n  /**\n  * Registers a listener to be called when an instance is destroyed.\n  * @param callback A callback
function to add as a listener.\n  * @returns A function which unregisters a listener.\n  */\n  @internal\n  @\n  ngOnDestroy(callback: () => void): VoidFunction {\n    NG_DEV_MODE && this.warnIfDestroyed();\n    this._destroyListeners.push(callback);\n    return () => remove(this._destroyListeners, callback);\n  }\n\n  /**\n  * Destroys an Angular application represented by this `ApplicationRef`. Calling this function\n  * will destroy the associated environment injectors as well as all the bootstrapped components\n  * with their views.\n  */\n  destroy(): void {\n    if (this._destroyed) {\n      throw new RuntimeError(\n        RuntimeErrorCode.APPLICATION_REF_ALREADY_DESTROYED,\n        ngDevMode && 'This instance of
the `ApplicationRef` has already been destroyed.);\n    }\n\n    // This is a temporary type to represent an instance of
an R3Injector, which can be destroyed.\n    // The type will be replaced with a different one once destroyable injector

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type is available.\n  type DestroyableInjector = Injector&{destroy?: Function, destroyed?: boolean};\n\n  const
injector = this._injector as DestroyableInjector;\n\n  // Check that this injector instance supports destroy
operation.\n  if (injector.destroy && !injector.destroyed) {\n    // Destroying an underlying injector
will trigger the `ngOnDestroy` lifecycle\n    // hook, which invokes the remaining cleanup actions.\n
injector.destroy();\n  }\n\n  /**\n   * Returns the number of attached views.\n   */\n  get viewCount() {\n
return this._views.length;\n  }\n\n  private warnIfDestroyed() {\n    if (NG_DEV_MODE && this._destroyed) {\n
console.warn(formatRuntimeError(\n
RuntimeErrorCode.APPLICATION_REF_ALREADY_DESTROYED,\n    'This instance of the
`ApplicationRef` has already been destroyed.));\n  }\n\n  }\n\n  function remove<T>(list: T[], el: T): void {\n
const index = list.indexOf(el);\n  if (index > -1) {\n    list.splice(index, 1);\n  }\n\n  }\n\n  function _lastDefined<T>(args:
T[]): T|undefined {\n    for (let i = args.length - 1; i >= 0; i--) {\n      if (args[i] !== undefined) {\n
return args[i];\n    }\n  }\n  return undefined;\n\n  }\n\n  function _mergeArrays(parts: any[][]): any[] {\n    const result: any[] = [];\n
parts.forEach((part) => part && result.push(...part));\n
return result;\n  }\n\n  /**\n   * @license\n   * Copyright Google LLC All Rights Reserved.\n   * Use of this source
code is governed by an MIT-style license that can be\n   * found in the LICENSE file at https://angular.io/license\n
*/\n\n  import {global} from './global';\n\n  /**\n   * This file is used to control if the default rendering pipeline should
be `ViewEngine` or `Ivy`.\n   * For more information on how to run and debug tests with either Ivy or View
Engine (legacy),\n   * please see [BAZEL.md](./docs/BAZEL.md).\n   */\n\n  let _devMode: boolean = true;\n  let
_runModeLocked: boolean = false;\n\n  /**\n   * Returns whether Angular is in development mode. After called
once,\n   * the value is locked and won't change any more.\n   * By default, this is true, unless a user calls
`enableProdMode`\n   * before calling this.\n   * @publicApi\n   */\n  export function isDevMode(): boolean {\n
return !_runModeLocked && _devMode;\n  }\n\n  /**\n   * Disable Angular's development mode, which
turns off assertions and other\n   * checks within the framework.\n   * One important assertion this disables
verifies that a change detection pass\n   * does not result in additional changes to any bindings (also known as\n
unidirectional data flow).\n   * @publicApi\n   */\n  export function enableProdMode(): void {\n    if
(!_runModeLocked) {\n      throw new Error('Cannot enable prod mode after platform setup.);\n    }\n\n    // The below
check is there so when ngDevMode is set via terser\n    // `global['ngDevMode'] = false;` is also dropped.\n    if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n      global['ngDevMode'] = false;\n    }\n\n    _devMode =
false;\n  }\n\n  /**\n   * @license\n   * Copyright Google LLC All Rights Reserved.\n   * Use of this source code is
governed by an MIT-style license that can be\n   * found in the LICENSE file at https://angular.io/license\n
*/\n\n  // Public API for Zone\n  export {NgZone, NoopNgZone as NoopNgZone} from './zone/ng_zone';\n\n  /**\n   *
@license\n   * Copyright
Google LLC All Rights Reserved.\n   * Use of this source code is governed by an MIT-style license that can be\n
found in the LICENSE file at https://angular.io/license\n   */\n\n  // Public API for render\n  export {Renderer2,
RendererFactory2} from './render/api';\n  export {RendererStyleFlags2, RendererType2} from
'./render/api_flags';\n\n  /**\n   * @license\n   * Copyright Google LLC All Rights Reserved.\n   * Use of this source
code is governed by an MIT-style license that can be\n   * found in the LICENSE file at https://angular.io/license\n
*/\n\n  import {Type} from './interface/type';\n  import {NgModuleFactory as R3NgModuleFactory} from
'./render3/ng_module_ref';\n  import {NgModuleFactory} from './ng_module_factory';\n  import
{getRegisteredNgModuleType} from './ng_module_registration';\n\n  /**\n   * Returns the NgModuleFactory with the
given id (specified using [@NgModule.id\n   * field](api/core/NgModule#id)), if it exists and has been loaded.
Factories for NgModules that do\n   * not specify
an `id` cannot be retrieved. Throws if an NgModule cannot be found.\n   * @publicApi\n   * @deprecated Use
`getNgModuleById` instead.\n   */\n  export function getModuleFactory(id: string): NgModuleFactory<any> {\n    const
type = getRegisteredNgModuleType(id);\n    if (!type) throw noModuleError(id);\n    return new
R3NgModuleFactory(type);\n  }\n\n  /**\n   * Returns the NgModule class with the given id (specified using
[@NgModule.id\n   * field](api/core/NgModule#id)), if it exists and has been loaded. Classes for NgModules that
do\n   * not specify an `id` cannot be retrieved. Throws if an NgModule cannot be found.\n   * @publicApi\n

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*\nexport function getNgModuleById<T>(id: string): Type<T> {\n  const type =
getRegisteredNgModuleType(id);\n  if (!type) throw noModuleError(id);\n  return type;\n}\n\nfunction
noModuleError(\n  id: string,\n  ): Error {\n  return new Error(`No module with ID ${id} loaded`);\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {InjectFlags} from './di';\nimport {InternalInjectFlags} from './di/interface/injector';\nimport {TNode,
TNodeType} from './render3/interfaces/node';\nimport {isComponentHost} from
'./render3/interfaces/type_checks';\nimport {DECLARATION_COMPONENT_VIEW, LView} from
'./render3/interfaces/view';\nimport {getCurrentTNode, getLView} from './render3/state';\nimport
{GetComponentLViewByIndex} from './render3/util/view_utils';\nimport {ViewRef as R3_ViewRef} from
'./render3/view_ref';\n\n/**\n * Base class that provides change detection functionality.\n * A change-detection tree
collects all views that are to be checked for changes.\n * Use the methods to add and remove views from the tree,
initiate change-detection,\n * and explicitly mark views as _dirty_, meaning that they have changed and need to be
re-rendered.\n *\n * @see [Using change detection hooks](guide/lifecycle-hooks#using-change-detection-hooks)\n
*\n * @see [Defining custom change detection](guide/lifecycle-hooks#defining-custom-change-detection)\n *\n *
@usageNotes\n *\n * The following examples demonstrate how to modify default change-detection behavior\n * to
perform explicit detection when needed.\n *\n * ### Use `markForCheck()` with `CheckOnce` strategy\n *\n * The
following example sets the `OnPush` change-detection strategy for a component\n * (`CheckOnce`, rather than the
default `CheckAlways`), then forces a second check\n * after an interval. See [live
demo](https://plnkr.co/edit/GC512b?p=preview).\n *\n * <code-example path="core/ts/change_detect/change-
detection.ts"\n * region="mark-for-check"></code-example>\n *\n * ### Detach change detector to limit how
often check occurs\n *\n * The following example defines a component with a large list of read-only data\n * that is
expected to change constantly, many times per second.\n * To improve performance, we want
to check and update the list\n * less often than the changes actually occur. To do that, we detach\n * the
component's change detector and perform an explicit local check every five seconds.\n *\n * <code-example
path="core/ts/change_detect/change-detection.ts"\n * region="detach"></code-example>\n *\n * ### Reattaching
a detached component\n *\n * The following example creates a component displaying live data.\n * The component
detaches its change detector from the main change detector tree\n * when the `live` property is set to false, and
reattaches it when the property\n * becomes true.\n *\n * <code-example path="core/ts/change_detect/change-
detection.ts"\n * region="reattach"></code-example>\n *\n * @publicApi\n *\nexport abstract class
ChangeDetectorRef {\n  /**\n * When a view uses the {@link ChangeDetectionStrategy#OnPush OnPush}
(checkOnce)\n * change detection strategy, explicitly marks the view as changed so that\n * it can be checked
again.\n *\n * Components
are normally marked as dirty (in need of rerendering) when inputs\n * have changed or events have fired in the
view. Call this method to ensure that\n * a component is checked even if these triggers have not occurred.\n *\n
* <!-- TODO: Add a link to a chapter on OnPush components -->\n *\n * \n\n abstract markForCheck(): void;\n\n
*/\n *\n * Detaches this view from the change-detection tree.\n * A detached view is not checked until it is
reattached.\n * Use in combination with `detectChanges()` to implement local change detection checks.\n *\n *
Detached views are not checked during change detection runs until they are\n * re-attached, even if they are
marked as dirty.\n *\n * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n *\n * <!-- TODO:
Add a live demo once ref.detectChanges is merged into master -->\n *\n * \n\n abstract detach(): void;\n\n /**\n *
Checks this view and its children. Use in combination with {@link ChangeDetectorRef#detach\n
* detach}\n * to implement local change detection checks.\n *\n * <!-- TODO: Add a link to a chapter on
detach/reattach/local digest -->\n *\n * <!-- TODO: Add a live demo once ref.detectChanges is merged into master --
->\n *\n * \n\n abstract detectChanges(): void;\n\n /**\n * Checks the change detector and its children, and throws
if any changes are detected.\n *\n * Use in development mode to verify that running change detection doesn't
introduce\n * other changes. Calling it in production mode is a noop.\n *\n * \n\n abstract checkNoChanges(): void;\n\n
*/\n *\n * Re-attaches the previously detached view to the change detection tree.\n * Views are attached to the tree

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by default.\n * \n * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n * \n * \n\n abstract  
reattach(): void;\n\n /** \n * @internal\n * @nocollapse\n * \n static __NG_ELEMENT_ID__: (flags:  
InjectFlags) => ChangeDetectorRef = injectChangeDetectorRef;\n}\n\n\n /**  
Returns a ChangeDetectorRef (a.k.a. a ViewRef) * \n\n export function injectChangeDetectorRef(flags: InjectFlags):  
ChangeDetectorRef {\n return createViewRef(\n getCurrentTNode()!, getLView(),\n (flags &  
InternalInjectFlags.ForPipe) === InternalInjectFlags.ForPipe);\n}\n\n\n /** \n * Creates a ViewRef and stores it on the  
injector as ChangeDetectorRef (public alias).\n * \n * @param tNode The node that is requesting a  
ChangeDetectorRef\n * @param IView The view to which the node belongs\n * @param isPipe Whether the view is  
being injected into a pipe.\n * @returns The ChangeDetectorRef to use\n * \n\n function createViewRef(tNode:  
TNode, IView: LView, isPipe: boolean): ChangeDetectorRef {\n if (isComponentHost(tNode) && !isPipe) {\n //  
The LView represents the location where the component is declared.\n // Instead we want the LView for the  
component View and so we need to look it up.\n const componentView =  
getComponentLViewByIndex(tNode.index, IView); // look  
down\n return new R3_ViewRef(componentView, componentView);\n } else if (tNode.type &  
(TNodeType.AnyRNode | TNodeType.AnyContainer | TNodeType.Icu)) {\n // The LView represents the location  
where the injection is requested from.\n // We need to locate the containing LView (in case where the `IView` is  
an embedded view)\n const hostComponentView = IView[DECLARATION_COMPONENT_VIEW]; // look  
up\n return new R3_ViewRef(hostComponentView, IView);\n }\n return null!;\n}\n\n\n /** \n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license  
that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\n import {ChangeDetectorRef} from  
'./change_detection/change_detector_ref';\n\n /** \n * Represents an Angular [view](guide/glossary#view  
"Definition").\n * \n * @see { @link ChangeDetectorRef#usage-notes Change detection usage }\n * \n *  
@publicApi\n * \n\n export abstract class ViewRef extends ChangeDetectorRef  
{\n /** \n * Destroys this view and all of the data structures associated with it.\n * \n * \n abstract destroy(): void;\n\n /** \n * Reports whether this view has been destroyed.\n * \n * @returns True after the `destroy()` method has been  
called, false otherwise.\n * \n abstract get destroyed(): boolean;\n\n /** \n * A lifecycle hook that provides  
additional developer-defined cleanup\n * functionality for views.\n * \n * @param callback A handler function that  
cleans up developer-defined data\n * associated with a view. Called when the `destroy()` method is invoked.\n * \n * \n abstract onDestroy(callback: Function): any /** TODO #9100 */;\n}\n\n\n /** \n * Represents an Angular  
[view](guide/glossary#view) in a view container.\n * \n * An [embedded view](guide/glossary#view-tree) can be  
referenced from a component\n * other than the hosting component whose template defines it, or it can be defined\n * independently by a `TemplateRef`.\n * \n * Properties of elements in a view can  
change, but the structure (number and order) of elements in\n * a view cannot. Change the structure of elements by  
inserting, moving, or\n * removing nested views in a view container.\n * \n * \n * @see `ViewContainerRef`\n * \n *  
@usageNotes\n * \n * The following template breaks down into two separate `TemplateRef` instances,\n * an outer  
one and an inner one.\n * \n * \n * Count: {{ items.length }}\n * <ul>\n * <li *ngFor="let item of  
items">{{ item }}</li>\n * </ul>\n * \n * This is the outer `TemplateRef`:\n * \n * \n * Count:  
{{ items.length }}\n * <ul>\n * <ng-template ngFor let-item [ngForOf]="items"></ng-template>\n * </ul>\n * \n * This is the inner `TemplateRef`:\n * \n * \n * <li>{{ item }}</li>\n * \n * This is the outer and inner  
`TemplateRef` instances are assembled into views as follows:\n * \n * \n * <!-- ViewRef: outer-0 -->\n * Count:  
2\n * <ul>\n * <ng-template view-container-ref></ng-template>\n * <!-- ViewRef: inner-1 --><li>first</li><!--  
/ViewRef:  
inner-1 -->\n * <!-- ViewRef: inner-2 --><li>second</li><!-- /ViewRef: inner-2 -->\n * </ul>\n * <!-- /ViewRef:  
outer-0 -->\n * \n * \n * @publicApi\n * \n\n export abstract class EmbeddedViewRef<C> extends ViewRef {\n /** \n * The context for this view, inherited from the anchor element.\n * \n * \n abstract context: C;\n\n /** \n * The root  
nodes for this embedded view.\n * \n * \n abstract get rootNodes(): any[];\n}\n\n\n export interface InternalViewRef  
extends ViewRef {\n detachFromAppRef(): void;\n attachToAppRef(appRef: ViewRefTracker): void;\n}\n\n\n /** \n * Interface for tracking root `ViewRef` s in `ApplicationRef`.\n * \n * \n * NOTE: Importing `ApplicationRef` here
```

directly creates circular dependency, which is why we have a subset of the `ApplicationRef` interface `ViewRefTracker` here.

```

export interface ViewRefTracker {
  detachView(viewRef: ViewRef):
  void;
}

```

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Public API for compiler

```

export { Compiler, COMPILER_OPTIONS, CompilerFactory, CompilerOptions,
ModuleWithComponentFactories } from './linker/compiler';
export { ComponentFactory, ComponentRef } from './linker/component_factory';
export { ComponentFactoryResolver } from './linker/component_factory_resolver';
export { ElementRef } from './linker/element_ref';
export { NgModuleFactory, NgModuleRef } from './linker/ng_module_factory';
export { getNgModuleFactory, getNgModuleById } from './linker/ng_module_factory_loader';
export { QueryList } from './linker/query_list';
export { TemplateRef } from './linker/template_ref';
export { ViewContainerRef } from './linker/view_container_ref';
export { EmbeddedViewRef, ViewRef } from './linker/view_ref';

```

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This file exists for easily patching NgModuleFactoryLoader in g3

```

export default { };

```

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```

import { Injector } from './di/injector';
import { assertTNodeForLView } from './render3/assert';
import { getLContext } from './render3/context_discovery';
import { CONTAINER_HEADER_OFFSET, LContainer, NATIVE } from './render3/interfaces/container';
import { TElementNode, TNode, TNodeFlags, TNodeType } from './render3/interfaces/node';
import { isComponentHost, isLContainer } from './render3/interfaces/type_checks';
import { DECLARATION_COMPONENT_VIEW, LView, PARENT, T_HOST, TData, TVIEW } from './render3/interfaces/view';
import { getComponent, getContext, getInjectionTokens, getInjector, getListeners, getLocalRefs, getOwningComponent } from './render3/util/discovery_utils';
import { INTERPOLATION_DELIMITER } from './render3/util/misc_utils';
import { renderStringify } from './render3/util/stringify_utils';
import { getComponentLViewByIndex, getNativeByTNodeOrNull } from './render3/util/view_utils';
import { assertDomNode } from './util/assert';

```

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```

export class DebugEventListener {
  constructor(public name: string, public callback: Function) {}
}
export function asNativeElements(debugEls: DebugElement[]): any {
  return debugEls.map((el) => el.nativeElement);
}
export class DebugNode {
  /** The underlying DOM node. Readonly */
  nativeNode: any;
  constructor(nativeNode: Node) {
    this.nativeNode = nativeNode;
  }
  /** The `DebugElement` parent. Will be `null` if this is the root element. */
  get parent(): DebugElement | null {
    const parent = this.nativeNode.parentNode as Element;
    return parent ? new DebugElement(parent) : null;
  }
  /** The host dependency injector. For example, the root element's component instance injector. */
  get injector(): Injector {
    return getInjector(this.nativeNode);
  }
  /** The element's own component instance, if it has one. */
  get componentInstance(): any {
    const nativeElement = this.nativeNode;
    return nativeElement && (getComponent(nativeElement as Element) || getOwningComponent(nativeElement));
  }
  /** An object that provides parent context for this element. Often an ancestor component instance that governs this element. */
  /** When an element is repeated within *ngFor, the context is an `NgForOf` whose `implicit` property is the value of the row instance value. For example, the `hero` in `*ngFor="let hero of heroes"` */
  get context(): any {
    return getComponent(this.nativeNode as Element) || getContext(this.nativeNode as Element);
  }
  /** The callbacks attached to the component's @Output properties and/or the element's event properties. */
  get listeners(): DebugEventListener[] {
    return getListeners(this.nativeNode as Element).filter(listener => listener.type === 'dom');
  }
  /** Dictionary of objects associated with template

```

```

local variables (e.g. #foo), keyed by the local
 * variable name.
 * get references(): {[key: string]: any} {
return getLocalRefs(this.nativeNode);
}
/**
 * This component's injector lookup tokens. Includes the
component itself plus the tokens that the
 * component lists in its providers metadata.
 * get
providerTokens(): any[] {
return getInjectionTokens(this.nativeNode as Element);
}
}
/**
 *
@publicApi
 * @see [Component testing scenarios](guide/testing-components-scenarios)
 * @see [Basics of
testing components](guide/testing-components-basics)
 * @see [Testing utility APIs](guide/testing-utility-apis)
 *
export class DebugElement extends DebugNode {
constructor(nativeNode: Element) {
ngDevMode &&
assertDomNode(nativeNode);
super(nativeNode);
}
/**
 * The underlying DOM element at the root of
the component.
 * get nativeElement(): any {
return this.nativeNode.nodeType ===
Node.ELEMENT_NODE ? this.nativeNode as Element : null;
}
/**
 * The element tag name, if it is an
element.
 * get name(): string {
const context = getLContext(this.nativeNode!);
const IView = context
? context.IView : null;
if (IView !== null) {
const tData = IView[TVIEW].data;
const tNode =
tData[context.nodeIndex] as TNode;
return tNode.value!;
} else {
return this.nativeNode.nodeName;
}
}
/**
 * Gets a map of property names to property values for an element.
 * This map
includes:
 * - Regular property bindings (e.g. `[id]="id"`)
 * - Host property bindings
(e.g. `host: { [id]: "id" }`)
 * - Interpolated property bindings (e.g. `id="{{ value }}"`)
 * It does not
include:
 * - input property bindings (e.g. `[myCustomInput]="value"`)
 * - attribute bindings (e.g.
`[attr.role]="menu"`)
 * get properties(): {[key: string]: any};
const context =
getLContext(this.nativeNode!);
const IView = context ? context.IView : null;
if (IView === null) {
return {};
}
const tData = IView[TVIEW].data;
const tNode = tData[context.nodeIndex] as TNode;
const properties: {[key: string]: string} = {};
// Collect properties from the DOM.
copyDomProperties(this.nativeElement, properties);
// Collect properties from the bindings. This is needed for
animation renderer which has
// synthetic properties which don't get reflected into the DOM.
collectPropertyBindings(properties, tNode, IView, tData);
return properties;
}
/**
 * A map
of attribute names to attribute values for an element.
 * get attributes(): {[key: string]: string|null} {
const
attributes: {[key: string]: string|null} = {};
const element = this.nativeElement;
if (!element) {
return
attributes;
}
const context = getLContext(element!);
const IView = context ? context.IView : null;
if (IView === null) {
return {};
}
const tNodeAttrs = (IView[TVIEW].data[context.nodeIndex] as
TNode).attrs;
const lowercaseTNodeAttrs: string[] = [];
// For debug nodes we take the element's attribute
directly from the DOM since it allows us
// to account for ones that weren't set via bindings (e.g. ViewEngine
keeps track of the ones
// that are set through `Renderer2`). The problem is that the browser will lowercase all
names,
// however since we have the attributes already on the TNode, we can preserve the case by going
//
through them once, adding them to the `attributes`
map and putting their lower-cased name
// into an array. Afterwards when we're going through the native DOM
attributes, we can check
// whether we haven't run into an attribute already through the TNode.
if
(tNodeAttrs) {
let i = 0;
while (i < tNodeAttrs.length) {
const attrName = tNodeAttrs[i];
//
Stop as soon as we hit a marker. We only care about the regular attributes. Everything
// else will be handled
below when we read the final attributes off the DOM.
if (typeof attrName !== 'string') break;
const
attrValue = tNodeAttrs[i + 1];
attributes[attrName] = attrValue as string;
}
lowercaseTNodeAttrs.push(attrName.toLowerCase());
i += 2;
}
const eAttrs =
element.attributes;
for (let i = 0; i < eAttrs.length; i++) {
const attr = eAttrs[i];
const lowercaseName =
attr.name.toLowerCase();
// Make sure that we don't assign the same
attribute both in its
// case-sensitive form and the lower-cased one from the browser.
if
(lowercaseTNodeAttrs.indexOf(lowercaseName) === -1) {
// Save the lowercase name to align the behavior
between browsers.
// IE preserves the case, while all other browser convert it to lower case.
attributes[lowercaseName] = attr.value;
}
}
return attributes;
}
/**
 * The inline styles of the
DOM element.
 * Will be `null` if there is no `style` property on the underlying DOM element.
 *
@see [ElementCSSInlineStyle](https://developer.mozilla.org/en-US/docs/Web/API/ElementCSSInlineStyle/style)

```

```

*\n get styles(): {[key: string]: string|null} {\n  if (this.nativeElement && (this.nativeElement as
HTMLElement).style) {\n    return (this.nativeElement as HTMLElement).style as {[key: string]: any};\n  }\n  return {};\n }\n\n /**\n  * A map containing the class names on the element as keys.\n  *\n  * This map is derived from the `className` property of the DOM element.\n  *\n  * Note: The values of this
object will always be `true`. The class key will not appear in the KV\n  * object if it does not exist on the element.\n
*\n  * @see [Element.className](https://developer.mozilla.org/en-US/docs/Web/API/Element/className)\n  */\n  get classes(): {[key: string]: boolean} {\n    const result: {[key: string]: boolean} = {};\n    const element =
this.nativeElement as HTMLElement | SVGElement;\n\n    // SVG elements return an `SVGAnimatedString` instead
of a plain string for the `className`.\n    const className = element.className as string | SVGAnimatedString;\n
const classes =\n      typeof className !== 'string' ? className.baseVal.split(' ') : className.split(' ');\n\n    classes.forEach((value: string) => result[value] = true);\n\n    return result;\n  }\n\n  /**\n   * The `childNodes` of the
DOM element as a `DebugNode` array.\n   *\n   * @see [Node.childNodes](https://developer.mozilla.org/en-
US/docs/Web/API/Node/childNodes)\n\n   */\n  get childNodes(): DebugNode[] {\n    const childNodes = this.nativeNode.childNodes;\n    const children:
DebugNode[] = [];\n    for (let i = 0; i < childNodes.length; i++) {\n      const element = childNodes[i];\n      children.push(getDebugNode(element));\n    }\n    return children;\n  }\n\n  /**\n   * The immediate
`DebugElement` children. Walk the tree by descending through `children`.\n   */\n  get children(): DebugElement[]
{\n    const nativeElement = this.nativeElement;\n    if (!nativeElement) return [];\n    const childNodes =
nativeElement.children;\n    const children: DebugElement[] = [];\n    for (let i = 0; i < childNodes.length; i++) {\n
const element = childNodes[i];\n      children.push(getDebugNode(element) as DebugElement);\n    }\n    return
children;\n  }\n\n  /**\n   * @returns the first `DebugElement` that matches the predicate at any depth in the
subtree.\n   */\n  query(predicate: Predicate<DebugElement>):
DebugElement {\n    const results = this.queryAll(predicate);\n    return results[0] || null;\n  }\n\n  /**\n   * @returns
All `DebugElement` matches for the predicate at any depth in the subtree.\n   */\n  queryAll(predicate:
Predicate<DebugElement>): DebugElement[] {\n    const matches: DebugElement[] = [];\n    _queryAll(this,
predicate, matches, true);\n    return matches;\n  }\n\n  /**\n   * @returns All `DebugNode` matches for the predicate
at any depth in the subtree.\n   */\n  queryAllNodes(predicate: Predicate<DebugNode>): DebugNode[] {\n    const
matches: DebugNode[] = [];\n    _queryAll(this, predicate, matches, false);\n    return matches;\n  }\n\n  /**\n   *
Triggers the event by its name if there is a corresponding listener in the element's\n   * `listeners` collection.\n   *\n
* If the event lacks a listener or there's some other problem, consider\n   * calling
`nativeElement.dispatchEvent(eventObject)`.\n   *\n   * @param eventName The name of the
event to trigger\n   * @param eventObj The `_event` object expected by the handler\n   *\n   * @see [Testing
components scenarios](guide/testing-components-scenarios#trigger-event-handler)\n   */\n  triggerEventHandler(eventName: string, eventObj?: any): void {\n    const node = this.nativeNode as any;\n    const
invokedListeners: Function[] = [];\n\n    this.listeners.forEach(listener => {\n      if (listener.name === eventName)
{\n        const callback = listener.callback;\n        callback.call(node, eventObj);\n\n        invokedListeners.push(callback);\n      }\n    });\n\n    // We need to check whether `eventListeners` exists, because
it's something\n    // that Zone.js only adds to `EventTarget` in browser environments.\n    if (typeof
node.eventListeners === 'function') {\n      // Note that in Ivy we wrap event listeners with a call to
`event.preventDefault` in some\n      // cases. We use `__ngUnwrap__` as a special token that gives us access to the
actual event\n      // listener.\n\n      node.eventListeners(eventName).forEach((listener: Function) => {\n        // In order to ensure that we can detect
the special `__ngUnwrap__` token described above, we\n        // use `toString` on the listener and see if it contains the
token. We use this approach to\n        // ensure that it still worked with compiled code since it cannot remove or
rename string\n        // literals. We also considered using a special function name (i.e. if(listener.name ===\n        // special)) but that was more cumbersome and we were also concerned the compiled code could\n        // strip the
name, turning the condition in to `(\"\" === \"\")` and always returning true.\n        if
(listener.toString().indexOf('__ngUnwrap__') !== -1) {\n          const unwrappedListener =

```

```

listener('__ngUnwrap__');\n      return invokedListeners.indexOf(unwrappedListener) === -1 &&\n
unwrappedListener.call(node, eventObj);\n      }\n      }\n      }\n      }\n      }\n\nfunction copyDomProperties(element:\n  Element|null, properties: {[name: string]: string}): void {\n  if (element) {\n    // Skip own properties (as those are\n  patched)\n    let obj = Object.getPrototypeOf(element);\n    const NodePrototype: any = Node.prototype;\n    while\n  (obj !== null && obj !== NodePrototype) {\n      const descriptors = Object.getOwnPropertyDescriptors(obj);\n  for (let key in descriptors) {\n      if (!key.startsWith('__') && !key.startsWith('on')) {\n          // don't include\n  properties starting with `__` and `on`.\n          // `__` are patched values which should not be included.\n          // `on` are listeners which also should not be included.\n          const value = (element as any)[key];\n          if\n  (isPrimitiveValue(value)) {\n              properties[key] = value;\n          }\n      }\n      }\n      }\n      }\n      }\n      }\n\nObject.getPrototypeOf(obj);\n      }\n      }\n      }\n\nfunction isPrimitiveValue(value: any): boolean {\n  return typeof value\n  === 'string' || typeof value === 'boolean' || typeof\n  value === 'number' ||\n  value === null;\n}\n\n/**\n * Walk the TNode tree to find matches for the predicate.\n *\n * @param parentElement the element from which the walk is started\n * @param predicate the predicate to\n  match\n * @param matches the list of positive matches\n * @param elementsOnly whether only elements should be\n  searched\n */\nfunction _queryAll(\n  parentElement: DebugElement, predicate: Predicate<DebugElement>,\n  matches: DebugElement[],\n  elementsOnly: true): void;\nfunction _queryAll(\n  parentElement: DebugElement,\n  predicate: Predicate<DebugNode>, matches: DebugNode[],\n  elementsOnly: false): void;\nfunction _queryAll(\n  parentElement: DebugElement, predicate: Predicate<DebugElement>|Predicate<DebugNode>,\n  matches:\n  DebugElement[]|DebugNode[], elementsOnly: boolean) {\n  const context =\n  getLContext(parentElement.nativeNode!);\n  const IView = context ? context.IView : null;\n  if (IView !== null) {\n    const parentTNode = IView[TVIEW].data[context.nodeIndex]\n    as TNode;\n    _queryNodeChildren(\n      parentTNode, IView, predicate, matches, elementsOnly,\n      parentElement.nativeNode);\n  } else {\n    // If the context is null, then `parentElement` was either created with\n    Renderer2 or native DOM\n    // APIs.\n    _queryNativeNodeDescendants(parentElement.nativeNode, predicate,\n      matches, elementsOnly);\n  }\n}\n\n/**\n * Recursively match the current TNode against the predicate, and goes on\n  with the next ones.\n *\n * @param tNode the current TNode\n * @param IView the LView of this TNode\n *\n * @param predicate the predicate to match\n * @param matches the list of positive matches\n * @param\n  elementsOnly whether only elements should be searched\n * @param rootNativeNode the root native node on which\n  predicate\n  should not be matched\n */\nfunction _queryNodeChildren(\n  tNode: TNode, IView: LView, predicate:\n  Predicate<DebugElement>|Predicate<DebugNode>,\n  matches: DebugElement[]|DebugNode[], elementsOnly:\n  boolean, rootNativeNode:\n  any) {\n  ngDevMode && assertTNodeForLView(tNode, IView);\n  const nativeNode =\n  getNativeByTNodeOrNull(tNode, IView);\n  // For each type of TNode, specific logic is executed.\n  if (tNode.type\n  & (TNodeType.AnyRNode | TNodeType.ElementContainer)) {\n    // Case 1: the TNode is an element\n    // The\n  native node has to be checked.\n    _addQueryMatch(nativeNode, predicate, matches, elementsOnly,\n      rootNativeNode);\n    if (isComponentHost(tNode)) {\n      // If the element is the host of a component, then all\n      nodes\n      in its view have to be processed.\n      // Note: the component's content (tNode.child) will be processed from\n      the\n      insertion points.\n      const componentView = getComponentLViewByIndex(tNode.index, IView);\n      if\n      (componentView && componentView[TVIEW].firstChild) {\n          _queryNodeChildren(\n            componentView[TVIEW].firstChild!, componentView, predicate, matches,\n            elementsOnly,\n            rootNativeNode);\n      }\n    } else {\n      if (tNode.child) {\n          // Otherwise, its children have to be processed.\n          _queryNodeChildren(tNode.child, IView, predicate,\n            matches,\n            elementsOnly, rootNativeNode);\n      }\n    }\n    // We also have to query the DOM directly in order to catch\n    elements\n    inserted through\n    // Renderer2. Note that this is __not__ optimal, because we're walking similar trees\n    multiple\n    // times. ViewEngine could do it more efficiently, because all the insertions go through\n    //\n    Renderer2, however that's not the case in Ivy. This approach is being used because:\n    // 1. Matching the\n    ViewEngine\n    behavior would mean potentially introducing a dependency\n    // from `Renderer2` to Ivy which\n    could\n    bring Ivy\n    code into ViewEngine.\n    // 2. It allows us to capture nodes that were inserted directly via the

```

```

DOM.\n  nativeNode && _queryNativeNodeDescendants(nativeNode, predicate, matches, elementsOnly);\n }
// In all cases, if a dynamic container exists for this node, each view inside it
has to be\n // processed.\n const nodeOrContainer = IView[tNode.index];\n if
(isLContainer(nodeOrContainer)) {\n  _queryNodeChildrenInContainer(\n    nodeOrContainer, predicate,
matches, elementsOnly, rootNativeNode);\n } else if (tNode.type & TNodeType.Container) {\n // Case 2:
the TNode is a container\n // The native node has to be checked.\n  const IContainer = IView[tNode.index];\n  _addQueryMatch(IContainer[NATIVE], predicate, matches, elementsOnly, rootNativeNode);\n // Each view
inside the container has to be processed.\n  _queryNodeChildrenInContainer(IContainer, predicate, matches,
elementsOnly, rootNativeNode);\n } else if (tNode.type & TNodeType.Projection) {\n // Case 3: the TNode is a
projection insertion point (i.e. a <ng-content>).\n // The nodes projected at this location all need to be processed.\n  const componentView = IView![DECLARATION_COMPONENT_VIEW];\n  const componentHost =
componentView[T_HOST] as TElementNode;\n
  const head: TNode|null =\n    (componentHost.projection as (TNode | null))[tNode.projection as number];\n\n  if (Array.isArray(head)) {\n    for (let nativeNode of head) {\n      _addQueryMatch(nativeNode, predicate,
matches, elementsOnly, rootNativeNode);\n    }\n  } else if (head) {\n    const nextLView =
componentView[PARENT]! as LView;\n    const nextTNode = nextLView[TVIEW].data[head.index] as TNode;\n    _queryNodeChildren(nextTNode, nextLView, predicate, matches, elementsOnly, rootNativeNode);\n  }\n } else
if (tNode.child) {\n // Case 4: the TNode is a view.\n  _queryNodeChildren(tNode.child, IView, predicate,
matches, elementsOnly, rootNativeNode);\n }\n\n // We don't want to go to the next sibling of the root node.\n if
(rootNativeNode !== nativeNode) {\n // To determine the next node to be processed, we need to use the next or
the projectionNext\n // link, depending on whether the current node has been projected.\n  const nextTNode
= (tNode.flags & TNodeFlags.isProjected) ? tNode.projectionNext : tNode.next;\n  if (nextTNode) {\n
_queryNodeChildren(nextTNode, IView, predicate, matches, elementsOnly, rootNativeNode);\n  }\n }\n\n**\n
* Process all TNodes in a given container.\n * @param IContainer the container to be processed\n * @param
predicate the predicate to match\n * @param matches the list of positive matches\n * @param elementsOnly
whether only elements should be searched\n * @param rootNativeNode the root native node on which predicate
should not be matched\n */\nfunction _queryNodeChildrenInContainer(\n  IContainer: LContainer, predicate:
Predicate<DebugElement>|Predicate<DebugNode>,\n  matches: DebugElement[]|DebugNode[], elementsOnly:
boolean, rootNativeNode: any) {\n  for (let i = CONTAINER_HEADER_OFFSET; i < IContainer.length; i++) {\n
const childView = IContainer[i] as LView;\n  const firstChild = childView[TVIEW].firstChild;\n  if (firstChild)
{\n    _queryNodeChildren(firstChild,
childView, predicate, matches, elementsOnly, rootNativeNode);\n  }\n }\n\n**\n
* Match the current native
node against the predicate.\n * @param nativeNode the current native node\n * @param predicate the predicate
to match\n * @param matches the list of positive matches\n * @param elementsOnly whether only elements should
be searched\n * @param rootNativeNode the root native node on which predicate should not be matched\n
*/\nfunction _addQueryMatch(\n  nativeNode: any, predicate:
Predicate<DebugElement>|Predicate<DebugNode>,\n  matches: DebugElement[]|DebugNode[], elementsOnly:
boolean, rootNativeNode: any) {\n  if (rootNativeNode !== nativeNode) {\n    const debugNode =
getDebugNode(nativeNode);\n    if (!debugNode) {\n      return;\n    }\n    // Type of the \"predicate and \"matches\"
array are set based on the value of\n    // the \"elementsOnly\" parameter. TypeScript is not able to properly infer
these\n    // types with generics, so we manually
cast the parameters accordingly.\n    if (elementsOnly && (debugNode instanceof DebugElement) &&
predicate(debugNode) &&\n      matches.indexOf(debugNode) === -1) {\n      matches.push(debugNode);\n    }
else if (\n      !elementsOnly && (predicate as Predicate<DebugNode>)(debugNode) &&\n      (matches as
DebugNode[]).indexOf(debugNode) === -1) {\n      (matches as DebugNode[]).push(debugNode);\n    }\n  }\n }\n\n**\n
* Match all the descendants of a DOM node against a predicate.\n * @param nativeNode the
current native node\n * @param predicate the predicate to match\n * @param matches the list where matches are
stored\n * @param elementsOnly whether only elements should be searched\n */\nfunction

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_queryNativeNodeDescendants(\n  parentNode: any, predicate:
Predicate<DebugElement>|Predicate<DebugNode>,\n  matches: DebugElement[]|DebugNode[], elementsOnly:
boolean) {\n  const nodes = parentNode.childNodes;\n  const length = nodes.length;\n\n  for (let i = 0; i < length;
i++) {\n    const node = nodes[i];\n    const debugNode = getDebugNode(node);\n\n    if (debugNode) {\n      if
(elementsOnly && (debugNode instanceof DebugElement) && predicate(debugNode) &&\n
matches.indexOf(debugNode) === -1) {\n        matches.push(debugNode);\n      } else if (\n        !elementsOnly
&& (predicate as Predicate<DebugNode>)(debugNode) &&\n        (matches as
DebugNode[]).indexOf(debugNode) === -1) {\n          (matches as DebugNode[]).push(debugNode);\n        }\n\n
_queryNativeNodeDescendants(node, predicate, matches, elementsOnly);\n    }\n  }\n}\n\n/**\n * Iterates through
the property bindings for a given node and generates\n * a map of property names to values. This map only contains
property bindings\n * defined in templates, not in host bindings.\n */\nfunction collectPropertyBindings(\n
properties: {[key: string]: string}, tNode: TNode, IView: LView, tData: TData): void {\n  let bindingIndexes =
tNode.propertyBindings;\n\n  if (bindingIndexes
!== null) {\n    for (let i = 0; i < bindingIndexes.length; i++) {\n      const bindingIndex = bindingIndexes[i];\n
const propMetadata = tData[bindingIndex] as string;\n      const metadataParts =
propMetadata.split(INTERPOLATION_DELIMITER);\n      const propertyName = metadataParts[0];\n      if
(metadataParts.length > 1) {\n        let value = metadataParts[1];\n        for (let j = 1; j < metadataParts.length - 1;
j++) {\n          value += renderStringify(IView[bindingIndex + j - 1]) + metadataParts[j + 1];\n        }\n
properties[propertyName] = value;\n      } else {\n        properties[propertyName] = IView[bindingIndex];\n      }\n
}\n}\n}\n\n// Need to keep the nodes in a global Map so that multiple angular apps are supported.\nconst
_nativeNodeToDebugNode = new Map<any, DebugNode>();\n\nconst NG_DEBUG_PROPERTY =
'__ng_debug__';\n\n/**\n * @publicApi\n */\nexport function getDebugNode(nativeNode: any): DebugNode|null
{\n  if (nativeNode instanceof Node)
{\n    if (!(nativeNode.hasOwnProperty(NG_DEBUG_PROPERTY))) {\n      (nativeNode as
any)[NG_DEBUG_PROPERTY] = nativeNode.nodeType === Node.ELEMENT_NODE ?\n      new
DebugElement(nativeNode as Element) : \n      new DebugNode(nativeNode);\n    }\n    return (nativeNode as
any)[NG_DEBUG_PROPERTY];\n  }\n  return null;\n}\n\n// TODO: cleanup all references to this function and
remove it.\nexport function getDebugNodeR2(_nativeNode: any): DebugNode|null {\n  return null;\n}\n\nexport
function getAllDebugNodes(): DebugNode[] {\n  return
Array.from(_nativeNodeToDebugNode.values());\n}\n\nexport function indexDebugNode(node: DebugNode) {\n
_nativeNodeToDebugNode.set(node.nativeNode, node);\n}\n\nexport function removeDebugNodeFromIndex(node:
DebugNode) {\n  _nativeNodeToDebugNode.delete(node.nativeNode);\n}\n\n/**\n * A boolean-valued function
over a value, possibly including context information\n * regarding that value's position in an array.\n */\n *
@publicApi\n */\nexport interface
Predicate<T> {\n  (value: T): boolean;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {RuntimeError, RuntimeErrorCode} from '../errors';\nimport
{isListLikeIterable, iterateListLike} from '../util/iterable';\nimport {stringify} from '../util/stringify';\nimport
{IterableChangeRecord, IterableChanges, IterableDiffer, IterableDifferFactory, NgIterable, TrackByFunction} from
'/iterable_differs';\n\nexport class DefaultIterableDifferFactory implements IterableDifferFactory {\n  constructor()
{\n    supports(obj: Object|null|undefined): boolean {\n      return isListLikeIterable(obj);\n    }\n\n    create<V>(trackByFn?: TrackByFunction<V>): DefaultIterableDiffer<V> {\n      return new
DefaultIterableDiffer<V>(trackByFn);\n    }\n  }\n\n  const trackByIdentity = (index: number, item: any) =>
item;\n\n  /**\n   * @deprecated\n   *\n   * v4.0.0 - Should not be part of public API.\n   */\n  @publicApi\n  export class DefaultIterableDiffer<V> implements
IterableDiffer<V>, IterableChanges<V> {\n    public readonly length: number = 0;\n    // TODO(issue/24571): remove
'!\n    public readonly collection!: V[]|Iterable<V>|null;\n    // Keeps track of the used records at any point in time
(during & across `_check()` calls)\n    private _linkedRecords: _DuplicateMap<V>|null = null;\n    // Keeps track of the

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removed records at any point in time during `_check()` calls.\n private _unlinkedRecords: _DuplicateMap<V>|null
= null;\n private _previousItHead: IterableChangeRecord_<V>|null = null;\n private _itHead:
IterableChangeRecord_<V>|null = null;\n private _itTail: IterableChangeRecord_<V>|null = null;\n private
_additionsHead: IterableChangeRecord_<V>|null = null;\n private _additionsTail: IterableChangeRecord_<V>|null
= null;\n private _movesHead: IterableChangeRecord_<V>|null = null;\n private _movesTail:
IterableChangeRecord_<V>|null
= null;\n private _removalsHead: IterableChangeRecord_<V>|null = null;\n private _removalsTail:
IterableChangeRecord_<V>|null = null;\n // Keeps track of records where custom track by is the same, but item
identity has changed\n private _identityChangesHead: IterableChangeRecord_<V>|null = null;\n private
_identityChangesTail: IterableChangeRecord_<V>|null = null;\n private _trackByFn: TrackByFunction<V>;\n\n
constructor(trackByFn?: TrackByFunction<V>) {\n this._trackByFn = trackByFn || trackByIdentity;\n }\n\n
forEachItem(fn: (record: IterableChangeRecord_<V>) => void) {\n let record: IterableChangeRecord_<V>|null;\n
for (record = this._itHead; record !== null; record = record._next) {\n fn(record);\n }\n}\n\n
forEachOperation(\n fn: (item: IterableChangeRecord_<V>, previousIndex: number|null, currentIndex:
number|null) =>\n void) {\n let nextIt = this._itHead;\n let nextRemove = this._removalsHead;\n let
addRemoveOffset = 0;\n
let moveOffsets: number[]|null = null;\n while (nextIt || nextRemove) {\n // Figure out which is the next
record to process\n // Order: remove, add, move\n const record: IterableChangeRecord_<V> = !nextRemove
||\n nextIt &&\n nextIt.currentIndex! <\n getNextIndex(nextRemove,
addRemoveOffset, moveOffsets) ?\n nextIt! :!\n nextRemove;\n const adjPreviousIndex =
getNextIndex(record, addRemoveOffset, moveOffsets);\n const currentIndex = record.currentIndex;\n\n //
consume the item, and adjust the addRemoveOffset and update moveDistance if necessary\n if (record ===
nextRemove) {\n addRemoveOffset--;\n nextRemove = nextRemove._nextRemoved;\n } else {\n
nextIt = nextIt!._next;\n if (record.previousIndex == null) {\n addRemoveOffset++;\n } else {\n
// INVARIANT: currentIndex < previousIndex\n if (!moveOffsets)
moveOffsets = [];\n const localMovePreviousIndex = adjPreviousIndex - addRemoveOffset;\n const
localCurrentIndex = currentIndex! - addRemoveOffset;\n if (localMovePreviousIndex != localCurrentIndex)
{\n for (let i = 0; i < localMovePreviousIndex; i++) {\n const offset = i < moveOffsets.length ?
moveOffsets[i] : (moveOffsets[i] = 0);\n const index = offset + i;\n if (localCurrentIndex <= index
&& index < localMovePreviousIndex) {\n moveOffsets[i] = offset + 1;\n }\n }\n
const previousIndex = record.previousIndex;\n moveOffsets[previousIndex] = localCurrentIndex -
localMovePreviousIndex;\n }\n }\n }\n\n if (adjPreviousIndex !== currentIndex) {\n fn(record,
adjPreviousIndex, currentIndex);\n }\n }\n }\n\n
forEachPreviousItem(fn: (record:
IterableChangeRecord_<V>) => void) {\n let record: IterableChangeRecord_<V>|null;\n
for (record = this._previousItHead; record !== null; record = record._nextPrevious) {\n fn(record);\n
}\n}\n\n
forEachAddedItem(fn: (record: IterableChangeRecord_<V>) => void) {\n let record:
IterableChangeRecord_<V>|null;\n for (record = this._additionsHead; record !== null; record =
record._nextAdded) {\n fn(record);\n }\n}\n\n
forEachMovedItem(fn: (record: IterableChangeRecord_<V>)
=> void) {\n let record: IterableChangeRecord_<V>|null;\n for (record = this._movesHead; record !== null;
record = record._nextMoved) {\n fn(record);\n }\n}\n\n
forEachRemovedItem(fn: (record:
IterableChangeRecord_<V>) => void) {\n let record: IterableChangeRecord_<V>|null;\n for (record =
this._removalsHead; record !== null; record = record._nextRemoved) {\n fn(record);\n }\n}\n\n
forEachIdentityChange(fn: (record: IterableChangeRecord_<V>) => void) {\n let record:
IterableChangeRecord_<V>|null;\n for (record = this._identityChangesHead;
record !== null; record = record._nextIdentityChange) {\n fn(record);\n }\n}\n\n
diff(collection:
NgIterable<V>|null|undefined): DefaultIterableDiffer<V>|null {\n if (collection == null) collection = [];\n
if (!isListLikeIterable(collection)) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_DIFFER_INPUT,\n ngDevMode &&\n `Error trying to diff '${collection}'

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stringify(collection)}`. Only arrays and iterables are allowed`);\n } \n\n if (this.check(collection)) {\n
return this;\n } else {\n return null;\n }\n\n onDestroy() {\n\n check(collection: NgIterable<V>):
boolean {\n this._reset();\n\n let record: IterableChangeRecord_<V>|null = this._itHead;\n let maybeDirty:
boolean = false;\n let index: number;\n let item: V;\n let itemTrackBy: any;\n if (Array.isArray(collection))
{\n (this as {length: number}).length = collection.length;\n\n for (let
index = 0; index < this.length; index++) {\n item = collection[index];\n itemTrackBy =
this._trackByFn(index, item);\n if (record === null || !Object.is(record.trackById, itemTrackBy)) {\n
record = this._mismatch(record, item, itemTrackBy, index);\n maybeDirty = true;\n } else {\n if
(maybeDirty) {\n // TODO(misko): can we limit this to duplicates only?\n record =
this._verifyReinsertion(record, item, itemTrackBy, index);\n } \n\n if (!Object.is(record.item, item))
this._addIdentityChange(record, item);\n } \n\n record = record._next;\n } \n } else {\n index = 0;\n
iterateListLike(collection, (item: V) => {\n itemTrackBy = this._trackByFn(index, item);\n if (record ===
null || !Object.is(record.trackById, itemTrackBy)) {\n record = this._mismatch(record, item, itemTrackBy,
index);\n maybeDirty = true;\n } else {\n if
(maybeDirty) {\n // TODO(misko): can we limit this to duplicates only?\n record =
this._verifyReinsertion(record, item, itemTrackBy, index);\n } \n\n if (!Object.is(record.item, item))
this._addIdentityChange(record, item);\n } \n\n record = record._next;\n index++;\n }); \n\n (this as
{length: number}).length = index;\n } \n\n this._truncate(record);\n (this as {collection: V[] |
Iterable<V>}).collection = collection;\n return this.isDirty;\n } \n\n /* CollectionChanges is considered dirty if it
has any additions, moves, removals, or identity\n * changes.\n *\n get isDirty(): boolean {\n return
this._additionsHead !== null || this._movesHead !== null || \n\n this._removalsHead !== null ||
this._identityChangesHead !== null;\n } \n\n /**\n * Reset the state of the change objects to show no changes.
This means set previousKey to\n * currentKey, and clear all of the queues (additions, moves, removals).\n
* Set the previousIndexes of moved and added items to their currentIndexes\n * Reset the list of additions, moves
and removals\n *\n * @internal\n *\n _reset() {\n if (this.isDirty) {\n let record:
IterableChangeRecord_<V>|null;\n\n for (record = this._previousItHead = this._itHead; record !== null; record =
record._next) {\n record._nextPrevious = record._next;\n } \n\n for (record = this._additionsHead; record
!== null; record = record._nextAdded) {\n record.previousIndex = record.currentIndex;\n } \n\n
this._additionsHead = this._additionsTail = null;\n\n for (record = this._movesHead; record !== null; record =
record._nextMoved) {\n record.previousIndex = record.currentIndex;\n } \n\n this._movesHead =
this._movesTail = null;\n\n this._removalsHead = this._removalsTail = null;\n\n this._identityChangesHead =
this._identityChangesTail = null;\n\n // TODO(vicb): when assert gets supported\n
// assert(!this.isDirty);\n } \n\n } \n\n /**\n * This is the core function which handles differences between
collections.\n *\n * - `record` is the record which we saw at this position last time. If null then it is a new\n *
item.\n * - `item` is the current item in the collection\n * - `index` is the position of the item in the collection\n
*\n * @internal\n *\n _mismatch(record: IterableChangeRecord_<V>|null, item: V, itemTrackBy: any, index:
number): IterableChangeRecord_<V> {\n // The previous record after which we will append the current
one.\n let previousRecord: IterableChangeRecord_<V>|null;\n\n if (record === null) {\n previousRecord =
this._itTail;\n } else {\n previousRecord = record._prev;\n // Remove the record from the collection since we
know it does not match the item.\n this._remove(record);\n } \n\n // See if we have evicted the item, which
used to be at some anterior position of _itHead list.\n
record = this._unlinkedRecords === null ? null : this._unlinkedRecords.get(itemTrackBy, null);\n if (record !==
null) {\n // It is an item which we have evicted earlier: reinsert it back into the list.\n // But first we need to
check if identity changed, so we can update in view if necessary.\n if (!Object.is(record.item, item))
this._addIdentityChange(record, item);\n\n this._reinsertAfter(record, previousRecord, index);\n } else {\n //
Attempt to see if the item is at some posterior position of _itHead list.\n record = this._linkedRecords === null ?
null : this._linkedRecords.get(itemTrackBy, index);\n if (record !== null) {\n // We have the item in _itHead
at/after `index` position. We need to move it forward in the\n // collection.\n // But first we need to check if

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identity changed, so we can update in view if necessary.\n    if (!Object.is(record.item, item))
this._addIdentityChange(record, item);\n    this._moveAfter(record,
previousRecord, index);\n    } else {\n        // It is a new item: add it.\n        record =\n            this._addAfter(new
IterableChangeRecord_<V>(item, itemTrackBy), previousRecord, index);\n    }\n    return record;\n}\n\n/**\n * This check is only needed if an array contains duplicates. (Short circuit of nothing dirty)\n * Use
case: `[a, a] => [b, a, a]`\n * If we did not have this check then the insertion of `b` would:\n * 1) evict first
`a`\n * 2) insert `b` at `0` index.\n * 3) leave `a` at index `1` as is. <-- this is wrong!\n * 3) reinsert `a` at
index 2. <-- this is wrong!\n * The correct behavior is:\n * 1) evict first `a`\n * 2) insert `b` at `0` index.\n
* 3) reinsert `a` at index 1.\n * 3) move `a` at from `1` to `2`.\n * Double check that we have not
evicted a duplicate item. We need to check if the item type may\n * have already been removed:\n * The insertion
of b will evict the first 'a'. If we don't reinsert it now it will be reinserted\n * at the end. Which will show up as the
two 'a's switching position. This is incorrect, since a\n * better way to think of it is as insert of 'b' rather than switch
'a' with 'b' and then add 'a'\n * at the end.\n * @internal\n */\n _verifyReinsertion(record:
IterableChangeRecord_<V>, item: V, itemTrackBy: any, index: number):\n    IterableChangeRecord_<V> {\n    let
reinsertRecord: IterableChangeRecord_<V>|null =\n        this._unlinkedRecords === null ? null :
this._unlinkedRecords.get(itemTrackBy, null);\n    if (reinsertRecord !== null) {\n        record =
this._reinsertAfter(reinsertRecord, record._prev!, index);\n    } else if (record.currentIndex !== index) {\n
record.currentIndex = index;\n        this._addToMoves(record, index);\n    }\n    return record;\n}\n\n/**\n * Get
rid of any excess {@link IterableChangeRecord_}s from the previous collection\n * - `record`\n * The first excess
{@link IterableChangeRecord_}.\n * @internal\n */\n _truncate(record:
IterableChangeRecord_<V>|null) {\n    // Anything after that needs to be removed;\n    while (record !== null) {\n
const nextRecord: IterableChangeRecord_<V>|null = record._next;\n    this._addToRemovals(this._unlink(record));\n    record = nextRecord;\n    }\n    if (this._unlinkedRecords !== null)
{\n        this._unlinkedRecords.clear();\n    }\n    if (this._additionsTail !== null) {\n
this._additionsTail._nextAdded = null;\n    }\n    if (this._movesTail !== null) {\n        this._movesTail._nextMoved =
null;\n    }\n    if (this._itTail !== null) {\n        this._itTail._next = null;\n    }\n    if (this._removalsTail !== null) {\n
this._removalsTail._nextRemoved = null;\n    }\n    if (this._identityChangesTail !== null) {\n
this._identityChangesTail._nextIdentityChange = null;\n    }\n    }\n}\n\n/** @internal */\n _reinsertAfter(\n    record:
IterableChangeRecord_<V>,
prevRecord: IterableChangeRecord_<V>|null,\n    index: number): IterableChangeRecord_<V> {\n    if
(this._unlinkedRecords !== null) {\n        this._unlinkedRecords.remove(record);\n    }\n    const prev =
record._prevRemoved;\n    const next = record._nextRemoved;\n    if (prev === null) {\n        this._removalsHead =
next;\n    } else {\n        prev._nextRemoved = next;\n    }\n    if (next === null) {\n        this._removalsTail = prev;\n
    } else {\n        next._prevRemoved = prev;\n    }\n    this._insertAfter(record, prevRecord, index);\n    this._addToMoves(record, index);\n    return record;\n}\n\n/** @internal */\n _moveAfter(\n    record:
IterableChangeRecord_<V>, prevRecord: IterableChangeRecord_<V>|null,\n    index: number):
IterableChangeRecord_<V> {\n    this._unlink(record);\n    this._insertAfter(record, prevRecord, index);\n    this._addToMoves(record, index);\n    return record;\n}\n\n/** @internal */\n _addAfter(\n    record:
IterableChangeRecord_<V>,
prevRecord: IterableChangeRecord_<V>|null,\n    index: number): IterableChangeRecord_<V> {\n    this._insertAfter(record, prevRecord, index);\n    if (this._additionsTail === null) {\n        // TODO(vic):\n        //
assert(this._additionsHead === null);\n        this._additionsTail = this._additionsHead = record;\n    } else {\n        //
TODO(vic):\n        // assert(_additionsTail._nextAdded === null);\n        // assert(record._nextAdded === null);\n
this._additionsTail = this._additionsTail._nextAdded = record;\n    }\n    return record;\n}\n\n/** @internal */\n _insertAfter(\n    record: IterableChangeRecord_<V>, prevRecord: IterableChangeRecord_<V>|null,\n    index:
number): IterableChangeRecord_<V> {\n    // TODO(vic):\n    // assert(record !== prevRecord);\n    //
assert(record._next === null);\n    // assert(record._prev === null);\n    const next:
IterableChangeRecord_<V>|null =\n        prevRecord === null ? this._itHead : prevRecord._next;\n    //

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    TODO(vicb);\n // assert(next != record);\n // assert(prevRecord != record);\n record._next = next;\n
record._prev = prevRecord;\n if (next === null) {\n this._itTail = record;\n } else {\n next._prev =
record;\n }\n if (prevRecord === null) {\n this._itHead = record;\n } else {\n prevRecord._next =
record;\n }\n\n if (this._linkedRecords === null) {\n this._linkedRecords = new _DuplicateMap<V>();\n
}\n this._linkedRecords.put(record);\n\n record.currentIndex = index;\n return record;\n }\n\n /** @internal
*\n _remove(record: IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n return
this._addToRemovals(this._unlink(record));\n }\n\n /** @internal *\n _unlink(record:
IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n if (this._linkedRecords !== null) {\n
this._linkedRecords.remove(record);\n }\n\n const prev = record._prev;\n const next = record._next;\n\n //
TODO(vicb):\n //
assert((record._prev = null) === null);\n // assert((record._next = null) === null);\n\n if (prev === null) {\n
this._itHead = next;\n } else {\n prev._next = next;\n }\n\n if (next === null) {\n this._itTail = prev;\n }
else {\n next._prev = prev;\n }\n\n return record;\n }\n\n /** @internal *\n _addToMoves(record:
IterableChangeRecord_<V>, toIndex: number): IterableChangeRecord_<V> {\n // TODO(vicb):\n //
assert(record._nextMoved === null);\n\n if (record.previousIndex === toIndex) {\n return record;\n }\n\n if
(this._movesTail === null) {\n // TODO(vicb):\n // assert(_movesHead === null);\n this._movesTail =
this._movesHead = record;\n } else {\n // TODO(vicb):\n // assert(_movesTail._nextMoved === null);\n
this._movesTail = this._movesTail._nextMoved = record;\n }\n\n return record;\n }\n\n private
_addToRemovals(record: IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n
if (this._unlinkedRecords === null) {\n this._unlinkedRecords = new _DuplicateMap<V>();\n }\n
this._unlinkedRecords.put(record);\n record.currentIndex = null;\n record._nextRemoved = null;\n\n if
(this._removalsTail === null) {\n // TODO(vicb):\n // assert(_removalsHead === null);\n
this._removalsTail = this._removalsHead = record;\n record._prevRemoved = null;\n } else {\n //
TODO(vicb):\n // assert(_removalsTail._nextRemoved === null);\n // assert(record._nextRemoved ===
null);\n record._prevRemoved = this._removalsTail;\n this._removalsTail = this._removalsTail._nextRemoved
= record;\n }\n return record;\n }\n\n /** @internal *\n _addIdentityChange(record:
IterableChangeRecord_<V>, item: V) {\n record.item = item;\n if (this._identityChangesTail === null) {\n
this._identityChangesTail = this._identityChangesHead = record;\n } else {\n this._identityChangesTail =
this._identityChangesTail._nextIdentityChange
= record;\n }\n return record;\n }\n\n\nexport class IterableChangeRecord_<V> implements
IterableChangeRecord<V> {\n currentIndex: number|null = null;\n previousIndex: number|null = null;\n\n /**
@internal *\n _nextPrevious: IterableChangeRecord_<V>|null = null;\n /** @internal *\n _prev:
IterableChangeRecord_<V>|null = null;\n /** @internal *\n _next: IterableChangeRecord_<V>|null = null;\n /**
@internal *\n _prevDup: IterableChangeRecord_<V>|null = null;\n /** @internal *\n _nextDup:
IterableChangeRecord_<V>|null = null;\n /** @internal *\n _prevRemoved: IterableChangeRecord_<V>|null =
null;\n /** @internal *\n _nextRemoved: IterableChangeRecord_<V>|null = null;\n /** @internal *\n
_nextAdded: IterableChangeRecord_<V>|null = null;\n /** @internal *\n _nextMoved:
IterableChangeRecord_<V>|null = null;\n /** @internal *\n _nextIdentityChange:
IterableChangeRecord_<V>|null = null;\n\n\n constructor(public item: V, public
trackById: any) { }\n\n\n// A linked list of IterableChangeRecords with the same
IterableChangeRecord_item\n\nclass _DuplicateItemRecordList<V> {\n /** @internal *\n _head:
IterableChangeRecord_<V>|null = null;\n /** @internal *\n _tail: IterableChangeRecord_<V>|null = null;\n\n
/**\n * Append the record to the list of duplicates.\n *\n * Note: by design all records in the list of duplicates
hold the same value in record.item.\n *\n add(record: IterableChangeRecord_<V>): void {\n if (this._head ===
null) {\n this._head = this._tail = record;\n record._nextDup = null;\n record._prevDup = null;\n } else
{\n // TODO(vicb):\n // assert(record.item == _head.item ||\n // record.item is num &&
record.item.isNaN && _head.item is num && _head.item.isNaN);\n this._tail!._nextDup = record;\n
record._prevDup = this._tail;\n record._nextDup = null;\n this._tail = record;\n }\n }\n\n // Returns a

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IterableChangeRecord_
  having IterableChangeRecord_.trackById == trackById and\n // IterableChangeRecord_.currentIndex >=
atOrAfterIndex\n get(trackById: any, atOrAfterIndex: number|null): IterableChangeRecord_<V>|null {\n let
record: IterableChangeRecord_<V>|null;\n for (record = this._head; record !== null; record = record._nextDup)
{\n if ((atOrAfterIndex === null || atOrAfterIndex <= record.currentIndex!) &&\n
Object.is(record.trackById, trackById)) {\n return record;\n }\n } return null;\n }\n\n /**\n *
Remove one {@link IterableChangeRecord_} from the list of duplicates.\n *\n * Returns whether the list of
duplicates is empty.\n *\n remove(record: IterableChangeRecord_<V>): boolean {\n // TODO(vicb);\n //
assert()\n // // verify that the record being removed is in the list.\n // for (IterableChangeRecord_ cursor =
_head; cursor != null; cursor = cursor._nextDup) {\n // if (identical(cursor, record)) return true;\n // }\n
// return false;\n //});\n\n const prev: IterableChangeRecord_<V>|null = record._prevDup;\n const next:
IterableChangeRecord_<V>|null = record._nextDup;\n if (prev === null) {\n this._head = next;\n } else {\n
prev._nextDup = next;\n }\n if (next === null) {\n this._tail = prev;\n } else {\n next._prevDup = prev;\n
}\n return this._head === null;\n }\n}\n\nclass _DuplicateMap<V> {\n map = new Map<any,
_DuplicateItemRecordList<V>>();\n\n put(record: IterableChangeRecord_<V>) {\n const key =
record.trackById;\n\n let duplicates = this.map.get(key);\n if (!duplicates) {\n duplicates = new
_DuplicateItemRecordList<V>();\n this.map.set(key, duplicates);\n }\n duplicates.add(record);\n }\n\n /**\n
* Retrieve the `value` using key. Because the IterableChangeRecord_ value may be one which we\n * have
already iterated over, we use the `atOrAfterIndex` to pretend it is not there.\n *\n * Use case: `[a, b,
c, a, a]` if we are at index `3` which is the second `a` then asking if we\n * have any more `a`s needs to return the
second `a`.\n *\n get(trackById: any, atOrAfterIndex: number|null): IterableChangeRecord_<V>|null {\n const
key = trackById;\n const recordList = this.map.get(key);\n return recordList ? recordList.get(trackById,
atOrAfterIndex) : null;\n }\n\n /**\n * Removes a {@link IterableChangeRecord_} from the list of duplicates.\n
*\n * The list of duplicates also is removed from the map if it gets empty.\n *\n remove(record:
IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n const key = record.trackById;\n const recordList:
_DuplicateItemRecordList<V> = this.map.get(key);\n // Remove the list of duplicates when it gets empty\n if
(recordList.remove(record)) {\n this.map.delete(key);\n }\n return record;\n }\n\n get isEmpty(): boolean {\n
return this.map.size === 0;\n }\n\n clear() {\n this.map.clear();\n }\n}\n\nfunction
getPreviousIndex(item: any, addRemoveOffset: number, moveOffsets: number[]|null): number {\n const
previousIndex = item.previousIndex;\n if (previousIndex === null) return previousIndex;\n let moveOffset = 0;\n
if (moveOffsets && previousIndex < moveOffsets.length) {\n moveOffset = moveOffsets[previousIndex];\n }\n
return previousIndex + addRemoveOffset + moveOffset;\n }\n\n", "/*\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport { RuntimeError, RuntimeErrorCode } from
'../../errors';\nimport { isJsObject } from '../../util/iterable';\nimport { stringify } from '../../util/stringify';\nimport
{ KeyValueChangeRecord, KeyValueChanges, KeyValueDiffer, KeyValueDifferFactory } from
'/keyvalue_differs';\n\nexport class DefaultKeyValueDifferFactory<K, V> implements KeyValueDifferFactory
{\n constructor() {\n supports(obj:
any): boolean {\n return obj instanceof Map || isJsObject(obj);\n }\n\n create<K, V>(): KeyValueDiffer<K, V>
{\n return new DefaultKeyValueDiffer<K, V>();\n }\n}\n\nexport class DefaultKeyValueDiffer<K, V>
implements KeyValueDiffer<K, V>, KeyValueChanges<K, V> {\n private _records = new Map<K,
KeyValueChangeRecord_<K, V>>();\n private _mapHead: KeyValueChangeRecord_<K, V>|null = null;\n //
_appendAfter is used in the check loop\n private _appendAfter: KeyValueChangeRecord_<K, V>|null = null;\n
private _previousMapHead: KeyValueChangeRecord_<K, V>|null = null;\n private _changesHead:
KeyValueChangeRecord_<K, V>|null = null;\n private _changesTail: KeyValueChangeRecord_<K, V>|null =
null;\n private _additionsHead: KeyValueChangeRecord_<K, V>|null = null;\n private _additionsTail:
KeyValueChangeRecord_<K, V>|null = null;\n private _removalsHead: KeyValueChangeRecord_<K, V>|null =
null;\n private _removalsTail: KeyValueChangeRecord_<K, V>|null = null;\n\n get

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isDirty(): boolean {\n  return this._additionsHead !== null || this._changesHead !== null ||\n
this._removalsHead !== null;\n }
\n\n forEachItem(fn: (r: KeyValueChangeRecord<K, V>) => void) {\n  let
record: KeyValueChangeRecord_<K, V>|null;\n  for (record = this._mapHead; record !== null; record =
record._next) {\n    fn(record);\n  }\n }\n\n forEachPreviousItem(fn: (r: KeyValueChangeRecord<K, V>) =>
void) {\n  let record: KeyValueChangeRecord_<K, V>|null;\n  for (record = this._previousMapHead; record !==
null; record = record._nextPrevious) {\n    fn(record);\n  }\n }\n\n forEachChangedItem(fn: (r:
KeyValueChangeRecord<K, V>) => void) {\n  let record: KeyValueChangeRecord_<K, V>|null;\n  for (record =
this._changesHead; record !== null; record = record._nextChanged) {\n    fn(record);\n  }\n }\n\n
forEachAddedItem(fn: (r: KeyValueChangeRecord<K, V>) => void) {\n  let record: KeyValueChangeRecord_<K,
V>|null;\n  for (record = this._additionsHead;\n    record !== null; record = record._nextAdded) {\n    fn(record);\n  }\n }\n\n
forEachRemovedItem(fn: (r: KeyValueChangeRecord<K, V>) => void) {\n  let record: KeyValueChangeRecord_<K,
V>|null;\n  for (record = this._removalsHead; record !== null; record = record._nextRemoved) {\n    fn(record);\n  }\n }\n\n
diff(map?: Map<any, any>|{[k: string]: any}|null): any {\n  if (!map) {\n    map = new Map();\n  } else if (!(map instanceof
Map || isJsObject(map))) {\n    throw new RuntimeError(\n      RuntimeErrorCode.INVALID_DIFFER_INPUT,\n      ngDevMode &&\n        `Error trying to diff
'${stringify(map)}'. Only maps and objects are allowed`);\n  }\n\n  return this.check(map) ? this : null;\n }\n\n
onDestroy() {\n\n  /**\n   * Check the current state of the map vs the previous.\n   * The algorithm is optimised for
when the keys do no change.\n   */\n  check(map: Map<any, any>|{[k: string]: any}): boolean {\n    this._reset();\n\n    let insertBefore
= this._mapHead;\n    this._appendAfter = null;\n\n    this._forEach(map, (value: any, key: any) => {\n      if
(insertBefore && insertBefore.key === key) {\n        this._maybeAddToChanges(insertBefore, value);\n\n        this._appendAfter =
insertBefore;\n        insertBefore = insertBefore._next;\n      } else {\n        const record =
this._getOrCreateRecordForKey(key, value);\n        insertBefore = this._insertBeforeOrAppend(insertBefore,
record);\n      }\n    });\n\n    // Items remaining at the end of the list have been deleted\n    if (insertBefore) {\n      if
(insertBefore._prev) {\n        insertBefore._prev._next = null;\n      }\n\n      this._removalsHead = insertBefore;\n\n      for (let record:
KeyValueChangeRecord_<K, V>|null = insertBefore; record !== null;\n        record = record._nextRemoved) {\n        if (record ===
this._mapHead) {\n          this._mapHead = null;\n        }\n\n        this._records.delete(record.key);\n        record._nextRemoved =
record._next;\n\n        record.previousValue = record.currentValue;\n        record.currentValue = null;\n        record._prev = null;\n\n        record._next = null;\n      }\n    }\n\n    // Make sure tails have no next records from previous runs\n    if
(this._changesTail) this._changesTail._nextChanged = null;\n    if (this._additionsTail)\n      this._additionsTail._nextAdded = null;\n\n    return this.isDirty;\n  }\n\n  /**\n   * Inserts a record before `before` or
append at the end of the list when `before` is null.\n   */\n  * Notes:\n   * - This method appends at
`this._appendAfter`,\n   * - This method updates `this._appendAfter`,\n   * - The return value is the new value for the
insertion pointer.\n   */\n  private _insertBeforeOrAppend(\n    before: KeyValueChangeRecord_<K, V>|null,\n    record:
KeyValueChangeRecord_<K, V>): KeyValueChangeRecord_<K, V>|null {\n    if (before) {\n      const prev
= before._prev;\n      record._next = before;\n      record._prev = prev;\n      before._prev
= record;\n      if (prev) {\n        prev._next = record;\n      }\n      if (before === this._mapHead) {\n        this._mapHead =
record;\n      }\n\n      this._appendAfter = before;\n      return before;\n    }\n\n    if
(this._appendAfter) {\n      this._appendAfter._next = record;\n      record._prev = this._appendAfter;\n    } else {\n      this._mapHead =
record;\n    }\n\n    this._appendAfter = record;\n    return null;\n  }\n\n  private
_getOrCreateRecordForKey(key: K, value: V): KeyValueChangeRecord_<K, V> {\n    if (this._records.has(key))\n      {\n        const record = this._records.get(key)!;\n        this._maybeAddToChanges(record, value);\n        const prev =
record._prev;\n        const next = record._next;\n        if (prev) {\n          prev._next = next;\n        }\n        if (next) {\n          next._prev =
prev;\n        }\n        record._next = null;\n        record._prev = null;\n\n        return record;\n      }\n\n      const
record = new KeyValueChangeRecord_<K, V>(key);\n      this._records.set(key,

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record);\n  record.currentValue = value;\n  this._addToAdditions(record);\n  return record;\n }\n\n /**\n  * @internal *\n  * _reset() {\n  *   if (this.isDirty) {\n  *     let record: KeyValueChangeRecord_<K, V>|null;\n  *     // let\n  *     ` _previousMapHead` contain the state of the map before the changes\n  *     this._previousMapHead =\n  *     this._mapHead;\n  *     for (record = this._previousMapHead; record !== null; record = record._next) {\n  *       record._nextPrevious = record._next;\n  *     }\n  *     // Update `record.previousValue` with the value of the item\n  *     before the changes\n  *     // We need to update all changed items (that's those which have been added and changed)\n  *     for (record = this._changesHead; record !== null; record = record._nextChanged) {\n  *       record.previousValue =\n  *       record.currentValue;\n  *     }\n  *     for (record = this._additionsHead; record != null; record = record._nextAdded) {\n  *       record.previousValue = record.currentValue;\n  *     }\n  *     this._changesHead\n  *     = this._changesTail = null;\n  *     this._additionsHead = this._additionsTail = null;\n  *     this._removalsHead = null;\n  *   }\n  * }\n  * }\n  * // Add the record or a given key to the list of changes only when the value has actually changed\n  * private _maybeAddToChanges(record: KeyValueChangeRecord_<K, V>, newValue: any): void {\n  *   if\n  *   (!Object.is(newValue, record.currentValue)) {\n  *     record.previousValue = record.currentValue;\n  *     record.currentValue = newValue;\n  *     this._addToChanges(record);\n  *   }\n  * }\n  * private _addToAdditions(record:\n  * KeyValueChangeRecord_<K, V>) {\n  *   if (this._additionsHead === null) {\n  *     this._additionsHead =\n  *     this._additionsTail = record;\n  *   } else {\n  *     this._additionsTail!._nextAdded = record;\n  *     this._additionsTail =\n  *     record;\n  *   }\n  * }\n  * private _addToChanges(record: KeyValueChangeRecord_<K, V>) {\n  *   if\n  *   (this._changesHead === null) {\n  *     this._changesHead = this._changesTail = record;\n  *   } else {\n  *     this._changesTail!._nextChanged\n  *     = record;\n  *     this._changesTail = record;\n  *   }\n  * }\n  * }\n  * }\n  * /** @internal *\n  * private _forEach<K, V>(obj: Map<K,\n  * V>|{[k: string]: V}, fn: (v: V, k: any) => void) {\n  *   if (obj instanceof Map) {\n  *     obj.forEach(fn);\n  *   } else {\n  *     Object.keys(obj).forEach(k => fn(obj[k], k));\n  *   }\n  * }\n  * }\n  * }\n  * class KeyValueChangeRecord_<K, V> implements\n  * KeyValueChangeRecord<K, V> {\n  *   previousValue: V|null = null;\n  *   currentValue: V|null = null;\n  * }\n  * /** @internal\n  * *\n  * _nextPrevious: KeyValueChangeRecord_<K, V>|null = null;\n  * /** @internal *\n  * _next:\n  * KeyValueChangeRecord_<K, V>|null = null;\n  * /** @internal *\n  * _prev: KeyValueChangeRecord_<K, V>|null =\n  * null;\n  * /** @internal *\n  * _nextAdded: KeyValueChangeRecord_<K, V>|null = null;\n  * /** @internal *\n  * _nextRemoved: KeyValueChangeRecord_<K, V>|null = null;\n  * /** @internal *\n  * _nextChanged:\n  * KeyValueChangeRecord_<K, V>|null = null;\n  * }\n  * }\n  * }\n  * constructor(public key: K) {\n  * }\n  * }\n  * }\n  * /** @license\n  * *\n  * Copyright Google

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```

import {defineInjectable} from\n  '././di/interface/defs';\nimport {StaticProvider} from '././di/interface/provider';\nimport {Optional, SkipSelf} from\n  '././di/metadata';\nimport {RuntimeError, RuntimeErrorCode} from '././errors';\nimport\n  {DefaultIterableDifferFactory} from './differs/default_iterable_differ';\n\n /**\n  * A type describing supported\n  * iterable types.\n  * *\n  * @publicApi\n  * *\n  * @export type NgIterable<T> = Array<T>|Iterable<T>;\n  * *\n  * A strategy\n  * for tracking changes over time to an iterable. Used by {@link NgForOf} to\n  * respond to changes in an iterable by\n  * effecting equivalent changes in the DOM.\n  * *\n  * @publicApi\n  * *\n  * @export interface IterableDiffer<V> {\n  * *\n  * * Iterate over all changes.\n  * *\n  * `IterableChangeRecord`\n  * will contain information about changes\n  * to each item.\n  * *\n  * forEachItem(fn: (record:\n  * IterableChangeRecord<V>) => void): void;\n  * *\n  * Iterate over a set of operations which when applied to the\n  * original `Iterable`\n  * will produce the\n  * new `Iterable`.\n  * *\n  * NOTE: These are not necessarily the actual\n  * operations which were applied to the original\n  * `Iterable`, rather these are a set of computed operations which\n  * may not be the same as the\n  * ones applied.\n  * *\n  * @param record A change which needs

```

```

value.\n  * @returns an object describing the difference. The return value is only valid until the next\n  * `diff()`\n  * invocation.\n  * *\n  * diff(object: NgIterable<V>|undefined|null): IterableChanges<V>|null;\n  * }\n  * }\n  * *\n  * An object\n  * describing the changes in the `Iterable` collection since last time\n  * `IterableDiffer#diff()`\n  * was invoked.\n  * *\n  * *\n  * @publicApi\n  * *\n  * @export interface IterableChanges<V> {\n  * *\n  * * Iterate over all changes.\n  * *\n  * `IterableChangeRecord`\n  * will contain information about changes\n  * to each item.\n  * *\n  * forEachItem(fn: (record:\n  * IterableChangeRecord<V>) => void): void;\n  * *\n  * Iterate over a set of operations which when applied to the\n  * original `Iterable`\n  * will produce the\n  * new `Iterable`.\n  * *\n  * NOTE: These are not necessarily the actual\n  * operations which were applied to the original\n  * `Iterable`, rather these are a set of computed operations which\n  * may not be the same as the\n  * ones applied.\n  * *\n  * @param record A change which needs

```



to be applied

- \* @param previousIndex The `IterableChangeRecord#previousIndex` of the `record` refers to the original `Iterable` location, where as `previousIndex` refers to the transient location of the item, after applying the operations up to this point.
- \* @param currentIndex The `IterableChangeRecord#currentIndex` of the `record` refers to the original `Iterable` location, where as `currentIndex` refers to the transient location of the item, after applying the operations up to this point.

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*^/n forEachOperation(\n fn:\n (record: IterableChangeRecord<V>, previousIndex: number|null,\n currentIndex: number|null) => void): void;\n /**\n * Iterate over changes in the order of original `Iterable` showing where the original items have moved.\n *^/n forEachPreviousItem(fn: (record: IterableChangeRecord<V>) => void): void;\n\n /** Iterate over all added items. *^/n forEachAddedItem(fn: (record: IterableChangeRecord<V>) => void): void;\n\n /** Iterate over all moved items. *^/n forEachMovedItem(fn: (record: IterableChangeRecord<V>) => void): void;\n\n /** Iterate over all removed items. *^/n forEachRemovedItem(fn: (record: IterableChangeRecord<V>) => void): void;\n\n /**\n * Iterate over all items which had their identity (as computed by the `TrackByFunction`) changed.\n *^/n forEachIdentityChange(fn: (record: IterableChangeRecord<V>) => void): void;\n}\n\n/**\n * Record representing the item change information.\n *\n * @publicApi\n *^/nexport interface IterableChangeRecord<V> {\n /** Current index of the item in `Iterable` or null if removed. *^/n readonly currentIndex: number|null;\n /** Previous index of the item in `Iterable` or null if added. *^/n readonly previousIndex: number|null;\n\n /** The item. *^/n readonly item: V;\n\n /** Track by identity as computed by the `TrackByFunction`. *^/n readonly trackById: any;\n}\n\n/**\n * A function optionally passed into the `NgForOf` directive to customize how `NgForOf` uniquely identifies items in an iterable.\n *\n * `NgForOf` needs to uniquely identify items in the iterable to correctly perform DOM updates when items in the iterable are reordered, new items are added, or existing items are removed.\n *\n * In all of these scenarios it is usually desirable to only update the DOM elements associated with the items affected by the change. This behavior is important to:\n *\n * - preserve any DOM-specific UI state (like cursor position, focus, text selection) when the iterable is modified\n * - enable animation of item addition, removal, and iterable reordering\n * - preserve the value of the <select> element when nested <option> elements are dynamically populated using `NgForOf` and the bound iterable is updated\n *\n * A common use for custom `trackBy` functions is when the model that `NgForOf` iterates over contains a property with a unique identifier. For example, given a model:\n *\n * ``ts\n * class User {\n * id: number;\n * name: string;\n * ...}\n *\n * a custom `trackBy` function could look like the following:\n *\n * ``ts\n * function userTrackBy(index, user) {\n * return user.id;\n * }\n *\n * A custom `trackBy` function must have several properties:\n *\n * - be [idempotent](https://en.wikipedia.org/wiki/Idempotence) (be without side effects, and always return the same value for a given input)\n * - return unique value for all unique inputs\n * - be fast\n *\n * @see [NgForOf#ngForTrackBy](api/common/NgForOf#ngForTrackBy)\n *\n * @publicApi\n *^/nexport interface TrackByFunction<T> {\n // Note: the type parameter `U` enables more accurate template type checking in case a trackBy function is declared using a base type of the iterated type. The `U` type gives TypeScript additional freedom to infer a narrower type for the `item` parameter type, instead of imposing the trackBy's declared item type as the inferred type for `T`. See https://github.com/angular/angular/issues/40125\n\n /**\n * @param index The index of the item within the iterable.\n * @param item The item in the iterable.\n *^/n <U extends T>(index: number, item: T&U): any;\n}\n\n/**\n * Provides a factory for {@link IterableDiffer}.\n *\n * @publicApi\n *^/nexport interface IterableDifferFactory {\n supports(objects: any): boolean;\n create<V>(trackByFn?: TrackByFunction<V>): IterableDiffer<V>;\n}\n\nexport function defaultIterableDiffersFactory() {\n return new IterableDiffers([new DefaultIterableDifferFactory()]);\n}\n\n/**\n * A repository of different iterable diffing strategies used by NgFor, NgClass, and others.\n *\n * @publicApi\n *^/nexport class IterableDiffers {\n /** @nocollapse *^/n static prov = /** @pureOrBreakMyCode */ defineInjectable(\n {token: IterableDiffers, providedIn: 'root', factory: defaultIterableDiffersFactory});\n\n /**\n * @deprecated

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v4.0.0 - Should be private\n  *^ factories: IterableDifferFactory[];\n  constructor(factories:
IterableDifferFactory[]) {\n    this.factories = factories;\n  }\n\n  static create(factories: IterableDifferFactory[],
parent?: IterableDiffer): IterableDiffer {\n    if (parent != null) {\n      const copied = parent.factories.slice();\n      factories = factories.concat(copied);\n    }\n\n    return new IterableDiffer(factories);\n  }\n\n  /**\n   * Takes an
array of { @link IterableDifferFactory } and returns a provider used to extend the\n   * inherited { @link
IterableDiffer } instance with the provided factories and return a new\n   * { @link IterableDiffer } instance.\n   *
* @usageNotes\n   * ### Example\n   * The following example shows how to extend an existing list of
factories,\n   * which will only be applied to the injector for this component and its children.\n   * This step is all
that's required to make a new { @link IterableDiffer } available.\n   *\n   * ```\n   * @Component({\n   *   viewProviders: [\n   *     IterableDiffer.extend([new ImmutableListDiffer()])\n   *   ]\n   * })\n   * ```\n   * ^ static extend(factories: IterableDifferFactory[]): StaticProvider {\n   *   return {\n   *     provide:
IterableDiffer,\n   *     useFactory: (parent: IterableDiffer|null) => {\n   *       // if parent is null, it means that we are in
the root injector and we have just overridden\n   *       // the default injection mechanism for IterableDiffer, in such a
case just assume\n   *       // `defaultIterableDifferFactory`.\n   *       return IterableDiffer.create(factories, parent ||
defaultIterableDifferFactory());\n   *     },\n   *     // Dependency technically isn't optional, but we can provide a better
error message this way.\n   *     deps: [[IterableDiffer, new SkipSelf(), new Optional()]]\n   *   }; }\n\n   * find(iterable:
any): IterableDifferFactory {\n   *   const factory = this.factories.find(f => f.supports(iterable));\n   *   if (factory != null)
{\n   *     return
factory;\n   *   } else {\n   *     throw new RuntimeError(\n
RuntimeErrorCode.NO_SUPPORTING_DIFFER_FACTORY,\n   *     ngDevMode &&\n   *     `Cannot find a
differ supporting object '${iterable}' of type '${\n   *       getTypeNameForDebugging(iterable)}';\n   *     }\n   *   }\n\n   * export function getTypeNameForDebugging(type: any): string {\n   *   return type['name'] || typeof
type;\n   * }\n\n   * ,"/**\n   * @license\n   * Copyright Google LLC All Rights Reserved.\n   * Use of this source code is
governed by an MIT-style license that can be\n   * found in the LICENSE file at https://angular.io/license\n
*/\n\n   * import { Optional, SkipSelf, StaticProvider, defineInjectable } from '././di';\n   * import { RuntimeError,
RuntimeErrorCode } from '././errors';\n   * import { DefaultKeyValueDifferFactory } from
'./default_keyvalue_differ';\n\n   * /**\n   * A differ that tracks changes made to an object over time.\n   *
* @publicApi\n   * ^ export interface KeyValueDiffer<K, V> {\n   *   /**\n   *    Compute a difference
between the previous state and the new `object` state.\n   *    * @param object containing the new value.\n   *
* @returns an object describing the difference. The return value is only valid until the next\n   *   * `diff()` invocation.\n
* ^ diff(object: Map<K, V>): KeyValueChanges<K, V>|null;\n   *   /**\n   *    Compute a difference between the
previous state and the new `object` state.\n   *    * @param object containing the new value.\n   *
* @returns an object describing the difference. The return value is only valid until the next\n   *   * `diff()` invocation.\n
* ^ diff(object: {[key: string]: V}): KeyValueChanges<string, V>|null;\n   *   // TODO(TS2.1): diff<KP extends
string>(this: KeyValueDiffer<KP, V>, object: Record<KP, V>):\n   *   // KeyValueDiffer<KP, V>;\n   * }\n\n   * /**\n   * An
object describing the changes in the `Map` or `{[k:string]: string}` since last time\n   * `KeyValueDiffer#diff()` was
invoked.\n   * * @publicApi\n   * ^ export interface KeyValueChanges<K, V> {\n   *   /**\n   *    Iterate over
all changes. `KeyValueChangeRecord` will contain information about changes\n   *    * to each item.\n   *    ^\n
* forEachItem(fn: (r: KeyValueChangeRecord<K, V>) => void): void;\n   *   /**\n   *    Iterate over changes in the order
of original Map showing where the original items\n   *    * have moved.\n   *    ^\n
* forEachPreviousItem(fn: (r: KeyValueChangeRecord<K, V>) => void): void;\n   *   /**\n   *    Iterate over all keys for which values have
changed.\n   *    ^\n
* forEachChangedItem(fn: (r: KeyValueChangeRecord<K, V>) => void): void;\n   *   /**\n   *    Iterate
over all added items.\n   *    ^\n
* forEachAddedItem(fn: (r: KeyValueChangeRecord<K, V>) => void): void;\n   *   /**\n   *    Iterate
over all removed items.\n   *    ^\n
* forEachRemovedItem(fn: (r: KeyValueChangeRecord<K, V>) => void):
void;\n   * }\n\n   * /**\n   * Record representing the item change information.\n   * * @publicApi\n   * ^ export interface
KeyValueChangeRecord<K, V> {\n   *   /**\n   *    Current key in the Map.\n   *    ^\n
* readonly key: K;\n   *   /**\n   *    Current value for

```



```

KeyValueDiffers(keyValDiff);\n", "/*\n * @license\n
 * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n/*\n * @module\n * @description\n
 * Change detection enables data binding in Angular.\n *\n\nexport { ChangeDetectionStrategy, ChangeDetectorRef,
DefaultIterableDiffer, IterableChangeRecord, IterableChanges, IterableDiffer, IterableDifferFactory, IterableDiffers,
KeyValueChangeRecord, KeyValueChanges, KeyValueDiffer, KeyValueDifferFactory, KeyValueDiffers,
NgIterable, PipeTransform, SimpleChange, SimpleChanges, TrackByFunction } from
'./change_detection/change_detection';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
 * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport { createPlatformFactory, PlatformRef } from './application_ref';\nimport
{ StaticProvider } from './di';\n\n\n
 * This platform has to be included in any other platform\n *\n * @publicApi\n *\n\nexport const platformCore:
(extraProviders?: StaticProvider[]|undefined) => PlatformRef =\n  createPlatformFactory(null, 'core', []);\n", "/*\n
 * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport { ApplicationRef }
from './application_ref';\nimport { NgModule } from './metadata';\n\n\n * Re-exported by `BrowserModule`, which
is included automatically in the root\n * `AppModule` when you create a new app with the CLI `new` command.
Eagerly injects\n * `ApplicationRef` to instantiate it.\n *\n * @publicApi\n *\n\n@NgModule()\nexport class
ApplicationModule {\n  // Inject ApplicationRef to make it eager...\n  constructor(appRef: ApplicationRef)
  {} }\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n\n * Coerces a value (typically a string) to a boolean. *\n\nexport function coerceToBoolean(value: unknown):
boolean {\n  return typeof value === 'boolean' ? value : (value != null && value !== 'false');\n}\n", "/*\n
 * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n\nexport
{ ALLOW_MULTIPLE_PLATFORMS as ALLOW_MULTIPLE_PLATFORMS, internalCreateApplication as
internalCreateApplication } from './application_ref';\nexport { APP_ID_RANDOM_PROVIDER as
APP_ID_RANDOM_PROVIDER } from './application_tokens';\nexport { defaultIterableDiffers as
defaultIterableDiffers, defaultKeyValueDiffers as defaultKeyValueDiffers } from
'./change_detection/change_detection';\nexport { ChangeDetectorStatus as ChangeDetectorStatus,
isDefaultChangeDetectionStrategy
as isDefaultChangeDetectionStrategy } from './change_detection/constants';\nexport { Console as Console } from
'./console';\nexport { getDebugNodeR2 as getDebugNodeR2 } from './debug/debug_node';\nexport
{ setCurrentInjector as setCurrentInjector } from './di/injector_compatibility';\nexport { getInjectableDef as
getInjectableDef, InjectableDeclaration, InjectorDef } from './di/interface/defs';\nexport { INJECTOR_SCOPE as
INJECTOR_SCOPE } from './di/scope';\nexport { formatRuntimeError as formatRuntimeError, RuntimeError as
RuntimeError } from './errors';\nexport { CurrencyIndex as CurrencyIndex, ExtraLocaleDataIndex as
ExtraLocaleDataIndex, findLocaleData as findLocaleData, getLocaleCurrencyCode as getLocaleCurrencyCode,
getLocalePluralCase as getLocalePluralCase, LocaleDataIndex as LocaleDataIndex, registerLocaleData as
registerLocaleData, unregisterAllLocaleData as unregisterLocaleData } from './i18n/locale_data_api';\nexport
{ DEFAULT_LOCALE_ID as DEFAULT_LOCALE_ID }
from './i18n/localization';\nexport { ComponentFactory as ComponentFactory } from
'./linker/component_factory';\nexport { clearResolutionOfComponentResourcesQueue as
clearResolutionOfComponentResourcesQueue, resolveComponentResources as resolveComponentResources } from
'./metadata/resource_loading';\nexport { ReflectionCapabilities as ReflectionCapabilities } from
'./reflection/reflection_capabilities';\nexport { allowSanitizationBypassAndThrow as
allowSanitizationBypassAndThrow, BypassType as BypassType, getSanitizationBypassType as
getSanitizationBypassType, SafeHtml as SafeHtml, SafeResourceUrl as SafeResourceUrl, SafeScript as SafeScript,

```

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SafeStyle as SafeStyle, SafeUrl as SafeUrl, SafeValue as SafeValue, unwrapSafeValue as unwrapSafeValue } from
'./sanitization/bypass';\nextport { _sanitizeHtml as _sanitizeHtml } from './sanitization/html_sanitizer';\nextport
{ _sanitizeUrl as _sanitizeUrl } from './sanitization/url_sanitizer';\nextport { TESTABILITY as TESTABILITY,
TESTABILITY_GETTER as TESTABILITY_GETTER } from './testability/testability';\nextport { coerceToBoolean
as coerceToBoolean } from './util/coercion';\nextport { devModeEqual as devModeEqual } from
'./util/comparison';\nextport { makeDecorator as makeDecorator } from './util/decorators';\nextport { global as global }
from './util/global';\nextport { isListLikeIterable as isListLikeIterable } from './util/iterable';\nextport { isObservable as
isObservable, isPromise as isPromise, isSubscribable as isSubscribable } from './util/lang';\nextport { stringify as
stringify } from './util/stringify';\nextport { NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR as
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR } from './view/provider_flags';\n\n// TODO(alxhub):
allows tests to compile, can be removed when tests have been updated.\nextport const ivyEnabled = true;\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE
file at https://angular.io/license\n */\n\nimport { FactoryTarget, getCompilerFacade, JitCompilerUsage,
R3DeclareComponentFacade, R3DeclareDirectiveFacade, R3DeclareFactoryFacade, R3DeclareInjectableFacade,
R3DeclareInjectorFacade, R3DeclareNgModuleFacade, R3DeclarePipeFacade } from
'./../compiler/compiler_facade';\nimport { Type } from './../interface/type';\nimport { setClassMetadata } from
'./../metadata';\nimport { angularCoreEnv } from './environment';\n\n/**\n * Compiles a partial directive declaration
object into a full directive definition object.\n *\n * @codeGenApi\n */\nextport function ngDeclareDirective(decl:
R3DeclareDirectiveFacade): unknown {\n  const compiler = getCompilerFacade(\n    { usage:
JitCompilerUsage.PartialDeclaration, kind: 'directive', type: decl.type });\n  return
compiler.compileDirectiveDeclaration(\n    angularCoreEnv, `ng:///${decl.type.name}/fac.js`, decl);\n}\n\n/**\n *
Evaluates the class metadata declaration.\n *\n * @codeGenApi\n */\nextport function
ngDeclareClassMetadata(decl: {\n  type: Type<any>;\n  decorators: any[];\n  ctorParameters?: () => any[];\n
propDecorators?: {[field: string]: any};\n}): void {\n  setClassMetadata(\n    decl.type, decl.decorators,
decl.ctorParameters ?? null, decl.propDecorators ?? null);\n}\n\n/**\n * Compiles a partial component declaration
object into a full component definition object.\n *\n * @codeGenApi\n */\nextport function
ngDeclareComponent(decl: R3DeclareComponentFacade): unknown {\n  const compiler = getCompilerFacade(\n
{ usage: JitCompilerUsage.PartialDeclaration, kind: 'component', type: decl.type });\n  return
compiler.compileComponentDeclaration(\n    angularCoreEnv, `ng:///${decl.type.name}/cmp.js`,
decl);\n}\n\n/**\n * Compiles a partial pipe declaration object into a full pipe definition object.\n *\n *
@codeGenApi\n */\nextport function ngDeclareFactory(decl: R3DeclareFactoryFacade): unknown {\n  const
compiler = getCompilerFacade({\n    usage: JitCompilerUsage.PartialDeclaration,\n
kind: getFactoryKind(decl.target),\n    type: decl.type\n });\n  return compiler.compileFactoryDeclaration(\n
angularCoreEnv, `ng:///${decl.type.name}/fac.js`, decl);\n}\n\nfunction getFactoryKind(target: FactoryTarget) {\n
switch (target) {\n  case FactoryTarget.Directive:\n    return 'directive';\n  case FactoryTarget.Component:\n
return 'component';\n  case FactoryTarget.Injectable:\n    return 'injectable';\n  case FactoryTarget.Pipe:\n
return 'pipe';\n  case FactoryTarget.NgModule:\n    return 'NgModule';\n  }\n}\n\n/**\n * Compiles a partial
injectable declaration object into a full injectable definition object.\n *\n * @codeGenApi\n */\nextport function
ngDeclareInjectable(decl: R3DeclareInjectableFacade): unknown {\n  const compiler = getCompilerFacade(\n
{ usage: JitCompilerUsage.PartialDeclaration, kind: 'injectable', type: decl.type });\n  return
compiler.compileInjectableDeclaration(\n    angularCoreEnv, `ng:///${decl.type.name}/prov.js`,
decl);\n}\n\n/**\n * These enums are used in the partial factory declaration calls.\n *\n * @codeGenApi\n */\nextport { FactoryTarget }
from './../compiler/compiler_facade';\n\n/**\n * Compiles a partial injector declaration object into a full injector
definition object.\n *\n * @codeGenApi\n */\nextport function ngDeclareInjector(decl: R3DeclareInjectorFacade):
unknown {\n  const compiler = getCompilerFacade(\n    { usage: JitCompilerUsage.PartialDeclaration, kind:
'NgModule', type: decl.type });\n  return compiler.compileInjectorDeclaration(\n    angularCoreEnv,
`ng:///${decl.type.name}/inj.js`, decl);\n}\n\n/**\n * Compiles a partial NgModule declaration object into a full

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NgModule definition object.\n *\n * @codeGenApi\n *^\nexport function ngDeclareNgModule(decl:
R3DeclareNgModuleFacade): unknown {\n  const compiler = getCompilerFacade(\n    {usage:
JitCompilerUsage.PartialDeclaration, kind: 'NgModule', type: decl.type});\n  return
compiler.compileNgModuleDeclaration(\n
  angularCoreEnv, `ng:///${decl.type.name}/mod.js`, decl);\n}\n\n/**\n * Compiles a partial pipe declaration
object into a full pipe definition object.\n *\n * @codeGenApi\n *^\nexport function ngDeclarePipe(decl:
R3DeclarePipeFacade): unknown {\n  const compiler = getCompilerFacade(\n    {usage:
JitCompilerUsage.PartialDeclaration, kind: 'pipe', type: decl.type});\n  return
compiler.compilePipeDeclaration(angularCoreEnv, `ng:///${decl.type.name}/pipe.js`, decl);\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n// clang-format off\n// we
reexport these symbols just so that they are retained during the dead code elimination\n// performed by rollup while
it's creating fesm files.\n\n// no code actually imports these symbols from the @angular/core entry point\n\nexport
{\n  compileNgModuleFactory as compileNgModuleFactory,\n
  isBoundToModule as isBoundToModule\n} from './application_ref';\nexport {\n  injectChangeDetectorRef as
injectChangeDetectorRef,\n} from './change_detection/change_detector_ref';\nexport {\n  getDebugNode as
getDebugNode,\n} from './debug/debug_node';\nexport {\n  NG_INJ_DEF as NG_INJ_DEF,\n  NG_PROV_DEF as
NG_PROV_DEF,\n  isInjectable as isInjectable,\n} from './di/interface/defs';\nexport {createInjector as
createInjector} from './di/create_injector';\nexport {\n  registerNgModuleType as registerNgModuleType,\n
  setAllowDuplicateNgModuleIdsForTest as setAllowDuplicateNgModuleIdsForTest,\n} from
 './linker/ng_module_registration';\nexport {\n  NgModuleDef as NgModuleDef,\n  NgModuleTransitiveScopes as
NgModuleTransitiveScopes,\n} from './metadata/ng_module_def';\nexport {\n  getLContext as getLContext\n} from
 './render3/context_discovery';\nexport {\n  NG_COMP_DEF as NG_COMP_DEF,\n  NG_DIR_DEF as
NG_DIR_DEF,\n  NG_ELEMENT_ID as NG_ELEMENT_ID,\n  NG_MOD_DEF
as NG_MOD_DEF,\n  NG_PIPE_DEF as NG_PIPE_DEF,\n} from './render3/fields';\nexport {\n  AttributeMarker
as AttributeMarker,\n  ComponentDef as ComponentDef,\n  ComponentFactory as Render3ComponentFactory,\n
  ComponentRef as Render3ComponentRef,\n  ComponentType as ComponentType,\n  CssSelectorList as
CssSelectorList,\n  detectChanges as detectChanges,\n  DirectiveDef as DirectiveDef,\n  DirectiveType as
DirectiveType,\n  getDirectives as getDirectives,\n  getHostElement as getHostElement,\n  LifecycleHooksFeature
as LifecycleHooksFeature,\n  NgModuleFactory as NgModuleFactory,\n  NgModuleRef as
Render3NgModuleRef,\n  NgModuleType as NgModuleType,\n  NO_CHANGE as NO_CHANGE,\n  PipeDef as
PipeDef,\n  RenderFlags as RenderFlags,\n  setClassMetadata as setClassMetadata,\n  setLocaleId as setLocaleId,\n
  store as store,\n  advance,\n  attribute,\n  attributeInterpolate1,\n  attributeInterpolate2,\n  attributeInterpolate3,\n
  attributeInterpolate4,\n  attributeInterpolate5,\n
  attributeInterpolate6,\n  attributeInterpolate7,\n  attributeInterpolate8,\n  attributeInterpolateV,\n  classMap,\n
  classMapInterpolate1,\n  classMapInterpolate2,\n  classMapInterpolate3,\n  classMapInterpolate4,\n
  classMapInterpolate5,\n  classMapInterpolate6,\n  classMapInterpolate7,\n  classMapInterpolate8,\n
  classMapInterpolateV,\n  classProp,\n  ComponentDeclaration,\n  contentQuery,\n  CopyDefinitionFeature,\n
  defineComponent,\n  defineDirective,\n  defineNgModule,\n  definePipe,\n  DirectiveDeclaration,\n
  directiveInject,\n  disableBindings,\n  element,\n  elementContainer,\n  elementContainerEnd,\n
  elementContainerStart,\n  elementEnd,\n  elementStart,\n  enableBindings,\n  FactoryDeclaration,\n
  getCurrentView,\n  getInheritedFactory,\n  hostProperty,\n  i18n,\n  i18nApply,\n  i18nAttributes,\n  i18nEnd,\n
  i18nExp,\n  i18nPostprocess,\n  i18nStart,\n  InheritDefinitionFeature,\n
  injectAttribute,\n  InjectorDeclaration,\n  invalidFactory,\n  listener,\n  loadQuery,\n  namespaceHTML,\n
  namespaceMathML,\n  namespaceSVG,\n  nextContext,\n  NgModuleDeclaration,\n  NgOnChangesFeature,\n
  pipe,\n  pipeBind1,\n  pipeBind2,\n  pipeBind3,\n  pipeBind4,\n  pipeBindV,\n  PipeDeclaration,\n
  projection,\n  projectionDef,\n  property,\n  propertyInterpolate,\n  propertyInterpolate1,\n  propertyInterpolate2,\n
  propertyInterpolate3,\n  propertyInterpolate4,\n  propertyInterpolate5,\n  propertyInterpolate6,\n

```

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propertyInterpolate7,\n propertyInterpolate8,\n propertyInterpolateV,\n ProvidersFeature,\n pureFunction0,\n
pureFunction1,\n pureFunction2,\n pureFunction3,\n pureFunction4,\n pureFunction5,\n pureFunction6,\n
pureFunction7,\n pureFunction8,\n pureFunctionV,\n queryRefresh,\n reference,\n resetView,\n resolveBody,\n
resolveDocument,\n resolveWindow,\n
  restoreView,\n\n setComponentScope,\n setNgModuleScope,\n StandaloneFeature,\n styleMap,\n
styleMapInterpolate1,\n styleMapInterpolate2,\n styleMapInterpolate3,\n styleMapInterpolate4,\n
styleMapInterpolate5,\n styleMapInterpolate6,\n styleMapInterpolate7,\n styleMapInterpolate8,\n
styleMapInterpolateV,\n styleProp,\n stylePropInterpolate1,\n stylePropInterpolate2,\n stylePropInterpolate3,\n
stylePropInterpolate4,\n stylePropInterpolate5,\n stylePropInterpolate6,\n stylePropInterpolate7,\n
stylePropInterpolate8,\n stylePropInterpolateV,\n syntheticHostListener,\n syntheticHostProperty,\n template,\n
templateRefExtractor,\n text,\n textInterpolate,\n textInterpolate1,\n textInterpolate2,\n textInterpolate3,\n
textInterpolate4,\n textInterpolate5,\n textInterpolate6,\n textInterpolate7,\n textInterpolate8,\n
textInterpolateV,\n viewQuery,\n getUnknownElementStrictMode,\n
  setUnknownElementStrictMode,\n getUnknownPropertyStrictMode,\n setUnknownPropertyStrictMode\n} from
'./render3/index';\nexport {\n  LContext as LContext,\n} from './render3/interfaces/context';\nexport {\n
  setDocument as setDocument\n} from './render3/interfaces/document';\nexport {\n  compileComponent as
compileComponent,\n  compileDirective as compileDirective,\n} from './render3/jit/directive';\nexport {\n
  resetJitOptions as resetJitOptions,\n} from './render3/jit/jit_options';\nexport {\n  compileNgModule as
compileNgModule,\n  compileNgModuleDefs as compileNgModuleDefs,\n  flushModuleScopingQueueAsMuchAsPossible as
flushModuleScopingQueueAsMuchAsPossible,\n  patchComponentDefWithScope as patchComponentDefWithScope,\n  resetCompiledComponents as
resetCompiledComponents,\n  transitiveScopesFor as transitiveScopesFor,\n} from './render3/jit/module';\nexport
{\n  FactoryTarget as FactoryTarget,\n  ngDeclareClassMetadata,\n  ngDeclareComponent,\n  ngDeclareDirective,\n
  ngDeclareFactory,\n  ngDeclareInjectable,\n  ngDeclareInjector,\n  ngDeclareNgModule,\n  ngDeclarePipe,\n}
from './render3/jit/partial';\nexport {\n  compilePipe as compilePipe,\n} from
'./render3/jit/pipe';\nexport { isStandalone as isStandalone } from './render3/definition';\nexport { Profiler as Profiler,
  ProfilerEvent as ProfilerEvent } from './render3/profiler';\nexport {\n  publishDefaultGlobalUtils as
publishDefaultGlobalUtils\n,\n  publishGlobalUtil as publishGlobalUtil } from './render3/util/global_utils';\nexport
{ ViewRef as ViewRef } from './render3/view_ref';\nexport {\n  bypassSanitizationTrustHtml as
bypassSanitizationTrustHtml,\n  bypassSanitizationTrustResourceUrl as bypassSanitizationTrustResourceUrl,\n
  bypassSanitizationTrustScript as bypassSanitizationTrustScript,\n  bypassSanitizationTrustStyle as
bypassSanitizationTrustStyle,\n  bypassSanitizationTrustUrl as bypassSanitizationTrustUrl,\n} from
'./sanitization/bypass';\nexport
{\n  sanitizeHtml,\n  sanitizeResourceUrl,\n  sanitizeScript,\n  sanitizeStyle,\n  sanitizeUrl,\n
  sanitizeUrlOrResourceUrl,\n  trustConstantHtml,\n  trustConstantResourceUrl,\n} from
'./sanitization/sanitization';\nexport {\n  validateIframeAttribute,\n} from
'./sanitization/iframe_attrs_validation';\nexport {\n  noSideEffects as noSideEffects,\n} from './util/closure';\n\n//
clang-format on\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport { Injector } from './di/injector';\nimport { EnvironmentInjector, getNullInjector } from
'./di/r3_injector';\nimport { Type } from './interface/type';\nimport { ComponentRef } from
'./linker/component_factory';\n\nimport { ComponentFactory } from './component_ref';\nimport { getComponentDef }
from './definition';\nimport { assertComponentDef } from './errors';\n\n/**\n
  * Creates a `ComponentRef` instance based on provided component type and a set of options.\n * \n *
  @usageNotes\n * \n * The example below demonstrates how the `createComponent` function can be used\n * to
  create an instance of a ComponentRef dynamically and attach it to an ApplicationRef,\n * so that it gets included
  into change detection cycles.\n * \n * Note: the example uses standalone components, but the function can also be
  used for\n * non-standalone components (declared in an NgModule) as well.\n * \n * ```\ntypescript\n *

```

```

@Component({\n * standalone: true,\n * template: `Hello {{ name }}!\n * `})\n * class HelloComponent {\n *
name = 'Angular';\n * }\n * \n * @Component({\n * standalone: true,\n * template: `<div id="hello-component-
host"></div>\n * `})\n * class RootComponent {\n * \n * // Bootstrap an application.\n * const applicationRef =
await bootstrapApplication(RootComponent);\n * \n * // Locate a DOM node that would be used as a host.\n * const
host
= document.getElementById('hello-component-host');\n * \n * // Get an `EnvironmentInjector` instance from the
`ApplicationRef`.\n * const environmentInjector = applicationRef.injector;\n * \n * // We can now create a
`ComponentRef` instance.\n * const componentRef = createComponent(HelloComponent, {host,
environmentInjector});\n * \n * // Last step is to register the newly created ref using the `ApplicationRef` instance\n
* // to include the component view into change detection cycles.\n *
applicationRef.attachView(componentRef.hostView);\n * ``\n * \n * @param component Component class
reference.\n * @param options Set of options to use:\n * * `environmentInjector`: An `EnvironmentInjector`
instance to be used for the component, see\n * additional info about it at https://angular.io/guide/standalone-
components#environment-injectors.\n * * `hostElement` (optional): A DOM node that should act as a host node for
the component. If not\n * provided, Angular creates one based on the tag name
used in the component selector (and falls\n * back to using `div` if selector doesn't have tag name info).\n * *
`elementInjector` (optional): An `ElementInjector` instance, see additional info about it at\n *
https://angular.io/guide/hierarchical-dependency-injection#elementinjector.\n * * `projectableNodes` (optional): A
list of DOM nodes that should be projected through\n *
[<ng-content>](api/core/ng-content) of the
new component instance.\n * @returns ComponentRef instance that represents a given Component.\n * \n *
@publicApi\n * \n * export function createComponent<C>(component: Type<C>, options: {\n * environmentInjector:
EnvironmentInjector,\n * hostElement?: Element,\n * elementInjector?: Injector,\n * projectableNodes?: Node[][],\n * }):
ComponentRef<C> {\n * \n * ngDevMode && assertComponentDef(component);\n * const componentDef =
getComponentDef(component)!;\n * const elementInjector = options.elementInjector || getNullInjector();\n * const
factory = new ComponentFactory<C>(componentDef);\n *
return factory.create(\n * elementInjector, options.projectableNodes, options.hostElement,
options.environmentInjector);\n * }\n * \n * \n * An interface that describes the subset of component metadata\n * that
can be retrieved using the `reflectComponentType` function.\n * \n * \n * @publicApi\n * \n * export interface
ComponentMirror<C> {\n * \n * /**\n * * The component's HTML selector.\n * * \n * get selector(): string;\n * \n * /**\n * * The
type of component the factory will create.\n * * \n * get type(): Type<C>;\n * \n * /**\n * * The inputs of the component.\n * * \n *
get inputs(): ReadonlyArray<{readonly propName: string, readonly templateName: string}>;\n * \n * /**\n * * The
outputs of the component.\n * * \n * get outputs(): ReadonlyArray<{readonly propName: string, readonly
templateName: string}>;\n * \n * /**\n * * Selector for all <ng-content> elements in the component.\n * * \n *
get ngContentSelectors(): ReadonlyArray<string>;\n * \n * /**\n * * Whether this component is marked as standalone.\n *
* \n * get isStandalone(): boolean;\n * }\n * \n * \n * Creates an object that allows to retrieve component metadata.\n * \n * \n * @usageNotes\n * \n * The example below
demonstrates how to use the function and how the fields\n * of the returned object map to the component
metadata.\n * \n * \n * typescript\n * @Component({\n * standalone: true,\n * selector: 'foo-component',\n *
template: `\n * <ng-content></ng-content>\n * <ng-content select="content-selector-a"></ng-content>\n *
`,\n * })\n * class FooComponent {\n * \n * @Input('inputName') inputPropName: string;\n * \n * @Output('outputName')
outputPropName = new EventEmitter<void>;\n * }\n * \n * const mirror =
reflectComponentType(FooComponent);\n * expect(mirror.type).toBe(FooComponent);\n *
expect(mirror.selector).toBe('foo-component');\n * expect(mirror.isStandalone).toBe(true);\n *
expect(mirror.inputs).toEqual([{\n * propName: 'inputName',\n * templateName: 'inputPropName'}]);\n *
expect(mirror.outputs).toEqual([{\n * propName: 'outputName',\n * templateName: 'outputPropName'}]);\n *
expect(mirror.ngContentSelectors).toEqual([\n * '*', // first `<ng-content>` in a template, the selector
defaults to `*\n * 'content-selector-a' // second `<ng-content>` in a template\n * ]);\n * ``\n * \n * \n * @param
component Component class reference.\n * @returns An object that allows to retrieve component metadata.\n * \n *

```





d", "getNamespace", "unusedValueToPlacateAjd", "unused1", "unused2", "unused3", "unused4", "unused5", "policy", "getPolicy", "inject", "USE\_VALUE", "NULL\_INJECTOR", "ComponentRef", "ComponentFactory", "getComponent", "ComponentFactoryResolver", "ViewRef", "AbstractComponentFactoryResolver", "AbstractComponentFactory", "AbstractComponentRef", "LOCALE\_ID", "NgModuleRef", "NgModuleFactory", "viewEngine\_NgModuleRef", "viewEngine\_ComponentFactoryResolver", "viewEngine\_NgModuleFactory", "defineInjectable", "getDirectiveMetadata", "getDebugNode", "R3\_ViewRef", "R3ComponentFactory", "R3ViewRef", "ViewEngine\_TemplateRef", "ViewEngine\_ElementRef", "r3.attribute", "r3.attributeInterpolate1", "r3.attributeInterpolate2", "r3.attributeInterpolate3", "r3.attributeInterpolate4", "r3.attributeInterpolate5", "r3.attributeInterpolate6", "r3.attributeInterpolate7", "r3.attributeInterpolate8", "r3.attributeInterpolateV", "r3.defineComponent", "r3.defineDirective", "r3.defineNgModule", 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/**  
 * @license Angular v14.3.0  
 * (c) 2010-2022 Google LLC. https://angular.io/  
 * License: MIT  
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Angular  
=====

The sources for this package are in the main [Angular](<https://github.com/angular/angular>) repo. Please file issues and pull requests against that repo.

Usage information and reference details can be found in [Angular documentation](<https://angular.io/docs>).

License: MIT

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* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nexport function\ngetClosureSafeProperty<T>(objWithPropertyToExtract: T): string {\n  for (let key in objWithPropertyToExtract)\n    if (objWithPropertyToExtract[key] === getClosureSafeProperty as any) {\n      return key;\n    }\n  }\n  throw\n  Error('Could not find renamed property on target object.);\n}\n\n/**\n * Sets properties on a target object from a\n * source object, but only if\n * the property doesn't already exist on the target object.\n * @param target The target to\n * set properties on\n * @param source The source of the property keys and values to set\n *\n\nexport function\nfillProperties(target: {[key: string]: string}, source: {[key: string]: string}) {\n  for (const\n  key in source) {\n    if (source.hasOwnProperty(key) && !target.hasOwnProperty(key)) {\n      target[key] =\n      source[key];\n    }\n  }\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this\n * source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n *\n\nexport function\nstringify(token: any): string {\n  if (typeof token === 'string') {\n    return token;\n  }\n  if (Array.isArray(token)) {\n    return '[' + token.map(stringify).join(', ') + ']';\n  }\n  if (token\n  === null) {\n    return '' + token;\n  }\n  if (token.overriddenName) {\n    return `${token.overriddenName}`;\n  }\n  if (token.name) {\n    return `${token.name}`;\n  }\n  const res = token.toString();\n  if (res === null) {\n    return '' + res;\n  }\n  const newLineIndex = res.indexOf('\\n');\n  return newLineIndex === -1 ? res :\n  res.substring(0, newLineIndex);\n}\n\n/**\n * Concatenates two strings with separator,\n * allocating new strings only when necessary.\n * @param before before string.\n * @param separator separator\n * string.\n * @param after after string.\n *\n\nexport function\nconcatStringsWithSpace(before: string|null, after: string|null): string {\n  return (before === null || before === '') ?\n  (after === null ? '' : after) :\n  ((after === null || after === '') ? before : before + ' ' + after);\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-\n * style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {Type} from\n'./interface/type';\nimport {getClosureSafeProperty} from './util/property';\nimport {stringify} from\n'./util/stringify';\n\n/**\n * An interface that a function passed into { @link forwardRef } has to implement.\n *\n * @usageNotes\n * ### Example\n *\n * { @example core/di/ts/forward_ref/forward_ref_spec.ts\n * region='forward_ref_fn'}\n *\n * @publicApi\n *\n\nexport interface\nForwardRefFn {\n  (): any;\n}\n\nconst\n__forward_ref__ =\ngetClosureSafeProperty({__forward_ref__: getClosureSafeProperty});\n\n/**\n * Allows to refer to references\n * which are not yet defined.\n *\n * For instance, `forwardRef` is used when the `token` which we need to refer to for
```

```

the purposes of DI is declared, but not yet defined. It is also used when the `token` which we use when
creating a query is not yet defined.
@usageNotes
### Example
{
  @example
  core/di/ts/forward_ref/forward_ref_spec.ts
  region='forward_ref'
}
@publicApi
export function
forwardRef(forwardRefFn: ForwardRefFn): Type<any> {
  (<any>forwardRefFn).__forward_ref__ =
  forwardRef;
  (<any>forwardRefFn).toString = function() {
    return stringify(this);
  };
  return
  (<Type<any>><any>forwardRefFn);
}
Lazily retrieves the reference value from a forwardRef.
Acts as the identity function when given a non-forward-ref
value.
@usageNotes
### Example
{
  @example
  core/di/ts/forward_ref/forward_ref_spec.ts
  region='resolve_forward_ref'
}
@see `forwardRef`
@publicApi
export function
resolveForwardRef<T>(type: T): T {
  return isForwardRef(type) ? type() : type;
}
Checks whether a
function is wrapped by a `forwardRef`.
export function isForwardRef(fn: any): fn is() => any {
  return typeof
  fn === 'function' && fn.hasOwnProperty('__forward_ref__') &&
  fn.__forward_ref__ ===
  forwardRef;
}
}
}
@license
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Use of this source
code is governed by an MIT-style license that can be
found in the LICENSE file at https://angular.io/license
Base URL for the error details page.
Keep the files below in full sync:
-
packages/compiler-cli/src/ngtsc/diagnostics/src/error_details_base_url.ts
-
packages/core/src/error_details_base_url.ts
export const ERROR_DETAILS_PAGE_BASE_URL
= 'https://angular.io/errors';
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Use of
this source code is governed by an MIT-style license that can be
found in the LICENSE file at
https://angular.io/license
import {ERROR_DETAILS_PAGE_BASE_URL} from
'./error_details_base_url';
The list of error codes used in runtime code of the `core` package.
Reserved
error code range: 100-999.
Note: the minus sign denotes the fact that a particular code has a detailed guide
on angular.io. This extra annotation is needed to avoid introducing a separate set to store
error codes which
have guides, which might leak into runtime code.
Full list of available error guides can be found at
https://angular.io/errors
export const enum RuntimeErrorCode {
  // Change Detection Errors
  EXPRESSION_CHANGED_AFTER_CHECKED = -100,
  RECURSIVE_APPLICATION_REF_TICK =
  101,
  // Dependency Injection Errors
  CYCLIC_DI_DEPENDENCY
  = -200,
  PROVIDER_NOT_FOUND = -201,
  INVALID_FACTORY_DEPENDENCY = 202,
  MISSING_INJECTION_CONTEXT = -203,
  INVALID_INJECTION_TOKEN = 204,
  INJECTOR_ALREADY_DESTROYED = 205,
  PROVIDER_IN_WRONG_CONTEXT = 207,
  MISSING_INJECTION_TOKEN = 208,
  INVALID_MULTI_PROVIDER = 209,
  // Template Errors
  MULTIPLE_COMPONENTS_MATCH = -300,
  EXPORT_NOT_FOUND = -301,
  PIPE_NOT_FOUND = -
  302,
  UNKNOWN_BINDING = 303,
  UNKNOWN_ELEMENT = 304,
  TEMPLATE_STRUCTURE_ERROR = 305,
  INVALID_EVENT_BINDING = 306,
  // Bootstrap Errors
  MULTIPLE_PLATFORMS = 400,
  PLATFORM_NOT_FOUND = 401,
  ERROR_HANDLER_NOT_FOUND
  = 402,
  BOOTSTRAP_COMPONENTS_NOT_FOUND = 403,
  PLATFORM_ALREADY_DESTROYED =
  404,
  ASYNC_INITIALIZERS_STILL_RUNNING = 405,
  APPLICATION_REF_ALREADY_DESTROYED
  = 406,
  RENDERER_NOT_FOUND = 407,
  // Styling Errors
  // Declarations Errors
  // i18n Errors
  INVALID_I18N_STRUCTURE = 700,
  MISSING_LOCALE_DATA = 701,
  // standalone errors
  IMPORT_PROVIDERS_FROM_STANDALONE = 800,
  // JIT Compilation Errors
  // Other
  INVALID_DIFFER_INPUT = 900,
  NO_SUPPORTING_DIFFER_FACTORY = 901,
  VIEW_ALREADY_ATTACHED = 902,
  INVALID_INHERITANCE = 903,
  UNSAFE_VALUE_IN_RESOURCE_URL = 904,
  UNSAFE_VALUE_IN_SCRIPT = 905,
  MISSING_GENERATED_DEF = 906,
  TYPE_IS_NOT_STANDALONE = 907,
  MISSING_ZONEJS = 908,
  UNEXPECTED_ZONE_STATE = 909,
  UNSAFE_IFRAME_ATTRS = -910,
}
Class that represents
a runtime error.
Formats and outputs the error message in a consistent way.
Example:
throw
new RuntimeError(
  RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,
  ngDevMode &&
  'Injector has already been destroyed.');
```

message as a string in development mode (when the `ngDevMode` is defined). In production mode (after tree-shaking pass), the `message` argument becomes `false`, thus we account for it in the typings and the runtime logic.

```

export class RuntimeError<T extends number = RuntimeErrorCode>
  extends Error {
    constructor(public code: T, message: null|false|string) {
      super(formatRuntimeError<T>(code, message));
    }
  }
  /**
   * Called to format a runtime error.
   * See additional info on the `message` argument
   * type in the `RuntimeError` class description.
   */
  export function formatRuntimeError<T extends number =
  RuntimeErrorCode>(code: T, message: null|false|string): string {
    // Error code might be a negative number,
    // which is a special marker that instructs the logic to
    // generate a link to the error details page on angular.io
    const fullCode = `NG0${Math.abs(code)}`;
    let errorMessage = `${fullCode}${message ? ': ' + message.trim() : ''}`;
    if (ngDevMode && code < 0) {
      const addPeriodSeparator = !errorMessage.match(/[,;!?$/);
      const separator = addPeriodSeparator ? '! : ' : '';
      errorMessage = `${errorMessage}${separator}`;
    }
    Find more at ${ERROR_DETAILS_PAGE_BASE_URL}/${fullCode};
    return errorMessage;
  }
  /**
   * @license
   * Copyright Google LLC All Rights Reserved.
   * Use of this source code is governed by an MIT-style
   * license that can be found in the LICENSE file at
   * https://angular.io/license
   */
  Used for stringifying render output in Ivy.
  Important! This function is very performance-sensitive and we should be extra careful
  not to introduce megamorphic reads in it.
  Check `core/test/render3/perf/render_stringify` for benchmarks and
  alternate implementations.
  export function stringify(value: any): string {
    if (typeof value === 'string')
      return value;
    if (value == null) return '';
    // Use `String` so that it invokes the `toString` method of the value.
    // Note that this appears to be faster than calling `value.toString` (see `render_stringify` benchmark).
    return String(value);
  }
  /**
   * Used to stringify a value so that it can be displayed in an error message.
   * Important! This function contains a megamorphic read and should only be used for error messages.
   */
  export function stringifyForError(value: any): string {
    if (typeof value === 'function')
      return value.name || value.toString();
    if (typeof value === 'object' && value != null && typeof value.type === 'function')
      return value.type.name || value.type.toString();
    return stringify(value);
  }
  /**
   * @license
   * Copyright Google LLC All Rights Reserved.
   * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at
   * https://angular.io/license
   */
  import {ImportedNgModuleProviders} from './di/interface/provider';
  import {RuntimeError, RuntimeErrorCode} from './errors';
  import {Type} from './interface/type';
  import {stringify} from './util/stringify';
  import {stringifyForError} from './util/stringify_utils';
  /**
   * Called when directives inject each other (creating a circular dependency)
   */
  export function throwCyclicDependencyError(token: string, path?: string[]): never {
    const depPath = path ? `Dependency path: ${path.join(' > ')} > ${token}` : '';
    throw new RuntimeError(RuntimeErrorCode.CYCLIC_DI_DEPENDENCY, `Circular dependency in DI detected for ${token}${depPath}`);
  }
  export function throwMixedMultiProviderError() {
    throw new Error(`Cannot mix multi providers and regular providers`);
  }
  export function throwInvalidProviderError(ngModuleType?: Type<unknown>, providers?: any[], provider?: any): never {
    if (ngModuleType && providers) {
      const providerDetail = providers.map(v => v == provider ? '?' + provider + '?' : '...');
      throw new Error(`Invalid provider for the NgModule '${stringify(ngModuleType)}' - only instances of Provider and Type are allowed, got: [${providerDetail.join(', ')}]`);
    } else if ((provider as ImportedNgModuleProviders).providers) {
      throw new RuntimeError(RuntimeErrorCode.PROVIDER_IN_WRONG_CONTEXT, `Invalid providers from 'importProvidersFrom' present in a non-environment injector. 'importProvidersFrom' can't be used for component providers.`);
    } else {
      throw new Error(`Invalid provider`);
    }
  }
  /**
   * Throws an error when a token is not found in DI.
   */
  export function throwProviderNotFoundError(token: any, injectorName?: string): never {
    const injectorDetails = injectorName ? ` in ${injectorName}` : '';
    throw new RuntimeError(RuntimeErrorCode.PROVIDER_NOT_FOUND, `ngDevMode && `No provider for ${stringifyForError(token)} found${injectorDetails}`);
  }
  /**
   * @license
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   * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at
   * https://angular.io/license
   */
  The functions in this file verify that the assumptions we are

```

making about state in an instruction

```
are correct before implementing any logic. They are meant only to be called in dev mode as sanity
checks.
import { stringify } from './stringify';
export function assertNumber(actual: any, msg: string): asserts
actual is number {
  if (!(typeof actual === 'number')) {
    throwError(msg, typeof actual, 'number', '===');
  }
}
export function assertNumberInRange(
  actual: any, minInclusive: number, maxInclusive: number):
asserts actual is number {
  assertNumber(actual, 'Expected a number');
  assertLessThanOrEqual(actual,
maxInclusive, 'Expected number to be less than or equal to');
  assertGreaterThanOrEqual(actual, minInclusive,
'Expected number to be greater than or equal to');
}
export function assertString(actual: any, msg: string):
asserts actual is string {
  if (!(typeof actual === 'string')) {
    throwError(msg, actual === null ? 'null' : typeof
actual, 'string', '===');
  }
}
export function assertFunction(actual: any, msg: string): asserts
actual is Function {
  if (!(typeof actual === 'function')) {
    throwError(msg, actual === null ? 'null' : typeof
actual, 'function', '===');
  }
}
export function assertEquals<T>(actual: T, expected: T, msg: string) {
  if
(actual !== expected) {
    throwError(msg, actual, expected, '===');
  }
}
export function
assertNotEqual<T>(actual: T, expected: T, msg: string): asserts actual is T {
  if (actual === expected) {
    throwError(msg, actual, expected, '!==');
  }
}
export function
assertSame<T>(actual: T, expected: T, msg:
string): asserts actual is T {
  if (actual !== expected) {
    throwError(msg, actual, expected, '===');
  }
}
export function
assertNotSame<T>(actual: T, expected: T, msg: string) {
  if (actual === expected) {
    throwError(msg, actual, expected, '!==');
  }
}
export function
assertLessThan<T>(actual: T, expected: T, msg:
string): asserts actual is T {
  if (actual <= expected) {
    throwError(msg, actual,
expected, '<');
  }
}
export function
assertLessThanOrEqual<T>(actual: T, expected: T, msg: string): asserts
actual is T {
  if (actual <= expected) {
    throwError(msg, actual, expected, '<=');
  }
}
export function
assertGreaterThan<T>(actual: T, expected: T, msg: string): asserts actual is T {
  if (actual >= expected) {
    throwError(msg, actual, expected, '>');
  }
}
export function
assertGreaterThanOrEqual<T>(
  actual: T,
  expected: T, msg: string): asserts actual is T {
  if (actual >= expected) {
    throwError(msg, actual, expected,
'>=');
  }
}
export function
assertNotDefined<T>(actual: T, msg: string) {
  if (actual !== null) {
    throwError(msg, actual, null, '===');
  }
}
export function
assertDefined<T>(actual: T | null | undefined, msg:
string): asserts actual is T {
  if (actual === null) {
    throwError(msg, actual, null, '!==');
  }
}
export function
throwError(msg: string): never;
export function throwError(msg: string,
actual?: any, expected?: any, comparison?: string): never {
  throw new Error(`
  ASSERTION ERROR: ${msg}
  +
  (comparison === null ? " : ` [Expected=>
  ${expected}
  ${comparison}
  ${actual}
  <=Actual]`);
`);
}
export function
assertDomNode(node: any): asserts node is Node {
  // If we're in a worker, `Node` will not be defined.
  if
  (!(typeof Node !== 'undefined' && node instanceof Node) &&
  !(typeof node === 'object' && node !== null
  &&
  node.constructor.name === 'WebWorkerRenderNode')) {
    throwError(`The provided value must be an
instance of a DOM Node but got
${stringify(node)}`);
  }
}
export
function assertIndexInRange(arr: any[],
index: number) {
  assertDefined(arr, 'Array must be defined.');
```

const maxLen = arr.length;
if (index < 0 ||
index >= maxLen) {
 throwError(`Index expected to be less than
\${maxLen} but got
\${index}`);
}
}
export
function assertOneOf(value: any, ...validValues: any[]) {
 if (validValues.indexOf(value) !== -1) return true;
 throwError(`Expected value to be one of
\${JSON.stringify(validValues)} but was
\${JSON.stringify(value)}.`);
}
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found in the LICENSE file at
<https://angular.io/license>
import { Type } from '../interface/type';
import { getClosureSafeProperty } from
 '../util/property';
import { ClassProvider, ConstructorProvider, ExistingProvider, FactoryProvider,
StaticClassProvider, ValueProvider } from './provider';
Information about how a type or
`InjectionToken` interfaces with the DI system.
At a minimum, this includes a `factory` which defines how
to create the given type `T`, possibly
requesting injection of other types if necessary.
Optionally, a
`providedIn` parameter



specifies that the given type belongs to a particular `Injector`, `NgModule`, or a special scope (e.g. `root`). A value of `null` indicates that the injectable does not belong to any scope. The ViewEngine compiler emits code with this type for injectables. This code is deployed to npm, and should be treated as public api.

`InjectableDeclaration<T>` Specifies that the given type belongs to a particular injector: `InjectorType` such as `NgModule`, `root` the root injector, `any` all injectors, `null`, does not belong to any injector. Must be explicitly listed in the `injectorProviders` providedIn: `InjectorType<any>|root|platform|any|environment|null`

The token to which this definition belongs. Note that this may not be the same as the type that the `factory` will create.

token: unknown;

`Factory method to execute to create an instance of the injectable.`

`factory: (t?: Type<any>) => T;`

In a case of no explicit injector, a location where the instance of the injectable is stored.

value: T|undefined;

Information about the providers to be included in an `Injector` as well as how the given type which carries the information should be created by the DI system.

An `InjectorDef` can import other types which have `InjectorDefs`, forming a deep nested structure of providers with a defined priority (identically to how `NgModule`'s also have an import/dependency structure).

NOTE: This is a private type and should not be exported.

`InjectorDef<T>` Narrow down the type here once decorators properly change the return type of the class they are decorating (to add the `prov` property for example).

providers:

```
(Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|
  StaticClassProvider|ClassProvider|any[]); imports:
```

`InjectorType<any>|InjectorTypeWithProviders<any>[];` A `Type` which has a `prov`: `InjectableDeclaration` static field.

`InjectableType`'s contain their own Dependency Injection metadata and are usable in an `InjectorDef`-based `StaticInjector`.

`InjectableType<T>` extends `Type<T>` Opaque type whose structure is highly version dependent. Do not rely on any properties.

`prov: unknown;` A type which has an `InjectorDef` static field.

`InjectorTypes` can be used to configure a `StaticInjector`.

This is an opaque type whose structure is highly version dependent. Do not rely on any properties.

`InjectorType<T>` extends `Type<T>` `fac?: unknown;` `inj: unknown;` Describes the `InjectorDef` equivalent

of a `ModuleWithProviders`, an `InjectorType` with an associated array of providers.

Objects of this type can be listed in the imports section of an `InjectorDef`.

NOTE: This is a private type and should not be exported.

`InjectorTypeWithProviders<T>` `ngModule: InjectorType<T>; providers?:`

```
(Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|
  StaticClassProvider|ClassProvider|any[]);
```

Construct an injectable definition which defines how a token will be constructed by the DI system, and in which injectors (if any) it will be available.

This should be assigned to a static `prov` field on a type, which will then be an `InjectableType`.

Options:

- `providedIn` determines which injectors will include the injectable, by either associating it with an `NgModule` or other `InjectorType`, or by specifying that this injectable should be provided in the `root` injector, which will be the application-level injector in most apps.
- `factory` gives the zero argument function which will create an instance of the injectable. The factory can call `inject` to access the `Injector` and request injection of dependencies.

This instruction has been emitted by ViewEngine for some time and is deployed to npm.

`defineInjectable<T>(opts: { token: unknown, providedIn?: Type<any>|root|platform|any|environment|null, factory: () => T, inj: unknown } | { token: opts.token, providedIn: opts.providedIn as any || null, factory: opts.factory, value: undefined, } as InjectableDeclaration<T>);`

@deprecated in v8, delete after v10. This API should be used only by generated code, and that code should now use `defineInjectable` instead.

`defineInjectable = defineInjectable;` Construct

```

an `InjectorDef` which configures an injector.\n * This should be assigned to a static injector def (`inj`) field on
a type, which will then be an\n * `InjectorType`.\n * Options:\n * * `providers`: an optional array of
providers to add to the injector. Each provider must\n * either have a factory or point to a type which has a `prov`
static property (the\n * type must be an `InjectableType`).\n * * `imports`: an optional array of imports of other
`InjectorType`s or `InjectorTypeWithModule`s\n * whose providers will also be added to the injector. Locally
provided types will override\n * providers from imports.\n * * @codeGenApi\n */\nexport function
defineInjector(options: {providers?: any[], imports?: any[]}): unknown {\n return {providers: options.providers || [],
imports: options.imports || []};\n}\n\n/**\n * Read the injectable def (`prov`) for `type` in a way which is immune to
accidentally reading\n * inherited value.\n * * @param type A type
which may have its own (non-inherited) `prov`.\n */\nexport function getInjectableDef<T>(type: any):
InjectableDeclaration<T>|null {\n return getOwnDefinition(type, NG_PROV_DEF) || getOwnDefinition(type,
NG_INJECTABLE_DEF);\n}\n\nexport function isInjectable(type: any): boolean {\n return getInjectableDef(type)
!== null;\n}\n\n/**\n * Return definition only if it is defined directly on `type` and is not inherited from a base\n *
class of `type`.\n */\nexport function getOwnDefinition<T>(type: any, field: string): InjectableDeclaration<T>|null {\n
return type.hasOwnProperty(field) ? type[field] : null;\n}\n\n/**\n * Read the injectable def (`prov`) for `type` or
read the `prov` from one of its ancestors.\n * * @param type A type which may have `prov`, via inheritance.\n *
* @deprecated Will be removed in a future version of Angular, where an error will occur in the\n * scenario if we
find the `prov` on an ancestor only.\n */\nexport function getInheritedInjectableDef<T>(type:
any): InjectableDeclaration<T>|null {\n const def = type && (type[NG_PROV_DEF] ||
type[NG_INJECTABLE_DEF]);\n if (def) {\n const typeName = getTypeName(type);\n // TODO(FW-1307):
Re-add ngDevMode when closure can handle it\n // ngDevMode && console.warn(\n `DEPRECATED:
DI is instantiating a token \"${\n typeName}\" that inherits its @Injectable decorator but does not provide one
itself.\\n` +\n `This will become an error in a future version of Angular. Please add @Injectable() to the \"${\n
typeName}\" class.`);\n return def;\n } else {\n return null;\n }\n}\n\n/** Gets the name of a type,
accounting for some cross-browser differences. */\nexport function getTypeName(type: any): string {\n //
`Function.prototype.name` behaves differently between IE and other browsers. In most browsers\n // it'll always
return the name of the function itself, no matter how many other functions it\n // inherits from. On IE the function
doesn't
have its own `name` property, but it takes it from\n // the lowest level in the prototype chain. E.g. if we have `class
Foo extends Parent` most\n // browsers will evaluate `Foo.name` to `Foo` while IE will return `Parent`. We work
around\n // the issue by converting the function to a string and parsing its name out that way via a regex.\n if
(type.hasOwnProperty('name')) {\n return type.name;\n }\n\n const match = (" +
type).match(/function\s*(\s*\s*(\s*\s*)/);\n return match === null ? " : match[1];\n}\n\n/**\n * Read the injector def
type in a way which is immune to accidentally reading inherited value.\n * * @param type type which may have
an injector def (`inj`)\n */\nexport function getInjectorDef<T>(type: any): InjectorDef<T>|null {\n return type &&
(type.hasOwnProperty(NG_INJ_DEF) || type.hasOwnProperty(NG_INJECTOR_DEF)) ?\n (type as
any)[NG_INJ_DEF] :\n null;\n}\n\nexport const NG_PROV_DEF = getClosureSafeProperty({prov:
getClosureSafeProperty});\nexport
const NG_INJ_DEF = getClosureSafeProperty({inj: getClosureSafeProperty});\n\n// We need to keep these around
so we can read off old defs if new defs are unavailable\nexport const NG_INJECTABLE_DEF =
getClosureSafeProperty({ngInjectableDef: getClosureSafeProperty});\nexport const NG_INJECTOR_DEF =
getClosureSafeProperty({ngInjectorDef: getClosureSafeProperty});\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\n/**\n * Special flag indicating that a decorator is of type
`Inject`. It's used to make `Inject`\n * decorator tree-shakable (so we don't have to rely on the `instanceof`
checks).\n * Note: this flag is not included into the `InjectFlags` since it's an internal-only API.\n */\nexport
const enum
DecoratorFlags {\n Inject = -1\n}\n\n/**\n * Injection flags for DI.\n * * @publicApi\n * @deprecated use an
options

```

```

object for `inject` instead.\n *^nexport enum InjectFlags {\n // TODO(alxhub): make this 'const' (and remove
`InternalInjectFlags` enum) when ngc no longer\n // writes exports of it into ngfactory files.\n\n /** Check self and
check parent injector if needed *\n Default = 0b0000,\n\n /**\n * Specifies that an injector should retrieve a
dependency from any injector until reaching the\n * host element of the current component. (Only used with
Element Injector)\n *^n Host = 0b0001,\n\n /** Don't ascend to ancestors of the node requesting injection. *\n
Self = 0b0010,\n\n /** Skip the node that is requesting injection. *\n SkipSelf = 0b0100,\n\n /** Inject
`defaultValue` instead if token not found. *\n Optional = 0b1000,\n\n\n/**\n * This enum is an exact copy of the
`InjectFlags` enum above, but the difference is that this is a\n * const enum, so actual enum values would be inlined
in generated code. The `InjectFlags` enum can\n * be turned into a const enum when
ViewEngine is removed (see TODO at the `InjectFlags` enum\n * above). The benefit of inlining is that we can use
these flags at the top level without affecting\n * tree-shaking (see `"no-toplevel-property-access"` tslint rule for more
info).\n * Keep this enum in sync with `InjectFlags` enum above.\n *^nexport const enum InternalInjectFlags {\n
/** Check self and check parent injector if needed *\n Default = 0b0000,\n\n /**\n * Specifies that an injector
should retrieve a dependency from any injector until reaching the\n * host element of the current component. (Only
used with Element Injector)\n *^n Host = 0b0001,\n\n /** Don't ascend to ancestors of the node requesting
injection. *\n Self = 0b0010,\n\n /** Skip the node that is requesting injection. *\n SkipSelf = 0b0100,\n\n /**
Inject `defaultValue` instead if token not found. *\n Optional = 0b1000,\n\n\n/**\n * This token is being injected
into a pipe.\n *\n * This flag is intentionally not in the public
facing `InjectFlags` because it is only added by\n * the compiler and is not a developer applicable flag.\n *^n
ForPipe = 0b10000,\n\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *^n\nimport {throwProviderNotFoundError} from './render3/errors_di';\nimport
{assertNotEqual} from './util/assert';\nimport {stringify} from './util/stringify';\nimport {getInjectableDef,
InjectableDeclaration} from './interface/defs';\nimport {InjectFlags} from './interface/injector';\nimport
{ProviderToken} from './provider_token';\n\n\n/**\n * Current implementation of inject.\n *\n * By default, it is
`injectInjectorOnly`, which makes it `Injector`-only aware. It can be changed\n * to `directiveInject`, which brings
in the `NodeInjector` system of ivy. It is designed this\n * way for two reasons:\n * 1. `Injector` should not
depend on ivy logic.\n * 2. To maintain tree shake-ability we don't want to bring in unnecessary code.\n *^nlet
_injectImplementation: (<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)|\n undefined;\nexport
function getInjectImplementation() {\n return _injectImplementation;\n}\n\n\n/**\n * Sets the current inject
implementation.\n *^nexport function setInjectImplementation(\n impl: (<T>(token: ProviderToken<T>, flags?:
InjectFlags) => T | null)|\n undefined): (<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)|\nundefined
{\n const previous = _injectImplementation;\n _injectImplementation = impl;\n return previous;\n}\n\n\n/**\n *
Injects `root` tokens in limp mode.\n *\n * If no injector exists, we can still inject tree-shakable providers which
have `providedIn` set to\n * `"root"`. This is known as the limp mode injection. In such case the value is stored in
the\n * injectable definition.\n *^nexport function injectRootLimpMode<T>(\n token:
ProviderToken<T>, notFoundValue: T|undefined, flags: InjectFlags): T|null {\n const injectableDef:
InjectableDeclaration<T>|null = getInjectableDef(token);\n if (injectableDef && injectableDef.providedIn ==
'root') {\n return injectableDef.value === undefined ? injectableDef.value = injectableDef.factory() :\n
injectableDef.value;\n }\n if (flags & InjectFlags.Optional) return null;\n if (notFoundValue !==
undefined) return notFoundValue;\n throwProviderNotFoundError(stringify(token), 'Injector');\n}\n\n\n\n/**\n *
Assert that `_injectImplementation` is not `fn`.\n *\n * This is useful, to prevent infinite recursion.\n *\n * @param
fn Function which it should not equal to\n *^nexport function assertInjectImplementationNotEqual(\n fn:
(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)) {\n ngDevMode &&\n
assertNotEqual(_injectImplementation, fn, 'Calling inject would cause infinite recursion');\n}\n\n",/**\n
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MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *^n\n\n/**\n * Convince
closure compiler that the wrapped function has no side-effects.\n *\n * Closure compiler always assumes that

```

```

`toString` has no side-effects. We use this quirk to allow us to execute a function but have closure compiler mark the call as no-side-effects. It is important that the return value for the `noSideEffects` function be assigned to something which is retained otherwise the call to `noSideEffects` will be removed by closure compiler.

export function noSideEffects<T>(fn: () => T): T {
  return {toString: fn}.toString() as unknown as T;
}

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The strategy that the default change detector uses to detect changes. When set, takes effect the next time change detection is triggered.

@see { @link ChangeDetectorRef#usage-notes Change detection usage }

@publicApi
export enum ChangeDetectionStrategy {
  /** Use the `CheckOnce` strategy, meaning that automatic change detection is deactivated until reactivated by setting the strategy to `Default` (`CheckAlways`). Change detection can still be explicitly invoked. This strategy applies to all child directives and cannot be overridden.
    OnPush = 0,
  /** Use the default `CheckAlways` strategy, in which change detection is automatic until explicitly deactivated.
    Default = 1,
}

Defines the possible states of the default change detector.

@see `ChangeDetectorRef`
export enum ChangeDetectorStatus {
  /** A state in which, after calling `detectChanges()`, the change detector state becomes `Checked`, and must be explicitly invoked or reactivated.
    CheckOnce,
  /** A state in which change detection is skipped until the change detector mode becomes `CheckOnce`.
    Checked,
  /** A state in which change detection continues automatically until explicitly deactivated.
    CheckAlways,
  /** A state in which a change detector sub tree is not a part of the main tree and should be skipped.
    Detached,
  /** Indicates that the change detector encountered an error checking a binding or calling a directive lifecycle method and is now in an inconsistent state. Change detectors in this state do not detect changes.
    Errored,
  /** Indicates that the change detector has been destroyed.
    Destroyed,
}

Reports whether a given strategy is currently the default for change detection.

@param changeDetectionStrategy The strategy to check.
@returns True if the given strategy is the current default, false otherwise.

@see `ChangeDetectorStatus`
@see `ChangeDetectorRef`
export function isDefaultChangeDetectionStrategy(changeDetectionStrategy: ChangeDetectionStrategy): boolean {
  return changeDetectionStrategy == null || changeDetectionStrategy === ChangeDetectionStrategy.Default;
}

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Defines the CSS styles encapsulation policies for the { @link Component } decorator's `encapsulation` option. See { @link Component#encapsulation encapsulation }.

@usageNotes
### Example
{ @example core/ts/metadata/encapsulation.ts region='longform' }

@publicApi
export enum ViewEncapsulation {
  // TODO: consider making `ViewEncapsulation` a `const enum` instead. See // https://github.com/angular/angular/issues/44119 for additional information.
  /** Emulates a native Shadow DOM encapsulation behavior by adding a specific attribute to the component's host element and applying the same attribute to all the CSS selectors provided via { @link Component#styles styles } or { @link Component#styleUrls styleUrls }. This is the default option.
    Emulated = 0,
  // Historically the 1 value was for `Native` encapsulation which has been removed as of v11.
  /** Doesn't provide any sort of CSS style encapsulation, meaning that all the styles provided via { @link Component#styles styles } or { @link Component#styleUrls styleUrls } are applicable to any HTML element of the application regardless of their host Component.
    None = 2,
  /** Uses the browser's native Shadow DOM API to encapsulate CSS styles, meaning that it creates a ShadowRoot for the component's host element which is then used to encapsulate all the Component's styling.
    ShadowDom = 3,
}

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TODO(jteplitz602): Load WorkerGlobalScope from lib.webworker.d.ts file #3492
declare var WorkerGlobalScope: any;
// TODO #9100 */;
// CommonJS / Node have global context exposed as `global`

```

```

variable.\n// We don't want to include the whole node.d.ts this this compilation unit so we'll just fake\n// the global
\"global\" var for now.\ndeclare var global: any /** TODO #9100 */;\n\n// Always use __globalThis if available,
which is the spec-defined global variable across all\n// environments, then fallback to __global first, because in
Node tests both __global and\n// __window may be defined and __global should be __global in that case. Note:
Typeof/Instanceof\n//
checks are considered side-effects in Terser. We explicitly mark this as side-effect free:\n//
https://github.com/terser/terser/issues/250.\nconst __global: any = (/ * @__PURE__ */ (\n () => (typeof globalThis
!=='undefined' && globalThis) ||\n (typeof global !== 'undefined' && global) || (typeof window !== 'undefined'
&& window) ||\n (typeof self !== 'undefined' && typeof WorkerGlobalScope !== 'undefined' &&\n self
instanceof WorkerGlobalScope && self)));\n\n/**\n * Attention: whenever providing a new value, be sure to add
an\n * entry into the corresponding `...externs.js` file,\n * so that closure won't use that global for its purposes.\n
*/\nexport {__global as global};\n","/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {global} from './global';\ndeclare global {\n /**\n * Values
of ngDevMode\n * Depending on the current state of the application, ngDevMode may have one of several
values.\n *\n * For convenience, the “truthy” value which enables dev mode is also an object which contains\n *
Angular’s performance counters. This is not necessary, but cuts down on boilerplate for the\n * perf counters.\n
*\n * ngDevMode may also be set to false. This can happen in one of a few ways:\n * - The user explicitly sets
`window.ngDevMode = false` somewhere in their app.\n * - The user calls `enableProdMode()`.\n * - The URL
contains a `ngDevMode=false` text.\n * Finally, ngDevMode may not have been defined at all.\n */\n const
ngDevMode: null|NgDevModePerfCounters;\n interface NgDevModePerfCounters {\n namedConstructors:
boolean;\n firstCreatePass: number;\n tNode: number;\n tView: number;\n rendererCreateTextNode:
number;\n rendererSetText: number;\n rendererCreateElement: number;\n rendererAddEventListener:
number;\n
rendererSetAttribute: number;\n rendererRemoveAttribute: number;\n rendererSetProperty: number;\n
rendererSetClassName: number;\n rendererAddClass: number;\n rendererRemoveClass: number;\n
rendererSetStyle: number;\n rendererRemoveStyle: number;\n rendererDestroy: number;\n
rendererDestroyNode: number;\n rendererMoveNode: number;\n rendererRemoveNode: number;\n
rendererAppendChild: number;\n rendererInsertBefore: number;\n rendererCreateComment: number;\n
}\n}\n\nexport function ngDevModeResetPerfCounters(): NgDevModePerfCounters {\n const locationString =
typeof location !== 'undefined' ? location.toString() : '';\n const newCounters: NgDevModePerfCounters = {\n
namedConstructors: locationString.indexOf('ngDevMode=namedConstructors') !== -1,\n firstCreatePass: 0,\n
tNode: 0,\n tView: 0,\n rendererCreateTextNode: 0,\n rendererSetText: 0,\n rendererCreateElement: 0,\n
rendererAddEventListener: 0,\n rendererSetAttribute:
0,\n rendererRemoveAttribute: 0,\n rendererSetProperty: 0,\n rendererSetClassName: 0,\n
rendererAddClass: 0,\n rendererRemoveClass: 0,\n rendererSetStyle: 0,\n rendererRemoveStyle: 0,\n
rendererDestroy: 0,\n rendererDestroyNode: 0,\n rendererMoveNode: 0,\n rendererRemoveNode: 0,\n
rendererAppendChild: 0,\n rendererInsertBefore: 0,\n rendererCreateComment: 0,\n };\n\n // Make sure to refer
to ngDevMode as [ngDevMode] for closure.\n const allowNgDevModeTrue =
locationString.indexOf('ngDevMode=false') === -1;\n global[ngDevMode] = allowNgDevModeTrue &&
newCounters;\n return newCounters;\n}\n\n/**\n * This function checks to see if the `ngDevMode` has been set. If
yes,\n * then we honor it, otherwise we default to dev mode with additional checks.\n *\n * The idea is that unless
we are doing production build where we explicitly\n * set `ngDevMode === false` we should be helping the
developer by providing\n * as much early warning and
errors as possible.\n *\n * `defineComponent` is guaranteed to have been called before any component template
functions\n * (and thus Ivy instructions), so a single initialization there is sufficient to ensure ngDevMode\n * is
defined for the entire instruction set.\n *\n * When checking `ngDevMode` on toplevel, always init it before
referencing it\n * (e.g. `((typeof ngDevMode === 'undefined' || ngDevMode) && initNgDevMode())`), otherwise

```

```

you can\n * get a `ReferenceError` like in https://github.com/angular/angular/issues/31595.\n *\n * Details on
possible values for `ngDevMode` can be found on its docstring.\n *\n * NOTE:\n * - changes to the `ngDevMode`
name must be synced with `compiler-cli/src/tooling.ts`.\n *\n * \nexport function initNgDevMode(): boolean {\n // The
below checks are to ensure that calling `initNgDevMode` multiple times does not\n // reset the counters.\n // If the
`ngDevMode` is not an object, then it means we have not created the perf counters\n // yet.\n
if (typeof ngDevMode === 'undefined' || ngDevMode) {\n if (typeof ngDevMode !== 'object') {\n
ngDevModeResetPerfCounters();\n }\n return typeof ngDevMode !== 'undefined' && !!ngDevMode;\n }\n
return false;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n *\nimport {initNgDevMode} from './ng_dev_mode';\n\n/*\n * This file contains reuseable \"empty\" symbols that
can be used as default return values\n * in different parts of the rendering code. Because the same symbols are
returned, this\n * allows for identity checks against these values to be consistently used by the framework\n *
code.\n *\n *\nexport const EMPTY_OBJ: {} = {};\nexport const EMPTY_ARRAY: any[] = [];\n\n// freezing the
values prevents any code from accidentally inserting new values in\nif ((typeof ngDevMode === 'undefined' ||
ngDevMode) && initNgDevMode())\n
{\n // These property accesses can be ignored because ngDevMode will be set to false\n // when optimizing code
and the whole if statement will be dropped.\n // tslint:disable-next-line:no-toplevel-property-access\n
Object.freeze(EMPTY_OBJ);\n // tslint:disable-next-line:no-toplevel-property-access\n
Object.freeze(EMPTY_ARRAY);\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n *\nimport {getClosureSafeProperty} from './util/property';\nexport const
NG_COMP_DEF = getClosureSafeProperty({cmp: getClosureSafeProperty});\nexport const NG_DIR_DEF =
getClosureSafeProperty({dir: getClosureSafeProperty});\nexport const NG_PIPE_DEF =
getClosureSafeProperty({pipe: getClosureSafeProperty});\nexport const NG_MOD_DEF =
getClosureSafeProperty({mod: getClosureSafeProperty});\nexport const NG_FACTORY_DEF =
getClosureSafeProperty({fac:
getClosureSafeProperty});\n\n/*\n * If a directive is diPublic, bloomAdd sets a property on the type with this
constant as\n * the key and the directive's unique ID as the value. This allows us to map directives to their\n *
bloom filter bit for DI.\n *\n *\n// TODO(misko): This is wrong. The NG_ELEMENT_ID should never be minified.\nexport
const NG_ELEMENT_ID = getClosureSafeProperty({__NG_ELEMENT_ID__:
getClosureSafeProperty});\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n *\nimport {ChangeDetectionStrategy} from './change_detection/constants';\nimport
{NG_PROV_DEF} from './di/interface/defs';\nimport {Mutable, Type} from './interface/type';\nimport
{NgModuleDef} from './metadata/ng_module_def';\nimport {SchemaMetadata} from './metadata/schema';\nimport
{ViewEncapsulation} from './metadata/view';\nimport
{noSideEffects} from './util/closure';\nimport {EMPTY_ARRAY, EMPTY_OBJ} from './util/empty';\nimport
{initNgDevMode} from './util/ng_dev_mode';\nimport {stringify} from './util/stringify';\nimport
{NG_COMP_DEF, NG_DIR_DEF, NG_MOD_DEF, NG_PIPE_DEF} from './fields';\nimport {ComponentDef,
ComponentDefFeature, ComponentTemplate, ComponentType, ContentQueriesFunction, DependencyTypeList,
DirectiveDef, DirectiveDefFeature, DirectiveDefList, HostBindingsFunction, PipeDef, PipeDefList, TypeOrFactory,
ViewQueriesFunction} from './interfaces/definition';\nimport {TAttributes, TConstantsOrFactory} from
 './interfaces/node';\nimport {CssSelectorList} from './interfaces/projection';\n\n\n/* Counter used to generate
unique IDs for component definitions. *\nlet componentDefCount = 0;\n\n/*\n * Create a component definition
object.\n *\n *\n * # Example\n * ```\n * class MyDirective {\n * // Generated by Angular Template Compiler\n *
// [Symbol] syntax will not be supported by
TypeScript until v2.7\n * static cmp = defineComponent({\n * ... \n * });\n * }\n * ```\n * @codeGenApi\n
*\n *\nexport function defineComponent<T>(componentDefinition: {\n /*\n * Directive type, needed to configure

```

the injector.  
`*\n type: Type<T>;`  
`/** The selectors that will be used to match nodes to this component. *\n selectors?: CssSelectorList;`  
`/**\n * The number of nodes, local refs, and pipes in this component template.\n *\n * Used to calculate the length of this component's LView array, so we\n * can pre-fill the array and set the binding start index.\n *\n // TODO(kara): remove queries from this count\n decls: number;`  
`/**\n * The number of bindings in this component template (including pure fn bindings).\n *\n * Used to calculate the length of this component's LView array, so we\n * can pre-fill the array and set the host binding start index.\n *\n vars: number;`  
`/**\n * A map of input names.\n *\n * The format is in: `{{actualPropertyName: string):(string|[string, string])}`.  
*\n * Given:\n * ```\n * class MyComponent {\n * @Input()\n * publicInput1: string;\n * @Input('publicInput2')\n * declaredInput2: string;\n * }\n * ```\n *\n * is described as:\n * ```\n * {\n * publicInput1: 'publicInput1',\n * declaredInput2: ['publicInput2', 'declaredInput2'],\n * }\n * ```\n *\n * Which the minifier may translate to:\n * ```\n * {\n * minifiedPublicInput1: 'publicInput1',\n * minifiedDeclaredInput2: ['publicInput2', 'declaredInput2'],\n * }\n * ```\n *\n * This allows the render to re-construct the minified, public, and declared names\n * of properties.  
*\n * NOTE:\n * - Because declared and public name are usually same we only generate the array\n * `['public', 'declared']` format when they differ.\n * - The reason why this API and `outputs` API is not the same is that `NgOnChanges` has\n * inconsistent behavior in that it uses declared names rather than minified or public. For\n * this reason `NgOnChanges` will be deprecated and removed in future version and this\n * API will be simplified to be consistent with `output`.  
*\n inputs?: {[P in keyof T]?: string | [string, string]};  
/**\n * A map of output names.\n *\n * The format is in: `{{actualPropertyName: string}:string}`.  
*\n * Which the minifier may translate to: `{{minifiedPropertyName: string}:string}`.  
*\n * This allows the render to re-construct the minified and non-minified names\n * of properties.\n *\n outputs?: {[P in keyof T]?: string};  
/**\n * Function executed by the parent template to allow child directive to apply host bindings.\n *\n hostBindings?: HostBindingsFunction<T>;  
/**\n * The number of bindings in this directive `hostBindings` (including pure fn bindings).\n *\n * Used to calculate the length of the component's LView array, so we\n * can pre-fill the array and set the host binding start index.\n *\n hostVars?: number;  
/**\n * Assign static attribute values to a host element.\n *\n * This property will assign static attribute values as well as class and style\n * values to a host element. Since attribute values can consist of different types of values, the\n * `hostAttrs` array must include the values in the following format:  
*\n * attrs = [\n * // static attributes (like `title`, `name`, `id`...)\n * attr1, value1, attr2, value,\n * // a single namespace value (like `x:id`)\n * NAMESPACE_MARKER, namespaceUri1, name1, value1,\n * // another single namespace value (like `x:name`)\n * NAMESPACE_MARKER, namespaceUri2, name2, value2,\n * // a series of CSS classes that will be applied to the element (no spaces)\n * CLASSES_MARKER, class1, class2, class3,\n * // a series of CSS styles (property + value) that will be applied to the element\n * STYLES_MARKER, prop1, value1, prop2, value2\n * ]\n *\n * All non-class and non-style attributes must be defined at the start of the list\n * first before all class and style values are set. When there is a change in value\n * type (like when classes and styles are introduced) a marker must be used to separate\n * the entries. The marker values themselves are set via entries found in the\n * [AttributeMarker] enum.  
*\n hostAttrs?: TAttributes;  
/**\n * Function to create instances of content queries associated with a given directive.\n *\n contentQueries?: ContentQueriesFunction<T>;  
/**\n * Defines the name that can be used in the template to assign this directive to a variable.\n *\n * See: {@link Directive.exportAs}\n *\n exportAs?: string[];  
/**\n * Template function use for rendering DOM.\n *\n * This function has following structure.  
*\n * ```\n * function Template<T>(ctx:T, creationMode: boolean) {\n * if (creationMode) {\n * // Contains creation mode instructions.\n * }\n * // Contains binding update instructions\n * }\n * ```\n *\n * Common instructions are:\n * Creation mode instructions:\n * - `elementStart`, `elementEnd`\n * - `text`\n * - `container`\n * - `listener`\n *\n * Binding update instructions:\n * - `bind`\n * - `elementAttribute`\n * - `elementProperty`\n * - `elementClass`\n * - `elementStyle`\n *\n *\n template: ComponentTemplate<T>;  
/**\n * Constants for the nodes in the`





file would otherwise create an\n \* import cycle.\n \*\n \* See [this explanation](https://hackmd.io/Odw80D0pR6yfsOjg\_7XCJg?view) for more details.\n \*\n \*

```

@codeGenApi\n *\nexport function setComponentScope(\n  type: ComponentType<any>, directives:
Type<any>[] | ((() => Type<any>[])),\n  pipes: Type<any>[] | ((() => Type<any>[])): void {\n  const def = (type.cmp as
ComponentDef<any>);\n  def.directiveDefs = () =>\n    (typeof directives === 'function' ? directives() :
directives).map(extractDirectiveDef) as\n    DirectiveDefList;\n  def.pipeDefs = () =>\n    (typeof pipes ===
'function' ? pipes() : pipes).map(getPipeDef) as PipeDefList;\n}\n\nexport function extractDirectiveDef(type:
Type<any>): DirectiveDef<any> | ComponentDef<any> | null {\n  return getComponentDef(type) ||
getDirectiveDef(type);\n}\n\nfunction nonNull<T>(value: T | null): value is T {\n  return value !== null;\n}\n\n/**\n * @codeGenApi\n *\nexport function defineNgModule<T>(def: {\n  /** Token representing the module. Used by
DI. *\n  type: T;\n  /** List of components to bootstrap. *\n  bootstrap?: Type<any>[] | ((() => Type<any>[]));\n  /** List of components,
directives, and pipes declared by this module. *\n  declarations?: Type<any>[] | ((() => Type<any>[]));\n  /** List
of modules or `ModuleWithProviders` imported by this module. *\n  imports?: Type<any>[] | ((() =>
Type<any>[]));\n  /** List of modules, `ModuleWithProviders`, components, directives, or pipes exported by
this\n  * module.\n  *\n  exports?: Type<any>[] | ((() => Type<any>[]));\n  /** The set of schemas that declare
elements to be allowed in the NgModule. *\n  schemas?: SchemaMetadata[] | null;\n  /** Unique ID for the
module that is used with `getModuleFactory`. *\n  id?: string | null;\n}): unknown {\n  return noSideEffects(() =>
{\n  const res: NgModuleDef<T> = {\n    type: def.type,\n    bootstrap: def.bootstrap || EMPTY_ARRAY,\n    declarations: def.declarations || EMPTY_ARRAY,\n    imports: def.imports || EMPTY_ARRAY,\n    exports:
def.exports || EMPTY_ARRAY,\n    transitiveCompileScopes: null,\n    schemas: def.schemas || null,\n    id: def.id || null,\n  };\n  return res;\n});\n}\n\n/**\n * Adds the module metadata that is necessary to compute
the module's transitive scope to an\n * existing module definition.\n *\n * Scope metadata of modules is not used in
production builds, so calls to this function can be\n * marked pure to tree-shake it from the bundle, allowing for all
referenced declarations\n * to become eligible for tree-shaking as well.\n *\n * @codeGenApi\n *\nexport function
setNgModuleScope(type: any, scope: {\n  /** List of components, directives, and pipes declared by this module.
*\n  declarations?: Type<any>[] | ((() => Type<any>[]));\n  /** List of modules or `ModuleWithProviders` imported
by this module. *\n  imports?: Type<any>[] | ((() => Type<any>[]));\n  /**\n  * List of modules,
`ModuleWithProviders`, components, directives, or pipes exported by this\n  * module.\n  *\n  exports?:
Type<any>[] | ((() => Type<any>[]));\n}): unknown {\n  return noSideEffects(() => {\n  const ngModuleDef
= getNgModuleDef(type, true);\n  ngModuleDef.declarations = scope.declarations || EMPTY_ARRAY;\n  ngModuleDef.imports =
scope.imports || EMPTY_ARRAY;\n  ngModuleDef.exports = scope.exports ||
EMPTY_ARRAY;\n  });\n}\n\n/**\n * Inverts an inputs or outputs lookup such that the keys, which were the\n *
minified keys, are part of the values, and the values are parsed so that\n * the publicName of the property is the new
key\n *\n * e.g. for\n *\n * ```\n * class Comp {\n *   @Input()\n *   propName1: string;\n *\n *   @Input('publicName2')\n *   declaredPropName2: number;\n *\n * }\n *\n * will be serialized as\n *\n * ```\n * {\n *   propName1: 'propName1',\n *   declaredPropName2: ['publicName2', 'declaredPropName2'],\n * }\n *\n * which is then translated by the minifier as:\n *\n * ```\n * {\n *   minifiedPropName1: 'propName1',\n *   minifiedPropName2: ['publicName2', 'declaredPropName2'],\n * }\n *\n * becomes: (public name =>
minifiedName)\n *\n * ```\n * {\n *   'propName1': 'minifiedPropName1',\n *   'publicName2': 'minifiedPropName2',\n * }\n *\n * }\n *\n * Optionally the function can take `secondary` which will result in: (public name => declared name)\n *\n * ```\n * {\n *   'propName1': 'propName1',\n *   'publicName2': 'declaredPropName2',\n * }\n *\n * }\n *\n * }\n\nfunction
invertObject<T>(\n  obj?: {[P in keyof T]?: string | [string, string]},\n  secondary?: {[key: string]: string}): {[P in
keyof T]: string} {\n  if (obj === null) return EMPTY_OBJ as any;\n  const newLookup: any = {};\n  for (const
minifiedKey in obj) {\n    if (obj.hasOwnProperty(minifiedKey)) {\n      let publicName: string | [string, string] =
obj[minifiedKey];\n      let declaredName = publicName;\n      if (Array.isArray(publicName)) {\n        declaredName =
publicName[1];\n        publicName = publicName[0];\n      }\n      newLookup[publicName] =

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minifiedKey;\n    if (secondary) {\n        (secondary[publicName] = declaredName as string);\n    }\n    }\n    }\n    return newLookup;\n}\n\n/**\n * Create a directive definition object.\n *\n * # Example\n * ```\n * class MyDirective {\n *     // Generated by Angular Template Compiler\n *     // [Symbol] syntax will not be supported\n *     // by TypeScript until v2.7\n *     static dir = defineDirective({\n *         ...;\n *     });\n * }\n * ```\n *\n * @codeGenApi\n *\n * ^\n * export const defineDirective =\n *     defineComponent as any as <T>(directiveDefinition: {\n *         /**\n *          * Directive type, needed to configure the injector.\n *          * ^\n *          * type: Type<T>;\n *          * /**\n *          * The selectors that will be\n *          * used to match nodes to this directive.\n *          * ^\n *          * selectors?: CssSelectorList;\n *          * /**\n *          * A map of input names.\n *          * ^\n *          * The format is in: `{actualPropertyName: string}:(string|[string, string])`. \n *          * ^\n *          * Given:\n *          * ```\n *          * class MyComponent {\n *          *     @Input()\n *          *     publicInput1: string;\n *          *     *\n *          * @Input('publicInput2')\n *          *     *\n *          * declaredInput2: string;\n *          *     }\n *          * ```\n *          * ^\n *          * is described as:\n *          * ```\n *          * {\n *          *     *\n *          * publicInput1: 'publicInput1',\n *          *     *\n *          * declaredInput2: ['declaredInput2', 'publicInput2'],\n *          *     }\n *          * ```\n *          * ^\n *          * Which the minifier may translate to:\n *          * ```\n *          * {\n *          *     *\n *          * minifiedPublicInput1: 'publicInput1',\n *          *     *\n *          * minifiedDeclaredInput2: ['publicInput2', 'declaredInput2'],\n *          *     }\n *          * ```\n *          * ^\n *          * This allows the\n *          * render to re-construct the minified, public, and declared names\n *          * of properties.\n *          * ^\n *          * NOTE:\n *          * - Because declared and public name are usually same we only generate the array\n *          *   `['declared', 'public']`\n *          * format when they differ.\n *          * - The reason why this API and `outputs` API is not the same is that\n *          *   `NgOnChanges` has\n *          *   inconsistent behavior in that it uses declared names rather than minified or public.\n *          * For\n *          * this reason\n *          * `NgOnChanges` will be deprecated and removed in future version and this\n *          * API will be simplified to be\n *          * consistent with `output`.\n *          * ^\n *          * inputs?: {[P in keyof T]?: string | [string, string];}\n *          * /**\n *          * A map of\n *          * output names.\n *          * ^\n *          * The format is in: `{[actualPropertyName: string]:string}`.\n *          * ^\n *          * Which the\n *          * minifier may translate to: `{[minifiedPropertyName: string]:string}`.\n *          * ^\n *          * This allows the render to re-\n *          * construct the minified and non-minified names\n *          * of properties.\n *          * ^\n *          * outputs?: {[P in keyof T]?:\n *          * string};\n *          * /**\n *          * A list of optional features to apply.\n *          * ^\n *          * See: { @link NgOnChangesFeature },\n *          * { @link ProvidersFeature }, { @link InheritDefinitionFeature }\n *          * ^\n *          * features?: DirectiveDefFeature[];\n *          * /**\n *          * Function executed by the parent template to allow child directive to apply host bindings.\n *          * ^\n *          * hostBindings?: HostBindingsFunction<T>;\n *          * /**\n *          * The number of bindings in this directive `hostBindings` (including pure fn bindings).\n *          * ^\n *          * Used to calculate the length of the component's LView array, so we\n *          * can pre-fill the array and set the host\n *          * binding start index.\n *          * ^\n *          * hostVars?: number;\n *          * /**\n *          * Assign static attribute values to a host\n *          * element.\n *          * ^\n *          * This property will assign static attribute values as well as class and style\n *          * values to a\n *          * host element. Since attribute values can consist of different types of values,\n *          * the `hostAttrs` array must\n *          * include the values in the following format:\n *          * ^\n *          * attrs = [\n *          *     // static attributes (like `title`, `name`,\n *          *     `id`...)\n *          *     attr1, value1, attr2, value,\n *          *     // a single namespace value (like `x:id`)\n *          *     *\n *          * NAMESPACE_MARKER, namespaceUri1, name1, value1,\n *          *     *\n *          * // another single namespace value (like\n *          * `x:name`)\n *          *     *\n *          * NAMESPACE_MARKER, namespaceUri2, name2, value2,\n *          *     *\n *          * // a series of CSS classes that\n *          * will be applied to the element (no spaces)\n *          *     *\n *          * CLASSES_MARKER, class1, class2, class3,\n *          *     *\n *          * // a\n *          * series of CSS styles (property + value) that will be applied to the element\n *          *     *\n *          * STYLES_MARKER, prop1,\n *          * value1, prop2, value2\n *          *     ]\n *          * ^\n *          * All non-class and non-style attributes must be defined at the start of\n *          * the list\n *          * first before all class and style values are set. When there is a change in value\n *          * type (like when\n *          * classes and styles are introduced) a marker must be used to separate\n *          * the entries. The marker values\n *          * themselves are set via entries found in the\n *          * [AttributeMarker] enum.\n *          * ^\n *          * hostAttrs?: TAttributes;\n *          * /**\n *          * Function to create instances of content queries associated with a given directive.\n *          * ^\n *          * contentQueries?: ContentQueriesFunction<T>;\n *          * /**\n *          * Additional set of instructions specific to view query processing. This could be seen as a\n *          * set of\n *          * instructions to be inserted into the template function.\n *          * ^\n *          * viewQuery?: ViewQueriesFunction<T> | null;\n *          * ^\n *          *

```



```

readonly[HOST]: RElement|RComment|LView;
/**
 * This is a type field which allows us to differentiate
`LContainer` from `StylingContext` in an
 * efficient way. The value is always set to `true`
 */ [TYPE]:
true;
/**
 * Flag to signify that this `LContainer` may have transplanted views which need to be change
 * detected. (see: `LView[DECLARATION_COMPONENT_VIEW]`).
 */
 * This flag, once set, is never unset for
the `LContainer`.
 */ [HAS_TRANSPLANTED_VIEWS]: boolean;
/**
 * Access to the parent view is
necessary so we can propagate back
 * up from inside a container to parent[NEXT].
 */ [PARENT]:
LView;
/**
 * This allows us to jump from a container to a sibling container or component
 * view
with the same parent, so we can remove listeners efficiently.
 */ [NEXT]: LView|LContainer|null;
/**
 * The number of direct transplanted views which need a refresh or have descendants themselves
 * that need a
refresh but have not marked their ancestors as Dirty. This tells us that during
 * change detection we should still
descend to find those children to refresh, even if the parents
 * are not `Dirty`/`CheckAlways`.
 */ [TRANSPLANTED_VIEWS_TO_REFRESH]: number;
/**
 * A collection of views created based on the
underlying `` element but inserted into
 * a different `LContainer`. We need to track views created
from a given declaration point since
 * queries collect matches from the embedded view declaration point and
_not_ the insertion point.
 */ [MOVED_VIEWS]: LView[]|null;
/**
 * Pointer to the `TNode` which
represents the host of the container.
 */ [T_HOST]: TNode;
/**
 * The comment element that serves
as an anchor for this LContainer.
 */
readonly[NATIVE]: RComment;
// TODO(misko): remove as this
value can be gotten by unwrapping `[HOST]`
/**
 * Array of `ViewRef`s used by any `ViewContainerRef`
s that point to this container.
 */
 * This is lazily initialized by `ViewContainerRef` when the first view is
inserted.
 */
 * NOTE: This is stored as `any[]` because render3 should really not be aware of `ViewRef` and
 * doing so creates circular dependency.
 */ [VIEW_REFS]: unknown[]|null;
}
// Note: This hack is
necessary so we don't erroneously get a circular dependency
// failure based on types.
export const
unusedValueExportToPlacateAjd = 1;
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 */
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
https://angular.io/license
import {Injector} from '../di/injector';
import {ProviderToken} from
 '../di/provider_token';
import
 {Type} from '../interface/type';
import {SchemaMetadata} from '../metadata/schema';
import {Sanitizer}
from '../sanitization/sanitizer';
import {LContainer} from './container';
import {ComponentDef,
ComponentTemplate, DirectiveDef, DirectiveDefList, HostBindingsFunction, PipeDef, PipeDefList,
ViewQueriesFunction} from './definition';
import {I18nUpdateOpCodes, T118n, TIcu} from './i18n';
import
 {TConstants, TNode} from './node';
import {LQueries, TQueries} from './query';
import {Renderer,
RendererFactory} from './renderer';
import {RComment, RElement} from './renderer_dom';
import {TStylingKey,
TStylingRange} from './styling';
// Below are constants for LView indices to help us look up LView
members
// without having to remember the specific indices.
// Uglify will inline these when minifying so there
shouldn't be a cost.
export const HOST = 0;
export const TVIEW = 1;
export const FLAGS = 2;
export const
PARENT = 3;
export const NEXT
= 4;
export const TRANSPLANTED_VIEWS_TO_REFRESH = 5;
export const T_HOST = 6;
export const
CLEANUP = 7;
export const CONTEXT = 8;
export const INJECTOR = 9;
export const
RENDERER_FACTORY = 10;
export const RENDERER = 11;
export const SANITIZER = 12;
export const
CHILD_HEAD = 13;
export const CHILD_TAIL = 14;
// FIXME(misko): Investigate if the three declarations
aren't all same thing.
export const DECLARATION_VIEW = 15;
export const
DECLARATION_COMPONENT_VIEW = 16;
export const DECLARATION_LCONTAINER = 17;
export const
PREORDER_HOOK_FLAGS = 18;
export const QUERIES = 19;
export const ID = 20;
export const
EMBEDDED_VIEW_INJECTOR = 21;
/**
 * Size of LView's header. Necessary to adjust for it when setting
slots.
 */
 * IMPORTANT: `HEADER_OFFSET` should only be referred to the in the `*` instructions to
translate
 * instruction index into `LView` index. All other indexes should be in the `LView` index space and
 * there should be no need to refer to `HEADER_OFFSET`

```

anywhere else.  
`export const HEADER_OFFSET = 22;`  
 This interface replaces the real LView interface if it is an arg or a return value of a public instruction. This ensures we don't need to expose the actual interface, which should be kept private.  
`export interface OpaqueViewState { __brand__: 'Brand for OpaqueViewState that nothing will match'; }`  
 LView stores all of the information needed to process the instructions as they are invoked from the template. Each embedded view and component view has its own LView. When processing a particular view, we set the viewData to that LView. When that view is done processing, the viewData is set back to whatever the original viewData was before (the parent LView).  
 Keeping separate state for each view facilitates view insertion / deletion, so we don't have to edit the data array based on which views are present.  
`export interface LView<T = unknown> extends Array<any>`

```
{
  /** Human readable representation of the LView.
   * NOTE: This property only exists if ngDevMode is set to true and it is not present in production. Its presence is purely to help debug issue in development, and should not be relied on in production application.
   * debug?: LViewDebug;
   * The node into which this LView is inserted.
   * [HOST]: RElement|null;
   * The static data for this view. We need a reference to this so we can easily walk up the node tree in DI and get the TView.data array associated with a node (where the directive defs are stored).
   * readonly[TVIEW]: TView;
   * Flags for this view. See LViewFlags for more info.
   * [FLAGS]: LViewFlags;
   * This may store an {@link LView} or {@link LContainer}.
   * LView - The parent view. This is needed when we exit the view and must restore the previous LView. Without this, the render method would have to keep a stack of views as it is recursively rendering templates.
   * LContainer - The current view is part of a container, and is an embedded view.
   * [PARENT]: LView|LContainer|null;
   * The next sibling LView or LContainer.
   * Allows us to propagate between sibling view states that aren't in the same container. Embedded views already have a node.next, but it is only set for views in the same container. We need a way to link component views and views across containers as well.
   * [NEXT]: LView|LContainer|null;
   * Queries active for this view - nodes from a view are reported to those queries.
   * [QUERIES]: LQueries|null;
   * Store the TNode of the location where the current LView is inserted into.
   * Given:
   * <div>
   * <ng-template><span></span></ng-template>
   * </div>
   * We end up with two TView's - parent TView which contains
   * <div><!-- anchor --></div>
   * - child TView which contains <span></span>
   * Typically the child is inserted into the declaration location of the parent, but it can be inserted anywhere. Because it can be inserted anywhere it is not possible to store the insertion information in the TView and instead we must store it in the LView[T_HOST].
   * So to determine where is our insertion parent we would execute:
   * const parentLView = LView[PARENT];
   * const parentTNode = LView[T_HOST];
   * const insertionParent = parentLView[parentTNode.index];
   * If null, this is the root view of an application (root component is in this view) and it has no parents.
   * [T_HOST]: TNode|null;
   * When a view is destroyed, listeners need to be released and outputs need to be unsubscribed. This context array stores both listener functions wrapped with their context and output subscription instances for a particular view.
   * These change per LView instance, so they cannot be stored on TView. Instead, TView.cleanup saves an index to the necessary context in this array.
   * After LView is created it is possible to attach additional instance specific functions at the end of the LView[CLEANUP] because we know that no more T level cleanup functions will be added here.
   * [CLEANUP]: any[]|null;
   * - For dynamic views, this is the context with which to render the template (e.g. NgForContext), or {} if not defined explicitly.
   * - For root view of the root component it's a reference to the component instance itself.
   * - For components, the context is a reference to the component instance itself.
   * - For inline views, the context is null.
   * [CONTEXT]: T;
   * An optional Module Injector to be used as fall back after Element Injectors are consulted.
   * readonly[INJECTOR]: Injector|null;
   * Factory to be used for creating Renderer.
   * [RENDERER_FACTORY]: RendererFactory;
   * Renderer to be used for this view.
   * [RENDERER]: Renderer;
   * An optional custom sanitizer.
   * [SANITIZER]:
```

Sanitizer

- \* Reference to the first LView or LContainer beneath this LView in the hierarchy.
- \* Necessary to store this so views can traverse through their nested views to remove listeners and call onDestroy callbacks.

[CHILD\_HEAD]: LView/LContainer

- \* The last LView or LContainer beneath this LView in the hierarchy.
- \* The tail allows us to quickly add a new state to the end of the view list without having to propagate starting from the first child.

[CHILD\_TAIL]:

LView/LContainer

- \* View where this view's template was declared.
- \* The template for a dynamically created view may be declared in a different view than it is inserted.

We already track the "insertion view" (view where the template was inserted) in LView[PARENT], but we also need access to the "declaration view" (view where the template was declared). Otherwise, we wouldn't be able to call the view's template function with the proper contexts. Context should be inherited from the declaration view tree, not the insertion view tree.

Example (AppComponent template):

```
<ng-template #foo></ng-template> <-- declared here --> <some-comp [tpl]="foo"></some-comp> <-- inserted inside this component -->
```

The <ng-template> above is declared in the AppComponent template, but it will be passed into SomeComp and inserted there. In this case, the declaration view would be the AppComponent, but the insertion view would be SomeComp. When we are removing views, we would want to traverse through the insertion view to clean up listeners. When we are calling the template function during change detection, we need the declaration view to get inherited context.

[DECLARATION\_VIEW]: LView

- \* Points to the declaration component view, used to track transplanted LView's.
- \* See: DECLARATION\_VIEW which points to the actual LView where it was declared, whereas DECLARATION\_COMPONENT\_VIEW points to the component which may not be same as DECLARATION\_VIEW.
- \* Example:

```
<#VIEW #myComp> <div *ngIf="true"> <ng-template #myTpl>...</ng-template> </div> </#VIEW>
```

In the above case DECLARATION\_VIEW for myTpl points to the LView of ngIf whereas DECLARATION\_COMPONENT\_VIEW points to LView of the myComp which owns the template.

The reason for this is that all embedded views are always check-always whereas the component view can be check-always or on-push. When we have a transplanted view it is important to

- \* determine if we have transplanted a view from check-always declaration to on-push insertion point. In such a case the transplanted view needs to be added to the LContainer in the declared LView and CD during the declared view CD (in addition to the CD at the insertion point.) (Any transplanted views which are intra Component are of no interest because the CD strategy of declaration and insertion will always be the same, because it is the same component.)
- \* Queries already track moved views in LView[DECLARATION\_LCONTAINER] and LContainer[MOVED\_VIEWS]. However the queries also track LView's which moved within the same component LView. Transplanted views are a subset of moved views, and we use DECLARATION\_COMPONENT\_VIEW to differentiate them. As in this example:

Example showing intra component LView movement:

```
<#VIEW #myComp> <div *ngIf="condition; then thenBlock else elseBlock"></div>
```

- \* <ng-template #thenBlock>Content to render when condition is true.</ng-template> <ng-template #elseBlock>Content to render when condition is false.</ng-template>
- \* </#VIEW>
- \* The thenBlock and elseBlock is moved but not transplanted.
- \* Example showing inter component LView movement (transplanted view):

```
<#VIEW #myComp> <ng-template #myTpl>...</ng-template> <insertion-component [template]="myTpl"></insertion-component>
```

In the above example myTpl is passed into a different component. If insertion-component instantiates myTpl and insertion-component is on-push then the LContainer needs to be marked as containing transplanted views and those views need to be CD as part of the declaration CD.

When change detection runs, it iterates over [MOVED\_VIEWS] and CDs any child LView's where the DECLARATION\_COMPONENT\_VIEW

of the current component and the child LView does not match (it has been transplanted across components.)

Note: [DECLARATION\_COMPONENT\_VIEW] points to itself if the LView is a

component view (the simplest / most common case). see also: -  
<https://hackmd.io/@mhevery/rJUJsvv9H> write up of the problem -

``LContainer[HAS_TRANSPLANTED_VIEWS]`` which marks which ``LContainer`` has transplanted views.  
``LContainer[TRANSPLANT_HEAD]`` and ``LContainer[TRANSPLANT_TAIL]`` storage for transplanted  
``LView[DECLARATION_LCONTAINER]`` similar problem for queries - ``LContainer[MOVED_VIEWS]``  
similar problem for queries  
``^` [DECLARATION_COMPONENT_VIEW]: LView;``  
A declaration point of embedded views (ones instantiated based on the content of a `<ng-template>`), null for other types of views.  
We need to track all embedded views created from a given declaration point so we can prepare query matches in a proper order (query matches are ordered based on their declaration point and not the insertion point).  
``^` [DECLARATION_LCONTAINER]: LContainer|null;``  
More flags for this view. See `PreOrderHookFlags` for more info.  
``^` [PREORDER_HOOK_FLAGS]: PreOrderHookFlags;``  
The number of direct transplanted views which need a refresh or have descendants themselves that need a refresh but have not marked their ancestors as Dirty. This tells us that during change detection we should still descend to find those children to refresh, even if the parents are not ``Dirty`` ``^` CheckAlways``  
``^` [TRANSPLANTED_VIEWS_TO_REFRESH]: number;``  
Unique ID of the view. Used for ``__ngContext__`` lookups in the ``LView`` registry.  
``^` [ID]: number;``  
Optional injector assigned to embedded views that takes precedence over the element and module injectors.  
``^` readonly[EMBEDDED_VIEW_INJECTOR]: Injector|null;``

Flags associated with an `LView` (saved in `LView[FLAGS]``)  
``^`export const enum LViewFlags {``  
The state of the init phase on the first 2 bits  
`InitPhaseStateIncrementer = 0b000000000001,``  
`InitPhaseStateMask = 0b000000000011,``  
Whether or not the view is in creationMode.  
This must be stored in the view rather than using ``data`` as a marker so that we can properly support embedded views. Otherwise, when exiting a child view back into the parent view, ``data`` will be defined and ``creationMode`` will be improperly reported as false.  
`CreationMode = 0b00000000100,``  
Whether or not this `LView` instance is on its first processing pass.  
An `LView` instance is considered to be on its "first pass" until it has completed one creation mode run and one update mode run. At this time, the flag is turned off.  
`FirstLViewPass = 0b00000001000,``  
Whether this view has default change detection strategy (checks always) or onPush  
`CheckAlways = 0b00000010000,``  
Whether or not this view is currently dirty (needing check)  
`Dirty = 0b00000100000,``  
Whether or not this view is currently attached to change detection tree.  
`Attached = 0b000001000000,``  
Whether or not this view is destroyed.  
`Destroyed = 0b000010000000,``  
Whether or not this view is the root view  
`IsRoot = 0b000100000000,``  
Whether this moved `LView` needs to be refreshed at the insertion location because the declaration was dirty.  
`RefreshTransplantedView = 0b001000000000,``  
Indicates that the view or any of its ancestors have an embedded view injector.  
`HasEmbeddedViewInjector = 0b001000000000,``  
Index of the current init phase on last 21 bits  
`IndexWithinInitPhaseIncrementer = 0b0100000000000,``  
`IndexWithinInitPhaseShift = 11,``  
`IndexWithinInitPhaseReset = 0b0011111111111,``

Possible states of the init phase:  
- 00: OnInit hooks to be run.  
- 01: AfterContentInit hooks to be run  
- 10: AfterViewInit hooks to be run  
- 11: All init hooks have been run  
``^`export const enum InitPhaseState {``  
`OnInitHooksToBeRun = 0b00,``  
`AfterContentInitHooksToBeRun = 0b01,``  
`AfterViewInitHooksToBeRun = 0b10,``  
`InitPhaseCompleted = 0b11,``

More flags associated with an `LView` (saved in `LView[PREORDER_HOOK_FLAGS]``)  
``^`export const enum PreOrderHookFlags {``  
The index of the next pre-order hook to be called in the hooks array, on the first 16 bits  
`IndexOfTheNextPreOrderHookMaskMask = 0b0111111111111111,``  
The number of init hooks that have already been called, on the last 16 bits  
`NumberOfInitHooksCalledIncrementer = 0b0100000000000000,``  
`NumberOfInitHooksCalledShift = 16,``  
`NumberOfInitHooksCalledMask = 0b11111111111111110000000000000000,``  
Stores a set of `OpCodes` to process ``HostBindingsFunction``

associated with a current view.  
 In order to invoke `HostBindingsFunction` we need:  
 1. `elementIdx`: Index to the element associated with the `HostBindingsFunction`.  
 2. `directiveIdx`: Index to the directive associated with the `HostBindingsFunction`. (This will become the context for the `HostBindingsFunction` invocation.)  
 3. `bindingRootIdx`: Location where the bindings for the `HostBindingsFunction` start. Internally `HostBindingsFunction` binding indexes start from `0` so we need to add `bindingRootIdx` to it.  
 4. `HostBindingOpCodes`: A host binding function to execute.  
 The above information needs to be encoded into the `HostBindingOpCodes` in an efficient manner.  
 1. `elementIdx` is encoded into the `HostBindingOpCodes` as `~elementIdx` (so a negative number);  
 2. `directiveIdx`  
 3. `bindingRootIdx`  
 4. `HostBindingOpCodes` is passed in as is.  
 The `HostBindingOpCodes` array contains:  
 \* - negative number to select the element index.  
 \* - followed by 1 or more of:  
 \* - a number to select the directive index  
 \* - a number to select the bindingRoot index  
 \* - and a function to invoke.  
 ##  
 Example  

```
const hostBindingOpCodes = [~30, // Select element 30
  40, 45,
  MyDir.dir.hostBindings // Invoke host bindings on MyDir on element 30;
  //
  directiveIdx = 40; bindingRootIdx = 45;
  50, 55, OtherDir.dir.hostBindings // Invoke host bindings on
  OtherDir on element 30;
  // directiveIdx = 50; bindingRootIdx = 55;
]

```

 ## Pseudocode  

```
const hostBindingOpCodes = tView.hostBindingOpCodes;
if (hostBindingOpCodes === null) return;
for (let i = 0; i < hostBindingOpCodes.length; i++) {
  const opCode = hostBindingOpCodes[i] as number;
  if (opCode < 0) {
    // Negative numbers are element indexes.
    setSelectedIndex(~opCode);
  } else {
    // Positive numbers are NumberTuple which store bindingRootIndex and directiveIndex.
    const directiveIdx = opCode;
    const bindingRootIdx = hostBindingOpCodes[++i] as number;
    const hostBindingFn = hostBindingOpCodes[++i] as HostBindingsFunction<any>;
    setBindingRootForHostBindings(bindingRootIdx, directiveIdx);
    const context = IView[directiveIdx];
    hostBindingFn(RenderFlags.Update, context);
  }
}

```

 ##  

```
export interface HostBindingOpCodes extends Array<number|HostBindingsFunction<any>> {
  __brand__: 'HostBindingOpCodes';
  debug?: string[];
}

```

Explicitly marks `TView` as a specific type in `ngDevMode`  
 It is useful to know conceptually what time of `TView` we are dealing with when debugging an application (even if the runtime does not need it.) For this reason we store this information in the `ngDevMode` `TView`  
 and then use it for better debugging experience.  

```
export const enum TViewType {
  Root
}

```

 `TView` is the used to bootstrap components into. It is used in conjunction with `LView` which takes an existing DOM node not owned by Angular and wraps it in `TView`/`LView` so that other components can be loaded into it.  
 Root = 0,  
 `TView` associated with a Component. This would be the `TView` directly associated with the component view (as opposed an `Embedded` `TView` which would be a child of `Component` `TView`)  
 Component = 1,  
 `TView` associated with a template. Such as `ngIf`, `` etc... A `Component` can have zero or more `Embedded` `TView`'s.  
 Embedded = 2,  
 Converts `TViewType` into human readable text.  
 Make sure this matches with `TViewType`  

```
export const TViewTypeAsString = [0 'Root', // 0 'Component', // 1 'Embedded', // 2] as const;

```

The static data for an LView (shared between all templates of a given type).  
 Stored on the `ComponentDef.tView`.  

```
export interface TView {
  type: TViewType;
  // This is a blueprint used to generate LView instances for this TView. Copying this blueprint is faster than creating a new LView from scratch.
  blueprint: LView;
  // The template function used to refresh the view of dynamically created views and components. Will be null for inline views.
  template: ComponentTemplate<{}>|null;
  // A function containing query-related instructions.
  viewQuery: ViewQueriesFunction<{}>|null;
  // A TNode representing the declaration location of this TView (not part of this TView).
  declTNode: TNode|null;
  // FIXME(misko): Why does TView not have declarationTView property?
  // Whether or not this

```



template has been processed in creation mode. `*^/n firstCreatePass: boolean;`  
`/**^/n * Whether or not this template has been processed in update mode (e.g. change detected)^/n *^/n * `firstUpdatePass` is used by styling to set up `TData` to contain metadata about the styling^/n * instructions. (Mainly to build up a linked list of styling priority order.)^/n *^/n * Typically this function gets cleared after first execution. If exception is thrown then this^/n * flag can remain turned un until there is first successful (no exception) pass. This means that^/n * individual styling instructions keep track of if they have already been added to the linked^/n * list to prevent double adding.^/n *^/n firstUpdatePass: boolean;`  
`/**^/n * Static data equivalent of LView.data[]. Contains TNodes, PipeDefInternal or TTI18n.^/n data: TData;`  
`/**^/n * The binding start index is the index at which the data array^/n * starts to store bindings only. Saving this value ensures that we^/n * will begin reading bindings at the correct point in the array when^/n * we are in update mode.^/n *^/n * -1 means that it has not been initialized.^/n *^/n bindingStartIndex: number;`  
`/**^/n * The index where the `expando` section of `LView` begins. The expando^/n * section contains injectors, directive instances, and host binding values.^/n * Unlike the `decls` and `vars` sections of `LView`, the length of this^/n * section cannot be calculated at compile-time because directives are matched^/n * at runtime to preserve locality.^/n *^/n * We store this start index so we know where to start checking host bindings^/n * in `setHostBindings`.^/n *^/n expandoStartIndex: number;`  
`/**^/n * Whether or not there are any static view queries tracked on this view.^/n *^/n * We store this so we know whether or not we should do a view query^/n * refresh after creation mode to collect static query results.^/n *^/n staticViewQueries: boolean;`  
`/**^/n * Whether or not there are any static content queries tracked on this view.^/n *^/n * We store this so we know whether or not we should do a content query^/n * refresh after creation mode to collect static query results.^/n *^/n staticContentQueries: boolean;`  
`/**^/n * A reference to the first child node located in the view.^/n *^/n firstChild: TNode|null;`  
`/**^/n * Stores the OpCodes to be replayed during change-detection to process the `HostBindings`^/n *^/n * See `HostBindingOpCodes` for encoding details.^/n *^/n hostBindingOpCodes: HostBindingOpCodes|null;`  
`/**^/n * Full registry of directives and components that may be found in this view.^/n *^/n * It's necessary to keep a copy of the full def list on the TView so it's possible^/n * to render template functions without a host component.^/n *^/n directiveRegistry: DirectiveDefList|null;`  
`/**^/n * Full registry of pipes that may be found in this view.^/n *^/n * The property is either an array of `PipeDefs` or a function which returns the array of^/n * `PipeDefs`. The function is necessary to be able to support forward declarations.^/n *^/n * It's necessary to keep a copy of the full def list on the TView so it's possible^/n * to render template functions without a host component.^/n *^/n pipeRegistry: PipeDefList|null;`  
`/**^/n * Array of ngOnInit, ngOnChanges and ngDoCheck hooks that should be executed for this view in^/n * creation mode.^/n *^/n * This array has a flat structure and contains TNode indices, directive indices (where an^/n * instance can be found in `LView`) and hook functions. TNode index is followed by the directive^/n * index and a hook function. If there are multiple hooks for a given TNode, the TNode index is^/n * not repeated and the next lifecycle hook information is stored right after the previous hook^/n * function. This is done so that at runtime the system can efficiently iterate over all of the^/n * functions to invoke without having to make any decisions/lookups.^/n *^/n preOrderHooks: HookData|null;`  
`/**^/n * Array of ngOnChanges and ngDoCheck hooks that should be executed for this view in update mode.^/n *^/n * This array has the same structure as the `preOrderHooks` one.^/n *^/n preOrderCheckHooks: HookData|null;`  
`/**^/n * Array of ngAfterContentInit and ngAfterContentChecked hooks that should be executed^/n * for this view in creation mode.^/n *^/n * Even indices: Directive index^/n * Odd indices: Hook function^/n *^/n contentHooks: HookData|null;`  
`/**^/n * Array of ngAfterContentChecked hooks that should be executed for this view in update^/n * mode.^/n *^/n * Even indices: Directive index^/n * Odd indices: Hook function^/n *^/n contentCheckHooks: HookData|null;`  
`/**^/n * Array of ngAfterViewInit and ngAfterViewChecked hooks that should be executed for^/n * this view in creation mode.^/n *^/n * Even indices: Directive index^/n * Odd indices: Hook function^/n *^/n viewHooks: HookData|null;`  
`/**^/n * Array of ngAfterViewChecked hooks that should be executed for this view in^/n * update mode.^/n *^/n * Even indices: Directive index^/n * Odd indices: Hook function^/n *^/n`

```

viewCheckHooks: HookData|null;\n\n /**\n * Array of ngOnDestroy hooks that should be executed when this
view is destroyed.\n *\n * Even indices: Directive index\n * Odd indices: Hook function\n */\n destroyHooks:
DestroyHookData|null;\n\n /**\n * When a view is destroyed, listeners need to be released and outputs need to
be\n * unsubscribed. This cleanup array stores both listener data (in chunks of 4)\n * and output data (in chunks of
2) for a particular view. Combining the arrays\n * saves on memory (70 bytes per array) and on a few bytes of code
size (for two\n * separate for loops).\n *\n * If it's a native DOM listener or output subscription being stored:\n
* 1st index is: event name `name = tView.cleanup[i+0]`\n * 2nd index is: index
of native element or a function that retrieves global target (window,\n * document or body) reference
based on the native element:\n * `typeof idxOrTargetGetter === 'function': global target getter function\n *
`typeof idxOrTargetGetter === 'number': index of native element\n *\n * 3rd index is: index of listener function
`listener = lView[CLEANUP][tView.cleanup[i+2]`\n * 4th index is: `useCaptureOrIdx = tView.cleanup[i+3]`\n
* `typeof useCaptureOrIdx === 'boolean': useCapture boolean\n * `typeof useCaptureOrIdx === 'number':\n *
`useCaptureOrIdx >= 0` `removeListener = lView[CLEANUP][useCaptureOrIdx]`\n *
`useCaptureOrIdx < 0` `subscription = lView[CLEANUP][-useCaptureOrIdx]`\n *\n * If it's an output
subscription or query list destroy hook:\n * 1st index is: output unsubscribe function / query list destroy function\n
* 2nd index is: index of function context in lView.cleanupInstances[]\n *
`tView.cleanup[i+0].call(lView[CLEANUP][tView.cleanup[i+1]])`\n */\n cleanup: any[]|null;\n\n /**\n * A
list of element indices for child components that will need to be\n * refreshed when the current view has finished
its check. These indices have\n * already been adjusted for the HEADER_OFFSET.\n *\n */\n components:
number[]|null;\n\n /**\n * A collection of queries tracked in a given view.\n */\n queries: TQueries|null;\n\n
/**\n * An array of indices pointing to directives with content queries alongside with the\n * corresponding query
index. Each entry in this array is a tuple of:\n * - index of the first content query index declared by a given
directive;\n * - index of a directive.\n *\n * We are storing those indexes so we can refresh content queries as
part of a view refresh\n * process.\n */\n contentQueries: number[]|null;\n\n /**\n * Set of schemas that declare
elements to be allowed inside the view.\n */\n schemas: SchemaMetadata[]|null;\n\n
/**\n * Array of constants for the view. Includes attribute arrays, local definition arrays etc.\n * Used for
directive matching, attribute bindings, local definitions and more.\n */\n consts: TConstants|null;\n\n /**\n
Indicates that there was an error before we managed to complete the first create pass of the\n * view. This means
that the view is likely corrupted and we should try to recover it.\n */\n incompleteFirstPass: boolean;\n\n /**\n
Single hook callback function. */\nexport type HookFn = () => void;\n\n /**\n * Information necessary to call a
hook. E.g. the callback that\n * needs to be invoked and the index at which to find its context.\n */\nexport type
HookEntry = number|HookFn;\n\n /**\n * Array of hooks that should be executed for a view and their directive
indices.\n *\n * For each node of the view, the following data is stored:\n * 1) Node index (optional)\n * 2) A series
of number/function pairs where:\n * - even indices are directive
indices\n * - odd indices are hook functions\n *\n * Special cases:\n * - a negative directive index flags an init
hook (ngOnInit, ngAfterContentInit, ngAfterViewInit)\n */\nexport type HookData = HookEntry[];\n\n /**\n * Array
of destroy hooks that should be executed for a view and their directive indices.\n *\n * The array is set up as a series
of number/function or number/(number|function)[]:\n * - Even indices represent the context with which hooks
should be called.\n * - Odd indices are the hook functions themselves. If a value at an odd index is an array,\n * it
represents the destroy hooks of a `multi` provider where:\n * - Even indices represent the index of the provider for
which we've registered a destroy hook,\n * inside of the `multi` provider array.\n * - Odd indices are the
destroy hook functions.\n * For example:\n * lView: `[0, 1, 2, AService, 4, [BService, CService, DService]]`\n *
destroyHooks: `[3, AService.ngOnDestroy, 5, [0, BService.ngOnDestroy,
2, DService.ngOnDestroy]]`\n *\n * In the example above `AService` is a type provider with an `ngOnDestroy`,
whereas `BService`,\n * `CService` and `DService` are part of a `multi` provider where only `BService` and
`DService`\n * have an `ngOnDestroy` hook.\n */\nexport type DestroyHookData =
(HookEntry|HookData)[];\n\n /**\n * Static data that corresponds to the instance-specific data array on an lView.\n
*\n * Each node's static data is stored in tData at the same index that it's stored\n * in the data array. Any nodes that

```

do not have static data store a null value in `tData` to avoid a sparse array. Each pipe's definition is stored here at the same index as its pipe instance in the data array. Each host property's name is stored here at the same index as its value in the data array. Each property binding name is stored here at the same index as its value in the data array. If the binding is an interpolation, the static string values are stored parallel to the dynamic values. Example: `id="prefix { { v0 } } a { { v1 } } b { { v2 } } suffix"` `LView` | `TView.data` ----- `v0 value` | `'a'` `v1 value` | `'b'` `v2 value` | `id prefix suffix`

Injector bloom filters are also stored here. `\nexport type TData = (TNode|PipeDef<any>|DirectiveDef<any>|ComponentDef<any>|number|TStylingRange|\n TStylingKey|ProviderToken<any>|TII8n|I18nUpdateOpCodes|Ticu|null|string)[];` `\n` // Note: This hack is necessary so we don't erroneously get a circular dependency `\n` // failure based on types. `\nexport const unusedValueExportToPlacateAjd = 1;` `\n` `**` `\n` \* Human readable version of the ``LView``. `\n` `**` `\n` \* ``LView`` is a data structure used internally to keep track of views. The ``LView`` is designed for `\n` \* efficiency and so at times it is difficult to read or write tests which assert on its values. For `\n` \* this reason when ``ngDevMode`` is true we patch a ``LView.debug`` property which points to `\n` \* ``LViewDebug`` for easier debugging and test writing. It is the intent of ``LViewDebug`` to be used `\n` \* in tests. `\n` `\nexport interface LViewDebug<T = unknown> {` `\n` `/**` `\n` \* Flags associated with the ``LView`` unpacked into a more readable state. `\n` `**` `\n` \* See ``LViewFlags`` for the flag meanings. `\n` `\n` `readonly` flags: `{` `\n` `initPhaseState: number,` `\n` `creationMode: boolean,` `\n` `firstViewPass: boolean,` `\n` `checkAlways: boolean,` `\n` `dirty: boolean,` `\n` `attached: boolean,` `\n` `destroyed: boolean,` `\n` `isRoot: boolean,` `\n` `indexWithinInitPhase: number,` `\n` `};` `\n` `/**` `\n` \* Associated `TView` `\n` `**` `\n` \* `readonly` `tView: TView;` `\n` `/**` `\n` \* Parent view (or container) `\n` `**` `\n` \* `readonly` `parent: LViewDebug|LContainerDebug|null;` `\n` `\n` `/**` `\n` \* Next sibling to the ``LView``. `\n` `**` `\n` \* `readonly` `next: LViewDebug|LContainerDebug|null;` `\n` `\n` `/**` `\n` \* The context used for evaluation of the ``LView`` `\n` `**` `\n` \* (Usually the component) `\n` `**` `\n` \* `readonly` `context: T;` `\n` `/**` `\n` \* Hierarchical tree of nodes. `\n` `**` `\n` \* `readonly` `nodes: DebugNode[];` `\n` `/**` `\n` \* Template structure (no instance data). `\n` \* (Shows how `TNodes` are connected) `\n` `**` `\n` \* `readonly` `template: string;` `\n` `\n` `/**` `\n` \* HTML representation of the ``LView``. `\n` `**` `\n` \* This is only approximate to actual HTML as child ``LView``'s are removed. `\n` `**` `\n` \* `readonly` `html: string;` `\n` `/**` `\n` \* The host element to which this ``LView`` is attached. `\n` `**` `\n` \* `readonly` `hostHTML: string|null;` `\n` `/**` `\n` \* Child ``LView``'s `\n` `**` `\n` \* `readonly` `childViews: Array<LViewDebug|LContainerDebug>;` `\n` `\n` `/**` `\n` \* Sub range of ``LView`` containing decls (DOM elements). `\n` `**` `\n` \* `readonly` `decls: LViewDebugRange;` `\n` `/**` `\n` \* Sub range of ``LView`` containing vars (bindings). `\n` `**` `\n` \* `readonly` `vars: LViewDebugRange;` `\n` `\n` `/**` `\n` \* Sub range of ``LView`` containing expando (used by DI). `\n` `**` `\n` \* `readonly` `expando: LViewDebugRange;` `\n` `\n` `/**` `\n` \* Human readable version of the ``LContainer`` `\n` `**` `\n` \* ``LContainer`` is a data structure used internally to keep track of child views. The ``LContainer`` `\n` \* is designed for efficiency and so at times it is difficult to read or write tests which assert on `\n` \* its values. For this reason when ``ngDevMode`` is true we patch a ``LContainer.debug`` property which `\n` \* points to ``LContainerDebug`` for easier debugging and test writing. It is the intent of `\n` \* ``LContainerDebug`` to be used in tests. `\n` `\nexport interface LContainerDebug {` `\n` `readonly` `native: RComment;` `\n` `/**` `\n` \* Child ``LView``'s. `\n` `**` `\n` \* `readonly` `views: LViewDebug[];` `\n` `readonly` `parent: LViewDebug|null;` `\n` `readonly` `movedViews: LView[]|null;` `\n` `readonly` `host: RElement|RComment|LView;` `\n` `readonly` `next: LViewDebug|LContainerDebug|null;` `\n` `readonly` `hasTransplantedViews: boolean;` `\n` `\n` `\n` `\n` `**` `\n` \* ``LView`` is subdivided to ranges where the actual data is stored. Some of these ranges such as ``decls`` and ``vars`` are known at compile time. Other such as ``i18n`` and ``expando`` are runtime only `\n` \* concepts. `\n` `\nexport interface LViewDebugRange {` `\n` `/**` `\n` \* The starting index in ``LView`` where the range begins. (Inclusive) `\n` `**` `\n` \* `start: number;` `\n` `/**` `\n` \* The ending index in ``LView`` where the range ends. (Exclusive) `\n` `**` `\n` \* `end: number;` `\n` `\n` `/**` `\n` \* The length of the range `\n` `**` `\n` \* `length: number;` `\n` `\n` `/**` `\n` \* The merged content of the range. ``t`` contains data from ``TView.data`` and ``i`` contains ``LView`` `\n` \* data at an index. `\n` `**` `\n` \* `content: LViewDebugRangeContent[];` `\n` `\n` `\n` `**` `\n` \* For convenience the static and instance portions of ``TView`` and ``LView`` are merged into a single `\n` \* object in ``LViewRange``. `\n` `\nexport interface LViewDebugRangeContent`

```

{\n /**\n * Index into original `LView` or `TView.data`. \n * \n index: number;\n\n /**\n * Value from the
`TView.data[index]` location. \n * \n t: any;\n\n /**\n * Value from the `LView[index]` location. \n * \n l:
any;\n}\n\n\n/**\n * A logical node which comprise into `LView`s. \n * \n * \nexport interface DebugNode {\n
/**\n * HTML representation of the node. \n * \n html: string|null;\n\n /**\n * Associated `TNode` \n * \n
tNode: TNode;\n\n /**\n * Human readable node type. \n * \n type: string;\n\n /**\n * DOM native node. \n
* \n native: Node;\n\n /**\n * Child nodes \n * \n children: DebugNode[];\n\n /**\n * A list of
Component/Directive types which need to be instantiated an this location. \n * \n factories: Type<unknown>[];\n\n
/**\n * A list of Component/Directive instances which were instantiated an this location. \n * \n instances:
unknown[];\n\n /**\n * NodeInjector information. \n * \n injector: NodeInjectorDebug;\n\n /**\n * Injector
resolution path. \n * \n injectorResolutionPath: any;\n}\n\nexport interface NodeInjectorDebug {\n /**\n *
Instance bloom. Does the current injector have a provider with a given bloom mask. \n * \n bloom: string;\n\n\n
/**\n * Cumulative bloom. Do any of the above injectors have a provider with a given bloom
mask. \n * \n cumulativeBloom: string;\n\n /**\n * A list of providers associated with this injector. \n * \n
providers: (Type<unknown>|DirectiveDef<unknown>|ComponentDef<unknown>)[];\n\n /**\n * A list of
providers associated with this injector visible to the view of the component only. \n * \n viewProviders:
Type<unknown>[];\n\n\n /**\n * Location of the parent `TNode`. \n * \n parentInjectorIndex:
number;\n}\n\n", /**\n * @license \n * Copyright Google LLC All Rights Reserved. \n * \n * Use of this source code is
governed by an MIT-style license that can be \n * found in the LICENSE file at https://angular.io/license\n
* \n\nimport {LContainer, TYPE} from './container';\nimport {ComponentDef, DirectiveDef} from
'./definition';\nimport {TNode, TNodeFlags} from './node';\nimport {RNode} from './renderer_dom';\nimport
{FLAGS, LView, LViewFlags} from './view';\n\n\n/**\n * True if `value` is `LView`. \n * \n * @param value wrapped
value of `RNode`, `LView`, `LContainer` \n * \nexport
function isLView(value: RNode|LView|LContainer|{ }|null): value is LView {\n return Array.isArray(value) &&
typeof value[TYPE] === 'object';\n}\n\n\n/**\n * True if `value` is `LContainer`. \n * \n * @param value wrapped value of
`RNode`, `LView`, `LContainer` \n * \nexport function isLContainer(value: RNode|LView|LContainer|{ }|null):
value is LContainer {\n return Array.isArray(value) && value[TYPE] === true;\n}\n\n\nexport function
isContentQueryHost(tNode: TNode): boolean {\n return (tNode.flags & TNodeFlags.hasContentQuery) !==
0;\n}\n\n\nexport function isComponentHost(tNode: TNode): boolean {\n return (tNode.flags &
TNodeFlags.isComponentHost) === TNodeFlags.isComponentHost;\n}\n\n\nexport function isDirectiveHost(tNode:
TNode): boolean {\n return (tNode.flags & TNodeFlags.isDirectiveHost) ===
TNodeFlags.isDirectiveHost;\n}\n\n\nexport function isComponentDef<T>(def: DirectiveDef<T>): def is
ComponentDef<T> {\n return (def as ComponentDef<T>).template !== null;\n}\n\n\nexport function
isRootView(target:
LView): boolean {\n return (target[FLAGS] & LViewFlags.IsRoot) !== 0;\n}\n\n", /**\n * @license \n * Copyright
Google LLC All Rights Reserved. \n * \n * Use of this source code is governed by an MIT-style license that can be \n
* found in the LICENSE file at https://angular.io/license\n
* \n\nimport {assertDefined, assertEquals, assertNumber,
throwError} from './util/assert';\nimport {getComponentDef, getNgModuleDef} from './definition';\nimport
{LContainer} from './interfaces/container';\nimport {DirectiveDef} from './interfaces/definition';\nimport {Ticu}
from './interfaces/i18n';\nimport {NodeInjectorOffset} from './interfaces/injector';\nimport {TNode} from
'./interfaces/node';\nimport {isLContainer, isLView} from './interfaces/type_checks';\nimport
{DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LView, T_HOST, TVIEW, TView} from
'./interfaces/view';\n\n// [Assert functions do not constraint type when they are guarded by a truthy\n//
expression.](https://github.com/microsoft/TypeScript/issues/37295)\n\n\nexport
function assertTNodeForLView(tNode: TNode, lView: LView) {\n assertTNodeForTView(tNode,
lView[TVIEW]);\n}\n\n\nexport function assertTNodeForTView(tNode: TNode, tView: TView) {\n
assertTNode(tNode);\n tNode.hasOwnProperty('tView_') &&\n assertEquals(\n (tNode as any as {tView_:
TView}).tView_, tView,\n 'This TNode does not belong to this TView.);\n}\n\n\nexport function
assertTNode(tNode: TNode) {\n assertDefined(tNode, 'TNode must be defined');\n if (!(tNode && typeof tNode

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=== 'object' && tNode.hasOwnProperty('directiveStylingLast')) {\n  throwError('Not of type TNode, got: ' +
tNode);\n } }\n\n\nexport function assertTlCu(tlCu: TlCu) {\n  assertDefined(tlCu, 'Expected TlCu to be defined');\n
if (!(typeof tlCu.currentCaseLViewIndex === 'number')) {\n  throwError('Object is not of TlCu type.);\n
}\n }\n\n\nexport function assertComponentType(\n  actual: any,\n  msg: string = 'Type passed in is not
ComponentType,
it does not have `cmp` property.') {\n  if (!getComponentDef(actual)) {\n  throwError(msg);\n } }\n\n\nexport
function assertNgModuleType(\n  actual: any,\n  msg: string = 'Type passed in is not NgModuleType, it does not
have `mod` property.') {\n  if (!getNgModuleDef(actual)) {\n  throwError(msg);\n } }\n }\n\n\nexport function
assertCurrentTNodeIsParent(isParent: boolean) {\n  assertEquals(isParent, true, 'currentTNode should be a
parent');\n }\n }\n\n\nexport function assertHasParent(tNode: TNode|null) {\n  assertDefined(tNode, 'currentTNode should
exist!);\n  assertDefined(tNode!.parent, 'currentTNode should have a parent');\n }\n }\n\n\nexport function
assertDataNext(IView: LView, index: number, arr?: any[]) {\n  if (arr == null) arr = IView;\n  assertEquals(\n
arr.length, index, `index ${index} expected to be at the end of arr (length ${arr.length})`);\n }\n }\n\n\nexport function
assertLContainer(value: any): asserts value is LContainer {\n  assertDefined(value, 'LContainer must be
defined');\n  assertEquals(isLContainer(value), true, 'Expecting LContainer');\n }\n }\n\n\nexport function
assertLViewOrUndefined(value: any): asserts value is LView|null|undefined {\n  value &&
assertEquals(isLView(value), true, 'Expecting LView or undefined or null');\n }\n }\n\n\nexport function
assertLView(value: any): asserts value is LView {\n  assertDefined(value, 'LView must be defined');\n
assertEquals(isLView(value), true, 'Expecting LView');\n }\n }\n\n\nexport function assertFirstCreatePass(tView: TView,
errMessage?: string) {\n  assertEquals(\n  tView.firstCreatePass, true, errMessage || 'Should only be called in first
create pass.);\n }\n }\n\n\nexport function assertFirstUpdatePass(tView: TView, errMessage?: string) {\n  assertEquals(\n
tView.firstUpdatePass, true, errMessage || 'Should only be called in first update pass.);\n }\n }\n\n\n/**\n * This is a basic
sanity check that an object is probably a directive def. DirectiveDef is\n * an interface, so we can't do a direct
instanceof check.\n */\n\nexport
function assertDirectiveDef<T>(obj: any): asserts obj is DirectiveDef<T> {\n  if (obj.type === undefined ||
obj.selectors == undefined || obj.inputs === undefined) {\n  throwError(\n  `Expected a
DirectiveDef/ComponentDef and this object does not seem to have the expected shape.`);\n } }\n }\n\n\nexport function
assertIndexInDeclRange(IView: LView, index: number) {\n  const tView = IView[1];\n  assertBetween(HEADER_OFFSET, tView.bindingStartIndex, index);\n }\n }\n\n\nexport function
assertIndexInVarsRange(IView: LView, index: number) {\n  const tView = IView[1];\n  assertBetween(tView.bindingStartIndex, tView.expandoStartIndex, index);\n }\n }\n\n\nexport function
assertIndexInExpandoRange(IView: LView, index: number) {\n  const tView = IView[1];\n  assertBetween(tView.expandoStartIndex, IView.length, index);\n }\n }\n\n\nexport function assertBetween(lower:
number, upper: number, index: number) {\n  if (!(lower <= index && index < upper)) {\n  throwError(`Index out
of range (expecting ${lower}
<= ${index} < ${upper})`);\n } }\n }\n\n\nexport function assertProjectionSlots(IView: LView, errMessage?: string)
{\n  assertDefined(IView[DECLARATION_COMPONENT_VIEW], 'Component views should exist.);\n  assertDefined(\n  IView[DECLARATION_COMPONENT_VIEW][T_HOST]!.projection,\n  errMessage ||\n  'Components with projection nodes (<ng-content>) must have projection slots defined.);\n }\n }\n\n\nexport function
assertParentView(IView: LView|null, errMessage?: string) {\n  assertDefined(\n  IView,\n  errMessage ||
'Component views should always have a parent view (component's host view);'\n }\n }\n\n\n/**\n * This is a basic
sanity check that the `injectorIndex` seems to point to what looks like a\n * NodeInjector data structure.\n * @param IView `LView` which should be checked.\n * @param injectorIndex index into the `LView` where the
`NodeInjector` is expected.\n */\n\nexport function assertNodeInjector(IView: LView, injectorIndex: number) {\n
assertIndexInExpandoRange(IView,
injectorIndex);\n  assertIndexInExpandoRange(IView, injectorIndex + NodeInjectorOffset.PARENT);\n  assertNumber(IView[injectorIndex + 0], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 1], 'injectorIndex should point to a bloom filter');\n

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assertNumber(IView[injectorIndex + 2], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 3], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 4], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 5], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 6], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 7], 'injectorIndex should point to a bloom filter');\n
assertNumber(\n
IView[injectorIndex + NodeInjectorOffset.PARENT],\n    'injectorIndex should point to parent\n
injector');\n}\n\n", "/*\n * @license\n * Copyright\n
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n\nimport {Type} from './interface/type';\nimport\n
{stringify} from './util/stringify';\nimport {NG_FACTORY_DEF} from './fields';\n\n\n/*\n * Definition of what a\n
factory function should look like.\n *\n\nexport type FactoryFn<T> = {\n /*\n * Subclasses without an explicit\n
constructor call through to the factory of their base\n * definition, providing it with their own constructor to\n
instantiate.\n *\n <U extends T>(t?: Type<U>): U;\n\n /*\n * If no constructor to instantiate is provided, an\n
instance of type T itself is created.\n *\n (t?: undefined): T;\n};\n\n\nexport function getFactoryDef<T>(type: any,\n
throwNotFound: true): FactoryFn<T>;\nexport function getFactoryDef<T>(type: any): FactoryFn<T>|null;\nexport\n
function getFactoryDef<T>(type: any, throwNotFound?: boolean): FactoryFn<T>|null\n
{\n const hasFactoryDef = type.hasOwnProperty(NG_FACTORY_DEF);\n if (!hasFactoryDef &&\n
throwNotFound === true && ngDevMode) {\n throw new Error('Type ${stringify(type)} does not have 'fac'\n
property.');

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as DirectiveDefFeature).ngInherit = true;\n\n/**\n * This is a synthetic lifecycle hook which gets inserted into
`TVView.preOrderHooks` to simulate\n * `ngOnChanges`.\n *\n * The hook reads the `NgSimpleChangesStore` data
from the component instance and if changes are\n * found it invokes `ngOnChanges` on the component instance.\n
*\n * @param this Component instance. Because this function gets inserted into `TVView.preOrderHooks`,\n * it is
guaranteed to be called with component instance.\n */\nfunction
rememberChangeHistoryAndInvokeOnChangesHook(this: OnChanges) {\n  const simpleChangesStore =
getSimpleChangesStore(this);\n  const current = simpleChangesStore?.current;\n\n  if (current) {\n    const previous
= simpleChangesStore!.previous;\n    if (previous === EMPTY_OBJ) {\n      simpleChangesStore!.previous =
current;\n    } else {\n      // New changes are copied to the previous store, so that we don't lose history for inputs\n
// which were not changed
      this.time\n      for (let key in current) {\n        previous[key] = current[key];\n      }\n    }\n\n    simpleChangesStore!.current = null;\n    this.ngOnChanges(current);\n  }\n}\n\nfunction
ngOnChangesSetInput<T>(\n  this: DirectiveDef<T>, instance: T, value: any, publicName: string, privateName:
string): void {\n  const simpleChangesStore = getSimpleChangesStore(instance) ||\n  setSimpleChangesStore(instance, {previous: EMPTY_OBJ, current: null});\n  const current =
simpleChangesStore.current || (simpleChangesStore.current = {});\n  const previous =
simpleChangesStore.previous;\n\n  const declaredName = (this.declaredInputs as {[key: string]:
string})[publicName];\n  const previousChange = previous[declaredName];\n  current[declaredName] = new
SimpleChange(\n    previousChange && previousChange.currentValue, value, previous === EMPTY_OBJ);\n\n  (instance as any)[privateName] = value;\n}\n\nconst SIMPLE_CHANGES_STORE =
'__ngSimpleChanges__';\n\nfunction getSimpleChangesStore(instance:
any): null|NgSimpleChangesStore {\n  return instance[SIMPLE_CHANGES_STORE] || null;\n}\n\nfunction
setSimpleChangesStore(instance: any, store: NgSimpleChangesStore): NgSimpleChangesStore {\n  return
instance[SIMPLE_CHANGES_STORE] = store;\n}\n\n/**\n * Data structure which is monkey-patched on the
component instance and used by `ngOnChanges`\n * life-cycle hook to track previous input values.\n */\ninterface
NgSimpleChangesStore {\n  previous: SimpleChanges;\n  current: SimpleChanges|null;\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * Profiler events is an enum
used by the profiler to distinguish between different calls of user\n * code invoked throughout the application
lifecycle.\n */\nexport const enum ProfilerEvent {\n  /**\n   * Corresponds to the point in time before the runtime
has called
the template function of a\n * component with `RenderFlags.Create`.\n */\n  TemplateCreateStart,\n\n  /**\n   *
Corresponds to the point in time after the runtime has called the template function of a\n * component with
`RenderFlags.Create`.\n */\n  TemplateCreateEnd,\n\n  /**\n   * Corresponds to the point in time before the
runtime has called the template function of a\n * component with `RenderFlags.Update`.\n */\n  TemplateUpdateStart,\n\n  /**\n   * Corresponds to the point in time after the runtime has called the template
function of a\n * component with `RenderFlags.Update`.\n */\n  TemplateUpdateEnd,\n\n  /**\n   * Corresponds
to the point in time before the runtime has called a lifecycle hook of a component\n * or directive.\n */\n  LifecycleHookStart,\n\n  /**\n   * Corresponds to the point in time after the runtime has called a lifecycle hook of a
component\n * or directive.\n */\n  LifecycleHookEnd,\n\n  /**\n   * Corresponds to the point in time
before the runtime has evaluated an expression associated with\n * an event or an output.\n */\n  OutputStart,\n\n  /**\n   * Corresponds to the point in time after the runtime has evaluated an expression associated with\n * an
event or an output.\n */\n  OutputEnd,\n}\n\n/**\n * Profiler function which the runtime will invoke before and
after user code.\n */\nexport interface Profiler {\n  (event: ProfilerEvent, instance: {}|null, hookOrListener?: (e?:
any) => any): void;\n}\n\nlet profilerCallback: Profiler|null = null;\n\n/**\n * Sets the callback function which
will be invoked before and after performing certain actions at\n * runtime (for example, before and after running
change detection).\n *\n * Warning: this function is *INTERNAL* and should not be relied upon in application's
code.\n *\n * The contract of the function might be changed in any release and/or the function can be removed\n */

```





```

function guarantees in dev mode to retrieve a non-null `RNode`.
\n * @param tNode
\n * @param lView
\n * ^\nextport function getNativeByTNode(tNode:
  TNode, lView: LView): RNode {
\n  ngDevMode && assertTNodeForLView(tNode, lView);
\n  ngDevMode &&
  assertIndexInRange(lView, tNode.index);
\n  const node: RNode = unwrapRNode(lView[tNode.index]);
\n  return
  node;
\n}
\n\n/**
\n * Retrieve an `RNode` or `null` for a given `TNode` and `LView`.
\n * Some `TNode`s don't
  have associated `RNode`s. For example `Projection`.
\n * @param tNode
\n * @param lView
\n * ^\nextport
  function getNativeByTNodeOrNull(tNode: TNode|null, lView: LView): RNode|null {
\n  const index = tNode ===
  null ? -1 : tNode.index;
\n  if (index !== -1) {
\n    ngDevMode && assertTNodeForLView(tNode!, lView);
\n    const
    node: RNode|null = unwrapRNode(lView[index]);
\n    return node;
\n  }
\n  return null;
\n}
\n\n// fixme(misko): The
  return Type should be `TNode|null`.
\n * ^\nextport function getTNode(tView: TView, index: number): TNode {
\n  ngDevMode && assertGreaterThan(index, -1, 'wrong index for TNode');
\n  ngDevMode && assertLessThan(index,
  tView.data.length, 'wrong index
  for TNode');
\n  const tNode = tView.data[index] as TNode;
\n  ngDevMode && tNode !== null &&
  assertTNode(tNode);
\n  return tNode;
\n}
\n\n/**
\n * Retrieves a value from any `LView` or `TData`.
\n * ^\nextport function
  load<T>(view: LView|TData, index: number): T {
\n  ngDevMode && assertIndexInRange(view, index);
\n  return
  view[index];
\n}
\n\n * ^\nextport function GetComponentLViewByIndex(nodeIndex: number, hostView: LView): LView
  {
\n  // Could be an LView or an LContainer. If LContainer, unwrap to find LView.
\n  ngDevMode &&
  assertIndexInRange(hostView, nodeIndex);
\n  const slotValue = hostView[nodeIndex];
\n  const lView =
  isLView(slotValue) ? slotValue : slotValue[HOST];
\n  return lView;
\n}
\n\n/**
\n * Checks whether a given view is in
  creation mode.
\n * ^\nextport function isCreationMode(view: LView): boolean {
\n  return (view[FLAGS] &
  LViewFlags.CreationMode) === LViewFlags.CreationMode;
\n}
\n\n/**
\n * Returns a boolean for whether the view
  is attached to the change detection tree.
\n * Note: This determines
  whether a view should be checked, not whether it's inserted
\n * into a container. For that, you'll want
  `viewAttachedToContainer` below.
\n * ^\nextport function viewAttachedToChangeDetector(view: LView): boolean
  {
\n  return (view[FLAGS] & LViewFlags.Attached) === LViewFlags.Attached;
\n}
\n\n/**
\n * Returns a boolean for
  whether the view is attached to a container.
\n * ^\nextport function viewAttachedToContainer(view: LView): boolean
  {
\n  return isLContainer(view[PARENT]);
\n}
\n\n/**
\n * Returns a constant from `TConstants`
  instance.
\n * ^\nextport
  function getConstant<T>(consts: TConstants|null, index: null|undefined): null;
\n * ^\nextport function
  getConstant<T>(consts: TConstants, index: number): T|null;
\n * ^\nextport function getConstant<T>(consts:
  TConstants|null, index: number|null|undefined): T|null;
\n * ^\nextport function getConstant<T>(consts: TConstants|null,
  index: number|null|undefined): T|null {
\n  if (index === null || index === undefined) return null;
\n  ngDevMode &&
  assertIndexInRange(consts!, index);
\n  return consts![index] as unknown as T;
\n}
\n\n/**
\n * Resets the pre-order hook flags of the view.
\n * @param
  lView the LView on which the flags are reset.
\n * ^\nextport function resetPreOrderHookFlags(lView: LView) {
\n  lView[PREORDER_HOOK_FLAGS] = 0;
\n}
\n\n/**
\n * Updates the
  `TRANSPLANTED_VIEWS_TO_REFRESH` counter on the `LContainer`
  as well as the parents
\n * whose
\n * 1.
  counter goes from 0 to 1, indicating that there is a new child
  that has a view to refresh
\n * or
\n * 2. counter goes
  from 1 to 0, indicating there are no more descendant views to
  refresh.
\n * ^\nextport function
  updateTransplantedViewCount(lContainer: LContainer, amount: 1|- 1) {
\n  lContainer[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;
\n  let viewOrContainer: LView|LContainer =
  lContainer;
\n  let parent: LView|LContainer|null = lContainer[PARENT];
\n  while (parent !== null &&
  ((amount === 1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH] === 1) ||
  (amount ===
  -1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH]
  === 0))) {
\n    parent[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;
\n    viewOrContainer = parent;
\n    parent = parent[PARENT];
\n  }
\n}
\n\n",
  /**
\n * @license
\n * Copyright Google LLC All Rights Reserved.
\n *
\n * Use of this source code is governed by an MIT-style license
  that can be
\n * found in the LICENSE file at
  https://angular.io/license
\n * ^\nimport {InjectFlags} from './di/interface/injector';
\nimport {assertDefined,
  assertEqual, assertGreaterThanOrEqual, assertLessThan,
  assertNotEqual, throwError} from './util/assert';
\nimport

```

```

{assertLViewOrUndefined, assertTNodeForLView, assertTNodeForTView} from './assert';
import {DirectiveDef}
from './interfaces/definition';
import {TNode, TNodeType} from './interfaces/node';
import {CONTEXT,
DECLARATION_VIEW, HEADER_OFFSET, LView, OpaqueViewState, T_HOST, TData, TVIEW, TView,
TViewType} from './interfaces/view';
import {MATH_ML_NAMESPACE, SVG_NAMESPACE} from
'./namespaces';
import {getTNode} from './util/view_utils';
}

interface LFrame {
  parent: LFrame;
  child: LFrame;
  state: LView;
  nodes: TView[];
  localVariables: TView;
  tView: TView;
  isParent: boolean;
  currentTNode: TNode;
  index: number;
  bindingIndex: number;
  viewData: TView;
  contextLView: LView;
  depthCount: number;
  elementDepthCount: number;
  currentNamespace: string;
  rootIndex: number;
  bindingRootIndex: number;
  currentQueryIndex: number;
  currentDirectiveIndex: number;
  elementStart: number;
  elementEnd: number;
  inI18nBlock: boolean;
}

It is useful to have a single object where all of the state is stored as a mental model
(rather than being spread across many different variables).
PERF NOTE: Turns out that writing to a true global variable is slower than having an
intermediate object with properties.
interface InstructionState {
  currentLFrame: LFrame;
  storesWhetherDirectivesShouldBeMatchedToElements: boolean;
  whenTemplateContainsNgNonBindable: boolean;
  preventRuntimeFromMatchingDirectivesOnChildrenOfThatElement: boolean;
  example: string;
  shouldMatchComponentDirective: boolean;
}

```

```

ngNonBindable>\n * <my-comp my-directive>\n * Should not match component / directive because we are in
ngNonBindable.\n * </my-comp>\n * </div>\n * ```\n * /\n bindingsEnabled: boolean;\n}\n\nconst
instructionState: InstructionState = {\n IFrame: createLFrame(null),\n bindingsEnabled: true,\n};\n\n/**\n * In this
mode, any changes in bindings will throw an ExpressionChangedAfterChecked error.\n *\n * Necessary to support
ChangeDetectorRef.checkNoChanges().\n *\n * The `checkNoChanges` function is invoked only in
ngDevMode=true and verifies that no unintended\n * changes exist in the change detector or its children.\n */\nlet
_isInCheckNoChangesMode = false;\n\n/**\n * Returns true if the instruction state stack is empty.\n *\n * Intended
to be called from tests only (tree shaken otherwise).\n */\nexport function specOnlyIsInstructionStateEmpty():
boolean {\n return instructionState.IFrame.parent === null;\n}\n\nexport function getElementDepthCount() {\n
return instructionState.IFrame.elementDepthCount;\n}\n\nexport function increaseElementDepthCount() {\n
instructionState.IFrame.elementDepthCount++;\n}\n\nexport function decreaseElementDepthCount() {\n
instructionState.IFrame.elementDepthCount--;\n}\n\nexport
function getBindingsEnabled(): boolean {\n return instructionState.bindingsEnabled;\n}\n\n\n/**\n * Enables
directive matching on elements.\n *\n * * Example:\n * ```\n * <my-comp my-directive>\n * Should match
component / directive.\n * </my-comp>\n * <div ngNonBindable>\n * <!-- disableBindings() -->\n * <my-comp
my-directive>\n * Should not match component / directive because we are in ngNonBindable.\n * </my-
comp>\n * <!-- enableBindings() -->\n * </div>\n * ```\n * @codeGenApi\n */\nexport function
enableBindings(): void {\n instructionState.bindingsEnabled = true;\n}\n\n\n/**\n * Disables directive matching on
element.\n *\n * * Example:\n * ```\n * <my-comp my-directive>\n * Should match component / directive.\n *
</my-comp>\n * <div ngNonBindable>\n * <!-- disableBindings() -->\n * <my-comp my-directive>\n *
Should not match component / directive because we are in ngNonBindable.\n * </my-comp>\n *
<!-- enableBindings() -->\n * </div>\n * ```\n * @codeGenApi\n */\nexport function disableBindings(): void
{\n instructionState.bindingsEnabled = false;\n}\n\n\n/**\n * Return the current `LView`.\n */\nexport function
getLView<T>(): LView<T> {\n return instructionState.IFrame.IView as LView<T>;\n}\n\n\n/**\n * Return the
current `TView`.\n */\nexport function getTView(): TView {\n return instructionState.IFrame.tView;\n}\n\n\n/**\n *
Restores `contextViewData` to the given OpaqueViewState instance.\n *\n * Used in conjunction with the
getCurrentView() instruction to save a snapshot\n * of the current view and restore it when listeners are invoked.
This allows\n * walking the declaration view tree in listeners to get vars from parent views.\n *\n * @param
viewToRestore The OpaqueViewState instance to restore.\n * @returns Context of the restored OpaqueViewState
instance.\n *\n * @codeGenApi\n */\nexport function restoreView<T = any>(viewToRestore: OpaqueViewState): T
{\n
instructionState.IFrame.contextLView = viewToRestore as any as LView;\n return (viewToRestore as any as
LView)[CONTEXT] as unknown as T;\n}\n\n\n/**\n * Clears the view set in `restoreView` from memory. Returns
the passed in\n * value so that it can be used as a return value of an instruction.\n *\n * @codeGenApi\n */\nexport
function resetView<T>(value?: T): T|undefined {\n instructionState.IFrame.contextLView = null;\n return
value;\n}\n\n\nexport function getCurrentTNode(): TNode|null {\n let currentTNode =
getCurrentTNodePlaceholderOk();\n while (currentTNode !== null && currentTNode.type ===
TNodeType.Placeholder) {\n currentTNode = currentTNode.parent;\n }\n return currentTNode;\n}\n\n\nexport
function getCurrentTNodePlaceholderOk(): TNode|null {\n return
instructionState.IFrame.currentTNode;\n}\n\n\nexport function getCurrentParentTNode(): TNode|null {\n const
IFrame = instructionState.IFrame;\n const currentTNode = IFrame.currentTNode;\n return IFrame.isParent
? currentTNode : currentTNode!.parent;\n}\n\n\nexport function setCurrentTNode(tNode: TNode|null, isParent:
boolean) {\n ngDevMode && tNode && assertTNodeForTView(tNode, instructionState.IFrame.tView);\n const
IFrame = instructionState.IFrame;\n IFrame.currentTNode = tNode;\n IFrame.isParent = isParent;\n}\n\n\nexport
function isCurrentTNodeParent(): boolean {\n return instructionState.IFrame.isParent;\n}\n\n\nexport function
setCurrentTNodeAsNotParent(): void {\n instructionState.IFrame.isParent = false;\n}\n\n\nexport function
setCurrentTNodeAsParent(): void {\n instructionState.IFrame.isParent = true;\n}\n\n\nexport function
getContextLView(): LView {\n const contextLView = instructionState.IFrame.contextLView;\n ngDevMode &&

```

```

assertDefined(contextLView, 'contextLView must be defined.);\n return contextLView!;\n}\n\nexport function
isInCheckNoChangesMode(): boolean {\n !ngDevMode && throwError('Must never be called in production
mode');\n return _isInCheckNoChangesMode;\n}\n\nexport
function setIsInCheckNoChangesMode(mode: boolean): void {\n !ngDevMode && throwError('Must never be
called in production mode');\n _isInCheckNoChangesMode = mode;\n}\n\n// top level variables should not be
exported for performance reasons (PERF_NOTES.md)\nexport function getBindingRoot() {\n const IFrame =
instructionState.IFrame;\n let index = IFrame.bindingRootIndex;\n if (index === -1) {\n index =
IFrame.bindingRootIndex = IFrame.tView.bindingStartIndex;\n }\n return index;\n}\n\nexport function
getBindingIndex(): number {\n return instructionState.IFrame.bindingIndex;\n}\n\nexport function
setBindingIndex(value: number): number {\n return instructionState.IFrame.bindingIndex = value;\n}\n\nexport
function nextBindingIndex(): number {\n return instructionState.IFrame.bindingIndex++;\n}\n\nexport function
incrementBindingIndex(count: number): number {\n const IFrame = instructionState.IFrame;\n const index =
IFrame.bindingIndex;\n IFrame.bindingIndex = IFrame.bindingIndex
+ count;\n return index;\n}\n\nexport function isInI18nBlock() {\n return
instructionState.IFrame.inI18n;\n}\n\nexport function setInI18nBlock(isInI18nBlock: boolean): void {\n
instructionState.IFrame.inI18n = isInI18nBlock;\n}\n\n/**\n * Set a new binding root index so that host template
functions can execute.\n * Bindings inside the host template are 0 index. But because we don't know ahead of
time\n * how many host bindings we have we can't pre-compute them. For this reason they are all\n * 0 index and
we just shift the root so that they match next available location in the LView.\n * @param bindingRootIndex
Root index for `hostBindings`\n * @param currentDirectiveIndex `TData[currentDirectiveIndex]` will point to the
current directive\n * whose `hostBindings` are being processed.\n */\nexport function
setBindingRootForHostBindings(\n bindingRootIndex: number, currentDirectiveIndex: number) {\n const IFrame =
instructionState.IFrame;\n IFrame.bindingIndex
= IFrame.bindingRootIndex = bindingRootIndex;\n setCurrentDirectiveIndex(currentDirectiveIndex);\n}\n\n/**\n *
When host binding is executing this points to the directive index.\n * `TView.data[getCurrentDirectiveIndex()]` is
`DirectiveDef`\n * `LView[getCurrentDirectiveIndex()]` is directive instance.\n */\nexport function
getCurrentDirectiveIndex(): number {\n return instructionState.IFrame.currentDirectiveIndex;\n}\n\n/**\n * Sets an
index of a directive whose `hostBindings` are being processed.\n * @param currentDirectiveIndex `TData`
index where current directive instance can be found.\n */\nexport function
setCurrentDirectiveIndex(currentDirectiveIndex: number): void {\n instructionState.IFrame.currentDirectiveIndex
= currentDirectiveIndex;\n}\n\n/**\n * Retrieve the current `DirectiveDef` which is active when `hostBindings`
instruction is being\n * executed.\n * @param tData Current `TData` where the `DirectiveDef` will be looked up
at.\n */\nexport function getCurrentDirectiveDef(tData:
TData): DirectiveDef<any>|null {\n const currentDirectiveIndex =
instructionState.IFrame.currentDirectiveIndex;\n return currentDirectiveIndex === -1 ? null :
tData[currentDirectiveIndex] as DirectiveDef<any>;\n}\n\nexport function getCurrentQueryIndex(): number {\n
return instructionState.IFrame.currentQueryIndex;\n}\n\nexport function setCurrentQueryIndex(value: number):
void {\n instructionState.IFrame.currentQueryIndex = value;\n}\n\n/**\n * Returns a `TNode` of the location where
the current `LView` is declared at.\n * @param IView an `LView` that we want to find parent `TNode` for.\n
*/\nfunction getDeclarationTNode(IView: LView): TNode|null {\n const tView = IView[TVIEW];\n\n // Return
the declaration parent for embedded views\n if (tView.type === TViewType.Embedded) {\n !ngDevMode &&
assertDefined(tView.declTNode, 'Embedded TNodes should have declaration parents.);\n return
tView.declTNode;\n }\n\n // Components don't have `TView.declTNode`
because each instance of component could be\n // inserted in different location, hence `TView.declTNode` is
meaningless.\n // Falling back to `T_HOST` in case we cross component boundary.\n if (tView.type ===
TViewType.Component) {\n return IView[T_HOST];\n }\n\n // Remaining TNode type is `TViewType.Root`
which doesn't have a parent TNode.\n return null;\n}\n\n/**\n * This is a light weight version of the `enterView`
which is needed by the DI system.\n * @param IView `LView` location of the DI context.\n * @param tNode

```

```

`TNode` for DI context\n * @param flags DI context flags. if `SkipSelf` flag is set than we walk up the declaration\n
* tree from `tNode` until we find parent declared `TElementNode`.\n * @returns `true` if we have successfully
entered DI associated with `tNode` (or with declared\n * `TNode` if `flags` has `SkipSelf`). Failing to enter DI
implies that no associated\n * `NodeInjector` can be found and we should instead use `ModuleInjector`.\n
* - If `true` than this call must be followed by `leaveDI`\n * - If `false` than this call failed and we should NOT
call `leaveDI`\n */\nexport function enterDI(IView: LView, tNode: TNode, flags: InjectFlags) {\n  ngDevMode &&
assertLViewOrUndefined(IView);\n\n  if (flags & InjectFlags.SkipSelf) {\n    ngDevMode &&
assertTNodeForTView(tNode, IView[TVIEW]);\n\n    let parentTNode = tNode as TNode | null;\n    let
parentLView = IView;\n\n    while (true) {\n      ngDevMode && assertDefined(parentTNode, 'Parent TNode should
be defined');\n      parentTNode = parentTNode!.parent as TNode | null;\n      if (parentTNode === null && !(flags &
InjectFlags.Host)) {\n        parentTNode = getDeclarationTNode(parentLView);\n        if (parentTNode === null)
break;\n        // In this case, a parent exists and is definitely an element. So it will definitely\n        // have an
existing IView as the declaration view, which is why we can assume it's defined.\n        ngDevMode &&
assertDefined(parentLView,
'Parent LView should be defined');\n        parentLView = parentLView[DECLARATION_VIEW]!;\n        // In
Ivy there are Comment nodes that correspond to ngIf and NgFor embedded directives\n        // We want to skip those
and look only at Elements and ElementContainers to ensure\n        // we're looking at true parent nodes, and not
content or other types.\n        if (parentTNode.type & (TNodeType.Element | TNodeType.ElementContainer)) {\n
          break;\n        }\n      } else {\n        break;\n      }\n    }\n\n    if (parentTNode === null) {\n      // If we failed to find a
parent TNode this means that we should use module injector.\n      return false;\n    } else {\n      tNode =
parentTNode;\n      IView = parentLView;\n    }\n\n    ngDevMode && assertTNodeForLView(tNode, IView);\n    const lFrame = instructionState.lFrame = allocLFrame();\n    lFrame.currentTNode = tNode;\n    lFrame.IView =
IView;\n\n    return true;\n  }\n\n  /**\n   * Swap the current IView with
a new IView.\n   * For performance reasons we store the IView in the top level of the module.\n   * This way we
minimize the number of properties to read. Whenever a new view\n   * is entered we have to store the IView for later,
and when the view is\n   * exited the state has to be restored\n   * @param newView New IView to become
active\n   * @returns the previously active IView;\n   */\n  export function enterView(newView: LView): void {\n
    ngDevMode && assertNotEqual(newView[0], newView[1] as any, '???');\n    ngDevMode &&
assertLViewOrUndefined(newView);\n    const newLFrame = allocLFrame();\n    if (ngDevMode) {\n      assertEqual(newLFrame.isParent, true, 'Expected clean LFrame');\n      assertEqual(newLFrame.IView, null,
'Expected clean LFrame');\n      assertEqual(newLFrame.tView, null, 'Expected clean LFrame');\n      assertEqual(newLFrame.selectedIndex, -1, 'Expected clean LFrame');\n      assertEqual(newLFrame.elementDepthCount, 0, 'Expected clean LFrame');\n      assertEqual(newLFrame.currentDirectiveIndex,
-1, 'Expected clean LFrame');\n      assertEqual(newLFrame.currentNamespace, null, 'Expected clean LFrame');\n      assertEqual(newLFrame.bindingRootIndex, -1, 'Expected clean LFrame');\n      assertEqual(newLFrame.currentQueryIndex, 0, 'Expected clean LFrame');\n    }\n    const tView =
newView[TVIEW];\n    instructionState.lFrame = newLFrame;\n    ngDevMode && tView.firstChild &&
assertTNodeForTView(tView.firstChild, tView);\n    newLFrame.currentTNode = tView.firstChild!;\n    newLFrame.IView = newView;\n    newLFrame.tView = tView;\n    newLFrame.contextLView = newView;\n    newLFrame.bindingIndex = tView.bindingStartIndex;\n    newLFrame.inI18n = false;\n  }\n\n  /**\n   * Allocates next
free LFrame. This function tries to reuse the `LFrame`'s to lower memory pressure.\n   */\n  function allocLFrame() {\n
    const currentLFrame = instructionState.lFrame;\n    const childLFrame = currentLFrame === null ? null :
currentLFrame.child;\n    const newLFrame = childLFrame === null ? createLFrame(currentLFrame) :
childLFrame;\n\n    return newLFrame;\n  }\n\n  function createLFrame(parent: LFrame | null): LFrame {\n    const lFrame: LFrame = {\n      currentTNode: null,\n      isParent: true,\n      IView: null!,\n      tView: null!,\n      selectedIndex: -1,\n      contextLView:
null,\n      elementDepthCount: 0,\n      currentNamespace: null,\n      currentDirectiveIndex: -1,\n      bindingRootIndex: -

```

```

1,\n bindingIndex: -1,\n currentQueryIndex: 0,\n parent: parent!,\n child: null,\n inI18n: false,\n };\n
parent !== null && (parent.child = IFrame); // link the new LFrame for reuse.\n return IFrame;\n}\n\n/**\n * A
lightweight version of leave which is used with DI.\n * This function only resets `currentTNode` and `LView` as
those are the only properties\n * used with DI (`enterDI()`).\n * NOTE: This function is reexported as `leaveDI`.
However `leaveDI` has return type of `void` where\n * as `leaveViewLight` has `LFrame`. This is so that
`leaveViewLight` can be used in `leaveView`.\n */\nfunction leaveViewLight():\n
LFrame {\n  const oldLFrame = instructionState.IFrame;\n  instructionState.IFrame = oldLFrame.parent;\n
oldLFrame.currentTNode = null!;\n  oldLFrame.LView = null!;\n  return oldLFrame;\n}\n\n/**\n * This is a
lightweight version of the `leaveView` which is needed by the DI system.\n * NOTE: this function is an alias so
that we can change the type of the function to have `void`\n * return type.\n */\nexport const leaveDI: () => void =
leaveViewLight;\n\n/**\n * Leave the current `LView`\n * This pops the `LFrame` with the associated `LView`
from the stack.\n * IMPORTANT: We must zero out the `LFrame` values here otherwise they will be retained.
This is\n * because for performance reasons we don't release `LFrame` but rather keep it for next use.\n */\nexport
function leaveView() {\n  const oldLFrame = leaveViewLight();\n  oldLFrame.isParent = true;\n  oldLFrame.tView =
null!;\n  oldLFrame.selectedIndex = -1;\n  oldLFrame.contextLView = null;\n  oldLFrame.elementDepthCount =
0;\n  oldLFrame.currentDirectiveIndex = -1;\n  oldLFrame.currentNamespace = null;\n
oldLFrame.bindingRootIndex = -1;\n  oldLFrame.bindingIndex = -1;\n  oldLFrame.currentQueryIndex =
0;\n}\n\nexport function nextContextImpl<T = any>(level: number): T {\n  const contextLView =
instructionState.IFrame.contextLView =\n    walkUpViews(level, instructionState.IFrame.contextLView!);\n
return contextLView[CONTEXT] as unknown as T;\n}\n\nfunction walkUpViews(nestingLevel: number,\n
currentView: LView): LView {\n  while (nestingLevel > 0) {\n    ngDevMode &&\n      assertDefined(\n
currentView[DECLARATION_VIEW],\n        'Declaration view should be defined if nesting level is greater than
0.);\n    currentView = currentView[DECLARATION_VIEW]!;\n    nestingLevel--;\n  }\n  return
currentView;\n}\n\n/**\n * Gets the currently selected element index.\n * Used with {@link property}
instruction (and more in the future) to identify the index in the\n * current `LView`
to act on.\n */\nexport function getSelectedIndex() {\n  return instructionState.IFrame.selectedIndex;\n}\n\n/**\n *
Sets the most recent index passed to {@link select}\n * Used with {@link property} instruction (and more in the
future) to identify the index in the\n * current `LView` to act on.\n * (Note that if an "exit function" was set
earlier (via `setElementExitFn`) then that will be\n * run if and when the provided `index` value is different from
the current selected index value.)\n */\nexport function setSelectedIndex(index: number) {\n  ngDevMode && index
!== -1 &&\n    assertGreaterThanOrEqual(index, HEADER_OFFSET, 'Index must be past HEADER_OFFSET (or
-1).);\n  ngDevMode &&\n    assertLessThan(\n    index, instructionState.IFrame.LView.length, 'Can\\'t set
index passed end of LView');\n  instructionState.IFrame.selectedIndex = index;\n}\n\n/**\n * Gets the `tNode` that
represents currently selected element.\n */\nexport function getSelectedTNode()\n
{\n  const IFrame = instructionState.IFrame;\n  return getTNode(IFrame.tView, IFrame.selectedIndex);\n}\n\n/**\n *
Sets the namespace used to create elements to `http://www.w3.org/2000/svg` in global state.\n */\n *
@codeGenApi\n */\nexport function namespaceSVG() {\n  instructionState.IFrame.currentNamespace =
SVG_NAMESPACE;\n}\n\n/**\n * Sets the namespace used to create elements to
`http://www.w3.org/1998/MathML/` in global state.\n */\n *
@codeGenApi\n */\nexport function
namespaceMathML() {\n  instructionState.IFrame.currentNamespace = MATH_ML_NAMESPACE;\n}\n\n/**\n * Sets the namespace used to create elements to `null`, which forces element creation to use\n * `createElement` rather
than `createElementNS`.\n */\n *
@codeGenApi\n */\nexport function namespaceHTML() {\n
namespaceHTMLInternal();\n}\n\n/**\n * Sets the namespace used to create elements to `null`, which forces
element creation to use\n * `createElement` rather than `createElementNS`.\n */\nexport function
namespaceHTMLInternal()\n
{\n  instructionState.IFrame.currentNamespace = null;\n}\n\nexport function getNamespace(): string|null {\n  return
instructionState.IFrame.currentNamespace;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the

```



hooks requires complex logic as we need to deal with 2 constraints.

1. Init hooks (ngOnInit, ngAfterContentInit, ngAfterViewInit) must all be executed once and only once, across many change detection cycles. This must be true even if some hooks throw, or if some recursively trigger a change detection cycle. To solve that, it is required to track the state of the execution of these init hooks. This is done by storing and maintaining flags in the view: the `{ @link InitPhaseState }`, and the index within that phase. They can be seen as a cursor in the following structure: `[[onInit1, onInit2], [afterContentInit1], [afterViewInit1, afterViewInit2, afterViewInit3]]`. They are stored as flags in `LView[FLAGS]`.
2. Pre-order hooks can be executed in batches, because of the select instruction. To be able to pause and resume their execution, we also need some state about the hook's array that is being processed:
  - the index of the next hook to be executed
  - the number of init hooks already found in the processed part of the array
 They are stored as flags in `LView[PREORDER_HOOK_FLAGS]`.

Executes pre-order check hooks ( `OnChanges`, `DoChanges`) given a view where all the init hooks were executed once. This is a light version of `executeInitAndCheckPreOrderHooks` where we can skip read / write of the init-hooks related flags.

@param `IView` The `LView` where hooks are defined

@param `hooks` Hooks to be run

@param `nodeIndex` 3 cases depending on the value:

- undefined: all hooks from the array should be executed (post-order case)
- null: execute hooks only from the saved index until the end of the array (pre-order case, when flushing the remaining hooks)
- number: execute hooks only from the saved index until that node index exclusive (pre-order case, when executing `select(number)`)

^nextport function `executeCheckHooks(IView: LView, hooks: HookData, nodeIndex?: number|null)`

```
{
  \n callHooks(IView, hooks, InitPhaseState.InitPhaseCompleted, nodeIndex);
}
```

Executes post-order init and check hooks (one of `AfterContentInit`, `AfterContentChecked`, `AfterViewInit`, `AfterViewChecked`) given a view where there are pending init hooks to be executed.

@param `IView` The `LView` where hooks are defined

@param `hooks` Hooks to be run

@param `initPhase` A phase for which hooks should be run

@param `nodeIndex` 3 cases depending on the value:

- undefined: all hooks from the array should be executed (post-order case)
- null: execute hooks only from the saved index until the end of the array (pre-order case, when flushing the remaining hooks)
- number: execute hooks only from the saved index until that node index exclusive (pre-order case, when executing `select(number)`)

^nextport function `executeInitAndCheckHooks(IView: LView, hooks: HookData, initPhase: InitPhaseState, nodeIndex?: number|null)`

```
{
  \n ngDevMode && \n
  assertNotEqual(
    initPhase, InitPhaseState.InitPhaseCompleted,
    'Init pre-order hooks should not be called more than once');
  \n if ((IView[FLAGS] & LViewFlags.InitPhaseStateMask) === initPhase) {
    \n callHooks(IView, hooks, initPhase, nodeIndex);
  }
}
```

^nextport function `incrementInitPhaseFlags(IView: LView, initPhase: InitPhaseState): void`

```
{
  \n ngDevMode && \n
  assertNotEqual(
    initPhase, InitPhaseState.InitPhaseCompleted,
    'Init hooks phase should not be incremented after all init hooks have been run.');
```

```
\n let flags = IView[FLAGS];
  \n if ((flags & LViewFlags.InitPhaseStateMask) === initPhase) {
    \n flags &= LViewFlags.IndexWithinInitPhaseReset;
    \n flags += LViewFlags.InitPhaseStateIncrementer;
  }
  \n IView[FLAGS] = flags;
}
```

^nextport function `callLifecycleHooks(IView: LView, arr: HookData, initPhase: InitPhaseState, currentIndex: number|null|undefined): void`

```
{
  \n ngDevMode && \n
  assertEquals(
    isInCheckNoChangesMode(), false,
    'Hooks should never be run when in check no changes mode.');
```

```
\n const startIndex = currentIndex !== undefined ?
  (currentView[PREORDER_HOOK_FLAGS] & PreOrderHookFlags.IndexOfTheNextPreOrderHookMaskMask) :
  0;
  \n const nodeIndexLimit =
```





NO\_PARENT\_INJECTOR: RelativeInjectorLocation = -1 as any;

Each injector is saved in 9 contiguous slots in `LView` and 9 contiguous slots in `TView.data`. This allows us to store information about the current node's tokens (which can be shared in `TView`) as well as the tokens of its ancestor nodes (which cannot be shared, so they live in `LView`). Each of these slots (aside from the last slot) contains a bloom filter. This bloom filter determines whether a directive is available on the associated node or not. This prevents us from searching the directives array at this level unless it's probable the directive is in it. See: [https://en.wikipedia.org/wiki/Bloom\\_filter](https://en.wikipedia.org/wiki/Bloom_filter) for more about bloom filters. Because all injectors have been flattened into `LView` and `TViewData`, they cannot be typed using interfaces as they were previously. The start index of each `LInjector` and `TInjector` will differ based on where it is flattened into the main array, so it's not possible to know the indices ahead of

time and save their types here. The interfaces are still included here for documentation purposes. export interface LInjector extends Array<any> {\n \* // Cumulative bloom for directive IDs 0-31 (IDs are % BLOOM\_SIZE)\n \* [0]: number;\n \* // Cumulative bloom for directive IDs 32-63\n \* [1]: number;\n \* // Cumulative bloom for directive IDs 64-95\n \* [2]: number;\n \* // Cumulative bloom for directive IDs 96-127\n \* [3]: number;\n \* // Cumulative bloom for directive IDs 128-159\n \* [4]: number;\n \* // Cumulative bloom for directive IDs 160 - 191\n \* [5]: number;\n \* // Cumulative bloom for directive IDs 192 - 223\n \* [6]: number;\n \* // Cumulative bloom for directive IDs 224 - 255\n \* [7]: number;\n \* // We need to store a reference to the injector's parent so DI can keep looking up\n \* // the injector tree until it finds the dependency it's looking for.\n \* [PARENT\_INJECTOR]: number;\n

\* }\n \* export interface TInjector extends Array<any> {\n \* // Shared node bloom for directive IDs 0-31 (IDs are % BLOOM\_SIZE)\n \* [0]: number;\n \* // Shared node bloom for directive IDs 32-63\n \* [1]: number;\n \* // Shared node bloom for directive IDs 64-95\n \* [2]: number;\n \* // Shared node bloom for directive IDs 96-127\n \* [3]: number;\n \* // Shared node bloom for directive IDs 128-159\n \* [4]: number;\n \* // Shared node bloom for directive IDs 160 - 191\n \* [5]: number;\n \* // Shared node bloom for directive IDs 192 - 223\n \* [6]: number;\n \* // Shared node bloom for directive IDs 224 - 255\n \* [7]: number;\n \* // Necessary to find directive indices for a particular node.\n \* [TNODE]:

TElementNode|TElementContainerNode|TContainerNode;\n \* }\n \* Factory for creating instances of injectors in the NodeInjector.\n \* This factory is complicated by the fact that it can resolve

`multi` factories as well.\n \* NOTE: Some of the fields are optional which means that this class has two hidden classes.\n \* - One without `multi` support (most common)\n \* - One with `multi` values, (rare).\n \* Since VMs can cache up to 4 inline hidden classes this is OK.\n \* - Single factory: Only `resolving` and `factory` is defined.\n \* - `providers` factory: `componentProviders` is a number and `index = -1`.\n \* - `viewProviders` factory: `componentProviders` is a number and `index` points to `providers`.

export class NodeInjectorFactory {\n \* // The inject implementation to be activated when using the factory.\n \* injectImpl: null|(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T);\n \* // Marker set to true during factory invocation to see if we get into recursive loop.\n \* Recursive loop causes an error to be displayed.\n \* resolving = false;\n \* Marks that the token can see other Tokens declared in `viewProviders`

on the same node.\n \* canSeeViewProviders: boolean;\n \* An array of factories to use in case of `multi` provider.\n \* multi?: Array<() => any>;\n \* Number of `multi`-providers which belong to the component.\n \* This is needed because when multiple components and directives declare the `multi` provider they have to be concatenated in the correct order.\n \* Example:\n \* If we have a component and directive active on a single element as declared here\n \* component:\n \* providers: [ {provide: String, useValue: 'component', multi: true} ],\n \* viewProviders: [ {provide: String, useValue: 'componentView', multi: true} ],\n \* directive:\n \* providers: [ {provide: String, useValue: 'directive', multi: true} ],\n \* Then the expected results are:\n \* providers: ['component', 'directive']\n \* viewProviders: ['component', 'componentView', 'directive']\n

\* The way to think about it is that the `viewProviders` have been inserted after the component but before the directives, which is why we need to know how many `multi`s have been declared by the component.\n

componentProviders?: number;\n\n /\*\*\n \* Current index of the Factory in the `data`. Needed for `viewProviders` and `providers` merging.\n \* See `providerFactory`. \n \*/\n index?: number;\n\n /\*\*\n \* Because the same `multi` provider can be declared in `providers` and `viewProviders` it is\n \* possible for `viewProviders` to shadow the `providers`. For this reason we store the\n \* `provideFactory` of the `providers` so that `providers` can be extended with `viewProviders`.\n \* \n \* Example:\n \* \n \* Given:\n \* ```\n \* providers: [ {provide: String, useValue: 'all', multi: true} ],\n \* viewProviders: [ {provide: String, useValue: 'viewOnly', multi: true} ],\n \* ```\n \* \n \* We have to return `[all]` in case of content injection, but `[all, 'viewOnly']` in case\n \* of view injection. We further have to make sure that the shared instances (in our case\n \* `all`) are the exact same instance in both the content as well as the view injection. (We\n \* have to make sure that we don't double instantiate.) For this reason the `viewProviders`\n \* `Factory` has a pointer to the shadowed `providers` factory so that it can instantiate the\n \* `providers` (`[all]`) and then extend it with `viewProviders` (`[all] + ['viewOnly']`).\n \*/\n providerFactory?: NodeInjectorFactory|null;\n\n constructor(\n /\*\*\n \* Factory to invoke in order to create a new instance.\n \*/\n public factory:\n (this: NodeInjectorFactory, \_: undefined,\n /\*\*\n \* array where injectables tokens are stored. This is used in\n \* case of an error reporting to produce friendlier errors.\n \*/\n tData: TData,\n /\*\*\n \* array where existing instances of injectables are stored. This is used in case\n \* of multi shadow is needed. See `multi` field documentation.\n \*/\n IView: LView,\n /\*\*\n \* The TNode of the same element injector.\n \*/\n tNode: TDirectiveHostNode) => any,\n /\*\*\n \* Set to `true` if the token is declared in `viewProviders` (or if it is component).\n \*/\n isViewProvider: boolean,\n injectImplementation: null|(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T)) {\n ngDevMode && assertDefined(factory, 'Factory not specified');\n ngDevMode && assertEqual(typeof factory, 'function', 'Expected factory function.);\n this.canSeeViewProviders = isViewProvider;\n this.injectImpl = injectImplementation;\n }\n}\n\nexport function isFactory(obj: any): obj is NodeInjectorFactory {\n return obj instanceof NodeInjectorFactory;\n}\n\n// Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*/\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*/\nimport {KeyValueArray} from '../util/array\_utils';\nimport {TStylingRange} from '../interfaces/styling';\nimport {Ticu} from './i18n';\nimport {CssSelector} from './projection';\nimport {RNode} from './renderer\_dom';\nimport {LView, TView} from './view';\n\n/\*\*\n \* TNodeType corresponds to the {@link TNode} `type` property.\n \* \n \* NOTE: type IDs are such that we use each bit to denote a type. This is done so that we can easily\n \* check if the `TNode` is of more than one type.\n \* \n \* if (tNode.type === TNodeType.Text || tNode.type === TNodeType.Element)\n \* can be written as:\n \* if (tNode.type & (TNodeType.Text | TNodeType.Element))\n \* \n \* However any given `TNode` can only be of one type.\n \*/\nexport const enum TNodeType {\n /\*\*\n \* The TNode contains information about a DOM element aka {@link RText}.\n \*/\n Text = 0b1,\n\n /\*\*\n \* The TNode contains information about a DOM element aka {@link RElement}.\n \*/\n Element = 0b10,\n\n /\*\*\n \* The TNode contains information about an {@link LContainer} for embedded views.\n \*/\n Container = 0b100,\n\n /\*\*\n \* The TNode contains information about an <ng-container> element {@link RNode}.\n \*/\n ElementContainer = 0b1000,\n\n /\*\*\n \* The TNode contains information about an <ng-content> projection.\n \*/\n Projection = 0b10000,\n\n /\*\*\n \* The TNode contains information about an ICU comment used in `i18n`.\n \*/\n Icu = 0b100000,\n\n /\*\*\n \* Special node type representing a placeholder for future `TNode` at this location.\n \* \n \* I18n translation blocks are created before the element nodes which they contain. (I18n blocks\n \* can span over many elements.) Because i18n `TNode`s (representing text) are created first they\n \* often may need to point to element `TNode`s which are not yet created. In such a case we create\n \* a `Placeholder` `TNode`. This allows the i18n to structurally link the `TNode`s together\n \* without knowing any information about the future nodes which will be at that location.\n \* \n \* On `firstCreatePass` When element instruction executes it will try to create

```

a `TNode` at that location. Seeing a `Placeholder` `TNode` already there tells the system that it should reuse
existing `TNode` (rather than create a new one) and just update the missing information.
Placeholder =
0b1000000, // Combined Types These should never be used for `TNode.type` only as a useful way to check
// if `TNode.type` is one of several choices. // See: https://github.com/microsoft/TypeScript/issues/35875 why we
can't refer to existing enum. AnyRNode = 0b11, // Text | Element,
AnyContainer = 0b1100, // Container | ElementContainer, // See:
// Converts `TNodeType` into human
readable text.
* Make sure this matches with `TNodeType`
* `TNodeType`
toTNodeTypeAsString(tNodeType: TNodeType): string {
let text = "";
(tNodeType & TNodeType.Text) &&
(text += 'Text');
(tNodeType & TNodeType.Element) && (text += 'Element');
(tNodeType &
TNodeType.Container) && (text += 'Container');
(tNodeType & TNodeType.ElementContainer) && (text +=
'ElementContainer');
(tNodeType & TNodeType.Projection) && (text += 'Projection');
(tNodeType &
TNodeType.Icu) && (text += 'IcuContainer');
(tNodeType & TNodeType.Placeholder) && (text +=
'Placeholder');
return text.length > 0 ? text.substring(1) : text;
}
* Corresponds to the TNode.flags
property.
* `TNode.flags`
* `TNode.flags`
* Bit #1 - This bit is set if the node is a host for any directive
(including a component)
* `isDirectiveHost`
isDirectiveHost = 0x1,
* Bit #2 - This bit is set if the node is a host for a component.
* `isDirectiveHost`
* Setting this bit implies that the
`isDirectiveHost` bit is set as well.
* `isComponentHost`
isComponentHost = 0x2,
* Bit #3 - This bit is set if the node has
been projected
* `isProjected`
isProjected = 0x4,
* Bit #4 - This bit is set if any directive on this node has content
queries
* `hasContentQuery`
hasContentQuery = 0x8,
* Bit #5 - This bit is set if the node has any `class` inputs
* `hasClassInput`
hasClassInput = 0x10,
* Bit #6 - This bit is set if the node has any `style` inputs
* `hasStyleInput`
hasStyleInput =
0x20,
* Bit #7 This bit is set if the node has been detached by i18n
* `isDetached`
isDetached = 0x40,
* Bit
#8 - This bit is set if the node has directives with host bindings.
* `isDetached`
* This flags allows us to guard host-binding
logic and invoke it only on nodes
* that actually have directives with host bindings.
* `hasHostBindings`
hasHostBindings =
0x80,
* Corresponds to the TNode.providerIndexes
property.
* `TNode.providerIndexes`
* `TNode.providerIndexes`
* The index of the first provider on this node is
encoded on the least significant bits.
* `ProvidersStartIndexMask`
ProvidersStartIndexMask =
0b00000000000000111111111111111111,
* The count of view providers from the component on this
node is
* encoded on the 20 most significant bits.
* `CptViewProvidersCountShifter`
CptViewProvidersCountShifter = 0b00000000000010000000000000000000,
* A set of marker values
to be used in the attributes arrays. These markers indicate that some
* items are not regular attributes and the
processing should be adapted accordingly.
* `AttributeMarker`
* `AttributeMarker`
* An implicit
marker which indicates that the value in the array are of `attributeKey`,
* `attributeValue` format.
* `AttributeMarker`
* NOTE: This is implicit as it is the type when no marker is present in array. We indicate that
* it should not be
present at runtime by the negative number.
* `ImplicitAttributes`
ImplicitAttributes = -1,
* Marker indicates that the following 3 values in the attributes array are:
* namespaceUri, attributeName, attributeValue
* in that order.
* `NamespaceURI`
NamespaceURI = 0,
* Signals class declaration.
* Each value following `Classes` designates a class name to include on the
element.
* ## Example:
* Given:
* <div class="foo bar baz">...</div>
* the
generated code is:
* var _c1 = [AttributeMarker.Classes, 'foo', 'bar', 'baz'];
* Classes =
1,
* Signals style declaration.
* Each pair of values following `Styles` designates a style name
and value to include on the
* element.
* ## Example:
* Given:
* <div
style="width:100px; height:200px; color:red">...</div>
* the generated code is:
* var
_c1 = [AttributeMarker.Styles, 'width', '100px', 'height',
'200px', 'color', 'red'];
* Styles = 2,
* Signals that the following attribute names were
extracted from input or output bindings.
* For example, given the following HTML:
* <div
moo="car" [foo]="exp" (bar)="doSth()">
* the generated code is:
* var _c1 =
['moo', 'car', AttributeMarker.Bindings, 'foo', 'bar'];
* Bindings = 3,
* Signals that the
following attribute names were hoisted from an inline-template declaration.
* For example, given the

```

following HTML:

```

<div *ngFor="let value of values; trackBy:trackBy" dirA [dirB]="value">

```

the generated code for the `template()` instruction would include:

```

['dirA', '',
AttributeMarker.Bindings, 'dirB', AttributeMarker.Template, 'ngFor', 'ngForOf',
'ngForTrackBy', 'let-value']

```

while the generated code for the `element()` instruction inside the template function would include:

```

['dirA', '',
AttributeMarker.Bindings, 'dirB']
Template = 4,
Signals that the following attribute is `ngProjectAs` and its value is a parsed `CssSelector`.
For example, given the following HTML:
<h1 attr="value" ngProjectAs="[title]">
the generated code for the `element()` instruction would include:
['attr', 'value', AttributeMarker.ProjectAs, ['title', '']]
ProjectAs = 5,
Signals that the following attribute will be translated by runtime i18n.
For example, given the following HTML:
<div moo="car" foo="value" i18n-foo [bar]="binding" i18n-bar>
the generated code is:
var _c1 = ['moo', 'car', AttributeMarker.I18n, 'foo', 'bar'];
I18n = 6,
}

```

A combination of:

- Attribute names and values.
- Special markers acting as flags to alter attributes processing.
- Parsed `ngProjectAs` selectors.

export type TAttributes = (string|AttributeMarker|CssSelector)[];

Constants that are associated with a view. Includes:

- Attribute arrays.
- Local definition arrays.
- Translated messages (i18n).

export type TConstants = (TAttributes|string)[];

Factory function that returns an array of consts. Consts can be represented as a function in case any additional statements are required to define consts in the list. An example is i18n where additional i18n calls are generated, which should be executed when consts are requested for the first time.

export type TConstantsFactory = () => TConstants;

TConstants type that describes how the `consts` field is generated on `ComponentDef`: it can be either an array or a factory function that returns that array.

export type TConstantsOrFactory = TConstants|TConstantsFactory;

Binding data (flyweight) for a particular node that is shared between all templates of a specific type.

If a property is:

- `PropertyAliases`: that property's data was generated and this is it
- `Null`: that property's data was already generated and nothing was found.
- `Undefined`: that property's data has not yet been generated

see: [https://en.wikipedia.org/wiki/Flyweight\\_pattern](https://en.wikipedia.org/wiki/Flyweight_pattern) for more on the Flyweight pattern

export interface TNode {

/\*\* The type of the TNode. See TNodeType. \*/

type: TNodeType;

/\*\* Index of the TNode in TView.data and corresponding native element in LView. This is necessary to get from any TNode to its corresponding native element when traversing the node tree. If index is -1, this is a dynamically created container node or embedded view node. \*/

index: number;

/\*\* Insert before existing DOM node index. When DOM nodes are being inserted, normally they are being appended as they are created. Under i18n case, the translated text nodes are created ahead of time as part of the `i18nStart` instruction which means that this `TNode` can't just be appended and instead needs to be inserted using `insertBeforeIndex` semantics. Additionally sometimes it is necessary to insert new text nodes as a child of this `TNode`. In such a case the value stores an array of text nodes to insert. Example: `<div i18n> Hello <span>World</span>!` In the above example the `i18nStart` instruction can create `Hello`, `World` and `!` text nodes. It can also insert `Hello` and `!` text node as a child of `<div>`, but it can't insert `World` because the `<span>` node has not yet been created. In such a case the `<span>` `TNode` will have an array which will direct the `<span>` to not only insert itself in front of `!` but also to insert the `World` (created by `i18nStart`) into `<span>` itself.

Pseudo code:

```

if (insertBeforeIndex === null) {
  // append as normal
} else if (Array.isArray(insertBeforeIndex)) {
  // First insert current `TNode` at correct location
  const currentNode = IView[this.index];
  parentNode.insertBefore(currentNode, IView[this.insertBeforeIndex[0]]);
  // Now append all of the children
  for(let i=1; i<this.insertBeforeIndex; i++) {
    currentNode.appendChild(IView[this.insertBeforeIndex[i]]);
  }
} else {
  parentNode.insertBefore(IView[this.index], IView[this.insertBeforeIndex])
}

```

Append as normal using `parentNode.appendChild`number``: Append using

```

parentNode.insertBefore(IView[this.index], IView[this.insertBeforeIndex])`
`
` * Initialization *
` * Because `i18nStart` executes before nodes are created, on `TView.firstCreatePass`
it is not possible for `i18nStart` to set the `insertBeforeIndex` value as the corresponding `TNode`
has not yet been created. For this reason the `i18nStart` creates a `TNodeType.Placeholder`
`TNode` at that location. See `TNodeType.Placeholder` for more information.
`
` insertBeforeIndex: InsertBeforeIndex;
`
` * The index of the closest injector in this node's LView.
` * If the index === -1, there is no injector on this node or any ancestor node in this view.
` * If the index !== -1, it is the index of this node's injector OR the index of a parent
injector in the same view. We pass the parent injector index down the node tree of a view so
it's possible to find the parent injector without walking a potentially deep node tree.
` * Injector indices are not set across view boundaries because there could
be multiple component hosts.
` * If tNode.injectorIndex === tNode.parent.injectorIndex, then the index belongs to a parent
injector.
`
` injectorIndex: number;
`
` * Stores starting index of the directives.
`
` * NOTE: The first directive is always component (if present).
`
` directiveStart: number;
`
` * Stores final exclusive index of the directives.
`
` * The area right behind the `directiveStart`-`directiveEnd` range is used to allocate the
`HostBindingFunction` `vars` (or null if no bindings.) Therefore `directiveEnd` is used to set
`LFrame.bindingRootIndex` before `HostBindingFunction` is executed.
`
` directiveEnd: number;
`
` * Stores the last directive which had a styling instruction.
`
` * Initial value of this is `-1` which means that no `hostBindings` styling instruction has
executed. As `hostBindings` instructions execute they set the value to the index of the
`DirectiveDef` which contained the last `hostBindings` styling instruction.
`
` * Valid values are:
` * - `-1` No `hostBindings` instruction has executed.
` * - `directiveStart <= directiveStylingLast < directiveEnd`: Points to the
`DirectiveDef` of the last styling instruction which executed in the `hostBindings`.
`
` * This data is needed so that styling instructions know which static styling data needs to be
collected from the `DirectiveDef.hostAttrs`. A styling instruction needs to collect all data
since last styling instruction.
`
` directiveStylingLast: number;
`
` * Stores indexes of property bindings. This field is only set in the ngDevMode and holds
indexes of property bindings so TestBed can get bound property metadata for a given node.
`
` propertyBindings: number[]|null;
`
` * Stores if Node isComponent, isProjected, hasContentQuery, hasClassInput and hasStyleInput
etc.
`
` flags: TNodeFlags;
`
` * This number stores two values using its bits:
` * - the index of the first provider on that node (first 16 bits)
` * - the count of view providers from the component on this node (last 16 bits)
`
` // TODO(misko): break this into actual vars.
` providerIndexes: TNodeProviderIndexes;
`
` * The value name associated with this node.
`
` if type:
` * `TNodeType.Text`: text value
` * `TNodeType.Element`: tag name
` * `TNodeType.ICUContainer`: `Ticu` value;
`
` * Attributes associated with an element. We need to store attributes to support various
use-cases (attribute injection, content projection with selectors, directives matching).
Attributes are stored statically because reading them from the DOM would be way too slow for
content projection and queries.
`
` * Since attrs will always be calculated first, they will never need to be marked undefined by
other instructions.
`
` * For regular attributes a name of an attribute and its value alternate in the array.
e.g. ['role', 'checkbox']
`
` * This array can contain flags that will indicate "special attributes" (attributes with namespaces,
attributes extracted from bindings and outputs).
`
` attrs: TAttributes|null;
`
` * Same as `TNode.attrs` but contains merged data across all directive host bindings.
`
` * We need to keep `attrs` as unmerged so that it can be used for attribute selectors.
`
` * We merge attrs here so that it can be used in a performant way for initial rendering.
`
` * The `attrs` are merged in first pass in following order:
` * - Component's `hostAttrs`
` * - Directives' `hostAttrs`
` * - Template `TNode.attrs` associated with the current `TNode`.
`
` mergedAttrs: TAttributes|null;
`
` * A set of local names under which a given element is exported in a template and visible to queries.
An entry in this array can be created for different reasons:
`
` * - an element itself is referenced, ex.: `<div #foo>`
` * - a component is referenced, ex.: `<my-cmpt #foo>`
`
` * - a directive is referenced, ex.: `<my-cmpt #foo="directiveExportAs">`.
`
` * A given element

```

might have different local names and those names can be associated with a directive. We store local names at even indexes while odd indexes are reserved for directive index in a view (or -1 if there is no associated directive).

Some examples:

```

<div #foo> => ["foo", -1]
<my-cmpt #foo> => ["foo", myCmptIdx, directiveIdx]
<div #foo #bar="directiveExportAs"> => ["foo", -1, "bar", directiveIdx]

```

localNames: (string|number)[]|null;

Information about input properties that need to be set once from attribute data.

initialInputs: InitialInputData|null|undefined;

Input data for all directives on this node. null means that there are no directives with inputs on this node.

inputs: PropertyAliases|null;

Output data for all directives on this node. null means that there are no directives with outputs on this node.

outputs: PropertyAliases|null;

The TView or TViews attached to this node.

If this TNode corresponds to an LContainer with inline views, the container will need to store separate static data for each of its view blocks (TView[]). Otherwise, nodes in inline views with the same index as nodes in their parent views will overwrite each other, as they are in the same template.

Each index in this array corresponds to the static data for a certain view. So if you had V(0) and V(1) in a container, you might have:

```

[
  { tagName: 'div', attrs: ... }, null, // V(0) TView
  [{ tagName: 'button', attrs ... }, null] // V(1) TView
]

```

If this TNode corresponds to an LContainer with a template (e.g. structural directive), the template's TView will be stored here.

If this TNode corresponds to an element, tViews will be null.

tViews: TView|TView[]|null;

The next sibling node. Necessary so we can propagate through the root nodes of a view to insert them or remove them from the DOM.

next: TNode|null;

The next projected sibling. Since in Angular content projection works on the node-by-node basis the act of projecting nodes might change nodes relationship at the insertion point (target view). At the same time we need to keep initial relationship between nodes as expressed in content view.

projectionNext: TNode|null;

First child of the current node.

For component nodes, the child will always be a ContentChild (in same view).

For embedded view nodes, the child will be in their child view.

child: TNode|null;

Parent node (in the same view only).

We need a reference to a node's parent so we can append the node to its parent's native element at the appropriate time.

If the parent would be in a different view (e.g. component host), this property will be null.

It's important that we don't try to cross component boundaries when retrieving the parent because the parent will change (e.g. index, attrs) depending on where the component was used (and thus shouldn't be stored on TNode). In these cases, we retrieve the parent through LView.node instead (which will be instance-specific).

If this is an inline view node (V), the parent will be its container.

parent: TElementNode|TContainerNode|null;

List of projected TNodes for a given component host element OR index into the said nodes.

For easier discussion assume this example:

```

<parent>'s view definition:
<child id="c1">content1</child>
<child id="c2"><span>content2</span></child>
<child>'s view definition:
<ng-content id="cont1"></ng-content>

```

If Array.isArray(projection) then TNode is a host element.

projection stores the content nodes which are to be projected.

The nodes represent categories defined by the selector: For example: <ng-content select="abc"/> would represent the heads for <ng-content/> and <ng-content select="abc"/> respectively.

The nodes we store in projection are heads only, we used .next to get their siblings.

The nodes .next is sorted/rewritten as part of the projection setup.

projection size is equal to the number of projections <ng-content>. The size of c1 will be 1 because <child> has only one <ng-content>.

we store projection with the host (c1, c2) rather than the <ng-content> (cont1) because the same component (<child>) can be used in multiple locations (c1, c2) and as a result have different set of nodes to project.

without projection it would be difficult to efficiently traverse nodes to be projected.

If typeof projection == 'number' then TNode is a <ng-content> element.

projection is an index of the host's projectionNodes.

This would return the first head node to project.

```

`getHost(currentTNode).projection[currentTNode.projection]`.
 * - When projecting nodes the parent node
retrieved may be a `` node, in which case
 * the process is recursive in nature.
 * If
`projection` is of type `RNode[]` then we have a collection of native nodes passed as
 * projectable nodes during
dynamic component creation.
 * /
projection: (TNode|RNode[])|number|null;
 /**
 * A collection of all `style` static values for an element (including from host).
 * This field will be
populated if and when:
 * - There are one or more initial `style`s on an element (e.g. `

`)
 * - There are one or more initial `style`s on a directive/component host
 * (e.g.
`@Directive({host: {style: "width:200px;"} })`)
 * /
styles: string|null;
 /**
 * A collection of all
`style` static values for an element excluding host sources.
 * Populated when there are one or more initial
`style`s on an element
 * (e.g. `

`)
 * Must be stored separately from `tNode.styles`
to facilitate setting directive
 * inputs that shadow the `style` property. If we used `tNode.styles` as is for
shadowed inputs,
 * we would feed host styles back into directives as `inputs`. If we used `tNode.attrs`, we
 * would have to concatenate the attributes on every template pass. Instead,
we process once on
 * first create pass and store here.
 * /
stylesWithoutHost: string|null;
 /**
 * A
`KeyValueArray` version of residual `styles`.
 * When there are styling instructions than each instruction
stores the static styling
 * which is of lower priority than itself. This means that there may be a higher priority
 * styling than the instruction.
 * Imagine:
 * ``
 * 

*
 * @Directive({
 *   host: {
 *     style: 'color: lowest;',
 *     [styles.color]: 'exp' // styleProp('color', ctx.exp);
 *   }
 * })
 * ``
 * In the above case:
 * - `color: lowest` is stored with `styleProp('color', ctx.exp);`
instruction
 * - `color: highest` is the residual and is stored here.
 * - `undefined`: not initialized.
 * -
`null`: initialized but `styles` is `null`
 * - `KeyValueArray`: parsed version of `styles`.
 * /
residualStyles:
KeyValueArray<any>|undefined|null;
 /**
 * A collection of all class static values for an element (including from host).
 * This field will be
populated if and when:
 * - There are one or more initial classes on an element (e.g. `

---



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```



```

element */nexport interface TElementNode extends TNode {*/n /**
  Index in the data[] array */n index: number;*/n child:
TElementNode|TTextNode|TElementContainerNode|TContainerNode|TProjectionNode|null;*/n /***/n * Element
nodes will have parents unless they are the first node of a component or*/n * embedded view (which means their
parent is in a different view and must be*/n * retrieved using viewData[HOST_NODE]).*/n */n parent:
TElementNode|TElementContainerNode|null;*/n tViews: null;*/n*/n /***/n * If this is a component TNode with
projection, this will be an array of projected*/n * TNodes or native nodes (see TNode.projection for more info). If
it's a regular element node*/n * or a component without projection, it will be null.*/n */n projection:
(TNode|RNode[]|[])|null;*/n*/n /***/n * Stores tagName*/n */n value: string;*/n}*/n/** Static data for a text node
*/nexport interface TTextNode extends TNode {*/n /** Index in the data[] array */n index: number;*/n child:
null;*/n /***/n * Text nodes will have parents unless they are
the first node of a component or*/n * embedded view (which means their parent is in a different view and must be*/n
* retrieved using LView.node).*/n */n parent: TElementNode|TElementContainerNode|null;*/n tViews: null;*/n
projection: null;*/n}*/n/** Static data for an LContainer */nexport interface TContainerNode extends TNode {*/n
/***/n * Index in the data[] array.*/n */n * If it's -1, this is a dynamically created container node that isn't stored
in*/n * data[] (e.g. when you inject ViewContainerRef) .*/n */n index: number;*/n child: null;*/n*/n /***/n *
Container nodes will have parents unless:*/n */n * - They are the first node of a component or embedded view*/n *
- They are dynamically created*/n */n parent: TElementNode|TElementContainerNode|null;*/n tViews:
TView|TView[]|null;*/n projection: null;*/n value: null;*/n}*/n/** Static data for an <ng-container> */nexport
interface TElementContainerNode extends TNode {*/n /** Index in the LView[] array. */n
index: number;*/n child:
TElementNode|TTextNode|TContainerNode|TElementContainerNode|TProjectionNode|null;*/n parent:
TElementNode|TElementContainerNode|null;*/n tViews: null;*/n projection: null;*/n}*/n/** Static data for an ICU
expression */nexport interface TIcuContainerNode extends TNode {*/n /** Index in the LView[] array. */n index:
number;*/n child: null;*/n parent: TElementNode|TElementContainerNode|null;*/n tViews: null;*/n projection: null;*/n
value: TIcu;*/n}*/n/** Static data for an LProjectionNode */nexport interface TProjectionNode extends TNode {*/n
/** Index in the data[] array */n child: null;*/n /***/n * Projection nodes will have parents unless they are the first
node of a component*/n * or embedded view (which means their parent is in a different view and must be*/n *
retrieved using LView.node).*/n */n parent: TElementNode|TElementContainerNode|null;*/n tViews: null;*/n*/n /**
Index of the projection node. (See TNode.projection for more info.) */n projection:
number;*/n value: null;*/n}*/n/***/n * A union type representing all TNode types that can host a directive.*/n
*/nexport type TDirectiveHostNode = TElementNode|TContainerNode|TElementContainerNode;*/n/***/n * This
mapping is necessary so we can set input properties and output listeners*/n * properly at runtime when property
names are minified or aliased.*/n */n * Key: unminified / public input or output name*/n * Value: array containing
minified / internal name and related directive index*/n */n * The value must be an array to support inputs and outputs
with the same name*/n * on the same node.*/n */nexport type PropertyAliases = {*/n // This uses an object map
because using the Map type would be too slow*/n [key: string]: PropertyAliasValue*/n};*/n/***/n * Store the runtime
input or output names for all the directives.*/n */n * i+0: directive instance index*/n * i+1: privateName*/n */n * e.g.
[0, 'change-minified']*/n */nexport type PropertyAliasValue = (number|string)[];*/n/***/n * This
array contains information about input properties that*/n * need to be set once from attribute data. It's ordered by*/n
* directive index (relative to element) so it's simple to*/n * look up a specific directive's initial input data.*/n
*/n * Within each sub-array:*/n */n * i+0: attribute name*/n * i+1: minified/internal input name*/n * i+2: initial value*/n
*/n * If a directive on a node does not have any input properties*/n * that should be set from attributes, its index is set to
null*/n * to avoid a sparse array.*/n */n * e.g. [null, ['role-min', 'minified-input', 'button']]*/n */nexport type
InitialInputData = (InitialInputs|null)[];*/n/***/n * Used by InitialInputData to store input properties*/n * that should
be set once from attributes.*/n */n * i+0: attribute name*/n * i+1: minified/internal input name*/n * i+2: initial value*/n
*/n * e.g. ['role-min', 'minified-input', 'button']*/n */nexport type InitialInputs = string[];*/n/** Note: This hack is
necessary so we don't erroneously get a circular

```

```

dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n\n/**\n * Type
representing a set of TNodes that can have local refs (`#foo`) placed on them.\n */\nexport type
TNodeWithLocalRefs = TContainerNode|TElementNode|TElementContainerNode;\n\n/**\n * Type for a function
that extracts a value for a local refs.\n * Example:\n * - `

` - `nativeDivEl` should point to the
native `

` element;\n * - `` - `tplRef` should point to the `TemplateRef` instance;\n
*/\nexport type LocalRefExtractor = (tNode: TNodeWithLocalRefs, currentView: LView) => any;\n\n/**\n *
Returns `true` if the `TNode` has a directive which has `@Input()` for `class` binding.\n */\n * ```\n * <div my-dir
[class]="exp"></div>\n * ```\n * and\n * ```\n * @Directive({\n * })\n * class MyDirective {\n * @Input()\n *
class: string;\n * }\n * ```\n */\n * In the above case it is necessary to write the reconciled styling information into
the\n *
directive's input.\n */\n * @param tNode\n */\nexport function hasClassInput(tNode: TNode) {\n return
(tNode.flags & TNodeFlags.hasClassInput) !== 0;\n}\n\n/**\n * Returns `true` if the `TNode` has a directive which
has `@Input()` for `style` binding.\n */\n * ```\n * <div my-dir [style]="exp"></div>\n * ```\n * and\n * ```\n *
@Directive({\n * })\n * class MyDirective {\n * @Input()\n * class: string;\n * }\n * ```\n */\n * In the above case
it is necessary to write the reconciled styling information into the\n * directive's input.\n */\n * @param tNode\n
*/\nexport function hasStyleInput(tNode: TNode) {\n return (tNode.flags & TNodeFlags.hasStyleInput) !==
0;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertDefined, throwError} from './util/assert';\nimport {TNode, TNodeType,
toTNodeTypeAsString} from
 './interfaces/node';\nexport function assertTNodeType(\n tNode: TNode|null, expectedTypes: TNodeType,
message?: string): void {\n assertDefined(tNode, 'should be called with a TNode');\n if ((tNode.type &
expectedTypes) === 0) {\n throwError(\n message ||\n `Expected
[${toTNodeTypeAsString(expectedTypes)}] but got ${\n toTNodeTypeAsString(tNode.type)}.`);\n
}\n}\n\nexport function assertPureTNodeType(type: TNodeType) {\n if (!(type === TNodeType.Element ||
/>\n type === TNodeType.Text || /\n type === TNodeType.Container || /\n type ===
TNodeType.ElementContainer || /\n type === TNodeType.Icu || /\n type ===
TNodeType.Projection || /\n type === TNodeType.Placeholder)) {\n throwError(`Expected TNodeType
to have only a single type selected, but got ${\n toTNodeTypeAsString(type)}.`);\n }\n}\n\n"/**\n * @license\n
* Copyright Google LLC All
Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {CharCode} from './util/char_code';\nimport
{AttributeMarker, TAttributes} from './interfaces/node';\nimport {CssSelector} from
 './interfaces/projection';\nimport {Renderer} from './interfaces/renderer';\nimport {RElement} from
 './interfaces/renderer_dom';\n\n/**\n * Assigns all attribute values to the provided element via the inferred
renderer.\n */\n * This function accepts two forms of attribute entries:\n * default: (key, value):\n * attrs = [key1,
value1, key2, value2]\n * namespaced: (NAMESPACE_MARKER, uri, name, value)\n * attrs =
[NAMESPACE_MARKER, uri, name, value, NAMESPACE_MARKER, uri, name, value]\n * The `attrs` array
can contain a mix of both the default and namespaced entries.\n * The `default` values are set without a marker,
but if the function comes across\n * a marker value
then it will attempt to set a namespaced value. If the marker is\n * not of a namespaced value then the function will
quit and return the index value\n * where it stopped during the iteration of the attrs array.\n */\n * See
[AttributeMarker] to understand what the namespace marker value is.\n */\n * Note that this instruction does not
support assigning style and class values to\n * an element. See `elementStart` and `elementHostAttrs` to learn how
styling values\n * are applied to an element.\n * @param renderer The renderer to be used\n * @param native The
element that the attributes will be assigned to\n * @param attrs The attribute array of values that will be assigned to
the element\n * @returns the index value that was last accessed in the attributes array\n */\nexport function
setUpAttributes(renderer: Renderer, native: RElement, attrs: TAttributes): number {\n let i = 0;\n while (i <


```

```

attrs.length) {\n  const value = attrs[i];\n  if (typeof value === 'number') {\n    //
    only namespaces are supported. Other value types (such as style/class\n    // entries) are not supported in this
function.\n    if (value !== AttributeMarker.NamespaceURI) {\n      break;\n    }\n    // we just landed on the
marker value ... therefore\n    // we should skip to the next entry\n    i++;\n    const namespaceURI = attrs[i++]
as string;\n    const attrName = attrs[i++] as string;\n    const attrVal = attrs[i++] as string;\n    ngDevMode &&
ngDevMode.rendererSetAttribute++;\n    renderer.setAttribute(native, attrName, attrVal, namespaceURI);\n  }
else {\n    // attrName is string;\n    const attrName = value as string;\n    const attrVal = attrs[++i];\n    //
Standard attributes\n    ngDevMode && ngDevMode.rendererSetAttribute++;\n    if (isAnimationProp(attrName))
{\n      renderer.setProperty(native, attrName, attrVal);\n    } else {\n      renderer.setAttribute(native, attrName,
attrVal as string);\n    }\n    i++;\n  }\n}\n\n// another piece of code may iterate over the same attributes array. Therefore\n// it may be helpful to
return the exact spot where the attributes array exited\n// whether by running into an unsupported marker or if all
the static values were\n// iterated over.\nreturn i;\n}\n\n/**\n * Test whether the given value is a marker that
indicates that the following\n * attribute values in a `TAttributes` array are only the names of attributes,\n * and not
name-value pairs.\n * @param marker The attribute marker to test.\n * @returns true if the marker is a "name-
only" marker (e.g. `Bindings`, `Template` or `I18n`).\n */\nexport function isNameOnlyAttributeMarker(marker:
string|AttributeMarker|CssSelector) {\n  return marker === AttributeMarker.Bindings || marker ===
AttributeMarker.Template ||\n  marker === AttributeMarker.I18n;\n}\n\nexport function isAnimationProp(name:
string): boolean {\n  // Perf note: accessing charCodeAt to check for the first character of a
string is faster as\n  // compared to accessing a character at index 0 (ex. name[0]). The main reason for this is that\n
// charCodeAt doesn't allocate memory to return a substring.\n  return name.charCodeAt(0) ===
CharCode.AT_SIGN;\n}\n\n/**\n * Merges `src` `TAttributes` into `dst` `TAttributes` removing any duplicates in
the process.\n * This merge function keeps the order of attrs same.\n * @param dst Location of where the
merged `TAttributes` should end up.\n * @param src `TAttributes` which should be appended to `dst`\n */\nexport
function mergeHostAttrs(dst: TAttributes|null, src: TAttributes|null): TAttributes|null {\n  if (src === null ||
src.length === 0) {\n    // do nothing\n  } else if (dst === null || dst.length === 0) {\n    // We have source, but dst is
empty, just make a copy.\n    dst = src.slice();\n  } else {\n    let srcMarker: AttributeMarker =
AttributeMarker.ImplicitAttributes;\n    for (let i = 0; i < src.length; i++) {\n      const item = src[i];\n      if (typeof item === 'number') {\n        srcMarker = item;\n      } else {\n        if (srcMarker ===
AttributeMarker.NamespaceURI) {\n          // Case where we need to consume `key1`, `key2`, `value` items.\n        }
else if (\n          srcMarker === AttributeMarker.ImplicitAttributes ||\n          srcMarker ===
AttributeMarker.Styles) {\n          // Case where we have to consume `key1` and `value` only.\n          mergeHostAttribute(dst, srcMarker, item as string, null, src[++i] as string);\n        } else {\n          // Case where we
have to consume `key1` only.\n          mergeHostAttribute(dst, srcMarker, item as string, null, null);\n        }\n      }\n    }\n    return dst;\n  }\n\n/**\n * Append `key`/`value` to existing `TAttributes` taking region marker and
duplicates into account.\n * @param dst `TAttributes` to append to.\n * @param marker Region where the
`key`/`value` should be added.\n * @param key1 Key to add to `TAttributes`\n * @param key2 Key to add
to `TAttributes` (in case of `AttributeMarker.NamespaceURI`)\n * @param value Value to add or to overwrite to
`TAttributes` Only used if `marker` is not Class.\n */\nexport function mergeHostAttribute(\n  dst: TAttributes,
marker: AttributeMarker, key1: string, key2: string|null,\n  value: string|null): void {\n  let i = 0;\n  // Assume that
new markers will be inserted at the end.\n  let markerInsertPosition = dst.length;\n  // scan until correct type.\n  if
(marker === AttributeMarker.ImplicitAttributes) {\n    markerInsertPosition = -1;\n  } else {\n    while (i <
dst.length) {\n      const dstValue = dst[i++];\n      if (typeof dstValue === 'number') {\n        if (dstValue ===
marker) {\n          markerInsertPosition = -1;\n          break;\n        } else if (dstValue > marker) {\n          // We need
to save this as we want the markers to be inserted in specific order.\n          markerInsertPosition = i - 1;\n          break;\n        }\n      }\n    }\n  }\n  // search
until you find place of insertion\n  while (i < dst.length) {\n    const item = dst[i];\n    if (typeof item === 'number')
{\n      // since `i` started as the index after the marker, we did not find it if we are at the next\n      // marker\n

```



```

EMBEDDED_VIEW_INJECTOR, FLAGS, INJECTOR, LView, LViewFlags, T_HOST, TData, TVIEW, TView,
TViewType} from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {enterDI,
getCurrentTNode, getLView, leaveDI} from './state';\nimport {isNameOnlyAttributeMarker} from
'/util/attrs_utils';\nimport {getParentInjectorIndex, getParentInjectorView, hasParentInjector} from
'/util/injector_utils';\nimport {stringifyForError} from './util/stringify_utils';\n\n\n**\n * Defines if the call to
`inject` should include `viewProviders` in its resolution.\n *\n * This is set to true when we try to instantiate a
component. This value is reset in\n * `getNodeInjectable` to a value which matches the declaration location of the
token about to be\n * instantiated. This is done so that if we are injecting
a token which was declared outside of\n * `viewProviders` we don't accidentally pull `viewProviders` in.\n *\n *
Example:\n *\n * ```\n * @Injectable()\n * class MyService {\n *   constructor(public value: String) {} \n * }\n *\n *
@Component({\n *   providers: [\n *     MyService,\n *     {provide: String, value: 'providers'} \n *   ]\n * }\n *
viewProviders: [\n *   {provide: String, value: 'viewProviders'} \n *   ]\n * })\n * class MyComponent {\n *
constructor(myService: MyService, value: String) {\n *   // We expect that Component can see into
`viewProviders`.\n *   expect(value).toEqual('viewProviders');\n *   // `MyService` was not declared in
`viewProviders` hence it can't see it.\n *   expect(myService.value).toEqual('providers');\n * }\n * }\n *
`\n *
*\n * \nlet includeViewProviders = true;\n\nexport function setIncludeViewProviders(v: boolean): boolean {\n const
oldValue = includeViewProviders;\n includeViewProviders = v;\n return oldValue;\n}\n\n\n**\n * The number
of slots in each bloom filter (used by DI). The larger this number, the fewer\n * directives that will share slots, and
thus, the fewer false positives when checking for\n * the existence of a directive.\n *\n\nconst BLOOM_SIZE =
256;\nconst BLOOM_MASK = BLOOM_SIZE - 1;\n\n\n**\n * The number of bits that is represented by a single
bloom bucket. JS bit operations are 32 bits,\n * so each bucket represents 32 distinct tokens which accounts for
log2(32) = 5 bits of a bloom hash\n * number.\n *\n\nconst BLOOM_BUCKET_BITS = 5;\n\n\n**\n * Counter used to
generate unique IDs for directives. *\n\nlet nextNgElementId = 0;\n\n\n**\n * Value used when something wasn't found
by an injector. *\n\nconst NOT_FOUND = {};\n\n\n**\n * Registers this directive as present in its node's injector by
flipping the directive's\n * corresponding bit in the injector's bloom filter.\n *\n *\n * @param injectorIndex The index
of the node injector where this token should be registered\n * @param tView The TView for the injector's
bloom filters\n * @param type The directive token to register\n *\n\nexport function bloomAdd(\n injectorIndex:
number, tView: TView, type: ProviderToken<any>|string): void {\n ngDevMode &&
assertEqual(tView.firstCreatePass, true, 'expected firstCreatePass to be true');\n let id: number|undefined;\n if
(typeof type === 'string') {\n id = type.charCodeAt(0) || 0;\n } else if
(type.hasOwnProperty(NG_ELEMENT_ID)) {\n id = (type as any)[NG_ELEMENT_ID];\n }\n\n // Set a unique
ID on the directive type, so if something tries to inject the directive,\n // we can easily retrieve the ID and hash it
into the bloom bit that should be checked.\n if (id == null) {\n id = (type as any)[NG_ELEMENT_ID] =
nextNgElementId++;\n }\n\n // We only have BLOOM_SIZE (256) slots in our bloom filter (8 buckets * 32 bits
each),\n // so all unique IDs must be modulo-ed into a number from 0 - 255 to fit into the filter.\n const bloomHash
= id & BLOOM_MASK;\n\n // Create a mask that targets
the specific bit associated with the directive.\n // JS bit operations are 32 bits, so this will be a number between 2^0
and 2^31, corresponding\n // to bit positions 0 - 31 in a 32 bit integer.\n const mask = 1 << bloomHash;\n\n // Each
bloom bucket in `tData` represents `BLOOM_BUCKET_BITS` number of bits of `bloomHash`.\n // Any bits in
`bloomHash` beyond `BLOOM_BUCKET_BITS` indicate the bucket offset that the mask\n // should be written
to.\n (tView.data as number[])[injectorIndex + (bloomHash >> BLOOM_BUCKET_BITS)] |= mask;\n}\n\n\n**\n *
Creates (or gets an existing) injector for a given element or container.\n *\n * @param tNode for which an injector
should be retrieved / created.\n * @param IView View where the node is stored\n * @returns Node injector\n
*\n\nexport function getOrCreateNodeInjectorForNode(\n tNode:
TElementNode|TContainerNode|TElementContainerNode, IView: LView): number {\n const existingInjectorIndex
= getInjectorIndex(tNode, IView);\n if (existingInjectorIndex
!==- 1) {\n return existingInjectorIndex;\n }\n\n const tView = IView[TVIEW];\n if (tView.firstCreatePass) {\n
tNode.injectorIndex = IView.length;\n insertBloom(tView.data, tNode); // foundation for node bloom\n

```

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insertBloom(IView, null); // foundation for cumulative bloom\n insertBloom(tView.blueprint, null);\n }\n\n
const parentLoc = getParentInjectorLocation(tNode, IView);\n const injectorIndex = tNode.injectorIndex;\n\n // If
a parent injector can't be found, its location is set to -1.\n // In that case, we don't need to set up a cumulative
bloom\n if (hasParentInjector(parentLoc)) {\n const parentIndex = getParentInjectorIndex(parentLoc);\n const
parentLView = getParentInjectorView(parentLoc, IView);\n const parentData = parentLView[TVIEW].data as
any;\n // Creates a cumulative bloom filter that merges the parent's bloom filter\n // and its own cumulative
bloom (which contains tokens for all ancestors)\n for (let i = 0;
i < NodeInjectorOffset.BLOOM_SIZE; i++) {\n IView[injectorIndex + i] = parentLView[parentIndex + i] |
parentData[parentIndex + i];\n }\n }\n\n IView[injectorIndex + NodeInjectorOffset.PARENT] = parentLoc;\n
return injectorIndex;\n}\n\nfunction insertBloom(arr: any[], footer: TNode|null): void {\n arr.push(0, 0, 0, 0, 0, 0, 0,
0, footer);\n}\n\n\nexport function getInjectorIndex(tNode: TNode, IView: LView): number {\n if
(tNode.injectorIndex === -1 ||\n // If the injector index is the same as its parent's injector index, then the index
has been\n // copied down from the parent node. No injector has been created yet on this node.\n
(tNode.parent && tNode.parent.injectorIndex === tNode.injectorIndex) ||\n // After the first template pass, the
injector index might exist but the parent values\n // might not have been calculated yet for this instance\n
IView[tNode.injectorIndex + NodeInjectorOffset.PARENT] === null) {\n return -1;\n } else {\n
ngDevMode && assertIndexInRange(IView, tNode.injectorIndex);\n return tNode.injectorIndex;\n
}\n}\n\n/**\n * Finds the index of the parent injector, with a view offset if applicable. Used to set the\n * parent
injector initially.\n * @returns Returns a number that is the combination of the number of LViews that we have
to go up\n * to find the LView containing the parent inject AND the index of the injector within that LView.\n
*/\nexport function getParentInjectorLocation(tNode: TNode, IView: LView): RelativeInjectorLocation {\n if
(tNode.parent && tNode.parent.injectorIndex !== -1) {\n // If we have a parent `TNode` and there is an injector
associated with it we are done, because\n // the parent injector is within the current `LView`.\n return
tNode.parent.injectorIndex as any; // ViewOffset is 0\n }\n\n // When parent injector location is computed it may
be outside of the current view. (ie it could\n // be pointing to a declared parent location). This variable
stores number of declaration parents\n // we need to walk up in order to find the parent injector location.\n let
declarationViewOffset = 0;\n let parentTNode: TNode|null = null;\n let IViewCursor: LView|null = IView;\n\n //
The parent injector is not in the current `LView`. We will have to walk the declared parent\n // `LView` hierarchy
and look for it. If we walk of the top, that means that there is no parent\n // `NodeInjector`.\n while (IViewCursor
!== null) {\n parentTNode = getTNodeFromLView(IViewCursor);\n if (parentTNode === null) {\n // If we
have no parent, than we are done.\n return NO_PARENT_INJECTOR;\n }\n\n ngDevMode &&
parentTNode && assertTNodeForLView(parentTNode!, IViewCursor[DECLARATION_VIEW]);\n // Every
iteration of the loop requires that we go to the declared parent.\n declarationViewOffset++;\n IViewCursor =
IViewCursor[DECLARATION_VIEW];\n\n if (parentTNode.injectorIndex !== -1) {\n // We found a
NodeInjector
which points to something.\n return (parentTNode.injectorIndex | (\n declarationViewOffset <<
RelativeInjectorLocationFlags.ViewOffsetShift)) as any;\n }\n }\n return NO_PARENT_INJECTOR;\n}\n\n/**\n
* Makes a type or an injection token public to the DI system by adding it to an\n * injector's bloom filter.\n
*/\n * @param di The node injector in which a directive will be added\n * @param token The type or the injection token
to be made public\n */\nexport function diPublicInInjector(\n injectorIndex: number, tView: TView, token:
ProviderToken<any>): void {\n bloomAdd(injectorIndex, tView, token);\n}\n\n/**\n * Inject static attribute value
into directive constructor.\n */\n * This method is used with `factory` functions which are generated as part of\n *
`defineDirective` or `defineComponent`. The method retrieves the static value\n * of an attribute. (Dynamic
attributes are not supported since they are not resolved\n * at the time of injection and can change over
time.)\n */\n * # Example\n * Given:\n * ```\n * @Component(...)\n * class MyComponent {\n *
constructor(@Attribute('title') title: string) { ... }\n * }\n * ```\n * When instantiated with\n * ```\n * <my-component
title="Hello"></my-component>\n * ```\n * Then factory method generated is:\n * ```\n * MyComponent.cmp
= defineComponent({\n * factory: () => new MyComponent(injectAttribute('title'))\n * ... \n * })\n * ```\n
*/

```

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@publicApi\n *\\nexport function injectAttributeImpl(tNode: TNode, attrNameToInject: string): string|null {\n
ngDevMode && assertTNodeType(tNode, TNodeType.AnyContainer | TNodeType.AnyRNode);\n ngDevMode
&& assertDefined(tNode, 'expecting tNode');\n if (attrNameToInject === 'class') {\n return tNode.classes;\n }\n
if (attrNameToInject === 'style') {\n return tNode.styles;\n }\n\n const attrs = tNode.attrs;\n if (attrs) {\n const
attrsLength = attrs.length;\n let i = 0;\n while (i < attrsLength) {\n const value = attrs[i];\n
// If we hit a `Bindings` or `Template` marker then we are done.\n if (isNameOnlyAttributeMarker(value))
break;\n\n // Skip namespaced attributes\n if (value === AttributeMarker.NamespaceURI) {\n // we skip
the next two values\n // as namespaced attributes looks like\n // [..., AttributeMarker.NamespaceURI,
'http://someuri.com/test', 'test:exist',\n // 'existValue', ...]\n i = i + 2;\n } else if (typeof value ===
'number') {\n // Skip to the first value of the marked attribute.\n i++;\n while (i < attrsLength &&
typeof attrs[i] === 'string') {\n i++;\n }\n } else if (value === attrNameToInject) {\n return attrs[i +
1] as string;\n } else {\n i = i + 2;\n }\n }\n }\n return null;\n}\n\nfunction
notFoundValueOrThrow<T>(\n notFoundValue: T|null, token: ProviderToken<T>, flags: InjectFlags): T|null {\n
if ((flags & InjectFlags.Optional) || notFoundValue
!== undefined) {\n return notFoundValue;\n } else {\n throwProviderNotFoundError(token, 'NodeInjector');\n
}\n}\n\n/**\n * Returns the value associated to the given token from the ModuleInjector or throws exception\n *
*\n * @param IView The `LView` that contains the `tNode`\n * @param token The token to look for\n * @param flags
Injection flags\n * @param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n *
*\n * @returns the value from the injector or throws an exception\n */\nfunction
lookupTokenUsingModuleInjector<T>(\n IView: LView, token: ProviderToken<T>, flags: InjectFlags,
notFoundValue?: any): T|null {\n if ((flags & InjectFlags.Optional) && notFoundValue === undefined) {\n //
This must be set or the NullInjector will throw for optional deps\n notFoundValue = null;\n }\n\n if ((flags &
(InjectFlags.Self | InjectFlags.Host)) === 0) {\n const moduleInjector = IView[INJECTOR];\n // switch to
`injectInjectorOnly` implementation
for module injector, since module injector\n // should not have access to Component/Directive DI scope (that may
happen through\n // `directiveInject` implementation)\n const previousInjectImplementation =
setInjectImplementation(undefined);\n try {\n if (moduleInjector) {\n return moduleInjector.get(token,
notFoundValue, flags & InjectFlags.Optional);\n } else {\n return injectRootLimpMode(token,
notFoundValue, flags & InjectFlags.Optional);\n }\n } finally {\n
setInjectImplementation(previousInjectImplementation);\n }\n }\n return
notFoundValueOrThrow<T>(notFoundValue, token, flags);\n}\n\n/**\n * Returns the value associated to the given
token from the NodeInjectors => ModuleInjector.\n **\n * Look for the injector providing the token by walking up
the node injector tree and then\n * the module injector tree.\n **\n * This function patches `token` with
`__NG_ELEMENT_ID__` which contains the id for the bloom\n * filter. `-1`
is reserved for injecting `Injector` (implemented by `NodeInjector`)\n **\n * @param tNode The Node where the
search for the injector should start\n * @param IView The `LView` that contains the `tNode`\n * @param token The
token to look for\n * @param flags Injection flags\n * @param notFoundValue The value to return when the
injection flags is `InjectFlags.Optional`\n * @returns the value from the injector, `null` when not found, or
`notFoundValue` if provided\n */\nexport function getOrCreateInjectable<T>(\n tNode: TDirectiveHostNode|null,
IView: LView, token: ProviderToken<T>,\n flags: InjectFlags = InjectFlags.Default, notFoundValue?: any):
T|null {\n if (tNode !== null) {\n // If the view or any of its ancestors have an embedded\n // view injector, we
have to look it up there first.\n if (IView[FLAGS] & LViewFlags.HasEmbeddedViewInjector) {\n const
embeddedInjectorValue =\n lookupTokenUsingEmbeddedInjector(tNode, IView, token, flags,
NOT_FOUND);\n\n if (embeddedInjectorValue !== NOT_FOUND) {\n return embeddedInjectorValue;\n }\n }\n\n //
Otherwise try the node injector.\n const value = lookupTokenUsingNodeInjector(tNode, IView, token, flags,
NOT_FOUND);\n if (value !== NOT_FOUND) {\n return value;\n }\n }\n\n // Finally, fall back to the
module injector.\n return lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n}\n\n/**

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* Returns the value associated to the given token from the node injector.\n *\n * @param tNode The Node where the search for the injector should start\n * @param IView The `LView` that contains the `tNode`\n * @param token The token to look for\n * @param flags Injection flags\n * @param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n * @returns the value from the injector, `null` when not found, or `notFoundValue` if provided\n *\nfunction lookupTokenUsingNodeInjector<T>(\n  tNode: TDirectiveHostNode, IView: LView, token: ProviderToken<T>, flags: InjectFlags,\n  notFoundValue?: any) {\n  const bloomHash = bloomHashBitOrFactory(token);\n  // If the ID stored here is a function, this is a special object like ElementRef or TemplateRef\n  // so just call the factory function to create it.\n  if (typeof bloomHash === 'function') {\n    if (!enterDI(IView, tNode, flags)) {\n      // Failed to enter DI, try module injector instead. If a token is injected with the @Host\n      // flag, the module injector is not searched for that token in Ivy.\n      return (flags & InjectFlags.Host) ?\n        notFoundValueOrThrow<T>(notFoundValue, token, flags) :\n        lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n    }\n    try {\n      const value = bloomHash(flags);\n      if (value == null && !(flags & InjectFlags.Optional)) {\n        throwProviderNotFoundError(token);\n      } else {\n        return value;\n      }\n    } finally {\n      leaveDI();\n    }\n  } else if (typeof bloomHash === 'number') {\n    // A reference to the previous injector TView that was found while climbing the element\n    // injector tree. This is used to know if viewProviders can be accessed on the current\n    // injector.\n    let previousTView: TView|null = null;\n    let injectorIndex = getInjectorIndex(tNode, IView);\n    let parentLocation: RelativeInjectorLocation = NO_PARENT_INJECTOR;\n    let hostTElementNode: TNode|null =\n      flags & InjectFlags.Host ? IView[DECLARATION_COMPONENT_VIEW][T_HOST] : null;\n    // If we should skip this injector, or if there is no injector on this node, start by\n    // searching the parent injector.\n    if (injectorIndex === -1 || flags & InjectFlags.SkipSelf) {\n      parentLocation = injectorIndex === -1 ?\n        getParentInjectorLocation(tNode, IView) :\n        IView[injectorIndex + NodeInjectorOffset.PARENT];\n      if (parentLocation === NO_PARENT_INJECTOR || !shouldSearchParent(flags, false)) {\n        {\n          injectorIndex = -1;\n        } else {\n          previousTView = IView[TVIEW];\n          injectorIndex = getParentInjectorIndex(parentLocation);\n          IView = getParentInjectorView(parentLocation, IView);\n        }\n      }\n    }\n    // Traverse up the injector tree until we find a potential match or until we know there\n    // isn't* a match.\n    while (injectorIndex !== -1) {\n      ngDevMode && assertNodeInjector(IView, injectorIndex);\n      // Check the current injector. If it matches, see if it contains token.\n      const tView = IView[TVIEW];\n      ngDevMode && assertTNodeForLView(tView.data[injectorIndex + NodeInjectorOffset.TNODE] as TNode, IView);\n      if (bloomHasToken(bloomHash, injectorIndex, tView.data)) {\n        // At this point, we have an injector which *may* contain the token, so we step through\n        // the providers and directives associated with the injector's corresponding node to get\n        // the instance.\n        const instance: T|{}|null = searchTokensOnInjector<T>(\n          injectorIndex, IView, token, previousTView, flags, hostTElementNode);\n        if (instance !== NOT_FOUND) {\n          return instance;\n        }\n      }\n      parentLocation = IView[injectorIndex + NodeInjectorOffset.PARENT];\n      if (parentLocation !== NO_PARENT_INJECTOR &&\n        shouldSearchParent(\n          flags,\n          IView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] === hostTElementNode) &&\n        bloomHasToken(bloomHash, injectorIndex, IView)) {\n        // The def wasn't found anywhere on this node, so it was a false positive.\n        // Traverse up the tree and continue searching.\n        previousTView = tView;\n        injectorIndex = getParentInjectorIndex(parentLocation);\n        IView = getParentInjectorView(parentLocation, IView);\n      } else {\n        // If we should not search parent OR If the ancestor bloom filter value does not have the\n        // bit corresponding to the directive we can give up on traversing up to find the specific\n        // injector.\n        injectorIndex = -1;\n      }\n    }\n  }\n  return notFoundValue;\n}\n\nfunction searchTokensOnInjector<T>(\n  injectorIndex: number, IView: LView, token: ProviderToken<T>, previousTView: TView|null,\n  flags: InjectFlags, hostTElementNode:

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TNode|null) {\n  const currentTView = IView[TVIEW];\n  const tNode = currentTView.data[injectorIndex +\n  NodeInjectorOffset.TNODE] as TNode;\n  // First, we need to determine if view providers can be accessed by the\n  starting element.\n  // There are two possibilities\n  const canAccessViewProviders = previousTView == null ?\n  // 1) This is the first invocation `previousTView == null` which means that we are at the\n  // `TNode` of where\n  injector is starting to look. In such a case the only time we are allowed\n  // to look into the ViewProviders is if:\n  // - we are on a component\n  // - AND the injector set `includeViewProviders`\n  to true (implying that the token can see\n  // ViewProviders because it is the Component or a Service which itself\n  was declared in\n  // ViewProviders)\n  (isComponentHost(tNode) && includeViewProviders) : \n  // 2)\n  `previousTView != null` which means that we are now walking across the parent nodes.\n  // In such a case we are\n  only allowed to look into the ViewProviders if:\n  // - We just crossed from child View to Parent View\n  `previousTView != currentTView`\n  // - AND the parent TNode is an Element.\n  // This means that we just\n  came from the Component's View and therefore are allowed to see\n  // into the ViewProviders.\n  (previousTView != currentTView && ((tNode.type & TNodeType.AnyRNode) !== 0));\n  // This special case\n  happens when there is a @host on the inject and when we are searching\n  // on the host element node.\n  const\n  isHostSpecialCase = (flags & InjectFlags.Host) && hostTElementNode === tNode;\n  const injectableIdx =\n  locateDirectiveOrProvider(\n\n    tNode, currentTView, token, canAccessViewProviders, isHostSpecialCase);\n  if (injectableIdx !== null) {\n  return getNodeInjectable(IView, currentTView, injectableIdx, tNode as TElementNode);\n  } else {\n  return\n  NOT_FOUND;\n  }\n}\n\n/**\n * Searches for the given token among the node's directives and providers.\n *\n * @param tNode TNode on which directives are present.\n * @param tView The tView we are currently processing\n * @param token Provider token or type of a directive to look for.\n * @param canAccessViewProviders Whether\n  view providers should be considered.\n * @param isHostSpecialCase Whether the host special case applies.\n *\n * @returns Index of a found directive or provider, or null when none found.\n */\nexport function\n  locateDirectiveOrProvider<T>(\n  tNode: TNode, tView: TView, token: ProviderToken<T>|string,\n  canAccessViewProviders: boolean,\n  isHostSpecialCase: boolean|number): number|null {\n  const\n  nodeProviderIndexes = tNode.providerIndexes;\n\n  const tInjectables = tView.data;\n  const injectablesStart = nodeProviderIndexes &\n  TNodeProviderIndexes.ProvidersStartIndexMask;\n  const directivesStart = tNode.directiveStart;\n  const\n  directiveEnd = tNode.directiveEnd;\n  const cptViewProvidersCount =\n  nodeProviderIndexes >>\n  TNodeProviderIndexes.CptViewProvidersCountShift;\n  const startingIndex =\n  canAccessViewProviders ?\n  injectablesStart : injectablesStart + cptViewProvidersCount;\n  // When the host special case applies, only the\n  viewProviders and the component are visible\n  const endIndex = isHostSpecialCase ? injectablesStart +\n  cptViewProvidersCount : directiveEnd;\n  for (let i = startingIndex; i < endIndex; i++) {\n  const\n  providerTokenOrDef = tInjectables[i] as ProviderToken<any>| DirectiveDef<any>| string;\n  if (i < directivesStart\n  && token === providerTokenOrDef ||\n  i >= directivesStart && (providerTokenOrDef as\n  DirectiveDef<any>).type === token) {\n  return i;\n  }\n\n  }\n  if (isHostSpecialCase) {\n  const dirDef = tInjectables[directivesStart] as DirectiveDef<any>;\n  if (dirDef\n  && isComponentDef(dirDef) && dirDef.type === token) {\n  return directivesStart;\n  }\n  }\n  return\n  null;\n}\n\n/**\n * Retrieve or instantiate the injectable from the `LView` at particular `index`.\n *\n * This function\n  checks to see if the value has already been instantiated and if so returns the\n  * cached `injectable`. Otherwise if it\n  detects that the value is still a factory it\n  * instantiates the `injectable` and caches the value.\n */\nexport function\n  getNodeInjectable(\n  IView: LView, tView: TView, index: number, tNode: TDirectiveHostNode): any {\n  let\n  value = IView[index];\n  const tData = tView.data;\n  if (isFactory(value)) {\n  const factory: NodeInjectorFactory\n  = value;\n  if (factory.resolving) {\n  throwCyclicDependencyError(stringifyForError(tData[index]));\n  }\n  }\n  const previousIncludeViewProviders = setIncludeViewProviders(factory.canSeeViewProviders);\n  factory.resolving = true;\n  const previousInjectImplementation =\n  factory.injectImpl ?\n  setInjectImplementation(factory.injectImpl) : null;\n  const success = enterDI(IView, tNode, InjectFlags.Default);\n  ngDevMode &&\n  assertEquals(\n  success, true,\n  'Because flags do not contain `SkipSelf` we

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expect this to always succeed.);\n try {\n   value = IView[index] = factory.factory(undefined, tData, IView,\n tNode);\n   // This code path is hit for both directives and providers.\n   // For perf reasons, we want to avoid\n   searching for hooks on providers.\n   // It does no harm to try (the hooks just won't exist), but the extra\n   // checks are unnecessary and this is a hot path. So we check to see\n   // if the index of the dependency is in the\n   directive range for this\n   // tNode. If it's not, we know it's a provider and skip hook registration.\n   if\n (tView.firstCreatePass && index >=\n tNode.directiveStart) {\n   ngDevMode && assertDirectiveDef(tData[index]);\n registerPreOrderHooks(index, tData[index] as DirectiveDef<any>, tView);\n } finally {\n previousInjectImplementation !== null &&\n   setInjectImplementation(previousInjectImplementation);\n setIncludeViewProviders(previousIncludeViewProviders);\n   factory.resolving = false;\n   leaveDI();\n }\n }\n return value;\n}\n\n/**\n * Returns the bit in an injector's bloom filter that should be used to determine whether\n or not\n * the directive might be provided by the injector.\n *\n * When a directive is public, it is added to the bloom\n filter and given a unique ID that can be\n * retrieved on the Type. When the directive isn't public or the token is not\n a directive `null`\n * is returned as the node injector can not possibly provide that token.\n *\n * @param token the\n injection token\n *\n * @returns the matching bit to check in the bloom filter or `null` if the token\n is not known.\n *\n * When the returned value is negative then it represents special values such as `Injector`.\n\n */\nexport function bloomHashBitOrFactory(token: ProviderToken<any>|string): number|Function|undefined {\n ngDevMode && assertDefined(token, 'token must be defined');\n if (typeof token === 'string') {\n   return\n token.charCodeAt(0) || 0;\n }\n const tokenId: number|undefined =\n // First check with `hasOwnProperty` so\n we don't get an inherited ID.\n   token.hasOwnProperty(NG_ELEMENT_ID) ? (token as\n any)[NG_ELEMENT_ID] : undefined;\n // Negative token IDs are used for special objects such as `Injector`\n if\n (typeof tokenId === 'number') {\n   if (tokenId >= 0) {\n     return tokenId & BLOOM_MASK;\n   } else {\n     ngDevMode &&\n       assertEqual(tokenId, InjectorMarkers.Injector, 'Expecting to get Special Injector Id');\n     return createNodeInjector;\n   }\n } else {\n   return tokenId;\n }\n}\n\nexport function\n bloomHasToken(bloomHash: number,\n injectorIndex: number, injectorView: LView|TData) {\n // Create a mask that targets the specific bit associated\n with the directive we're looking for.\n // JS bit operations are 32 bits, so this will be a number between 2^0 and\n 2^31, corresponding\n // to bit positions 0 - 31 in a 32 bit integer.\n const mask = 1 << bloomHash;\n\n // Each\n bloom bucket in `injectorView` represents `BLOOM_BUCKET_BITS` number of bits of\n // `bloomHash`. Any\n bits in `bloomHash` beyond `BLOOM_BUCKET_BITS` indicate the bucket offset\n // that should be used.\n const\n value = injectorView[injectorIndex + (bloomHash >> BLOOM_BUCKET_BITS)];\n // If the bloom filter value\n has the bit corresponding to the directive's bloomBit flipped on,\n // this injector is a potential match.\n return\n !!(value & mask);\n}\n\n/**\n * Returns true if flags prevent parent injector from being searched for tokens\n */\nexport function\n shouldSearchParent(flags: InjectFlags, isFirstHostTNode: boolean): boolean|number {\n return !(flags\n & InjectFlags.Self) && !(flags & InjectFlags.Host && isFirstHostTNode);\n}\n\nexport class NodeInjector\n implements Injector {\n constructor(\n private _tNode:\n TElementNode|TContainerNode|TElementContainerNode|null,\n private _IView: LView) {} \n\n get(token: any,\n notFoundValue?: any, flags?: InjectFlags): any {\n return getOrCreateInjectable(this._tNode, this._IView, token,\n flags, notFoundValue);\n }\n}\n\n/**\n * Creates a `NodeInjector` for the current node.\n */\nexport function\n createNodeInjector(): Injector {\n return new NodeInjector(getCurrentTNode()! as TDirectiveHostNode,\n getLView()) as any;\n}\n\n/**\n * @codeGenApi\n */\nexport function\n getInheritedFactory<T>(type: Type<any>):\n (type: Type<T>) => T {\n return noSideEffects(() => {\n   const ownConstructor = type.prototype.constructor;\n   const ownFactory = ownConstructor[NG_FACTORY_DEF] || getFactoryOf(ownConstructor);\n   const\n objectPrototype = Object.prototype;\n   let parent = Object.getPrototypeOf(type.prototype).constructor;\n\n   // Go up the prototype until we hit `Object`.\n   while (parent && parent !== objectPrototype) {\n     const\n factory = parent[NG_FACTORY_DEF] || getFactoryOf(parent);\n\n     // If we hit something that has a factory and\n the factory isn't the same as the type,\n // we've found the inherited factory. Note the check that the factory isn't\n the type's\n // own factory is redundant in most cases, but if the user has custom decorators on the\n // class,\n
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this lookup will start one level down in the prototype chain, causing us to
// find the own factory first and
potentially triggering an infinite loop downstream.
if (factory && factory !== ownFactory) {
  return
  factory;
}
parent = Object.getPrototypeOf(parent);
// There is no factory defined. Either this
was improper usage of inheritance
// (no Angular decorator on the superclass) or there is no constructor at all
// in the inheritance
chain. Since the two cases cannot be distinguished, the
// latter has to be assumed.
return t => new t();
});
function getFactoryOf<T>(type: Type<any>): ((type?: Type<T>) => T | null)|null {
  if
  (isForwardRef(type)) {
    return () => {
      const factory = getFactoryOf<T>(resolveForwardRef(type));
      return factory && factory();
    };
  }
  return getFactoryDef<T>(type);
}
/**
 * Returns a value from the
closest embedded or node injector.
@param tNode The Node where the search for the injector should start
 * @param lView The `LView` that contains the `tNode`
 * @param token The token to look for
 * @param flags
Injection flags
 * @param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`
 * @returns the value from the injector, `null` when not found, or `notFoundValue` if provided
 */
function
lookupTokenUsingEmbeddedInjector<T>(
  tNode: TDirectiveHostNode, lView: LView, token:
  ProviderToken<T>,
  flags: InjectFlags,
  notFoundValue?: any) {
  let currentTNode: TDirectiveHostNode|null = tNode;
  let
  currentLView: LView|null = lView;
  // When an LView with an embedded view injector is inserted, it'll likely
  be interlaced with
  // nodes who may have injectors (e.g. node injector -> embedded view injector -> node
  injector).
  // Since the bloom filters for the node injectors have already been constructed and we don't
  // have a
  way of extracting the records from an injector, the only way to maintain the correct
  // hierarchy when resolving
  the value is to walk it node-by-node while attempting to resolve
  // the token at each level.
  while (currentTNode
  !== null && currentLView !== null &&
  (currentLView[FLAGS] &
  LViewFlags.HasEmbeddedViewInjector) &&
  !(currentLView[FLAGS] & LViewFlags.IsRoot)) {
    ngDevMode && assertTNodeForLView(currentTNode, currentLView);
    // Note that this lookup on the node
    injector is using the `Self` flag,
    because
    // we don't want the node injector to look at any parent injectors since we
    // may hit the embedded
    view injector first.
    const nodeInjectorValue = lookupTokenUsingNodeInjector(
      currentTNode,
      currentLView, token, flags | InjectFlags.Self, NOT_FOUND);
    if (nodeInjectorValue !== NOT_FOUND) {
      return nodeInjectorValue;
    }
    // Has an explicit type due to a TS bug:
    https://github.com/microsoft/TypeScript/issues/33191
    let parentTNode: TElementNode|TContainerNode|null =
    currentTNode.parent;
    // `TNode.parent` includes the parent within the current view only. If it doesn't exist,
    // it means that we've hit the view boundary and we need to go up to the next view.
    if (!parentTNode) {
      // Before we go to the next LView, check if the token exists on the current embedded injector.
      const
      embeddedViewInjector = currentLView[EMBEDDED_VIEW_INJECTOR];
      if (embeddedViewInjector) {
        const embeddedViewInjectorValue
        =
        embeddedViewInjector.get(token, NOT_FOUND as T | {}, flags);
        if
        (embeddedViewInjectorValue !== NOT_FOUND) {
          return embeddedViewInjectorValue;
        }
      }
      // Otherwise keep going up the tree.
      parentTNode = getTNodeFromLView(currentLView);
      currentLView = currentLView[DECLARATION_VIEW];
    }
    currentTNode = parentTNode;
  }
  return
  notFoundValue;
}
/** Gets the TNode associated with an LView inside of the declaration view. */
function
getTNodeFromLView(lView: LView): TElementNode|TElementContainerNode|null {
  const tView =
  lView[TVIEW];
  const tViewType = tView.type;
  // The parent pointer differs based on `TView.type`.
  if
  (tViewType === TViewType.Embedded) {
    ngDevMode && assertDefined(tView.declTNode, 'Embedded
    TNodes should have declaration parents. ');
    return tView.declTNode as TElementContainerNode;
  }
  else if
  (tViewType === TViewType.Component) {
    // Components don't
    have `TView.declTNode` because each instance of component could be
    // inserted in different location, hence
    `TView.declTNode` is meaningless.
    return lView[T_HOST] as TElementNode;
  }
  return
  null;
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is

```

```

governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 * \nimport {injectAttributeImpl} from './di';\nimport {getCurrentTNode} from './state';\n\n/**\n * Facade for the
attribute injection from DI.\n *\n * @codeGenApi\n */\nexport function injectAttribute(attrNameToInject: string):
string|null {\n  return injectAttributeImpl(getCurrentTNode(), attrNameToInject);\n}\n\n",/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be
 * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Type} from
 './interface/type';\n\nimport
 {noSideEffects} from './closure';\n\n\n/**\n * An interface implemented by all Angular type decorators, which
allows them to be used as
 * decorators as well as Angular syntax.\n *\n * ```\n * @ng.Component({...})\n * class
MyClass {...}\n * ```\n *\n * @publicApi\n */\nexport interface TypeDecorator {\n  /**\n * Invoke as decorator.\n
*\n * <T extends Type<any>>(type: T): T;\n\n // Make TypeDecorator assignable to built-in ParameterDecorator
type.\n // ParameterDecorator is declared in lib.d.ts as a `declare type`\n // so we cannot declare this interface as a
subtype.\n // see https://github.com/angular/angular/issues/3379#issuecomment-126169417\n (target: Object,
propertyKey?: string|symbol, parameterIndex?: number): void;\n}\n\nexport const ANNOTATIONS =
'__annotations__';\nexport const PARAMETERS = '__parameters__';\nexport const PROP_METADATA =
'__prop__metadata__';\n\n/**\n * @suppress {globalThis}\n */\nexport function makeDecorator<T>(\n  name:
string,\n  props?: (...args: any[]) => any, parentClass?: any,\n  additionalProcessing?: (type: Type<T>) => void,\n  typeFn?:
(type: Type<T>, ...args: any[]) => void):\n  {new (...args: any[]): any; (...args: any[]): any; (...args: any[]): (cls:
any) => any;} {\n  return noSideEffects(() => {\n    const metaCtor = makeMetadataCtor(props);\n\n    function
DecoratorFactory(\n      this: unknown|typeof DecoratorFactory, ...args: any[]): (cls: Type<T>) => any {\n      if
(this instanceof DecoratorFactory) {\n        metaCtor.call(this, ...args);\n        return this as typeof
DecoratorFactory;\n      }\n\n      const annotationInstance = new (DecoratorFactory as any)(...args);\n      return
function TypeDecorator(cls: Type<T>) {\n        if (typeFn) typeFn(cls, ...args);\n        // Use of
Object.defineProperty is important since it creates non-enumerable property which\n        // prevents the property is
copied during subclassing.\n        const annotations = cls.hasOwnProperty(ANNOTATIONS)\n        ?\n          (cls as any)[ANNOTATIONS] :\n          (Object.defineProperty(cls, ANNOTATIONS, {value: []}) as
any)[ANNOTATIONS];\n        annotations.push(annotationInstance);\n\n        if (additionalProcessing)\n          additionalProcessing(cls);\n\n        return cls;\n      };\n      }\n\n      if (parentClass) {\n        DecoratorFactory.prototype
= Object.create(parentClass.prototype);\n      }\n\n      DecoratorFactory.prototype.ngMetadataName = name;\n\n      (DecoratorFactory as any).annotationCls = DecoratorFactory;\n      return DecoratorFactory as any;\n
    });\n  }\n\n  function makeMetadataCtor(props?: (...args: any[]) => any): any {\n    return function ctor(this: any, ...args:
any[]) {\n      if (props) {\n        const values = props(...args);\n        for (const propName in values) {\n
this[propName] = values[propName];\n        }\n      }\n    };\n  }\n\n  export function makeParamDecorator(\n    name:
string, props?: (...args: any[]) => any, parentClass?: any): any {\n    return noSideEffects(() => {\n
      const metaCtor = makeMetadataCtor(props);\n      function ParamDecoratorFactory(\n        this: unknown|typeof
ParamDecoratorFactory, ...args: any[]): any {\n        if (this instanceof ParamDecoratorFactory) {\n
          metaCtor.apply(this, args);\n          return this;\n        }\n        const annotationInstance = new
(<any>ParamDecoratorFactory)(...args);\n        (<any>ParamDecorator).annotation = annotationInstance;\n        return
ParamDecorator;\n      }\n\n      function ParamDecorator(cls: any, unusedKey: any, index: number): any {\n        //
Use of Object.defineProperty is important since it creates non-enumerable property which\n        // prevents the
property is copied during subclassing.\n        const parameters = cls.hasOwnProperty(PARAMETERS) ?\n        (cls as any)[PARAMETERS] :\n        Object.defineProperty(cls, PARAMETERS, {value:
[]})[PARAMETERS];\n\n        // there might be gaps if some in between parameters do not have annotations.\n        // we pad with nulls.\n
        while (parameters.length <= index) {\n          parameters.push(null);\n        }\n\n        (parameters[index] =
parameters[index] || []).push(annotationInstance);\n        return cls;\n      }\n      }\n      if (parentClass) {\n
ParamDecoratorFactory.prototype = Object.create(parentClass.prototype);\n      }\n

```

```

ParamDecoratorFactory.prototype.ngMetadataName = name;\n (<any>ParamDecoratorFactory).annotationCls =
ParamDecoratorFactory;\n return ParamDecoratorFactory;\n });\n\n\nexport function makePropDecorator(\n
name: string, props?: (...args: any[]) => any, parentClass?: any,\n additionalProcessing?: (target: any, name: string,
...args: any[]) => void): any {\n return noSideEffects(() => {\n const metaCtor = makeMetadataCtor(props);\n
function PropDecoratorFactory(this: unknown|typeof PropDecoratorFactory, ...args: any[]): any {\n if (this
instanceof PropDecoratorFactory) {\n metaCtor.apply(this, args);\n return this;\n }\n\n
const decoratorInstance = new (<any>PropDecoratorFactory)(...args);\n\n function PropDecorator(target: any,
name: string) {\n const constructor = target.constructor;\n // Use of Object.defineProperty is important
because it creates a non-enumerable property\n // which prevents the property from being copied during
subclassing.\n const meta = constructor.hasOwnProperty(PROP_METADATA) ?\n (constructor as
any)[PROP_METADATA] :\n Object.defineProperty(constructor, PROP_METADATA, { value:
{}})[PROP_METADATA];\n meta[name] = meta.hasOwnProperty(name) && meta[name] || [];\n
meta[name].unshift(decoratorInstance);\n\n if (additionalProcessing) additionalProcessing(target, name,
...args);\n }\n\n return PropDecorator;\n }\n\n if (parentClass) {\n PropDecoratorFactory.prototype =
Object.create(parentClass.prototype);\n }\n\n PropDecoratorFactory.prototype.ngMetadataName = name;\n
(<any>PropDecoratorFactory).annotationCls
= PropDecoratorFactory;\n return PropDecoratorFactory;\n });\n\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {injectAttribute} from
'./render3/instructions/di_attr';\nimport {makeParamDecorator} from './util/decorators';\n\n\n/**\n * Type of the
Attribute decorator / constructor function.\n *\n * @publicApi\n */\nexport interface AttributeDecorator {\n /**\n
* Parameter decorator for a directive constructor that designates\n * a host-element attribute whose value is
injected as a constant string literal.\n *\n * @usageNotes\n *\n * Suppose we have an `` element and
want to know its `type`.\n *\n * ``html\n * <input type="text">\n * ``\n *\n * The following example uses
the decorator to inject the string literal `text` in a directive.\n *\n
* {\n * @example core/ts/metadata/metadata.ts region='attributeMetadata'}\n *\n * The following example uses the
decorator in a component constructor.\n *\n * {\n * @example core/ts/metadata/metadata.ts
region='attributeFactory'}\n *\n */\n (name: string): any;\n new(name: string): Attribute;\n\n\n/**\n * Type of
the Attribute metadata.\n *\n * @publicApi\n */\nexport interface Attribute {\n /**\n * The name of the attribute
whose value can be injected.\n *\n */\n attributeName: string;\n\n\n/**\n * Attribute decorator and metadata.\n *\n
*/\n @Annotation\n * @publicApi\n */\nexport const Attribute: AttributeDecorator = makeParamDecorator(\n
'Attribute',\n (attributeName?: string) =>\n ({attributeName, __NG_ELEMENT_ID__: () =>
injectAttribute(attributeName!)}));\n\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Type} from './interface/type';\nimport {assertLessThan} from './util/assert';\n\nimport
{defineInjectable} from './interface/defs';\n\n\n/**\n * Creates a token that can be used in a DI Provider.\n *\n * Use
an `InjectionToken` whenever the type you are injecting is not reified (does not have a\n * runtime representation)
such as when injecting an interface, callable type, array or\n * parameterized type.\n *\n * `InjectionToken` is
parameterized on `T` which is the type of object which will be returned by\n * the `Injector`. This provides an
additional level of type safety.\n *\n * ``\n * interface MyInterface {...}\n * const myInterface = injector.get(new
InjectionToken<MyInterface>('SomeToken'));\n * // myInterface is inferred to be MyInterface.\n * ``\n *\n * When
creating an `InjectionToken`, you can optionally specify a factory function which returns\n * (possibly by creating) a
default value of the parameterized type `T`. This sets up the\n * `InjectionToken`
using this factory as a provider as if it was defined explicitly in the\n * application's root injector. If the factory
function, which takes zero arguments, needs to inject\n * dependencies, it can do so using the `inject` function.\n
*\n * As you can see in the Tree-shakable InjectionToken example below.\n *\n * Additionally, if a `factory` is specified
you can also specify the `providedIn` option, which\n * overrides the above behavior and marks the token as

```

```

belonging to a particular `@NgModule`. As mentioned above, `root` is the default value for `providedIn`.
 * @usageNotes
 * ### Basic Examples
 * ### Plain InjectionToken
 * { @example
core/di/ts/injector_spec.ts region='InjectionToken'}
 * ### Tree-shakable InjectionToken
 * { @example
core/di/ts/injector_spec.ts region='ShakableInjectionToken'}
 * @publicApi
 * ^\nexport class
InjectionToken<T> {
 /** @internal
 * ^\n readonly ngMetadataName = 'InjectionToken';
 * ^\n readonly prov:
unknown;
 /**
 * @param _desc Description for the token,
 * used only for debugging purposes,
 * it should but does not need to be unique
 * @param options Options for the token's usage, as described above
 * ^\n constructor(protected _desc: string, options?: {
 * providedIn?: Type<any>|'root'|'platform'|'any'|null, factory:
() => T
 }) {
 this.prov = undefined;
 if (typeof options == 'number') {
 (typeof ngDevMode ===
'undefined' || ngDevMode) &&
 assertLessThan(options, 0, 'Only negative numbers are supported here');
 // This is a special hack to assign __NG_ELEMENT_ID__ to this instance.
 // See `InjectorMarkers`
 (this
as any).__NG_ELEMENT_ID__ = options;
 } else if (options !== undefined) {
 this.prov =
defineInjectable({
 token: this,
 providedIn: options.providedIn || 'root',
 factory: options.factory,
 });
 }
 }
 /**
 * @internal
 * ^\n get multi(): InjectionToken<Array<T>> {
 return this as InjectionToken<Array<T>>;
 }
 toString():
string {
 return `InjectionToken ${this._desc}`;
 }
 }
 ^\nexport interface InjectableDefToken<T> extends
InjectionToken<T> {
 prov: unknown;
 }
 /**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
https://angular.io/license
 * ^\nimport {InjectionToken} from './di/injection_token';
import {ProviderToken}
from './di/provider_token';
import {makePropDecorator} from './util/decorators';
 * A DI token that you
can use to create a virtual [provider](guide/glossary#provider)
 * that will populate the `entryComponents` field of
components and NgModules
 * based on its `useValue` property value.
 * All components that are referenced in
the `useValue` value (either directly
 * or in a nested array or map) are added to the `entryComponents`
property.
 * @usageNotes
 * The following example shows how the router can populate the
`entryComponents`
 * field of an NgModule based on a router configuration that refers
 * to components.
 * ^\n
 * ^\ntypescript
 * // helper function inside the router
 * function provideRoutes(routes) {
 return [
 {provide: ROUTES, useValue: routes},
 {provide: ANALYZE_FOR_ENTRY_COMPONENTS, useValue:
routes, multi: true}
 ];
 }
 * // user code
 * let routes = [
 {path: '/root', component: RootComp},
 {path: '/teams', component: TeamsComp}
 ];
 * @NgModule({
 providers: [provideRoutes(routes)]
 })
 * class ModuleWithRoutes {
 * ^\n
 * @publicApi
 * @deprecated Since 9.0.0. With Ivy, this
property is no longer necessary.
 * ^\nexport const ANALYZE_FOR_ENTRY_COMPONENTS = new
InjectionToken<any>('AnalyzeForEntryComponents');
 * Type of the `Attribute` decorator / constructor
function.
 * @publicApi
 * ^\nexport interface AttributeDecorator {
 /**
 * Specifies that a constant attribute value should be injected.
 * The directive can inject constant string literals of host element attributes.
 * @usageNotes
 * Suppose we have an `` element and want to know its `type`.
 * ^\n
 * ^\nhtml
 * <input type="text">
 * ^\n
 * A decorator can inject string literal `text` as in the following example.
 * { @example
core/ts/metadata/metadata.ts region='attributeMetadata'}
 * @publicApi
 * ^\n (name: string): any;
 * new(name: string): Attribute;
 }
 * Type of the Attribute metadata.
 * @publicApi
 * ^\nexport
interface Attribute {
 /**
 * The name of the attribute to be injected into the constructor.
 * ^\n
 * attributeName?: string;
 }
 * Type of the Query metadata.
 * @publicApi
 * ^\nexport interface Query
{
 descendants: boolean;
 emitDistinctChangesOnly: boolean;
 first: boolean;
 read: any;
 isViewQuery: boolean;
 selector: any;
 static?: boolean;
 }
 // Stores the default value of
`emitDistinctChangesOnly` when the `emitDistinctChangesOnly` is not explicitly set.
 * ^\nexport const
emitDistinctChangesOnlyDefaultValue = true;
 * Base class for query metadata.
 * @see
`ContentChildren`.
 * @see `ContentChild`.
 * @see `ViewChildren`.
 * @see `ViewChild`.
 * @publicApi
 * ^\nexport abstract class Query {
 * Type of the ContentChildren decorator / constructor

```



only query direct children of the element.

- `read` - Used to read a different token from the queried element.
- `static` - True to resolve query results before change detection runs, false to resolve after change detection. Defaults to false.

The following selectors are supported:

- Any class with the `@Component` or `@Directive` decorator
- A template reference variable as a string (e.g. `query`<my-component #cmp></my-component>`` with `@ViewChild('cmp')`)
- Any provider defined in the child component tree of the current component (e.g. `@ViewChild(SomeService) someService: SomeService``)
- Any provider defined through a string token (e.g. `@ViewChild('someToken') someTokenVal: any``)
- A `TemplateRef` (e.g. `query`<ng-template></ng-template>`` with `@ViewChild(TemplateRef) template;``)

The following values are supported by `read`:

- Any class with the `@Component` or `@Directive` decorator
- Any provider defined on the injector of the component that is matched by the `selector` of this query
- Any provider defined through a string token (e.g. `{provide: 'token', useValue: 'val'}``)
- `TemplateRef`, `ElementRef`, and `ViewContainerRef`
- `@usageNotes`

```
{@example core/di/ts/contentChild/content_child_howto.ts region='HowTo'}

### Example
{@example core/di/ts/contentChild/content_child_example.ts region='Component'}

@Annotation
^ (selector: ProviderToken<unknown>|Function|string,
  opts?: {descendants?: boolean, read?: any, static?: boolean}): any;
new(selector: ProviderToken<unknown>|Function|string,
  opts?: {descendants?: boolean, read?: any, static?: boolean}):
ContentChild;
}

Type of the ContentChild metadata.
@publicApi
^/next export type
ContentChild = Query;

ContentChild decorator and metadata.
@Annotation
@publicApi
^/next const ContentChild: ContentChildDecorator = makePropDecorator(
  'ContentChild',
  (selector?: any, data: any = {}) =>
    ({selector, first: true, isViewQuery: false, descendants: true, ...data}),
  Query);

Type of the ViewChildren decorator / constructor function.
@see `ViewChildren`.
@publicApi
^/next interface ViewChildrenDecorator
{
  /**
   * @description
   * Property decorator that configures a view query.
   * Use to get the
   * `QueryList` of elements or directives from the view DOM.
   * Any time a child element is added, removed, or
   * moved, the query list will be updated,
   * and the changes observable of the query list will emit a new value.
   * View queries are set before the `ngAfterViewInit` callback is called.
   * **Metadata Properties**
   * **selector** - The directive type or the name used for querying.
   * **read** - Used to read a different
   * token from the queried elements.
   * **emitDistinctChangesOnly** - The `QueryList#changes` observable will
   * emit new values only
   * if the QueryList result has changed. When `false` the `changes` observable might emit
   * even
   * if the QueryList has not changed.
   * ** Note: ** This config option is **deprecated**, it will be
   * permanently set to `true` and
   * removed in future versions of Angular.
   * The following selectors are supported.
   * Any class with the `@Component` or `@Directive`
   * decorator
   * A template reference variable as a string (e.g. query`<my-component #cmp></my-component>`
   * with @ViewChildren('cmp'))
   * Any provider defined in the child component tree of the
   * current component (e.g. @ViewChildren(SomeService) someService!: SomeService`)
   * Any provider
   * defined through a string token (e.g. @ViewChildren('someToken') someTokenVal!: any`)
   * A
   * TemplateRef (e.g. query`<ng-template></ng-template>` with @ViewChildren(TemplateRef)
   * template;`)
   * In addition, multiple string selectors can be separated with a comma (e.g.
   * @ViewChildren('cmp1,cmp2'))
   * The following values are supported by read:
   * Any class with
   * the @Component or @Directive decorator
   * Any provider defined on the injector of the component that is
   * matched by the selector of
   * this query
   * Any provider defined through a string token (e.g. {provide: 'token', useValue: 'val'}`)
   * TemplateRef, ElementRef, and ViewContainerRef
   * @usageNotes
   * {@example
   * core/di/ts/viewChildren/view_children_howto.ts region='HowTo'}
   * ### Another example
   * {@example core/di/ts/viewChildren/view_children_example.ts region='Component'}
   * @Annotation
   * ^ (selector: ProviderToken<unknown>|Function|string,
   * opts?: {read?: any, emitDistinctChangesOnly?:
```



```

boolean}): any;\n new(selector: ProviderToken<unknown>|Function|string,\n  opts?: {read?: any,
emitDistinctChangesOnly?: boolean}): ViewChildren;\n}\n\n/**\n * Type of the ViewChildren metadata.\n *\n * @publicApi\n */\nexport type ViewChildren = Query;\n\n/**\n * ViewChildren decorator and metadata.\n *\n * @Annotation\n * @publicApi\n */\nexport const ViewChildren: ViewChildrenDecorator = makePropDecorator(\n  'ViewChildren', (selector?: any, data:
any = {}) => ({\n  selector,\n  first: false,\n  isViewQuery: true,\n  descendants: true,\n  emitDistinctChangesOnly: emitDistinctChangesOnlyDefaultValue,\n  ...data\n  })),\n  Query);\n\n/**\n * Type of the ViewChild decorator / constructor function.\n *\n * @see
`ViewChild`.\n * @publicApi\n */\nexport interface ViewChildDecorator {\n  /**\n   * @description\n   * Property
decorator that configures a view query.\n   * The change detector looks for the first element or the directive
matching the selector\n   * in the view DOM. If the view DOM changes, and a new child matches the selector,\n   *
the property is updated.\n   * View queries are set before the `ngAfterViewInit` callback is called.\n   *\n   *
**Metadata Properties**:\n   * **selector** - The directive type or the name used for querying.\n   *
**read** - Used to read
a different token from the queried elements.\n   * **static** - True to resolve query results before change
detection runs,\n   * false to resolve after change detection. Defaults to false.\n   *\n   * The following selectors
are supported.\n   * * Any class with the `@Component` or `@Directive` decorator\n   * * A template reference
variable as a string (e.g. query `<my-component #cmp></my-component>` with `@ViewChild('cmp')`)\n   * *
Any provider defined in the child component tree of the current component (e.g. `@ViewChild(SomeService)
someService: SomeService`)\n   * * Any provider defined through a string token (e.g. `@ViewChild('someToken')
someTokenVal: any`)\n   * * A `TemplateRef` (e.g. query `<ng-template></ng-template>` with
`@ViewChild(TemplateRef)`)\n   * * The following values are supported by `read`:\n   * * Any
class with the `@Component` or `@Directive` decorator\n   * * Any provider defined on the injector
of the component that is matched by the `selector` of\n   * this query\n   * * Any provider defined through a string
token (e.g. `{provide: 'token', useValue: 'val'}`)\n   * * `TemplateRef`, `ElementRef`, and `ViewContainerRef`\n
*\n * @usageNotes\n *\n * {@example core/di/ts/viewChild/view_child_example.ts region='Component'}\n
*\n * ### Example 2\n *\n * {@example core/di/ts/viewChild/view_child_howto.ts region='HowTo'}\n *\n *
@Annotation\n */\n (selector: ProviderToken<unknown>|Function|string, opts?: {read?: any, static?: boolean}):
any;\n new(selector: ProviderToken<unknown>|Function|string,\n  opts?: {read?: any, static?: boolean}):
ViewChild;\n}\n\n/**\n * Type of the ViewChild metadata.\n *\n * @publicApi\n */\nexport type ViewChild =
Query;\n\n/**\n * ViewChild decorator and metadata.\n *\n * @Annotation\n * @publicApi\n */\nexport const
ViewChild: ViewChildDecorator = makePropDecorator(\n  'ViewChild',\n  (selector: any, data: any) => (\n
({selector, first: true, isViewQuery: true, descendants: true, ...data}),\n  Query);\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * A set of interfaces which are
shared between `@angular/core` and `@angular/compiler` to allow\n * for late binding of `@angular/compiler` for
JIT purposes.\n *\n * This file has two copies. Please ensure that they are in sync:\n * -
packages/compiler/src/compiler_facade_interface.ts (main)\n * -
packages/core/src/compiler/compiler_facade_interface.ts (replica)\n *\n * Please ensure that the two files are in
sync using this command:\n * ``\n * cp packages/compiler/src/compiler_facade_interface.ts \\|\n *
packages/core/src/compiler/compiler_facade_interface.ts\n * ``\n */\n\nexport interface ExportedCompilerFacade
{\n  compilerFacade: CompilerFacade;\n}\n\nexport
interface CompilerFacade {\n  compilePipe(angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3PipeMetadataFacade):\n  any;\n  compilePipeDeclaration(\n    angularCoreEnv: CoreEnvironment,\n
sourceMapUrl: string, declaration: R3DeclarePipeFacade): any;\n  compileInjectable(\n    angularCoreEnv:
CoreEnvironment, sourceMapUrl: string, meta: R3InjectableMetadataFacade): any;\n  compileInjectableDeclaration(\n
    angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3DeclareInjectableFacade): any;\n  compileInjector(\n    angularCoreEnv: CoreEnvironment, sourceMapUrl:

```

```

string, meta: R3InjectorMetadataFacade): any;\n compileInjectorDeclaration(\n  angularCoreEnv:
CoreEnvironment, sourceMapUrl: string,\n  declaration: R3DeclareInjectorFacade): any;\n compileNgModule(\n
  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3NgModuleMetadataFacade): any;\n
compileNgModuleDeclaration(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string,\n
  declaration: R3DeclareNgModuleFacade): any;\n compileDirective(\n  angularCoreEnv: CoreEnvironment,
sourceMapUrl: string, meta: R3DirectiveMetadataFacade): any;\n compileDirectiveDeclaration(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string,\n  declaration: R3DeclareDirectiveFacade): any;\n
compileComponent(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3ComponentMetadataFacade): any;\n compileComponentDeclaration(\n  angularCoreEnv: CoreEnvironment,
sourceMapUrl: string,\n  declaration: R3DeclareComponentFacade): any;\n compileFactory(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3FactoryDefMetadataFacade): any;\n
compileFactoryDeclaration(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3DeclareFactoryFacade): any;\n\n createParseSourceSpan(kind: string, typeName: string, sourceUrl: string):
ParseSourceSpan;\n\n FactoryTarget: typeof FactoryTarget;\n // Note that we
do not use `new(): ResourceLoader` here because\n // the resource loader class is abstract and not
constructable.\n ResourceLoader: Function&{prototype: ResourceLoader};\n\n\nexport interface
CoreEnvironment {\n  [name: string]: Function;\n}\n\nexport type ResourceLoader = {\n  get(url: string):
Promise<string>|string;\n};\n\nexport type StringMap = {\n  [key: string]: string;\n};\n\nexport type
StringMapWithRename = {\n  [key: string]: string|[string, string];\n};\n\nexport type Provider = unknown;\n\nexport
type Type = Function;\n\nexport type OpaqueValue = unknown;\n\nexport enum FactoryTarget {\n  Directive = 0,\n  Component = 1,\n  Injectable = 2,\n  Pipe = 3,\n  NgModule = 4,\n}\n\nexport interface
R3DependencyMetadataFacade {\n  token: OpaqueValue;\n  attribute: string|null;\n  host: boolean;\n  optional:
boolean;\n  self: boolean;\n  skipSelf: boolean;\n}\n\nexport interface R3DeclareDependencyMetadataFacade {\n
token: OpaqueValue;\n  attribute?: boolean;\n  host?: boolean;\n
  optional?: boolean;\n  self?: boolean;\n  skipSelf?: boolean;\n}\n\nexport interface R3PipeMetadataFacade {\n
name: string;\n  type: Type;\n  pipeName: string;\n  pure: boolean;\n  isStandalone: boolean;\n}\n\nexport interface
R3InjectableMetadataFacade {\n  name: string;\n  type: Type;\n  typeArgumentCount: number;\n  providedIn?:
Type|'root'|'platform'|'any'|null;\n  useClass?: OpaqueValue;\n  useFactory?: OpaqueValue;\n  useExisting?:
OpaqueValue;\n  useValue?: OpaqueValue;\n  deps?: R3DependencyMetadataFacade[];\n}\n\nexport interface
R3NgModuleMetadataFacade {\n  type: Type;\n  bootstrap: Function[];\n  declarations: Function[];\n  imports:
Function[];\n  exports: Function[];\n  schemas: {name: string}[]|null;\n  id: string|null;\n}\n\nexport interface
R3InjectorMetadataFacade {\n  name: string;\n  type: Type;\n  providers: Provider[];\n  imports:
OpaqueValue[];\n}\n\nexport interface R3DirectiveMetadataFacade {\n  name: string;\n  type: Type;\n
  typeSourceSpan: ParseSourceSpan;\n
  selector: string|null;\n  queries: R3QueryMetadataFacade[];\n  host: {[key: string]: string};\n  propMetadata: {[key:
string]: OpaqueValue[]};\n  lifecycle: {usesOnChanges: boolean;};\n  inputs: string[];\n  outputs: string[];\n
  usesInheritance: boolean;\n  exportAs: string[]|null;\n  providers: Provider[]|null;\n  viewQueries:
R3QueryMetadataFacade[];\n  isStandalone: boolean;\n}\n\nexport interface R3ComponentMetadataFacade extends
R3DirectiveMetadataFacade {\n  template: string;\n  preserveWhitespaces: boolean;\n  animations:
OpaqueValue[]|undefined;\n  declarations: R3TemplateDependencyFacade[];\n  styles: string[];\n  encapsulation:
ViewEncapsulation;\n  viewProviders: Provider[]|null;\n  interpolation?: [string, string];\n  changeDetection?:
ChangeDetectionStrategy;\n}\n\nexport interface R3DeclareDirectiveFacade {\n  selector?: string;\n  type: Type;\n
  inputs?: {[classPropertyName: string]: string|[string, string]};\n  outputs?: {[classPropertyName: string]: string};\n
  host?:
{\n  attributes?: {[key: string]: OpaqueValue};\n  listeners?: {[key: string]: string};\n  properties?: {[key:
string]: string};\n  classAttribute?: string;\n  styleAttribute?: string;\n  };;\n  queries?:
R3DeclareQueryMetadataFacade[];\n  viewQueries?: R3DeclareQueryMetadataFacade[];\n  providers?:
OpaqueValue;\n  exportAs?: string[];\n  usesInheritance?: boolean;\n  usesOnChanges?: boolean;\n  isStandalone?:

```

```

boolean;\n}\n\nexport interface R3DeclareComponentFacade extends R3DeclareDirectiveFacade {\n  template:
string;\n  isInline?: boolean;\n  styles?: string[];\n\n  // Post-standalone libraries use a unified dependencies field.\n  dependencies?: R3DeclareTemplateDependencyFacade[];\n\n  // Pre-standalone libraries have separate
component/directive/pipe fields:\n  components?: R3DeclareDirectiveDependencyFacade[];\n  directives?:
R3DeclareDirectiveDependencyFacade[];\n  pipes?: {[pipeName: string]: OpaqueValue|(() =>
OpaqueValue)};\n\n\n  viewProviders?: OpaqueValue;\n  animations?: OpaqueValue;\n  changeDetection?: ChangeDetectionStrategy;\n  encapsulation?:
ViewEncapsulation;\n  interpolation?: [string, string];\n  preserveWhitespaces?: boolean;\n}\n\nexport type
R3DeclareTemplateDependencyFacade = {\n  kind:
string;\n}&(R3DeclareDirectiveDependencyFacade|R3DeclarePipeDependencyFacade|\n
R3DeclareNgModuleDependencyFacade);\n\nexport interface R3DeclareDirectiveDependencyFacade {\n  kind?:
'directive'|'component';\n  selector: string;\n  type: OpaqueValue|(() => OpaqueValue);\n  inputs?: string[];\n
  outputs?: string[];\n  exportAs?: string[];\n}\n\nexport interface R3DeclarePipeDependencyFacade {\n  kind?:
'pipe';\n  name: string;\n  type: OpaqueValue|(() => OpaqueValue);\n}\n\nexport interface
R3DeclareNgModuleDependencyFacade {\n  kind: 'ngmodule';\n  type: OpaqueValue|(() =>
OpaqueValue);\n}\n\nexport enum R3TemplateDependencyKind {\n  Directive = 0,\n  Pipe = 1,\n  NgModule =
2,\n}\n\nexport interface R3TemplateDependencyFacade {\n  kind: R3TemplateDependencyKind;\n
  type: OpaqueValue|(() => OpaqueValue);\n}\n\nexport interface R3FactoryDefMetadataFacade {\n  name: string;\n
  type: Type;\n  typeArgumentCount: number;\n  deps: R3DependencyMetadataFacade[]|null;\n  target:
FactoryTarget;\n}\n\nexport interface R3DeclareFactoryFacade {\n  type: Type;\n  deps:
R3DeclareDependencyMetadataFacade[]|'invalid'|null;\n  target: FactoryTarget;\n}\n\nexport interface
R3DeclareInjectableFacade {\n  type: Type;\n  providedIn?: Type|'root'|'platform'|'any'|null;\n  useClass?:
OpaqueValue;\n  useFactory?: OpaqueValue;\n  useExisting?: OpaqueValue;\n  useValue?: OpaqueValue;\n  deps?:
R3DeclareDependencyMetadataFacade[];\n}\n\nexport enum ViewEncapsulation {\n  Emulated = 0,\n  //
Historically the 1 value was for `Native` encapsulation which has been removed as of v11.\n  None = 2,\n
  ShadowDom = 3\n}\n\nexport type ChangeDetectionStrategy = number;\n\nexport interface
R3QueryMetadataFacade {\n  propertyName: string;\n  first: boolean;\n  predicate:
OpaqueValue|string[];\n  descendants: boolean;\n  emitDistinctChangesOnly: boolean;\n  read: OpaqueValue|null;\n
  static: boolean;\n}\n\nexport interface R3DeclareQueryMetadataFacade {\n  propertyName: string;\n  first?:
boolean;\n  predicate: OpaqueValue|string[];\n  descendants?: boolean;\n  read?: OpaqueValue;\n  static?: boolean;\n
  emitDistinctChangesOnly?: boolean;\n}\n\nexport interface R3DeclareInjectorFacade {\n  type: Type;\n  imports?:
OpaqueValue[];\n  providers?: OpaqueValue[];\n}\n\nexport interface R3DeclareNgModuleFacade {\n  type:
Type;\n  bootstrap?: OpaqueValue[]|(() => OpaqueValue[]);\n  declarations?: OpaqueValue[]|(() =>
OpaqueValue[]);\n  imports?: OpaqueValue[]|(() => OpaqueValue[]);\n  exports?: OpaqueValue[]|(() =>
OpaqueValue[]);\n  schemas?: OpaqueValue[];\n  id?: OpaqueValue;\n}\n\nexport interface R3DeclarePipeFacade
{\n  type: Type;\n  name: string;\n  pure?: boolean;\n  isStandalone?: boolean;\n}\n\nexport interface
ParseSourceSpan {\n  start:
any;\n  end: any;\n  details: any;\n  fullStart: any;\n}\n\n"/>**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {global} from './util/global';\nimport {CompilerFacade,
ExportedCompilerFacade, Type} from './compiler_facade_interface';\nexport * from
'./compiler_facade_interface';\n\nexport const enum JitCompilerUsage {\n  Decorator,\n  PartialDeclaration,\n}\n\ninterface JitCompilerUsageRequest {\n  usage: JitCompilerUsage;\n  kind:
'directive'|'component'|'pipe'|'injectable'|'NgModule';\n  type: Type;\n}\n\nexport function
getCompilerFacade(request: JitCompilerUsageRequest): CompilerFacade {\n  const globalNg:
ExportedCompilerFacade = global['ng'];\n  if (globalNg && globalNg.compilerFacade) {\n    return
globalNg.compilerFacade;\n  }\n\n  if (typeof ngDevMode === 'undefined' || ngDevMode) {\n    // Log the type as
an error

```

```

so that a developer can easily navigate to the type from the
// console
console.error(`JIT compilation failed
for ${request.kind}`, request.type);
let message = `The ${request.kind} '${request.type.name}'
needs to be compiled using the JIT compiler, but '@angular/compiler' is not available.`;
if (request.usage
=== JitCompilerUsage.PartialDeclaration) {
message += `The ${request.kind} is part of a library that has been
partially compiled.`;
message += `However, the Angular Linker has not processed the library such
that JIT compilation is used as fallback.`;
message += `Ideally, the library is
processed using the Angular Linker to become fully AOT compiled.`;
} else {
message += `JIT
compilation is discouraged for production use-cases! Consider using AOT mode instead.`;
}
message += `
Alternatively, the JIT compiler
should be loaded by bootstrapping using '@angular/platform-browser-dynamic' or '@angular/platform-
server',
or manually provide the compiler with 'import "@angular/compiler";' before
bootstrapping.`;
throw new Error(message);
} else {
throw new Error('JIT compiler unavailable');
}
}
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is
governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
*/
 * @description
 * Represents a type that a Component or other object is instances of.
 * An
example of a `Type` is `MyCustomComponent` class, which in JavaScript is represented by the
`MyCustomComponent` constructor function.
 * @publicApi
 * @next export const Type = Function;
 * next export
function isType(v: any): v is Type<any> {
return typeof v === 'function';
}
 * @description
 * Represents an abstract class
`T`, if applied to a concrete class it would stop being
 * instantiable.
 * @publicApi
 * @next export interface
AbstractType<T> extends Function {
prototype: T;
}
 * next export interface Type<T> extends Function {
new(...args: any[]): T;
}
 * next export type Mutable<T extends {[x: string]: any}, K extends string> = {
[P in K]:
T[P];
};
 * Returns a writable type version of type.
 * USAGE:
 * Given:
 * `` interface Person
{readonly name: string}
 * ``
 * We would like to get a read/write version of `Person`.
 * const
WritablePerson = Writable<Person>;
 * ``
 * The result is that you can do:
 * const
readonlyPerson: Person = {name: 'Marry'};
 * readonlyPerson.name = 'John'; // TypeError
 * (readonlyPerson as
WritablePerson).name = 'John'; // OK
 * // Error: Correctly detects that `Person` did not have `age` property.
 * (readonlyPerson as WritablePerson).age = 30;
 * ``
 * @next export type Writable<T> = {
-readonly[K
in keyof T]: T[K];
};
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this
source code is governed by an MIT-style license that can be found in the LICENSE file at
https://angular.io/license
*/
 * @next import {assertEqual, assertLessThanOrEqual} from './assert';
 * Equivalent
to ES6 spread, add each item to an array.
 * @param items The items to add
 * @param arr The array to
which you want to add the items
 * @next export function addAllToArray(items: any[], arr: any[]) {
for (let i = 0; i <
items.length; i++) {
arr.push(items[i]);
}
}
 * Determines if the contents of two arrays is identical
 * @param a first array
 * @param b second array
 * @param identityAccessor Optional function for
extracting stable object identity from a value in
the array.
 * @next export function arrayEquals<T>(a: T[], b: T[],
identityAccessor?: (value: T) => unknown): boolean {
if (a.length !== b.length) return false;
for (let i = 0; i < a.length; i++) {
let valueA = a[i];
let valueB = b[i];
if (identityAccessor) {
valueA =
identityAccessor(valueA) as any;
valueB = identityAccessor(valueB) as any;
}
if (valueB !==
valueA) {
return false;
}
}
return true;
}
}
 * Flattens an array.
 * @next export function
flatten(list: any[], dst?: any[]): any[] {
if (dst === undefined) dst = list;
for (let i = 0; i < list.length; i++) {
let item = list[i];
if (Array.isArray(item)) {
// we need to inline it.
if (dst === list) {
// Our
assumption that the list was already flat was wrong and
// we need to clone flat since we need to write to it.
dst = list.slice(0, i);
}
flatten(item, dst);
} else if (dst !== list) {
dst.push(item);
}
}
return dst;
}
 * @next export function deepForEach<T>(input: (T|any[])[], fn: (value: T) => void): void {
input.forEach(value => Array.isArray(value)
? deepForEach(value, fn) : fn(value));
}
 * @next export function addToArray(arr: any[], index: number, value: any):
void {
// perf: array.push is faster than array.splice!
if (index >= arr.length) {
arr.push(value);
} else {
}
}
}

```

```
arr.splice(index, 0, value);\n }\n}\n\nexport function removeFromArray(arr: any[], index: number): any {\n // perf:
array.pop is faster than array.splice!\n if (index >= arr.length - 1) {\n return arr.pop();\n } else {\n return
arr.splice(index, 1)[0];\n }\n}\n\nexport function newArray<T = any>(size: number): T[];\nexport function
newArray<T>(size: number, value: T): T[];\nexport function newArray<T>(size: number, value?: T): T[] {\n const
list: T[] = [];\n for (let i = 0; i < size; i++) {\n list.push(value!);\n }\n return list;\n}\n\n/**\n * Remove item from
array (Same as `Array.splice()` but faster.)\n *\n * `Array.splice()` is not as fast because it has to allocate an array
for the elements which were\n * removed.
```

```
This causes memory pressure and slows down code when most of the time we don't\n * care about the deleted items
array.\n *\n * https://jsperf.com/fast-array-splice (About 20x faster)\n *\n * @param array Array to splice\n *
@param index Index of element in array to remove.\n * @param count Number of items to remove.\n */\nexport
function arraySplice(array: any[], index: number, count: number): void {\n const length = array.length - count;\n
while (index < length) {\n array[index] = array[index + count];\n index++;\n }\n while (count--)\n array.pop();
// shrink the array\n }\n}\n\n/**\n * Same as `Array.splice(index, 0, value)` but faster.\n *\n * `Array.splice()`
is not fast because it has to allocate an array for the elements which were\n * removed. This causes
memory pressure and slows down code when most of the time we don't\n * care about the deleted items array.\n *\n
* @param array Array to splice.\n * @param index Index in array where the `value` should be
added.\n * @param value Value to add to array.\n */\nexport function arrayInsert(array: any[], index: number,
value: any): void {\n ngDevMode && assertLessThanOrEqual(index, array.length, 'Can\\'t insert past array end.);\n
let end = array.length;\n while (end > index) {\n const previousEnd = end - 1;\n array[end] =
array[previousEnd];\n end = previousEnd;\n }\n array[index] = value;\n }\n\n/**\n * Same as
`Array.splice2(index, 0, value1, value2)` but faster.\n *\n * `Array.splice()` is not fast because it has to allocate an
array for the elements which were\n * removed. This causes memory pressure and slows down code when most of
the time we don't\n * care about the deleted items array.\n *\n * @param array Array to splice.\n * @param index
Index in array where the `value` should be added.\n * @param value1 Value to add to array.\n * @param value2
Value to add to array.\n */\nexport function arrayInsert2(array: any[], index: number, value1: any, value2: any): void
{\n
```

```
ngDevMode && assertLessThanOrEqual(index, array.length, 'Can\\'t insert past array end.);\n let end =
array.length;\n if (end == index) {\n // inserting at the end.\n array.push(value1, value2);\n } else if (end === 1)
{\n // corner case when we have less items in array than we have items to insert.\n array.push(value2,
array[0]);\n array[0] = value1;\n } else {\n end--;\n array.push(array[end - 1], array[end]);\n while (end >
index) {\n const previousEnd = end - 2;\n array[end] = array[previousEnd];\n end--;\n }\n array[index]
= value1;\n array[index + 1] = value2;\n }\n}\n\n/**\n * Insert a `value` into an `array` so that the array remains
sorted.\n *\n * NOTE:\n * - Duplicates are not allowed, and are ignored.\n * - This uses binary search algorithm for
fast inserts.\n *\n * @param array A sorted array to insert into.\n * @param value The value to insert.\n * @returns
index of the inserted value.\n */\nexport function arrayInsertSorted(array:
```

```
string[], value: string): number {\n let index = arrayIndexOfSorted(array, value);\n if (index < 0) {\n // if we did
not find it insert it.\n index = ~index;\n arrayInsert(array, index, value);\n }\n return index;\n }\n\n/**\n *
Remove `value` from a sorted `array`.\n *\n * NOTE:\n * - This uses binary search algorithm for fast removals.\n *\n
* @param array A sorted array to remove from.\n * @param value The value to remove.\n * @returns index of
the removed value.\n * - positive index if value found and removed.\n * - negative index if value not found.
```

```
(`~index` to get the value where it should have been\n * inserted)\n */\nexport function arrayRemoveSorted(array:
string[], value: string): number {\n const index = arrayIndexOfSorted(array, value);\n if (index >= 0) {\n
arraySplice(array, index, 1);\n }\n return index;\n }\n\n/**\n * Get an index of an `value` in a sorted `array`.\n *\n
* NOTE:\n * - This uses binary search algorithm for fast
```

```
removals.\n *\n * @param array A sorted array to binary search.\n * @param value The value to look for.\n *
@returns index of the value.\n * - positive index if value found.\n * - negative index if value not found. (`~index`
to get the value where it should have been\n * located)\n */\nexport function arrayIndexOfSorted(array: string[],
value: string): number {\n return _arrayIndexOfSorted(array, value, 0);\n }\n\n/**\n * `KeyValueArray` is an
```

array where even positions contain keys and odd positions contain values.

`KeyValueArray` provides a very efficient way of iterating over its contents. For small sets (~10) the cost of binary searching an `KeyValueArray` has about the same performance characteristics that of a `Map` with significantly better memory footprint.

If used as a `Map` the keys are stored in alphabetical order so that they can be binary searched for retrieval.

See: `keyValueArraySet`, `keyValueArrayGet`, `keyValueArrayIndexOf`, `keyValueArrayDelete`.

```

export interface KeyValueArray<VALUE> extends Array<VALUE|string> {
  __brand__: 'array-map';
  Set a `value` for a `key`.
  @param keyValueArray to modify.
  @param key The key to locate or create.
  @param value The value to set for a `key`.
  @returns index (always even) of where the value was set.
}

export function keyValueArraySet<V>(keyValueArray:
  KeyValueArray<V>, key: string, value: V): number {
  let index = keyValueArrayIndexOf(keyValueArray, key);
  if (index >= 0) // if we found it set it.
    keyValueArray[index | 1] = value;
  else index = ~index;
  arrayInsert2(keyValueArray, index, key, value);
  return index;
}

Retrieve a `value` for a `key` (on `undefined` if not found).
@param keyValueArray to search.
@param key The key to locate.
@return The `value` stored at the `key` location or `undefined` if not found.

export function
keyValueArrayGet<V>(keyValueArray:
  KeyValueArray<V>, key: string): V|undefined {
  const index = keyValueArrayIndexOf(keyValueArray, key);
  if (index >= 0) // if we found it retrieve it.
    return keyValueArray[index | 1] as V;
  return
  undefined;
}

Retrieve a `key` index value in the array or `-1` if not found.
@param
keyValueArray to search.
@param key The key to locate.
@returns index of where the key is (or should have been.)
- positive (even) index if key found.
- negative index if key not found.
(`~index` (even) to get the index where it should have
  been inserted.)

export function
keyValueArrayIndexOf<V>(keyValueArray: KeyValueArray<V>, key: string): number {
  return
  _arrayIndexOfSorted(keyValueArray as string[], key, 1);
}

Delete a `key` (and `value`) from the `KeyValueArray`.
@param keyValueArray to modify.
@param key The key to locate or delete (if exist).
@returns index of where the key was
(or should have been.)
- positive (even) index if key found and deleted.
- negative index if key not found.
(`~index` (even) to get the index where it should have
  been.)

export function
keyValueArrayDelete<V>(keyValueArray: KeyValueArray<V>, key: string): number {
  const index =
  keyValueArrayIndexOf(keyValueArray, key);
  if (index >= 0) // if we found it remove it.
    arraySplice(keyValueArray, index, 2);
  return index;
}

INTERNAL: Get an index of an `value`
in a sorted `array` by grouping search by `shift`.
NOTE:
- This uses binary search algorithm for fast
  removals.
@param array A sorted array to binary search.
@param value The value to look for.
@param shift grouping shift.
- `0` means look at every location
- `1` means only look at every other
(even) location (the odd locations are to be ignored as
  they are values.)
@returns index of the value.
- positive index
if value found.
- negative index if value not found.
(`~index` to get the value where it should have been
  inserted)

function _arrayIndexOfSorted(array: string[], value: string, shift: number): number {
  ngDevMode
  && assertEqual(Array.isArray(array), true, 'Expecting an array');
  let start = 0;
  let end = array.length >> shift;
  while (end !== start) {
    const middle = start + ((end - start) >> 1); // find the middle.
    const current =
    array[middle << shift];
    if (value === current) {
      return (middle << shift);
    } else if (current > value) {
      end = middle;
    } else {
      start = middle + 1; // We already searched middle so make it non-inclusive by
      adding 1
    }
  }
  return ~(end << shift);
}

"/*
 * @license
 * Copyright Google LLC All Rights
  Reserved.
 * Use of this source code is governed by an MIT-style license that can be
  found in the
  LICENSE file at https://angular.io/license
*/

import {isType, Type}
from './interface/type';
import {newArray} from './util/array_utils';
import {ANNOTATIONS, PARAMETERS,
  PROP_METADATA} from './util/decorators';
import {global} from './util/global';
import
{PlatformReflectionCapabilities} from './platform_reflection_capabilities';

#####
 * Attention: These Regular expressions have to hold even if the code is minified!

```



```

typeof tsickleCtorParams === 'function' ? tsickleCtorParams() : tsickleCtorParams;\n  const paramTypes =
ctorParameters.map((ctorParam: any) => ctorParam && ctorParam.type);\n  const paramAnnotations =
ctorParameters.map(\n    (ctorParam: any) =>\n      ctorParam &&
convertTsickleDecoratorIntoMetadata(ctorParam.decorators));\n  return
this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n  }\n\n  // API for metadata created by
invoking the decorators.\n  const paramAnnotations = type.hasOwnProperty(PARAMETERS) && (type as
any)[PARAMETERS];\n  const paramTypes = this._reflect && this._reflect.getOwnMetadata
&&\n    this._reflect.getOwnMetadata('design:paramtypes', type);\n  if (paramTypes || paramAnnotations) {\n
return this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n  }\n\n  // If a class has no decorators, at
least create metadata\n  // based on function.length.\n  // Note: We know that this is a real constructor as we
checked\n  // the content of the constructor above.\n  return newArray<any[]>(type.length);\n  }\n\n
parameters(type: Type<any>): any[][] {\n  // Note: only report metadata if we have at least one class decorator\n
// to stay in sync with the static reflector.\n  if (!isType(type)) {\n    return [];\n  }\n  const parentCtor =
getParentCtor(type);\n  let parameters = this._ownParameters(type, parentCtor);\n  if (!parameters && parentCtor
!== Object) {\n    parameters = this.parameters(parentCtor);\n  }\n  return parameters || [];\n  }\n\n  private
_ownAnnotations(typeOrFunc: Type<any>, parentCtor: any): any[]|null
{\n  // Prefer the direct API.\n  if ((<any>typeOrFunc).annotations && (<any>typeOrFunc).annotations !==
parentCtor.annotations) {\n    let annotations = (<any>typeOrFunc).annotations;\n    if (typeof annotations ===
'function' && annotations.annotations) {\n      annotations = annotations.annotations;\n    }\n    return
annotations;\n  }\n\n  // API of tsickle for lowering decorators to properties on the class.\n  if
((<any>typeOrFunc).decorators && (<any>typeOrFunc).decorators !== parentCtor.decorators) {\n    return
convertTsickleDecoratorIntoMetadata((<any>typeOrFunc).decorators);\n  }\n\n  // API for metadata created by
invoking the decorators.\n  if (typeOrFunc.hasOwnProperty(ANNOTATIONS)) {\n    return (typeOrFunc as
any)[ANNOTATIONS];\n  }\n  return null;\n  }\n\n  annotations(typeOrFunc: Type<any>): any[] {\n  if
(!isType(typeOrFunc)) {\n    return [];\n  }\n  const parentCtor = getParentCtor(typeOrFunc);\n  const
ownAnnotations
= this._ownAnnotations(typeOrFunc, parentCtor) || [];\n  const parentAnnotations = parentCtor !== Object ?
this.annotations(parentCtor) : [];\n  return parentAnnotations.concat(ownAnnotations);\n  }\n\n  private
_ownPropMetadata(typeOrFunc: any, parentCtor: any): {[key: string]: any[]}|null {\n  // Prefer the direct API.\n
if ((<any>typeOrFunc).propMetadata &&\n    (<any>typeOrFunc).propMetadata !== parentCtor.propMetadata)
{\n    let propMetadata = (<any>typeOrFunc).propMetadata;\n    if (typeof propMetadata === 'function' &&
propMetadata.propMetadata) {\n      propMetadata = propMetadata.propMetadata;\n    }\n    return
propMetadata;\n  }\n\n  // API of tsickle for lowering decorators to properties on the class.\n  if
((<any>typeOrFunc).propDecorators &&\n    (<any>typeOrFunc).propDecorators !==
parentCtor.propDecorators) {\n    const propDecorators = (<any>typeOrFunc).propDecorators;\n    const
propMetadata = <{[key: string]: any[]}>{};\n    Object.keys(propDecorators).forEach(prop
=> {\n      propMetadata[prop] = convertTsickleDecoratorIntoMetadata(propDecorators[prop]);\n    });\n
return propMetadata;\n  }\n\n  // API for metadata created by invoking the decorators.\n  if
(typeOrFunc.hasOwnProperty(PROP_METADATA)) {\n    return (typeOrFunc as any)[PROP_METADATA];\n  }\n
return null;\n  }\n\n  propMetadata(typeOrFunc: any): {[key: string]: any[]} {\n  if (!isType(typeOrFunc))
{\n    return {};\n  }\n  const parentCtor = getParentCtor(typeOrFunc);\n  const propMetadata: {[key: string]:
any[]}
= {};\n  if (parentCtor !== Object) {\n    const parentPropMetadata = this.propMetadata(parentCtor);\n
Object.keys(parentPropMetadata).forEach((propName) => {\n      propMetadata[propName] =
parentPropMetadata[propName];\n    });\n  }\n  const ownPropMetadata = this._ownPropMetadata(typeOrFunc,
parentCtor);\n  if (ownPropMetadata) {\n    Object.keys(ownPropMetadata).forEach((propName)
=> {\n      const decorators: any[] = [];\n      if (propMetadata.hasOwnProperty(propName)) {\n
decorators.push(...propMetadata[propName]);\n      }\n      decorators.push(...ownPropMetadata[propName]);\n
propMetadata[propName] = decorators;\n    });\n  }\n  return propMetadata;\n  }\n\n

```



```

ownPropMetadata(typeOrFunc: any): {[key: string]: any[]} {\n  if (!isType(typeOrFunc)) {\n    return {};\n  }\n  return this._ownPropMetadata(typeOrFunc, getParentCtor(typeOrFunc)) || {};\n}\n\nhasLifecycleHook(type: any,\n  lcProperty: string): boolean {\n  return type instanceof Type && lcProperty in type.prototype;\n}\n\nfunction\n  convertTsickleDecoratorIntoMetadata(decoratorInvocations: any[]): any[] {\n  if (!decoratorInvocations) {\n    return [];\n  }\n  return decoratorInvocations.map(decoratorInvocation => {\n    const decoratorType =\n      decoratorInvocation.type;\n    const annotationCls = decoratorType.annotationCls;\n    const annotationArgs =\n      decoratorInvocation.args\n      ? decoratorInvocation.args : [];\n    return new annotationCls(...annotationArgs);\n  });\n}\n\nfunction\n  getParentCtor(ctor: Function): Type<any> {\n  const parentProto = ctor.prototype ?\n    Object.getPrototypeOf(ctor.prototype) : null;\n  const parentCtor = parentProto ? parentProto.constructor : null;\n  //\n  Note: We always use `Object` as the null value\n  // to simplify checking later on.\n  return parentCtor ||\n    Object;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is\n * governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport './util/ng_dev_mode';\nimport { RuntimeError, RuntimeErrorCode } from './errors';\nimport { Type }\n  from './interface/type';\nimport { stringify } from './util/stringify';\nimport { resolveForwardRef } from\n  './forward_ref';\nimport { getInjectImplementation, injectRootLimpMode } from './inject_switch';\nimport { Injector }\n  from './injector';\nimport\n  { DecoratorFlags, InjectFlags, InternalInjectFlags } from './interface/injector';\nimport { ProviderToken } from\n  './provider_token';\n\nconst _THROW_IF_NOT_FOUND = {};\nexport const THROW_IF_NOT_FOUND =\n  _THROW_IF_NOT_FOUND;\n\n/*\n * Name of a property (that we patch onto DI decorator), which is used as an\n * annotation of which\n * InjectFlag this decorator represents. This allows to avoid direct references to the DI\n * decorators\n * in the code, thus making them tree-shakable.\n */\nconst DI_DECORATOR_FLAG =\n  '__NG_DI_FLAG__';\n\nexport const NG_TEMP_TOKEN_PATH = 'ngTempTokenPath';\nconst\n  NG_TOKEN_PATH = 'ngTokenPath';\nconst NEW_LINE = '\\n';\nconst NO_NEW_LINE = '';\nexport const\n  SOURCE = '__source';\n\n/*\n * Current injector value used by `inject`. \n * - `undefined`: it is an error to call\n * `inject`\n * - `null`: `inject` can be called but there is no injector (limp-mode).\n * - Injector instance: Use the\n * injector for resolution.\n */\nlet _currentInjector: Injector|undefined|null\n  = undefined;\n\nexport function setCurrentInjector(injector: Injector|null|undefined): Injector|undefined|null {\n  const former = _currentInjector;\n  _currentInjector = injector;\n  return former;\n}\n\nexport function\n  injectInjectorOnly<T>(token: ProviderToken<T>): T;\nexport function injectInjectorOnly<T>(token:\n  ProviderToken<T>, flags?: InjectFlags): T|null;\nexport function injectInjectorOnly<T>(token: ProviderToken<T>,\n  flags = InjectFlags.Default): T|\n  null {\n  if (_currentInjector === undefined) {\n    throw new RuntimeError(\n      RuntimeErrorCode.MISSING_INJECTION_CONTEXT,\n      ngDevMode &&\n        `inject() must be called\n        from an injection context such as a constructor, a factory function, a field initializer, or a function used with\n        \\`EnvironmentInjector#runInContext\\`.`);\n  } else if (_currentInjector === null) {\n    return\n      injectRootLimpMode(token, undefined, flags);\n  } else {\n    return _currentInjector.get(token, flags &\n      InjectFlags.Optional\n      ? null : undefined, flags);\n  }\n}\n\n/*\n * Generated instruction: injects a token from the currently active\n * injector.\n * (Additional documentation moved to `inject`, as it is the public API, and an alias for this\n * instruction)\n * @see inject\n * @codeGenApi\n * @publicApi This instruction has been emitted by\n * ViewEngine for some time and is deployed to npm.\n */\nexport function inject<T>(token: ProviderToken<T>):\n  T;\nexport function inject<T>(token: ProviderToken<T>, flags?: InjectFlags): T|null;\nexport function\n  inject<T>(token: ProviderToken<T>, flags = InjectFlags.Default): T|null {\n  return (getInjectImplementation() ||\n    injectInjectorOnly)(resolveForwardRef(token), flags);\n}\n\n/*\n * Throws an error indicating that a factory\n * function could not be generated by the compiler for a\n * particular class.\n * The name of the class is not\n * mentioned here, but will be in the generated factory function name\n * and thus in the stack trace.\n */\n@codeGenApi\n
```

```

*^nextport function invalidFactoryDep(index: number): never {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_FACTORY_DEPENDENCY,\n ngDevMode &&\n `This constructor is not
compatible with Angular Dependency Injection because its dependency at index ${\n index} of the
parameter list is invalid.\nThis can happen if the dependency type is a primitive like a string or if an ancestor of this
class is missing an Angular decorator.\n\nPlease check that 1) the type for the parameter at index ${\n
index} is correct and 2) the correct Angular decorators are defined for this class and its ancestors.`);\n}\n\n/**\n *
Type of the options argument to `inject`.\n *\n * @publicApi\n */\nexport interface InjectOptions {\n /**\n * Use
optional injection, and return `null` if the requested token is not found.\n *\n optional?: boolean;\n\n /**\n *
Start injection at the parent of the current injector.\n *\n skipSelf?: boolean;\n\n
/**\n * Only query the current injector for the token, and don't fall back to the parent injector if\n * it's not
found.\n *\n self?: boolean;\n\n /**\n * Stop injection at the host component's injector. Only relevant when
injecting from an element\n * injector, and a no-op for environment injectors.\n *\n host?: boolean;\n}\n\n/**\n
* @param token A token that represents a dependency that should be injected.\n * @returns the injected value if
operation is successful, `null` otherwise.\n * @throws if called outside of a supported context.\n *\n */\n * @publicApi\n
*/\nexport function inject<T>(token: ProviderToken<T>): T;\n\n/**\n * @param token A token that represents a
dependency that should be injected.\n * @param flags Control how injection is executed. The flags correspond to
injection strategies that\n * can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and
`@Optional`.\n * @returns the injected value if operation is successful, `null` otherwise.\n
* @throws if called outside of a supported context.\n *\n */\n * @publicApi\n */\n * @deprecated prefer an options object
instead of `InjectFlags`\n */\nexport function inject<T>(token: ProviderToken<T>, flags?: InjectFlags):
T|null;\n\n/**\n * @param token A token that represents a dependency that should be injected.\n * @param options
Control how injection is executed. Options correspond to injection strategies\n * that can be specified with
parameter decorators `@Host`, `@Self`, `@SkipSelf`, and\n * `@Optional`.\n * @returns the injected value if
operation is successful.\n * @throws if called outside of a supported context, or if the token is not found.\n *\n
*/\n * @publicApi\n */\nexport function inject<T>(token: ProviderToken<T>, options: InjectOptions&{ optional?: false }):
T;\n\n/**\n * @param token A token that represents a dependency that should be injected.\n * @param options
Control how injection is executed. Options correspond to injection strategies\n * that can be specified
with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and\n * `@Optional`.\n * @returns the injected value
if operation is successful, `null` if the token is not\n * found and optional injection has been requested.\n *
@throws if called outside of a supported context, or if the token is not found and optional\n * injection was not
requested.\n *\n */\n * @publicApi\n */\nexport function inject<T>(token: ProviderToken<T>, options: InjectOptions):
T|null;\n\n/**\n * Injects a token from the currently active injector.\n * `inject` is only supported during instantiation
of a dependency by the DI system. It can be used\n * during:\n * - Construction (via the `constructor`) of a class
being instantiated by the DI system, such\n * as an `@Injectable` or `@Component`.\n * - In the initializer for fields
of such classes.\n * - In the factory function specified for `useFactory` of a `Provider` or an `@Injectable`.\n * - In
the `factory` function specified for an `InjectionToken`.\n
*\n * @param token A token that represents a dependency that should be injected.\n * @param flags Optional flags
that control how injection is executed.\n * The flags correspond to injection strategies that can be specified with\n *
parameter decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.\n * @returns the injected value if operation
is successful, `null` otherwise.\n * @throws if called outside of a supported context.\n *\n */\n * @usageNotes\n * In
practice the `inject()` calls are allowed in a constructor, a constructor parameter and a\n * field initializer:\n *\n
```\ntypescript\n * @Injectable({providedIn: 'root'})\n * export class Car {\n * radio: Radio|undefined;\n * // OK:
field initializer\n * spareTyre = inject(Tyre);\n *\n * constructor() {\n * // OK: constructor body\n *
this.radio = inject(Radio);\n * }\n * }\n *```\n *\n * It is also legal to call `inject` from a provider's factory:\n *\n
```\ntypescript\n * providers: [\n * {provide: Car, useFactory:\n * () => {\n * // OK: a class factory\n * const engine = inject(Engine);\n * return new Car(engine);\n * }}\n *
]\n *```\n *\n * Calls to the `inject()` function outside of the class creation context will result in error. Most\n *
notably, calls to `inject()` are disallowed after a class instance was created, in methods\n * (including lifecycle

```



example shows a class constructor that specifies a `new()` custom provider of a dependency using the parameter decorator. When `@Inject()` is not present, the injector uses the type annotation of the parameter as the provider.

```

<code-example path="core/di/ts/metadata_spec.ts" region="InjectWithoutDecorator">
@see ["Dependency Injection Guide"](guide/dependency-injection)
(token: any): any;
new(token: any): Inject;
Type of the Inject metadata.
@publicApi
export interface Inject {
  A [DI token](guide/glossary#di-token) that maps to the dependency to be injected.
  token: any;
}
Inject decorator and metadata.
@Annotation
@publicApi
export const Inject: InjectDecorator = attachInjectFlag(
  // Disable tslint because `DecoratorFlags` is a const enum which gets inlined.
  // tslint:disable-next-line: no-toplevel-property-access
  makeParamDecorator('Inject', (token: any) => ({ token })),
  DecoratorFlags.Inject);
Type of the Optional decorator / constructor function.
@publicApi
export interface OptionalDecorator {
  Parameter decorator to be used on constructor parameters, which marks the parameter as being an optional dependency.
  The DI framework provides `null` if the dependency is not found.
  Can be used together with other parameter decorators that modify how dependency injection operates.
}
@usageNotes
The following code allows the possibility of a `null` result:
<code-example path="core/di/ts/metadata_spec.ts" region="Optional">
@see ["Dependency Injection Guide"](guide/dependency-injection)
(): any;
new(): Optional;
Type of the Optional metadata.
@publicApi
export interface Optional {
}
Optional decorator and metadata.
@Annotation
@publicApi
export const Optional: OptionalDecorator =
  // Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.
  // tslint:disable-next-line: no-toplevel-property-access
  attachInjectFlag(makeParamDecorator('Optional'), InternalInjectFlags.Optional);
Type of the Self decorator / constructor function.
@publicApi
export interface SelfDecorator {
  Parameter decorator to be used on constructor parameters, which tells the DI framework to start dependency resolution from the local injector.
  Resolution works upward through the injector hierarchy, so the children of this class must configure their own providers or be prepared for a `null` result.
}
@usageNotes
In the following example, the dependency can be resolved by the local injector when instantiating the class itself, but not when instantiating a child.
<code-example path="core/di/ts/metadata_spec.ts" region="Self">
@see `SkipSelf`
@see `Optional`
(): any;
new(): Self;
Type of the Self metadata.
@publicApi
export interface Self {
}
Self decorator and metadata.
@Annotation
@publicApi
export const Self: SelfDecorator =
  // Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.
  // tslint:disable-next-line: no-toplevel-property-access
  attachInjectFlag(makeParamDecorator('Self'), InternalInjectFlags.Self);
Type of the `SkipSelf` decorator / constructor function.
@publicApi
export interface SkipSelfDecorator {
  Parameter decorator to be used on constructor parameters, which tells the DI framework to start dependency resolution from the parent injector.
  Resolution works upward through the injector hierarchy, so the local injector is not checked for a provider.
}
@usageNotes
In the following example, the dependency can be resolved when instantiating a child, but not when instantiating the class itself.
<code-example path="core/di/ts/metadata_spec.ts" region="SkipSelf">
@see [Dependency Injection guide](guide/dependency-injection-in-action#skip).
@see `Self`
@see `Optional`
(): any;
new(): SkipSelf;
Type of the `SkipSelf` metadata.
@publicApi
export interface SkipSelf {
}
`SkipSelf` decorator and metadata.
@Annotation
@publicApi
export const SkipSelf: SkipSelfDecorator =
  // Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.
  // tslint:disable-next-line: no-toplevel-property-access
  attachInjectFlag(makeParamDecorator('SkipSelf'), InternalInjectFlags.SkipSelf);
Type of the `Host` decorator / constructor function.
@publicApi
export interface HostDecorator {
  Parameter decorator on a view-provider parameter of a class constructor that tells the DI framework to resolve the view by checking injectors of child elements, and stop when reaching the host element of the current component.
}

```



```

resolveComponentResources(\n  resourceResolver: (url: string) => (Promise<string|{text(): Promise<string>>}>)):
Promise<void> {\n // Store all
  promises which are fetching the resources.\n  const componentResolved: Promise<void>[] = [];\n\n // Cache so that
we don't fetch the same resource more than once.\n  const urlMap = new Map<string, Promise<string>>();\n
function cachedResourceResolve(url: string): Promise<string> {\n  let promise = urlMap.get(url);\n  if (!promise)
{\n    const resp = resourceResolver(url);\n    urlMap.set(url, promise = resp.then(unwrapResponse));\n  }\n
return promise;\n }\n\n componentResourceResolutionQueue.forEach((component: Component, type: Type<any>))
=> {\n  const promises: Promise<void>[] = [];\n  if (component.templateUrl) {\n
promises.push(cachedResourceResolve(component.templateUrl).then((template) => {\n    component.template =
template;\n  }));\n  }\n  const styleUrls = component.styleUrls;\n  const styles = component.styles ||
(component.styles = []);\n  const styleOffset = component.styles.length;\n  styleUrls &&
styleUrls.forEach((styleUrl, index)
=> {\n    styles.push(""); // pre-allocate array.\n    promises.push(cachedResourceResolve(styleUrl).then((style)
=> {\n    styles[styleOffset + index] = style;\n    styleUrls.splice(styleUrls.indexOf(styleUrl), 1);\n    if
(styleUrls.length == 0) {\n      component.styleUrls = undefined;\n    }\n  }));\n  });\n  const fullyResolved
= Promise.all(promises).then(() => componentDefResolved(type));\n  componentResolved.push(fullyResolved);\n
});\n  clearResolutionOfComponentResourcesQueue();\n  return Promise.all(componentResolved).then(() =>
undefined);\n }\n\nlet componentResourceResolutionQueue = new Map<Type<any>, Component>();\n\n// Track
when existing cmp for a Type is waiting on resources.\nconst componentDefPendingResolution = new
Set<Type<any>>();\n\nexport function maybeQueueResolutionOfComponentResources(type: Type<any>,
metadata: Component) {\n  if (componentNeedsResolution(metadata)) {\n
componentResourceResolutionQueue.set(type, metadata);\n
  componentDefPendingResolution.add(type);\n  }\n}\n\nexport function isComponentDefPendingResolution(type:
Type<any>): boolean {\n  return componentDefPendingResolution.has(type);\n }\n\nexport function
componentNeedsResolution(component: Component): boolean {\n  return !!(\n    (component.templateUrl &&
!component.hasOwnProperty('template')) ||\n    component.styleUrls && component.styleUrls.length);\n }\n\nexport
function clearResolutionOfComponentResourcesQueue(): Map<Type<any>, Component> {\n  const old =
componentResourceResolutionQueue;\n  componentResourceResolutionQueue = new Map();\n  return
old;\n }\n\nexport function restoreComponentResolutionQueue(queue: Map<Type<any>, Component>): void {\n
componentDefPendingResolution.clear();\n  queue.forEach( (_, type) =>
componentDefPendingResolution.add(type));\n  componentResourceResolutionQueue = queue;\n }\n\nexport
function isComponentResourceResolutionQueueEmpty() {\n  return componentResourceResolutionQueue.size ===
0;\n }\n\nfunction unwrapResponse(response: string|{text(): Promise<string>>): string|Promise<string> {\n
return
typeof response == 'string' ? response : response.text();\n }\n\nfunction componentDefResolved(type: Type<any>):
void {\n  componentDefPendingResolution.delete(type);\n }\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {Type} from './interface/type';\nimport
{NgModuleType} from './metadata/ng_module_def';\nimport {getNgModuleDef} from
'./render3/definition';\nimport {stringify} from './util/stringify';\n\n/**\n * Map of module-id to the corresponding
NgModule.\n */\nconst modules = new Map<string, NgModuleType>();\n\n/**\n * Whether to check for duplicate
NgModule registrations.\n */\n * This can be disabled for testing.\n */\nlet checkForDuplicateNgModules =
true;\n\nfunction assertSameOrNotExisting(id:
string, type: Type<any>|null, incoming: Type<any>): void {\n  if (type && type !== incoming &&
checkForDuplicateNgModules) {\n    throw new Error(\n      `Duplicate module registered for ${id} -
${stringify(type)} vs ${stringify(type.name)}`);\n  }\n }\n\n/**\n * Adds the given NgModule type to Angular's
NgModule registry.\n */\n * This is generated as a side-effect of NgModule compilation. Note that the `id` is passed
in\n * explicitly and not read from the NgModule definition. This is for two reasons: it avoids a\n * megamorphic
read, and in JIT there's a chicken-and-egg problem where the NgModule may not be\n * fully resolved when it's

```







```

generates the `template` instruction with\n // the `null` as the tagName. The directive matching logic at runtime
relies\n // on this effect (see `isInlineTemplate`), thus using the `ng-template` as\n // a default value of the
`tNode.value` is not feasible at this moment.\n if (!tagName && nodeType === TNodeType.Container) {\n
tagName = 'ng-template';\n }\n\n const isHostStandalone = isHostComponentStandalone(IView);\n const
templateLocation = getTemplateLocationDetails(IView);\n\n let message = `Can't bind to '${propName}' since it
isn't
a known property of '${tagName}'${\n   templateLocation}.\n\n const schemas = ``${isHostStandalone ?
'@Component' : '@NgModule'}.schemas`;\n const importLocation = isHostStandalone ?\n   included in the
`@Component.imports` of this component':\n   a part of an @NgModule where this component is declared';\n
if (KNOWN_CONTROL_FLOW_DIRECTIVES.has(propName)) {\n   // Most likely this is a control flow
directive (such as `*ngIf`) used in\n   // a template, but the directive or the `CommonModule` is not imported.\n
const correspondingImport = KNOWN_CONTROL_FLOW_DIRECTIVES.get(propName);\n   message += `\n\nIf
the '${propName}' is an Angular control flow directive,` +\n   `please make sure that either the '${\n
correspondingImport}' directive or the 'CommonModule' is ${importLocation}.\n }` else {\n   // May be an
Angular component, which is not imported/declared?\n   message += `\n\n1. If '${tagName}' is an Angular
component and it has
the ` +\n   ` '${propName}' input, then verify that it is ${importLocation}.\n   // May be a Web Component?\n
if (tagName && tagName.indexOf('-') > -1) {\n   message += `\n\n2. If '${tagName}' is a Web Component then add
'CUSTOM_ELEMENTS_SCHEMA'` +\n   ` to the ${schemas} of this component to suppress this message.\n\n
message += `\n\n3. To allow any property add 'NO_ERRORS_SCHEMA' to ` +\n   ` the ${schemas} of this
component.`;\n   } else {\n   // If it's expected, the error can be suppressed by the `NO_ERRORS_SCHEMA`
schema.\n   message += `\n\n2. To allow any property add 'NO_ERRORS_SCHEMA' to ` +\n   ` the
${schemas} of this component.`;\n   }\n }\n\n reportUnknownPropertyError(message);\n\n\nexport function
reportUnknownPropertyError(message: string) {\n if (shouldThrowErrorOnUnknownProperty) {\n   throw new
RuntimeError(RuntimeErrorCode.UNKNOWN_BINDING, message);\n } else {\n
console.error(formatRuntimeError(RuntimeErrorCode.UNKNOWN_BINDING,
message));\n }\n}\n\n/**\n * WARNING: this is a **dev-mode only** function (thus should always be guarded by
the `ngDevMode`)\n * and must **not** be used in production bundles. The function makes megamorphic reads,
which might\n * be too slow for production mode and also it relies on the constructor function being available.\n
*\n * Gets a reference to the host component def (where a current component is declared).\n *\n * @param IView An
`LView` that represents a current component that is being rendered.\n */\nfunction
getDeclarationComponentDef(IView: LView): ComponentDef<unknown>|null {\n !ngDevMode &&
throwError('Must never be called in production mode');\n\n const declarationLView =
IView[DECLARATION_COMPONENT_VIEW] as LView<Type<unknown>>;\n const context =
declarationLView[CONTEXT];\n\n // Unable to obtain a context.\n if (!context) return null;\n\n return
context.constructor ? getComponentDef(context.constructor) : null;\n}\n\n/**\n * WARNING: this is a **dev-mode
only** function (thus should always be guarded by the `ngDevMode`)\n * and must **not** be used in production
bundles. The function makes megamorphic reads, which might\n * be too slow for production mode.\n *\n * Checks
if the current component is declared inside of a standalone component template.\n *\n * @param IView An `LView`
that represents a current component that is being rendered.\n */\nexport function
isHostComponentStandalone(IView: LView): boolean {\n !ngDevMode && throwError('Must never be called in
production mode');\n\n const componentDef = getDeclarationComponentDef(IView);\n // Treat host component as
non-standalone if we can't obtain the def.\n return !!componentDef?.standalone;\n}\n\n/**\n * WARNING: this is a
**dev-mode only** function (thus should always be guarded by the `ngDevMode`)\n * and must **not** be used in
production bundles. The function makes megamorphic reads, which might\n * be too slow for production mode.\n
*\n * Constructs a string describing
the location of the host component template. The function is used\n * in dev mode to produce error messages.\n
*\n * @param IView An `LView` that represents a current component that is being rendered.\n */\nexport function

```



create comment nodes which\n \* may contain such text and expect them to be safe.)\n \*\n \* This function escapes the comment text by looking for comment delimiters (`<` and `>`) and\n \* surrounding them with `>` where the `>` is a zero width space `>`. The result is that if a\n \* comment contains any of the comment start/end delimiters (such as `<!--`, `-->` or `--!>`) the\n \* text it will render normally but it will not cause the HTML parser to close/open the comment.\n \*\n \* @param value text to make safe for comment node by escaping the comment open/close character\n \* sequence.\n \*/\nexport function escapeCommentText(value: string): string {\n return value.replace(\n COMMENT\_DISALLOWED, (text) => text.replace(COMMENT\_DELIMITER, COMMENT\_DELIMITER\_ESCAPED));\n}\n\n",/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n

```

*\n\nimport {assertNumber} from './util/assert';\nimport {ID, LView} from './view';\n// Keeps track of the currently-active LViews.\nconst TRACKED_LVIEWS = new Map<number, LView>();\n\n// Used for generating unique IDs for LViews.\nlet uniqueIdCounter = 0;\n\n/** Gets a unique ID that can be assigned to an LView.
*\nexport function getUniqueLViewId(): number {\n return uniqueIdCounter++;}\n\n/** Starts tracking an LView.
*\nexport function registerLView(lview: LView): void {\n ngDevMode && assertNumber(lview[ID], 'LView must have an ID in order to be registered');\n TRACKED_LVIEWS.set(lview[ID], lview);\n}\n\n/** Gets an LView by its unique ID.
*\nexport function getLViewById(id: number): LView|null {\n ngDevMode && assertNumber(id, 'ID used for LView lookup must be a number');\n return TRACKED_LVIEWS.get(id) || null;\n}\n\n/** Stops tracking an LView.
*\nexport function unregisterLView(lview: LView): void {\n ngDevMode && assertNumber(lview[ID], 'Cannot

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stop tracking an LView that does not have an ID');\n TRACKED_LVIEWS.delete(lview[ID]);\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {getLViewById} from './lview_tracking';\nimport {RNode} from './renderer_dom';\nimport {LView} from './view';\n\n/**\n * The internal view context which is specific to a given DOM element, directive or\n * component instance. Each value in here (besides the LView and element node details)\n * can be present, null or undefined. If undefined then it implies the value has not been\n * looked up yet, otherwise, if null, then a lookup was executed and nothing was found.\n *\n * Each value will get filled when the respective value is examined within the\n * getContext\n * function. The component, element and each directive instance will share the same\n * instance\n * of the context.\n
```

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*\nexport class LContext {\n /**\n * The instance of the Component node.\n *\n public component: {}|null|undefined;\n\n /**\n * The list of active directives that exist on this element.\n *\n public directives: any[]|null|undefined;\n\n /**\n * The map of local references (local reference name => element or directive instance) that\n * exist on this element.\n *\n public localRefs: {[key: string]: any}|null|undefined;\n\n /**\n * Component's parent view data.\n *\n get lview(): LView|null {\n return getLViewById(this.lviewId);\n }\n\n constructor(\n /**\n * ID of the component's parent view data.\n *\n private lviewId: number,\n\n /**\n * The index instance of the node.\n *\n public nodeId: number,\n\n /**\n * The instance of the DOM node that is attached to the lnode.\n *\n public native: RNode) {\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this

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source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport './util/ng_dev_mode';\nimport {assertDefined, assertDomNode} from './util/assert';\nimport {EMPTY_ARRAY} from './util/empty';\nimport {assertLView} from './assert';\nimport {LContext} from './interfaces/context';\nimport {getLViewById, registerLView} from './interfaces/lview_tracking';\nimport {TNode, TNodeFlags} from './interfaces/node';\nimport {RElement, RNode} from './interfaces/renderer_dom';\nimport {isLView} from './interfaces/type_checks';\nimport {CONTEXT, HEADER_OFFSET, HOST, ID, LView, TVIEW} from './interfaces/view';\nimport {GetComponentLViewByIndex, unwrapRNode} from './util/view_utils';\n\n/**\n * Returns the matching `LContext` data for a given DOM node, directive or component instance.\n *\n * This function will examine the provided DOM element, component, or

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directive instance\n * monkey-patched property to derive the `LContext`
data. Once called then the monkey-patched\n * value will be that of the newly created `LContext`.\n *\n * If the
monkey-patched value is the `LView` instance then the context value for that\n * target will be created and the
monkey-patch reference will be updated. Therefore when this\n * function is called it may mutate the provided
element\ns, component\ns or any of the associated\n * directive\ns monkey-patch values.\n *\n * If the monkey-
patch value is not detected then the code will walk up the DOM until an element\n * is found which contains a
monkey-patch reference. When that occurs then the provided element\n * will be updated with a new context (which
is then returned). If the monkey-patch value is not\n * detected for a component/directive instance then it will throw
an error (all components and\n * directives should be automatically monkey-patched by ivy).\n *\n * @param target
Component, Directive or DOM Node.\n */\nexport function getLContext(target: any): LContext|null
{\n  let mpValue = readPatchedData(target);\n  if (mpValue) {\n    // only when it's an array is it considered an
LView instance\n    // ... otherwise it's an already constructed LContext instance\n    if (isLView(mpValue)) {\n
const IView: LView = mpValue!;\n    let nodeIndex: number;\n    let component: any = undefined;\n    let
directives: any[]|null|undefined = undefined;\n\n    if (isComponentInstance(target)) {\n      nodeIndex =
findViaComponent(IView, target);\n      if (nodeIndex == -1) {\n        throw new Error("The provided component
was not found in the application");\n      }\n      component = target;\n    } else if (isDirectiveInstance(target)) {\n
nodeIndex = findViaDirective(IView, target);\n      if (nodeIndex == -1) {\n        throw new Error("The provided
directive was not found in the application");\n      }\n      directives = getDirectivesAtNodeIndex(nodeIndex,
IView, false);\n    } else {\n      nodeIndex = findViaNativeElement(IView,
target as RElement);\n      if (nodeIndex == -1) {\n        return null;\n      }\n    }\n\n    // the goal is not to fill
the entire context full of data because the lookups\n    // are expensive. Instead, only the target data (the element,
component, container, ICU\n    // expression or directive details) are filled into the context. If called multiple
times\n    // with different target values then the missing target data will be filled in.\n    const native =
unwrapRNode(IView[nodeIndex]);\n    const existingCtx = readPatchedData(native);\n    const context: LContext
= (existingCtx && !Array.isArray(existingCtx)) ? existingCtx :\n      createLContext(IView, nodeIndex,
native);\n\n    // only when the component has been discovered then update the monkey-patch\n    if (component
&& context.component === undefined) {\n      context.component = component;\n      attachPatchData(context.component, context);\n    }\n\n    // only when the directives have been discovered then update the monkey-patch\n    if (directives &&
context.directives === undefined) {\n      context.directives = directives;\n      for (let i = 0; i < directives.length;
i++) {\n        attachPatchData(directives[i], context);\n      }\n    }\n\n    attachPatchData(context.native,
context);\n    mpValue = context;\n  }\n } else {\n   const rElement = target as RElement;\n   ngDevMode &&
assertDomNode(rElement);\n\n   // if the context is not found then we need to traverse upwards up the DOM\n   //
to find the nearest element that has already been monkey patched with data\n   let parent = rElement as any;\n   while (parent = parent.parentNode) {\n     const parentContext = readPatchedData(parent);\n     if (parentContext)
{\n       const IView = Array.isArray(parentContext) ? parentContext as LView : parentContext.IView;\n\n       // the
edge of the app was also reached here through another means\n       // (maybe because the DOM was changed manually).\n       if (!IView) {\n         return null;\n       }\n\n       const index = findViaNativeElement(IView, rElement);\n       if (index >= 0) {\n         const native =
unwrapRNode(IView[index]);\n         const context = createLContext(IView, index, native);\n         attachPatchData(native, context);\n         mpValue = context;\n         break;\n       }\n     }\n\n     }\n\n     return
(mpValue as LContext) || null;\n  }\n}\n\n/**\n * Creates an empty instance of a `LContext` context\n */\nfunction
createLContext(IView: LView, nodeIndex: number, native: RNode): LContext {\n  return new LContext(IView[ID],
nodeIndex, native);\n}\n\n/**\n * Takes a component instance and returns the view for that component.\n */\n *
@param componentInstance\n * @returns The component's view\n */\nexport function
getComponentViewByInstance(componentInstance: {}): LView {\n  let patchedData =
readPatchedData(componentInstance);\n  let IView:

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LView;\n\n if (isLView(patchedData)) {\n  const contextLView: LView = patchedData;\n  const nodeIndex =
findViaComponent(contextLView, componentInstance);\n  IView = getComponentLViewByIndex(nodeIndex,
contextLView);\n  const context = createLContext(contextLView, nodeIndex, IView[HOST] as RElement);\n
context.component = componentInstance;\n  attachPatchData(componentInstance, context);\n
attachPatchData(context.native, context);\n } else {\n  const context = patchedData as unknown as LContext;\n
const contextLView = context.IView!;\n  ngDevMode && assertLView(contextLView);\n  IView =
getComponentLViewByIndex(context.nodeIndex, contextLView);\n } \n return IView;\n}\n\n/**\n * This property
will be monkey-patched on elements, components and directives.\n */\nconst MONKEY_PATCH_KEY_NAME =
'__ngContext__';\n\n/**\n * Assigns the given data to the given target (which could be a component,\n * directive or
DOM node instance) using monkey-patching.\n */\nexport
function attachPatchData(target: any, data: LView|LContext) {\n  ngDevMode && assertDefined(target, "Target
expected");\n  // Only attach the ID of the view in order to avoid memory leaks (see #41047). We only do this\n //
for `LView`, because we have control over when an `LView` is created and destroyed, whereas\n // we can't know
when to remove an `LContext`.\n  if (isLView(data)) {\n    target[MONKEY_PATCH_KEY_NAME] = data[ID];\n
registerLView(data);\n  } else {\n    target[MONKEY_PATCH_KEY_NAME] = data;\n  }\n}\n\n/**\n * Returns the
monkey-patch value data present on the target (which could be\n * a component, directive or a DOM node).\n
*/\nexport function readPatchedData(target: any): LView|LContext|null {\n  ngDevMode && assertDefined(target,
"Target expected");\n  const data = target[MONKEY_PATCH_KEY_NAME];\n  return (typeof data === 'number') ?
getLViewById(data) : data || null;\n}\n\nexport function readPatchedLView<T>(target: any): LView<T>|null {\n
const value = readPatchedData(target);\n
if (value) {\n  return (isLView(value) ? value : value.IView) as LView<T>;\n } \n return null;\n}\n\nexport
function isComponentInstance(instance: any): boolean {\n  return instance && instance.constructor &&
instance.constructor.cmp;\n}\n\nexport function isDirectiveInstance(instance: any): boolean {\n  return instance &&
instance.constructor && instance.constructor.dir;\n}\n\n/**\n * Locates the element within the given LView and
returns the matching index\n */\nfunction findViaNativeElement(IView: LView, target: RElement): number {\n
const tView = IView[TVIEW];\n  for (let i = HEADER_OFFSET; i < tView.bindingStartIndex; i++) {\n    if
(unwrapRNode(IView[i]) === target) {\n      return i;\n    } \n  }\n  return -1;\n}\n\n/**\n * Locates the next tNode
(child, sibling or parent).\n */\nfunction traverseNextElement(tNode: TNode): TNode|null {\n  if (tNode.child) {\n
return tNode.child;\n } else if (tNode.next) {\n  return tNode.next;\n } else {\n
// Let's take the following template: <div><span>text</span></div><component/>\n // After checking the text
node, we need to find the next parent that has a "next" TNode,\n // in this case the parent `div`, so that we can
find the component.\n  while (tNode.parent && !tNode.parent.next) {\n    tNode = tNode.parent;\n  }\n  return
tNode.parent && tNode.parent.next;\n } \n}\n\n/**\n * Locates the component within the given LView and returns
the matching index\n */\nfunction findViaComponent(IView: LView, componentInstance: {}): number {\n  const
componentIndices = IView[TVIEW].components;\n  if (componentIndices) {\n    for (let i = 0; i <
componentIndices.length; i++) {\n      const elementComponentIndex = componentIndices[i];\n      const
componentView = getComponentLViewByIndex(elementComponentIndex, IView);\n      if
(componentView[CONTEXT] === componentInstance) {\n        return elementComponentIndex;\n      } \n } \n
} else {\n  const rootComponentView = getComponentLViewByIndex(HEADER_OFFSET,
IView);\n  const rootComponent = rootComponentView[CONTEXT];\n  if (rootComponent ===
componentInstance) {\n    // we are dealing with the root element here therefore we know that the\n // element is
the very first element after the HEADER data in the IView\n    return HEADER_OFFSET;\n  } \n } \n return -
1;\n}\n\n/**\n * Locates the directive within the given LView and returns the matching index\n */\nfunction
findViaDirective(IView: LView, directiveInstance: {}): number {\n  // if a directive is monkey patched then it will
(by default)\n // have a reference to the LView of the current view. The\n // element bound to the directive being
search lives somewhere\n // in the view data. We loop through the nodes and check their\n // list of directives for
the instance.\n  let tNode = IView[TVIEW].firstChild;\n  while (tNode) {\n    const directiveIndexStart =
tNode.directiveStart;\n    const directiveIndexEnd = tNode.directiveEnd;\n

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    for (let i = directiveIndexStart; i < directiveIndexEnd; i++) {\n      if (IView[i] === directiveInstance) {\n
return tNode.index;\n      }\n    }\n    tNode = traverseNextElement(tNode);\n  }\n  return -1;\n}\n\n/**\n * Returns a
list of directives extracted from the given view based on the\n * provided list of directive index values.\n *\n *
@param nodeIndex The node index\n * @param IView The target view data\n * @param includeComponents
Whether or not to include components in returned directives\n */\nexport function getDirectivesAtNodeIndex(\n
nodeIndex: number, IView: LView, includeComponents: boolean): any[]|null {\n  const tNode =
IView[TVIEW].data[nodeIndex] as TNode;\n  let directiveStartIndex = tNode.directiveStart;\n  if
(directiveStartIndex == 0) return EMPTY_ARRAY;\n  const directiveEndIndex = tNode.directiveEnd;\n  if
(!includeComponents && tNode.flags & TNodeFlags.isComponentHost) directiveStartIndex++;\n  return
IView.slice(directiveStartIndex, directiveEndIndex);\n}\n\nexport
function getComponentAtNodeIndex(nodeIndex: number, IView: LView): {}|null {\n  const tNode =
IView[TVIEW].data[nodeIndex] as TNode;\n  let directiveStartIndex = tNode.directiveStart;\n  return
tNode.flags & TNodeFlags.isComponentHost ? IView[directiveStartIndex] : null;\n}\n\n/**\n * Returns a map of local references
(local reference name => element or directive instance) that\n * exist on a given element.\n */\nexport function
discoverLocalRefs(IView: LView, nodeIndex: number): {[key: string]: any}|null {\n  const tNode =
IView[TVIEW].data[nodeIndex] as TNode;\n  if (tNode && tNode.localNames) {\n    const result: {[key: string]:
any} = {};\n    let localIndex = tNode.index + 1;\n    for (let i = 0; i < tNode.localNames.length; i += 2) {\n
result[tNode.localNames[i]] = IView[localIndex];\n    localIndex++;\n    }\n    return result;\n  }\n  return
null;\n}\n\n", /*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n/**\n * @fileoverview\n *\n * This file provides mechanism by which code relevant to the
`TicuContainerNode` is only loaded if\n * ICU is present in the template.\n */\n\nimport {TicuContainerNode}
from './interfaces/node';\nimport {RNode} from './interfaces/renderer_dom';\nimport {LView} from
'./interfaces/view';\n\nlet _icuContainerIterate: (tIcuContainerNode: TicuContainerNode, IView: LView) =>\n
() => RNode | null);\n\n/**\n * Iterator which provides ability to visit all of the `TicuContainerNode` root
`RNode`s.\n */\nexport function icuContainerIterate(tIcuContainerNode: TicuContainerNode, IView: LView): ()
=>\n  RNode | null {\n  return _icuContainerIterate(tIcuContainerNode, IView);\n}\n\n/**\n * Ensures that
`IcuContainerVisitor`'s implementation is present.\n *\n * This function is invoked when i18n instruction comes
across an ICU. The purpose is to allow
the\n * bundler to tree shake ICU logic and only load it if ICU instruction is executed.\n */\nexport function
ensureIcuContainerVisitorLoaded(\n  loader: () => ((tIcuContainerNode: TicuContainerNode, IView: LView) =>
() => RNode | null))) {\n  if (_icuContainerIterate === undefined) {\n    // Do not inline this function. We want to
keep `ensureIcuContainerVisitorLoaded` light, so it\n    // can be inlined into call-site.\n    _icuContainerIterate =
loader();\n  }\n}\n\n", /*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n/**\n * Expresses a single CSS Selector.\n *\n * Beginning of array\n * - First index: element name\n * -
Subsequent odd indices: attr keys\n * - Subsequent even indices: attr values\n *\n * After SelectorFlags.CLASS
flag\n * - Class name values\n *\n * SelectorFlags.NOT flag\n * - Changes the mode to
NOT\n * - Can be combined with other flags to set the element / attr / class mode\n *\n * e.g. SelectorFlags.NOT |
SelectorFlags.ELEMENT\n *\n * Example:\n * Original: `div.foo.bar[attr1=val1][attr2]`\n * Parsed: ['div', 'attr1',
'val1', 'attr2', ", SelectorFlags.CLASS, 'foo', 'bar']\n *\n * Original: 'div[attr1]:not(.foo[attr2])`\n * Parsed: [\n * 'div',
'attr1', ",\n * SelectorFlags.NOT | SelectorFlags.ATTRIBUTE 'attr2', ", SelectorFlags.CLASS, 'foo'\n * ]\n *\n * See
more examples in node_selector_matcher_spec.ts\n */\nexport type CssSelector = (string|SelectorFlags)[];\n\n/**\n * A list of
CssSelectors.\n *\n * A directive or component can have multiple selectors. This type is used for\n *
directive defs so any of the selectors in the list will match that directive.\n *\n * Original: 'form, [ngForm]`\n *
Parsed: [['form'], [' ', 'ngForm', '']]\n */\nexport type CssSelectorList = CssSelector[];\n\n/**\n * List of slots for a
projection. A slot can be either based on a parsed CSS

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selector\n * which will be used to determine nodes which are projected into that slot.\n *\n * When set to \"*\", the
slot is reserved and can be used for multi-slot projection\n * using { @link ViewContainerRef#createComponent }.
The last slot that specifies the\n * wildcard selector will retrieve all projectable nodes which do not match any
selector.\n */\nexport type ProjectionSlots = (CssSelectorList|*)[];\n\n/** Flags used to build up CssSelectors
*\nexport const enum SelectorFlags {\n /** Indicates this is the beginning of a new negative selector *\n NOT =
0b0001,\n\n /** Mode for matching attributes *\n ATTRIBUTE = 0b0010,\n\n /** Mode for matching tag names
*\n ELEMENT = 0b0100,\n\n /** Mode for matching class names *\n CLASS = 0b1000,\n}\n\n// Note: This
hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const
unusedValueExportToPlacateAjd = 1;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { RendererStyleFlags2, RendererType2 } from './render/api_flags';\nimport
{ TrustedHTML, TrustedScript, TrustedScriptURL } from './util/security/trusted_type_defs';\nimport
{ RComment, RElement, RNode, RText } from './renderer_dom';\n\n/**\n * The goal here is to make sure that the
browser DOM API is the Renderer.\n * We do this by defining a subset of DOM API to be the renderer and then\n *
use that at runtime for rendering.\n *\n * At runtime we can then use the DOM api directly, in server or web-
worker\n * it will be easy to implement such API.\n */\nexport type GlobalTargetName =
'document'|'window'|'body';\nexport type GlobalTargetResolver = (element: any) => EventTarget;\n\n/**\n *
Procedural style of API needed to create elements and text nodes.\n *\n * In non-native browser environments (e.g.
platforms such as web-workers),
this is the\n * facade that enables element manipulation. In practice, this is implemented by `Renderer2`.\n
*\nexport interface Renderer {\n destroy(): void;\n createComment(value: string): RComment;\n
createElement(name: string, namespace?: string|null): RElement;\n createText(value: string): RText;\n /**\n *
This property is allowed to be null / undefined,\n * in which case the view engine won't call it.\n * This is used as
a performance optimization for production mode.\n */\n destroyNode?: ((node: RNode) => void)|null;\n
appendChild(parent: RElement, newChild: RNode): void;\n insertBefore(parent: RNode, newChild: RNode,
refChild: RNode|null, isMove?: boolean): void;\n removeChild(parent: RElement, oldChild: RNode,
isHostElement?: boolean): void;\n selectRootElement(selectorOrNode: string|any, preserveContent?: boolean):
RElement;\n\n parentNode(node: RNode): RElement|null;\n nextSibling(node: RNode): RNode|null;\n\n
setAttribute(\n el: RElement, name:
string, value: string|TrustedHTML|TrustedScript|TrustedScriptURL,\n namespace?: string|null): void;\n
removeAttribute(el: RElement, name: string, namespace?: string|null): void;\n addClass(el: RElement, name:
string): void;\n removeClass(el: RElement, name: string): void;\n setStyle(el: RElement, style: string, value: any,
flags?: RendererStyleFlags2): void;\n removeStyle(el: RElement, style: string, flags?: RendererStyleFlags2):
void;\n setProperty(el: RElement, name: string, value: any): void;\n setValue(node: RText|RComment, value:
string): void;\n\n // TODO(misko): Deprecate in favor of addEventListener/removeEventListener\n listen(\n
target: GlobalTargetName|RNode, eventName: string,\n callback: (event: any) => boolean | void): () =>
void;\n}\n\nexport interface RendererFactory {\n createRenderer(hostElement: RElement|null, rendererType:
RendererType2|null): Renderer;\n begin?(): void;\n end?(): void;\n}\n\n// Note: This hack is necessary so we
don't
erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd =
1;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { assertDefined } from './util/assert';\nimport { assertLView } from './assert';\nimport { readPatchedLView } from
'./context_discovery';\nimport { LContainer } from './interfaces/container';\nimport { isLContainer, isLView } from
'./interfaces/type_checks';\nimport { CHILD_HEAD, CONTEXT, FLAGS, LView, LViewFlags, NEXT, PARENT } from
'./interfaces/view';\n\n/**\n * Gets the parent LView of the passed LView, if the PARENT is an LContainer,
will get the parent of\n * that LContainer, which is an LView\n * @param IView the IView whose parent to get\n
*\nexport function getLViewParent(IView: LView): LView|null {\n ngDevMode && assertLView(IView);\n

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const
  parent = IView[PARENT];\n return isLContainer(parent) ? parent[PARENT]! : parent;\n}\n\n/**\n * Retrieve the
  root view from any component or `LView` by walking the parent `LView` until\n * reaching the root `LView`.\n *\n
  * @param componentOrLView any component or `LView`\n */\nexport function
  getRootView<T>(componentOrLView: LView|{}): LView<T> {\n  ngDevMode &&
  assertDefined(componentOrLView, 'component');\n  let IView = isLView(componentOrLView) ?
  componentOrLView : readPatchedLView(componentOrLView)!;\n  while (IView && !(IView[FLAGS] &
  LViewFlags.IsRoot)) {\n    IView = getLViewParent(IView)!;\n  }\n  ngDevMode && assertLView(IView);\n  return IView as LView<T>;\n}\n\n/**\n * Returns the context information associated with the application where the
  target is situated. It\n * does this by walking the parent views until it gets to the root view, then getting the context\n
  * off of that.\n */\n * @param viewOrComponent the `LView` or component to get the root context for.\n */\nexport
  function getRootContext<T>(viewOrComponent: LView<T>|{}): T {\n  const rootView =
  getRootView(viewOrComponent);\n  ngDevMode &&\n    assertDefined(rootView[CONTEXT], 'Root view has
  no context. Perhaps it is disconnected?');\n  return rootView[CONTEXT] as T;\n}\n\n/**\n * Gets the first
  `LContainer` in the LView or `null` if none exists.\n */\nexport function getFirstLContainer(IView: LView):
  LContainer|null {\n  return getNearestLContainer(IView[CHILD_HEAD]);\n}\n\n/**\n * Gets the next `LContainer`
  that is a sibling of the given container.\n */\nexport function getNextLContainer(container: LContainer):
  LContainer|null {\n  return getNearestLContainer(container[NEXT]);\n}\n\nfunction
  getNearestLContainer(viewOrContainer: LContainer|LView|null) {\n  while (viewOrContainer !== null &&
  !isLContainer(viewOrContainer)) {\n    viewOrContainer = viewOrContainer[NEXT];\n  }\n  return
  viewOrContainer as LContainer | null;\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
  *\n  * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n */\nimport {ViewEncapsulation} from './metadata/view';\nimport
  {RendererStyleFlags2} from './render/api_flags';\nimport {addToArray, removeFromArray} from
  './util/array_utils';\nimport {assertDefined, assertEquals, assertFunction, assertString} from './util/assert';\nimport
  {escapeCommentText} from './util/dom';\nimport {assertLContainer, assertLView, assertParentView,
  assertProjectionSlots, assertTNodeForLView} from './assert';\nimport {attachPatchData} from
  './context_discovery';\nimport {IcuContainerIterate} from './i18n/i18n_tree_shaking';\nimport
  {CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS, NATIVE,
  unusedValueExportToPlacateAjd as unused1} from './interfaces/container';\nimport {ComponentDef} from
  './interfaces/definition';\nimport {NodeInjectorFactory} from './interfaces/injector';\nimport {unregisterLView}
  from './interfaces/lview_tracking';\nimport {TElementNode, TIcuContainerNode, TNode, TNodeFlags,
  TNodeType, TProjectionNode, unusedValueExportToPlacateAjd as unused2} from './interfaces/node';\nimport
  {unusedValueExportToPlacateAjd as unused3} from './interfaces/projection';\nimport {Renderer,
  unusedValueExportToPlacateAjd as unused4} from './interfaces/renderer';\nimport {RComment, RElement, RNode,
  RTemplate, RText} from './interfaces/renderer_dom';\nimport {isLContainer, isLView} from
  './interfaces/type_checks';\nimport {CHILD_HEAD, CLEANUP, DECLARATION_COMPONENT_VIEW,
  DECLARATION_LCONTAINER, DestroyHookData, FLAGS, HookData, HookFn, HOST, LView, LViewFlags,
  NEXT, PARENT, QUERIES, RENDERER, T_HOST, TVIEW, TView, TViewType,
  unusedValueExportToPlacateAjd as unused5} from './interfaces/view';\nimport {assertTNodeType} from
  './node_assert';\nimport {profiler, ProfilerEvent} from './profiler';\nimport {getLViewParent} from
  './util/view_traversal_utils';\nimport {getNativeByTNode,
  unwrapRNode, updateTransplantedViewCount} from './util/view_utils';\n\n\nconst unusedValueToPlacateAjd =
  unused1 + unused2 + unused3 + unused4 + unused5;\n\nconst enum WalkTNodeTreeAction {\n  /** node create in
  the native environment. Run on initial creation. *\n  Create = 0,\n\n  /**\n   * node insert in the native
  environment.\n   * Run when existing node has been detached and needs to be re-attached.\n   *\n  Insert = 1,\n\n
  /** node detach from the native environment *\n  Detach = 2,\n\n  /** node destruction using the renderer's API
  *\n  Destroy = 3,\n}\n\n\n\n/**\n * NOTE: for performance reasons, the possible actions are inlined within the

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function instead of\n * being passed as an argument.\n *\nfunction applyToElementOrContainer(\n  action:
WalkTreeNodeTreeAction, renderer: Renderer, parent: RElement|null,\n  INodeToHandle: RNode|LContainer|LView,
beforeNode?: RNode|null) {\n // If this slot was allocated for a text node dynamically created by i18n, the text node
itself\n
  // won't be created until i18nApply() in the update block, so this node should be skipped.\n // For more info, see
'\nICU expressions should work inside an ngTemplateOutlet inside an ngFor'\n // in `i18n_spec.ts`.\n if
(INodeToHandle != null) {\n let lContainer: LContainer|undefined;\n let isComponent = false;\n // We are
expecting an RNode, but in the case of a component or LContainer the `RNode` is\n // wrapped in an array which
needs to be unwrapped. We need to know if it is a component and if\n // it has LContainer so that we can process
all of those cases appropriately.\n if (isLContainer(INodeToHandle)) {\n lContainer = INodeToHandle;\n }
else if (isLView(INodeToHandle)) {\n isComponent = true;\n ngDevMode &&
assertDefined(INodeToHandle[HOST], 'HOST must be defined for a component LView');\n INodeToHandle =
INodeToHandle[HOST]!;\n }\n const rNode: RNode = unwrapRNode(INodeToHandle);\n\n if (action ===
WalkTreeNodeTreeAction.Create
&& parent !== null) {\n if (beforeNode == null) {\n nativeAppendChild(renderer, parent, rNode);\n }
else {\n nativeInsertBefore(renderer, parent, rNode, beforeNode || null, true);\n }\n } else if (action ===
WalkTreeNodeTreeAction.Insert && parent !== null) {\n nativeInsertBefore(renderer, parent, rNode, beforeNode ||
null, true);\n } else if (action === WalkTreeNodeTreeAction.Detach) {\n nativeRemoveNode(renderer, rNode,
isComponent);\n } else if (action === WalkTreeNodeTreeAction.Destroy) {\n ngDevMode &&
ngDevMode.rendererDestroyNode++;\n renderer.destroyNode!(rNode);\n }\n if (lContainer != null) {\n
applyContainer(renderer, action, lContainer, parent, beforeNode);\n }\n }\n}\n\nexport function
createTextNode(renderer: Renderer, value: string): RText {\n ngDevMode &&
ngDevMode.rendererCreateTextNode++;\n ngDevMode && ngDevMode.rendererSetText++;\n return
renderer.createText(value);\n}\n\nexport function updateTextNode(renderer:
Renderer, rNode: RText, value: string): void {\n ngDevMode && ngDevMode.rendererSetText++;\n
renderer.setValue(rNode, value);\n}\n\nexport function createCommentNode(renderer: Renderer, value: string):
RComment {\n ngDevMode && ngDevMode.rendererCreateComment++;\n return
renderer.createComment(escapeCommentText(value));\n}\n\n/**\n * Creates a native element from a tag name,
using a renderer.\n * @param renderer A renderer to use\n * @param name the tag name\n * @param namespace
Optional namespace for element.\n * @returns the element created\n *\nexport function createElementNode(\n
renderer: Renderer, name: string, namespace: string|null): RElement {\n ngDevMode &&
ngDevMode.rendererCreateElement++;\n return renderer.createElement(name, namespace);\n}\n\n/**\n *
Removes all DOM elements associated with a view.\n * @param tView The `TView` of the `LView` from which elements
should be added or removed\n * @param lView The view from which elements should be added or removed\n
*\nexport function removeViewFromContainer(tView: TView, lView: LView): void {\n const renderer =
lView[RENDERER];\n applyView(tView, lView, renderer, WalkTreeNodeTreeAction.Detach, null, null);\n
lView[HOST] = null;\n lView[T_HOST] = null;\n}\n\n/**\n * Adds all DOM elements associated with a view.\n
*\n * @param tView The `TView` of the `LView` from which elements should be added or removed\n * @param parentTNode The `TNode` where the `LView`
should be attached to.\n * @param renderer Current renderer to use for DOM manipulations.\n * @param lView
The view from which elements should be added or
removed\n * @param parentNativeNode The parent `RElement` where it should be inserted into.\n * @param
beforeNode The node before which elements should be added, if insert mode\n *\nexport function
addViewToContainer(\n  tView: TView, parentTNode: TNode, renderer: Renderer, lView: LView,
parentNativeNode: RElement,\n  beforeNode: RNode|null): void {\n lView[HOST] = parentNativeNode;\n

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IView[T_HOST] = parentTNode;\n applyView(tView, IView, renderer, WalkTNodeTreeAction.Insert,
parentNativeNode, beforeNode);\n}\n\n\n/**\n * Detach a `LView` from the DOM by detaching its nodes.\n *\n * @param tView The `TView` of the `LView` to be detached\n * @param IView the `LView` to be detached.\n */\n\nexport function renderDetachView(tView: TView, IView: LView) {\n applyView(tView, IView,
IView[RENDERER], WalkTNodeTreeAction.Detach, null, null);\n}\n\n\n/**\n * Traverses down and up the tree of
views and containers to remove listeners and\n * call onDestroy callbacks.\n *\n * Notes:\n * - Because
it's used for onDestroy calls, it needs to be bottom-up.\n * - Must process containers instead of their views to avoid
splicing\n * when views are destroyed and re-added.\n * - Using a while loop because it's faster than recursion\n *
- Destroy only called on movement to sibling or movement to parent (laterally or up)\n *\n * @param rootView
The view to destroy\n */\n\nexport function destroyViewTree(rootView: LView): void {\n // If the view has no
children, we can clean it up and return early.\n let IViewOrLContainer = rootView[CHILD_HEAD];\n if
(!IViewOrLContainer) {\n return cleanUpView(rootView[TVIEW], rootView);\n }\n\n while
(IViewOrLContainer) {\n let next: LView|LContainer|null = null;\n\n if (isLView(IViewOrLContainer)) {\n //
If LView, traverse down to child.\n next = IViewOrLContainer[CHILD_HEAD];\n } else {\n ngDevMode
&& assertLContainer(IViewOrLContainer);\n // If container, traverse down to its first LView.\n const
firstView:
LView|undefined = IViewOrLContainer[CONTAINER_HEADER_OFFSET];\n if (firstView) next =
firstView;\n }\n\n if (!next) {\n // Only clean up view when moving to the side or up, as destroy hooks\n //
should be called in order from the bottom up.\n while (IViewOrLContainer && !IViewOrLContainer![NEXT]
&& IViewOrLContainer !== rootView) {\n if (isLView(IViewOrLContainer)) {\n
cleanUpView(IViewOrLContainer[TVIEW], IViewOrLContainer);\n }\n IViewOrLContainer =
IViewOrLContainer[PARENT];\n }\n if (IViewOrLContainer === null) IViewOrLContainer = rootView;\n
if (isLView(IViewOrLContainer)) {\n cleanUpView(IViewOrLContainer[TVIEW], IViewOrLContainer);\n
}\n next = IViewOrLContainer && IViewOrLContainer![NEXT];\n }\n IViewOrLContainer = next;\n
}\n}\n\n\n/**\n * Inserts a view into a container.\n *\n * This adds the view to the container's array of active views in
the correct\n * position. It also adds
the view's elements to the DOM if the container isn't a\n * root node of another view (in that case, the view's
elements will be added when\n * the container's parent view is added later).\n *\n * @param tView The `TView` of
the `LView` to insert\n * @param IView The view to insert\n * @param IContainer The container into which the
view should be inserted\n * @param index Which index in the container to insert the child view into\n */\n\nexport
function insertView(tView: TView, IView: LView, IContainer: LContainer, index: number) {\n ngDevMode &&
assertLView(IView);\n ngDevMode && assertLContainer(IContainer);\n const indexInContainer =
CONTAINER_HEADER_OFFSET + index;\n const containerLength = IContainer.length;\n\n if (index > 0) {\n
// This is a new view, we need to add it to the children.\n IContainer[indexInContainer - 1][NEXT] = IView;\n }\n
if (index < containerLength - CONTAINER_HEADER_OFFSET) {\n IView[NEXT] =
IContainer[indexInContainer];\n addToArray(IContainer,
CONTAINER_HEADER_OFFSET + index, IView);\n } else {\n IContainer.push(IView);\n IView[NEXT] =
null;\n }\n\n IView[PARENT] = IContainer;\n\n // track views where declaration and insertion points are
different\n const declarationLContainer = IView[DECLARATION_LCONTAINER];\n if (declarationLContainer
!== null && IContainer !== declarationLContainer) {\n trackMovedView(declarationLContainer, IView);\n }\n\n
// notify query that a new view has been added\n const IQueries = IView[QUERIES];\n if (IQueries !== null) {\n
IQueries.insertView(tView);\n }\n\n // Sets the attached flag\n IView[FLAGS] |=
LViewFlags.Attached;\n}\n\n\n/**\n * Track views created from the declaration container (TemplateRef) and inserted
into a\n * different LContainer.\n */\n\nfunction trackMovedView(declarationContainer: LContainer, IView: LView)
{\n ngDevMode && assertDefined(IView, 'LView required');\n ngDevMode &&
assertLContainer(declarationContainer);\n const movedViews = declarationContainer[MOVED_VIEWS];\n
const insertedLContainer = IView[PARENT] as LContainer;\n ngDevMode &&
assertLContainer(insertedLContainer);\n const insertedComponentLView =

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insertedLContainer[PARENT]![DECLARATION_COMPONENT_VIEW];\n ngDevMode &&
assertDefined(insertedComponentLView, 'Missing insertedComponentLView');\n const declaredComponentLView
= IView[DECLARATION_COMPONENT_VIEW];\n ngDevMode && assertDefined(declaredComponentLView,
'Missing declaredComponentLView');\n if (declaredComponentLView !== insertedComponentLView) {\n // At
this point the declaration-component is not same as insertion-component; this means that\n // this is a transplanted
view. Mark the declared IView as having transplanted views so that\n // those views can participate in CD.\n
declarationContainer[HAS_TRANSPLANTED_VIEWS] = true;\n }\n if (movedViews === null) {\n
declarationContainer[MOVED_VIEWS] = [IView];\n } else {\n movedViews.push(IView);\n }\n}\n\nfunction
detachMovedView(declarationContainer:
LContainer, IView: LView) {\n ngDevMode && assertLContainer(declarationContainer);\n ngDevMode &&\n
assertDefined(\n declarationContainer[MOVED_VIEWS],\n 'A projected view should belong to a non-
empty projected views collection');\n const movedViews = declarationContainer[MOVED_VIEWS]!;\n const
declarationViewIndex = movedViews.indexOf(IView);\n const insertionLContainer = IView[PARENT] as
LContainer;\n ngDevMode && assertLContainer(insertionLContainer);\n\n // If the view was marked for refresh
but then detached before it was checked (where the flag\n // would be cleared and the counter decremented), we
need to decrement the view counter here\n // instead.\n if (IView[FLAGS] &
LViewFlags.RefreshTransplantedView) {\n IView[FLAGS] &= ~LViewFlags.RefreshTransplantedView;\n
updateTransplantedViewCount(insertionLContainer, -1);\n }\n\n movedViews.splice(declarationViewIndex,
1);\n}\n\n/**\n * Detaches a view from a container.\n *\n * This method removes the view from the container's array of active views. It also\n * removes the view's elements
from the DOM.\n *\n * @param lContainer The container from which to detach a view\n * @param removeIndex
The index of the view to detach\n * @returns Detached LView instance.\n */\n\nexport function
detachView(lContainer: LContainer, removeIndex: number): LView|undefined {\n if (lContainer.length <=
CONTAINER_HEADER_OFFSET) return;\n\n const indexInContainer = CONTAINER_HEADER_OFFSET +
removeIndex;\n const viewToDetach = lContainer[indexInContainer];\n\n if (viewToDetach) {\n const
declarationLContainer = viewToDetach[DECLARATION_LCONTAINER];\n if (declarationLContainer !== null
&& declarationLContainer !== lContainer) {\n detachMovedView(declarationLContainer, viewToDetach);\n
}\n\n if (removeIndex > 0) {\n lContainer[indexInContainer - 1][NEXT] = viewToDetach[NEXT] as
LView;\n }\n const removedLView = removeFromArray(lContainer, CONTAINER_HEADER_OFFSET
+ removeIndex);\n removeViewFromContainer(viewToDetach[TVIEW], viewToDetach);\n // notify query
that a view has been removed\n const lQueries = removedLView[QUERIES];\n if (lQueries !== null) {\n
lQueries.detachView(removedLView[TVIEW]);\n }\n\n viewToDetach[PARENT] = null;\n
viewToDetach[NEXT] = null;\n // Unsets the attached flag\n viewToDetach[FLAGS] &=
~LViewFlags.Attached;\n }\n\n return viewToDetach;\n}\n\n/**\n * A standalone function which destroys an
LView,\n * conducting clean up (e.g. removing listeners, calling onDestroys).\n *\n * @param tView The `TView`
of the `LView` to be destroyed\n * @param lView The LView to be destroyed.\n */\n\nexport function
destroyLView(tView: TView, lView: LView) {\n if (!(lView[FLAGS] & LViewFlags.Destroyed)) {\n const
renderer = lView[RENDERER];\n if (renderer.destroyNode) {\n applyView(tView, lView, renderer,
WalkTreeNodeTreeAction.Destroy, null, null);\n }\n\n destroyViewTree(lView);\n
}\n}\n\n/**\n * Calls onDestroys hooks for all directives and pipes in a given view and then removes all\n *
listeners. Listeners are removed as the last step so events delivered in the onDestroys hooks\n * can be propagated to
@Output listeners.\n *\n * @param tView `TView` for the `LView` to clean up.\n * @param lView The LView to
clean up\n */\n\nfunction cleanUpView(tView: TView, lView: LView): void {\n if (!(lView[FLAGS] &
LViewFlags.Destroyed)) {\n // Usually the Attached flag is removed when the view is detached from its parent,
however\n // if it's a root view, the flag won't be unset hence why we're also removing on destroy.\n
lView[FLAGS] &= ~LViewFlags.Attached;\n\n // Mark the LView as destroyed *before* executing the
onDestroy hooks. An onDestroy hook\n // runs arbitrary user code, which could include its own
`viewRef.destroy()` (or similar). If\n // We don't flag the view as destroyed before the hooks, this could lead to an

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infinite loop.\n // This
also aligns with the ViewEngine behavior. It also means that the onDestroy hook is\n // really more of an
"afterDestroy" hook if you think about it.\n IView[FLAGS] |= LViewFlags.Destroyed;\n
executeOnDestroys(tView, IView);\n processCleanups(tView, IView);\n // For component views only, the local
renderer is destroyed at clean up time.\n if (IView[VIEW].type === TViewType.Component) {\n
ngDevMode && ngDevMode.rendererDestroy++;;\n IView[RENDERER].destroy();\n }\n\n const
declarationContainer = IView[DECLARATION_LCONTAINER];\n // we are dealing with an embedded view that
is still inserted into a container\n if (declarationContainer !== null && isLContainer(IView[PARENT])) {\n //
and this is a projected view\n if (declarationContainer !== IView[PARENT]) {\n
detachMovedView(declarationContainer, IView);\n }\n\n // For embedded views still attached to a container:
remove query result from this view.\n const IQueries
= IView[QUERIES];\n if (IQueries !== null) {\n IQueries.detachView(tView);\n }\n\n //
Unregister the view once everything else has been cleaned up.\n unregisterLView(IView);\n }\n\n/** Removes
listeners and unsubscribes from output subscriptions *\nfunction processCleanups(tView: TView, IView: LView):
void {\n const tCleanup = tView.cleanup;\n const ICleanup = IView[CLEANUP];\n // `LCleanup` contains both
share information with `TCleanup` as well as instance specific\n // information appended at the end. We need to
know where the end of the `TCleanup` information\n // is, and we track this with `lastLCleanupIndex`.\n let
lastLCleanupIndex = -1;\n if (tCleanup !== null) {\n for (let i = 0; i < tCleanup.length - 1; i += 2) {\n if (typeof
tCleanup[i] === 'string') {\n // This is a native DOM listener\n const idxOrTargetGetter = tCleanup[i + 1];\n
const target = typeof idxOrTargetGetter === 'function' ?\n
idxOrTargetGetter(IView) : \n unwrapRNode(IView[idxOrTargetGetter]);\n const listener =
ICleanup[lastLCleanupIndex = tCleanup[i + 2]];\n const useCaptureOrSubIdx = tCleanup[i + 3];\n if
(typeof useCaptureOrSubIdx === 'boolean') {\n // native DOM listener registered with Renderer3\n
target.removeEventListener(tCleanup[i], listener, useCaptureOrSubIdx);\n } else {\n if
(useCaptureOrSubIdx >= 0) {\n // unregister\n ICleanup[lastLCleanupIndex =
useCaptureOrSubIdx]();\n } else {\n // Subscription\n ICleanup[lastLCleanupIndex = -
useCaptureOrSubIdx].unsubscribe();\n }\n }\n i += 2;\n } else {\n // This is a cleanup function
that is grouped with the index of its context\n const context = ICleanup[lastLCleanupIndex = tCleanup[i + 1]];\n
tCleanup[i].call(context);\n }\n }\n }\n if (ICleanup !== null) {\n for (let i
= lastLCleanupIndex + 1; i < ICleanup.length; i++) {\n const instanceCleanupFn = ICleanup[i];\n
ngDevMode && assertFunction(instanceCleanupFn, 'Expecting instance cleanup function.);\n
instanceCleanupFn();\n }\n IView[CLEANUP] = null;\n }\n\n/** Calls onDestroy hooks for this view
*\nfunction executeOnDestroys(tView: TView, IView: LView): void {\n let destroyHooks:
DestroyHookData|null;\n\n if (tView != null && (destroyHooks = tView.destroyHooks) != null) {\n for (let i = 0;
i < destroyHooks.length; i += 2) {\n const context = IView[destroyHooks[i] as number];\n\n // Only call the
destroy hook if the context has been requested.\n if (!(context instanceof NodeInjectorFactory)) {\n const
toCall = destroyHooks[i + 1] as HookFn | HookData;\n\n if (Array.isArray(toCall)) {\n for (let j = 0; j <
toCall.length; j += 2) {\n const callContext = context[toCall[j] as number];\n const hook = toCall[j +
1]
as HookFn;\n profiler(ProfilerEvent.LifecycleHookStart, callContext, hook);\n try {\n
hook.call(callContext);\n } finally {\n profiler(ProfilerEvent.LifecycleHookEnd, callContext,
hook);\n }\n }\n } else {\n profiler(ProfilerEvent.LifecycleHookStart, context, toCall);\n
try {\n toCall.call(context);\n } finally {\n profiler(ProfilerEvent.LifecycleHookEnd, context,
toCall);\n }\n }\n }\n }\n }\n\n/**\n * Returns a native element if a node can be inserted into the
given parent.\n *\n * There are two reasons why we may not be able to insert a element immediately.\n * -
Projection: When creating a child content element of a component, we have to skip the\n * insertion because the
content of a component will be projected.\n * - `<component><content>delayed due to
projection</content></component>`\n * - Parent container is disconnected:

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This can happen when we are inserting a view into a parent container, which itself is disconnected. For example the parent container is part of a View which has not been inserted or is made for projection but has not been inserted into destination.

```

@param tView: Current `TView`.
@param tNode: `TNode` for which we wish to retrieve render parent.
@param lView: Current `LView`.
\nexport function
getParentRElement(tView: TView, tNode: TNode, lView: LView): RElement|null {
  return
  getClosestRElement(tView, tNode.parent, lView);
}
\n/**
 * Get closest `RElement` or `null` if it can't be found.
 * If `TNode` is `TNodeType.Element` => return `RElement` at `LView[tNode.index]` location.
 * If `TNode` is `TNodeType.ElementContainer|IcuContain` => return the parent (recursively).
 * If `TNode` is `null` then return host `RElement`.
 * - return `null` if projection
 * - return `null` if parent container is disconnected (we have no parent.)

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@param tView: Current `TView`.
@param tNode: `TNode` for which we wish to retrieve `RElement` (or `null` if host element is needed).
@param lView: Current `LView`.
@returns `null` if the `RElement` can't be determined at this time (no parent / projection)
\nexport function getClosestRElement(tView: TView, tNode: TNode|null, lView: LView): RElement|null {
  let parentTNode: TNode|null = tNode;
  // Skip over element and ICU containers as those are represented by a comment node and
  // can't be used as a render parent.
  while (parentTNode !== null && (parentTNode.type & (TNodeType.ElementContainer | TNodeType.Icu)))
    {
      tNode = parentTNode;
      parentTNode = tNode.parent;
    }
  // If the parent tNode is null, then we are inserting across views: either into an embedded view
  // or a component view.
  if (parentTNode === null) {
    // We are inserting a root element of the component view into the component host element and
    // it should always be eager.
    return lView[HOST];
  } else {
    ngDevMode &&
    assertTNodeType(parentTNode, TNodeType.AnyRNode | TNodeType.Container);
    if (parentTNode.flags & TNodeFlags.isComponentHost) {
      ngDevMode && assertTNodeForLView(parentTNode, lView);
      const encapsulation = (tView.data[parentTNode.directiveStart] as ComponentDef<unknown>).encapsulation;
      // We've got a parent which is an element in the current view. We just need to verify if the
      // parent element is not a component. Component's content nodes are not inserted immediately
      // because they will be projected, and so doing insert at this point would be wasteful.
      // Since the projection would then move it to its final destination. Note that we can't
      // make this assumption when using the Shadow DOM, because the native projection placeholders
      // (<content> or <slot>) have to be in place as elements are being inserted.
      if (encapsulation ===

```

```

ViewEncapsulation.None || encapsulation === ViewEncapsulation.Emulated) {
    return null;
  }
}
\n
return getNativeByTNode(parentTNode, lView) as RElement;
}
\n/**
 * Inserts a native node before another native node for a given parent.
 * This is a utility function that can be used when native nodes were determined.
 *
\nexport function nativeInsertBefore(
  renderer: Renderer, parent: RElement, child: RNode, beforeNode: RNode|null,
  isMove: boolean): void {
  ngDevMode && ngDevMode.rendererInsertBefore++;
  renderer.insertBefore(parent, child, beforeNode, isMove);
}
\nfunction nativeAppendChild(renderer: Renderer, parent: RElement, child: RNode): void {
  ngDevMode && ngDevMode.rendererAppendChild++;
  ngDevMode && assertDefined(parent, 'parent node must be defined');
  renderer.appendChild(parent, child);
}
\nfunction nativeAppendOrInsertBefore(
  renderer: Renderer, parent: RElement, child: RNode, beforeNode: RNode|null, isMove: boolean) {
  if (beforeNode !== null) {
    nativeInsertBefore(renderer, parent, child, beforeNode, isMove);
  } else {
    nativeAppendChild(renderer, parent, child);
  }
}
\n/**
 * Removes a node from the DOM given its native parent.
 *
\nfunction nativeRemoveChild(
  renderer: Renderer, parent: RElement, child: RNode, isHostElement?: boolean): void {
  renderer.removeChild(parent, child, isHostElement);
}
\n/**
 * Checks if an element is a `<template>` node.
 *
\nfunction isTemplateNode(node: RElement): node is RTemplate {
  return node.tagName === 'TEMPLATE' && (node as RTemplate).content !== undefined;
}
\n/**
 * Returns a native parent of a given native node.
 *
\nexport function nativeParentNode(renderer: Renderer, node: RNode): RElement|null {
  return renderer.parentNode(node);
}
\n/**
 * Returns a native sibling of a given native node.
 *
\nexport function nativeNextSibling(renderer: Renderer, node: RNode): RNode|null {
  return renderer.nextSibling(node);
}
\n/**

```

```

* Find a node in front of which `currentTNode` should be inserted.\n *\n * This method determines the `RNode` in
front of which we should insert the `currentRNode`. This\n * takes `TNode.insertBeforeIndex` into account if i18n
code has been invoked.\n *\n * @param parentTNode parent `TNode`\n * @param currentTNode current `TNode`
(The node which we would like to insert into the DOM)\n * @param IView current `LView`\n */\nfunction
getInsertInFrontOfRNode(parentTNode: TNode, currentTNode: TNode, IView: LView): RNode| null {\n return
_getInsertInFrontOfRNodeWithI18n(parentTNode, currentTNode, IView);\n }\n\n/**\n * Find a node in front of
which `currentTNode` should be inserted. (Does not take i18n into\n * account)\n *\n * This method determines the
`RNode` in front of which we should insert the `currentRNode`. This\n * does not take `TNode.insertBeforeIndex`
into account.\n *\n * @param parentTNode parent `TNode`\n * @param currentTNode current `TNode` (The node
which we would like to insert into the DOM)\n * @param IView current `LView`\n */\nexport function
getInsertInFrontOfRNodeWithNoI18n(\n parentTNode: TNode, currentTNode: TNode, IView: LView):
RNode|null {\n if (parentTNode.type & (TNodeType.ElementContainer | TNodeType.Icu)) {\n return
getNativeByTNode(parentTNode, IView);\n } return null;\n }\n\n/**\n * Tree shakable boundary for
`getInsertInFrontOfRNodeWithI18n` function.\n *\n * This function will only be set if i18n code runs.\n */\nlet
_getInsertInFrontOfRNodeWithI18n: (parentTNode: TNode, currentTNode: TNode, IView: LView) =>\n RNode |
null = getInsertInFrontOfRNodeWithNoI18n;\n\n/**\n * Tree shakable boundary for `processI18nInsertBefore`
function.\n *\n * This function will only be set if i18n code runs.\n */\nlet _processI18nInsertBefore: (\n
renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[],\n parentRElement: RElement|null)
=> void;\n\nexport function setI18nHandling(\n getInsertInFrontOfRNodeWithI18n:
(parentTNode: TNode, currentTNode: TNode, IView: LView) =>\n RNode | null,\n processI18nInsertBefore:
(\n renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[],\n
parentRElement: RElement|null) => void) {\n _getInsertInFrontOfRNodeWithI18n =
getInsertInFrontOfRNodeWithI18n;\n _processI18nInsertBefore = processI18nInsertBefore;\n }\n\n/**\n * Appends
the `child` native node (or a collection of nodes) to the `parent`.\n *\n * @param tView The `TView` to be
appended\n * @param IView The current LView\n * @param childRNode The native child (or children) that should
be appended\n * @param childTNode The TNode of the child element\n */\nexport function appendChild(\n
tView: TView, IView: LView, childRNode: RNode|RNode[], childTNode: TNode): void {\n const parentRNode =
getParentRElement(tView, childTNode, IView);\n const renderer = IView[RENDERER];\n const parentTNode:
TNode = childTNode.parent || IView[T_HOST];\n
const anchorNode = getInsertInFrontOfRNode(parentTNode, childTNode, IView);\n if (parentRNode !== null) {\n
if (Array.isArray(childRNode)) {\n for (let i = 0; i < childRNode.length; i++) {\n
nativeAppendOrInsertBefore(renderer, parentRNode, childRNode[i], anchorNode, false);\n } } else {\n
nativeAppendOrInsertBefore(renderer, parentRNode, childRNode, anchorNode, false);\n } }\n\n
_processI18nInsertBefore !== undefined &&\n _processI18nInsertBefore(renderer, childTNode, IView,
childRNode, parentRNode);\n }\n\n/**\n * Returns the first native node for a given LView, starting from the
provided TNode.\n *\n * Native nodes are returned in the order in which those appear in the native tree (DOM).\n
*/\nfunction getFirstNativeNode(IView: LView, tNode: TNode|null): RNode|null {\n if (tNode !== null) {\n
ngDevMode &&\n assertTNodeType(\n tNode,\n TNodeType.AnyRNode |
TNodeType.AnyContainer | TNodeType.Icu | TNodeType.Projection);\n\n
const tNodeType = tNode.type;\n if (tNodeType & TNodeType.AnyRNode) {\n return
getNativeByTNode(tNode, IView);\n } else if (tNodeType & TNodeType.Container) {\n return
getNodeBeforeView(-1, IView[tNode.index]);\n } else if (tNodeType & TNodeType.ElementContainer) {\n
const eIcuContainerChild = tNode.child;\n if (eIcuContainerChild !== null) {\n return
getFirstNativeNode(IView, eIcuContainerChild);\n } else {\n const rNodeOrLContainer =
IView[tNode.index];\n if (isLContainer(rNodeOrLContainer)) {\n return getNodeBeforeView(-1,
rNodeOrLContainer);\n } else {\n return unwrapRNode(rNodeOrLContainer);\n } }\n } else if
(tNodeType & TNodeType.Icu) {\n let nextRNode = icuContainerIterate(tNode as TIcuContainerNode,
IView);\n let rNode: RNode|null = nextRNode();\n // If the ICU container has no nodes, than we use the ICU

```



their own Containers at the View roots.

- Projection: implies that we have to insert/remove/destroy the nodes of the projection. The complication is that the nodes we are projecting can themselves have Containers or other Projections. As you can see this is a very recursive problem. Yes recursion is not most efficient but the code is complicated enough that trying to implemented with recursion becomes unmaintainable.

```

@param tView The `TView` which needs to be inserted, detached, destroyed
@param IView The LView which needs to be inserted, detached, destroyed.
@param renderer Renderer to use
@param action action to perform (insert, detach, destroy)
@param parentRElement parent DOM element for insertion (Removal does not need it).
@param beforeNode Before which node the insertions should happen.
\n\nfunction applyView(\n  tView: TView, IView: LView, renderer: Renderer, action: WalkTreeNodeTreeAction.Destroy,\n  parentRElement: null, beforeNode: null): void;\nfunction applyView(\n  tView: TView, IView: LView, renderer: Renderer, action: WalkTreeNodeTreeAction,\n  parentRElement: RElement|null, beforeNode: RNode|null): void;\nfunction applyView(\n  tView: TView, IView: LView, renderer: Renderer, action: WalkTreeNodeTreeAction,\n  parentRElement: RElement|null, beforeNode: RNode|null): void {\n  applyNodes(renderer, action, tView.firstChild, IView, parentRElement, beforeNode, false);\n}\n\n**\n `applyProjection` performs operation on the projection.
\n\n * Inserting a projection requires us to locate the projected nodes from the parent component. The complication is that those nodes themselves could be re-projected from their parent component.
\n\n * @param tView The `TView` of `LView` which needs to be inserted, detached, destroyed
\n\n * @param IView The `LView` which needs to be inserted, detached, destroyed.
\n\n * @param tProjectionNode node to project
\n\n * @export function applyProjection(tView: TView, IView: LView, tProjectionNode: TProjectionNode) {\n  const renderer = IView[RENDERER];\n  const parentRNode = getParentRElement(tView, tProjectionNode, IView);\n  const parentTNode = tProjectionNode.parent || IView[T_HOST];\n  let beforeNode = getInsertInFrontOfRNode(parentTNode, tProjectionNode, IView);\n  applyProjectionRecursive(\n    renderer, WalkTreeNodeTreeAction.Create, IView, tProjectionNode, parentRNode, beforeNode);\n}\n\n**\n `applyProjectionRecursive` performs operation on the projection specified by `action` (insert, detach, destroy)
\n\n * Inserting a projection requires us to locate the projected nodes from the parent component. The complication is that those nodes themselves could be re-projected from their parent component.
\n\n * @param renderer Render to use
\n\n * @param action action to perform (insert, detach, destroy)
\n\n * @param IView The LView which needs to be inserted, detached, destroyed.
\n\n * @param tProjectionNode node to project
\n\n * @param parentRElement parent DOM element for insertion/removal.
\n\n * @param beforeNode Before which node the insertions should happen.
\n\n * @function applyProjectionRecursive(\n  renderer: Renderer, action: WalkTreeNodeTreeAction, IView: LView, tProjectionNode: TProjectionNode,\n  parentRElement: RElement|null, beforeNode: RNode|null) {\n  const componentLView = IView[DECLARATION_COMPONENT_VIEW];\n  const componentNode = componentLView[T_HOST] as TElementNode;\n  ngDevMode &&\n    assertEqual(typeof tProjectionNode.projection, 'number', 'expecting projection index');\n  const nodeToProjectOrRNodes = componentNode.projection![tProjectionNode.projection];\n  if (Array.isArray(nodeToProjectOrRNodes)) {\n    // This should not exist, it is a bit of a hack. When we bootstrap a top level node and we\n    // need to support passing projectable nodes, so we cheat and put them in the TNode\n    // of the Host TView. (Yes we put instance info at the T Level). We can get away with it\n    // because we know that that TView is not shared and therefore it will not be a problem.\n    // This should be refactored and cleaned up.\n    for (let i = 0; i < nodeToProjectOrRNodes.length; i++)\n      {\n        const rNode = nodeToProjectOrRNodes[i];\n        applyToElementOrContainer(action, renderer, parentRElement, rNode, beforeNode);\n      } } else {\n    let nodeToProject: TNode|null = nodeToProjectOrRNodes;\n    const projectedComponentLView = componentLView[PARENT] as LView;\n    applyNodes(\n      renderer, action, nodeToProject, projectedComponentLView, parentRElement, beforeNode, true);\n  }\n}\n\n**\n `applyContainer` performs an operation on the container and its views as specified by\n `action` (insert, detach, destroy)
\n\n * Inserting a Container is complicated by the fact that the container may have

```



```

Views which themselves have containers or projections.
@param renderer Renderer to use
@param action action to perform (insert, detach, destroy)
@param IContainer The LContainer which needs to be inserted, detached, destroyed.
@param parentRElement parent DOM element for insertion/removal.
@param beforeNode Before which node the insertions should happen.
*/function applyContainer(renderer: Renderer, action: WalkTreeNodeAction, IContainer: LContainer, parentRElement: RElement|null, beforeNode: RNode|null|undefined) {
  ngDevMode && assertLContainer(IContainer);
  const anchor = IContainer[NATIVE]; // LContainer has its own before node.
  const native = unwrapRNode(IContainer); // An LContainer can be created dynamically on any node by injecting ViewContainerRef.
  // Asking for a ViewContainerRef on an element will result in a creation of a separate anchor
  // node (comment in the DOM) that will be different from the LContainer's host node. In this
  // particular case we need to execute action on 2 nodes:
  // - container's host node (this is done in the executeActionOnElementOrContainer)
  // - container's host node (this is done here)
  if (anchor !== native) {
    // This is very strange to me (Misko). I would expect that the native is same as anchor.
    // don't see a reason why they should be different, but they are.
    // If they are we need to process the second anchor as well.
    applyToElementOrContainer(action, renderer, parentRElement, anchor, beforeNode);
  }
  for (let i = CONTAINER_HEADER_OFFSET; i < IContainer.length; i++) {
    const IView = IContainer[i] as LView;
    applyView(IView[TVIEW], IView, renderer, action, parentRElement, anchor);
  }
  // Writes class/style to element.
  @param renderer Renderer to use.
  @param isClassBased `true` if it should be written to `class` (`false` to write to `style`)
  @param rNode The Node to write to.
  @param prop Property to write to. This would be the class/style name.
  @param value Value to write. If `null`/`undefined`/`false` this is considered a remove (set/add otherwise).
  */function applyStyling(renderer: Renderer, isClassBased: boolean, rNode: RElement, prop: string, value: any) {
    if (isClassBased) {
      // We actually want JS true/false here because any truthy value should add the class
      if (!value) {
        ngDevMode && ngDevMode.rendererRemoveClass++;
        renderer.removeClass(rNode, prop);
      } else {
        ngDevMode && ngDevMode.rendererAddClass++;
        renderer.addClass(rNode, prop);
      }
    } else {
      let flags = prop.indexOf('-') === -1 ? undefined : RendererStyleFlags2.DashCase as number;
      if (value === null /* || value === undefined */) {
        ngDevMode && ngDevMode.rendererRemoveStyle++;
        renderer.removeStyle(rNode, prop, flags);
      } else {
        // A value is important if it ends with `!important`. The style parser strips any semicolons at the end of the value.
        const isImportant = typeof value === 'string' ? value.endsWith('!important') : false;
        if (isImportant) {
          // !important has to be stripped from the value for it to be valid.
          value = value.slice(0, -10);
          flags |= RendererStyleFlags2.Important;
        }
        ngDevMode && ngDevMode.rendererSetStyle++;
        renderer.setStyle(rNode, prop, value, flags);
      }
    }
  }
  // Write `cssText` to `RElement`.
  @param This function does direct write without any reconciliation. Used for writing initial values, so that static styling values do not pull in the style parser.
  @param renderer Renderer to use
  @param element The element which needs to be updated.
  @param newValue The new class list to write.
  */function writeDirectStyle(renderer: Renderer, element: RElement, newValue: string) {
    ngDevMode && assertString(newValue, '\\newValue\\' should be a string');
    renderer.setAttribute(element, 'style', newValue);
    ngDevMode && ngDevMode.rendererSetStyle++;
  }
  // Write `className` to `RElement`.
  @param This function does direct write without any reconciliation. Used for writing initial values, so that static styling values do not pull in the style parser.
  @param renderer Renderer to use
  @param element The element which needs to be updated.
  @param newValue The new class list to write.
  */function writeDirectClass(renderer: Renderer, element: RElement, newValue: string) {
    ngDevMode && assertString(newValue, '\\newValue\\' should be a string');
    if (newValue === '') {
      // There are tests in `google3` which expect `element.getAttribute('class')` to be `null`.
      renderer.removeAttribute(element, 'class');
    } else {
      renderer.setAttribute(element, 'class', newValue);
    }
  }
  ngDevMode && ngDevMode.rendererSetClassName++;
}
*/
*/ @license
*/ Copyright Google LLC All Rights Reserved.
*/ Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at

```

```

https://angular.io/license\n *\n\n**\n * @fileoverview\n * A module to facilitate use of a Trusted Types policy
internally within\n * Angular. It lazily constructs the Trusted Types policy, providing helper\n * utilities for
promoting
strings to Trusted Types. When Trusted Types are not\n * available, strings are used as a fallback.\n * @security
All use of this module is security-sensitive and should go through\n * security review.\n *\n\nimport {global} from
'./global';\nimport {TrustedHTML, TrustedScript, TrustedScriptURL, TrustedTypePolicy,
TrustedTypePolicyFactory} from './trusted_type_defs';\n\n**\n * The Trusted Types policy, or null if Trusted
Types are not\n * enabled/supported, or undefined if the policy has not been created yet.\n *\n\nlet policy:
TrustedTypePolicy|null|undefined;\n\n**\n * Returns the Trusted Types policy, or null if Trusted Types are not\n *
enabled/supported. The first call to this function will create the policy.\n *\n\nfunction getPolicy():
TrustedTypePolicy|null {\n  if (policy === undefined) {\n    policy = null;\n    if (global.trustedTypes) {\n      try {\n
        policy = (global.trustedTypes as TrustedTypePolicyFactory).createPolicy('angular', {\n          createHTML:
(s: string) => s,\n          createScript: (s: string) => s,\n          createScriptURL: (s: string) => s,\n        });\n      } catch
{\n        // trustedTypes.createPolicy throws if called with a name that is\n        // already registered, even in report-
only mode. Until the API changes,\n        // catch the error not to break the applications functionally. In such\n        //
cases, the code will fall back to using strings.\n      }\n    }\n    return policy;\n  }\n\n**\n * Unsafely promote a
string to a TrustedHTML, falling back to strings when\n * Trusted Types are not available.\n * @security This is a
security-sensitive function; any use of this function\n * must go through security review. In particular, it must be
assured that the\n * provided string will never cause an XSS vulnerability if used in a context\n * that will be
interpreted as HTML by a browser, e.g. when assigning to\n * element.innerHTML.\n *\n\nexport function
trustedHTMLFromString(html: string): TrustedHTML|string
{\n  return getPolicy()?.createHTML(html) || html;\n}\n\n**\n * Unsafely promote a string to a TrustedScript,
falling back to strings when\n * Trusted Types are not available.\n * @security In particular, it must be assured that
the provided string will\n * never cause an XSS vulnerability if used in a context that will be\n * interpreted and
executed as a script by a browser, e.g. when calling eval.\n *\n\nexport function trustedScriptFromString(script:
string): TrustedScript|string {\n  return getPolicy()?.createScript(script) || script;\n}\n\n**\n * Unsafely promote a
string to a TrustedScriptURL, falling back to strings\n * when Trusted Types are not available.\n * @security This is
a security-sensitive function; any use of this function\n * must go through security review. In particular, it must be
assured that the\n * provided string will never cause an XSS vulnerability if used in a context\n * that will cause a
browser to load and execute a resource, e.g. when\n * assigning
to script.src.\n *\n\nexport function trustedScriptURLFromString(url: string): TrustedScriptURL|string {\n  return
getPolicy()?.createScriptURL(url) || url;\n}\n\n**\n * Unsafely call the Function constructor with the given string
arguments. It\n * is only available in development mode, and should be stripped out of\n * production code.\n *
@security This is a security-sensitive function; any use of this function\n * must go through security review. In
particular, it must be assured that it\n * is only called from development code, as use in production code can lead
to\n * XSS vulnerabilities.\n *\n\nexport function newTrustedFunctionForDev(...args: string[]): Function {\n  if
(typeof ngDevMode === 'undefined') {\n    throw new Error('newTrustedFunctionForDev should never be called in
production');\n  }\n  if (!global.trustedTypes) {\n    // In environments that don't support Trusted Types, fall back to
the most\n    // straightforward implementation:\n    return new Function(...args);\n  }\n  }\n  // Chrome currently does not support passing TrustedScript to the Function\n  // constructor. The following
implements the workaround proposed on the page\n  // below, where the Chromium bug is also referenced:\n  //
https://github.com/w3c/webappsec-trusted-types/wiki/Trusted-Types-for-function-constructor\n  const fnArgs =
args.slice(0, -1).join(',');\n  const fnBody = args[args.length - 1];\n  const body = `(function
anonymous(${fnArgs}) { ${fnBody} })`;\n  // Using eval directly confuses the compiler and prevents this
module from\n  // being stripped out of JS binaries even if not used. The global['eval']\n  // indirection fixes that.\n  const fn = global['eval'](trustedScriptFromString(body) as string) as Function;\n  if (fn.bind === undefined) {\n    //
Workaround for a browser bug that only exists in Chrome 83, where passing\n    // a TrustedScript to eval just
returns the TrustedScript back without\n    // evaluating it. In that case, fall back to the most

```

```

straightforward\n // implementation:\n return new Function(...args);\n }\n\n // To completely mimic the
behavior of calling "new Function", two more\n // things need to happen:\n // 1. Stringifying the resulting function
should return its source code\n fn.toString = () => body;\n // 2. When calling the resulting function, `this` should
refer to `global`\n return fn.bind(global);\n\n // When Trusted Types support in Function constructors is widely
available,\n // the implementation of this function can be simplified to:\n // return new Function(...args.map(a =>
trustedScriptFromString(a)));\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport { RuntimeError, RuntimeErrorCode } from './errors';\nimport
{ getTemplateLocationDetails } from './render3/instructions/element_validation';\nimport { TNodeType } from
'./render3/interfaces/node';\nimport { RComment, RElement } from './render3/interfaces/renderer_dom';\nimport
{ RENDERER } from './render3/interfaces/view';\nimport { nativeRemoveNode } from
'./render3/node_manipulation';\nimport { getLView, getSelectedTNode } from './render3/state';\nimport
{ getNativeByTNode } from './render3/util/view_utils';\nimport { trustedHTMLFromString } from
'./util/security/trusted_types';\n\n/**\n * Validation function invoked at runtime for each binding that might
potentially\n * represent a security-sensitive attribute of an <iframe>.\n * See
`IFRAME_SECURITY_SENSITIVE_ATTRS` in the\n * `packages/compiler/src/schema/dom_security_schema.ts`
script for the full list\n * of such attributes.\n *\n * @codeGenApi\n */\nexport function
validateIframeAttribute(attrValue: any, tagName: string, attrName: string) {\n const IView = getLView();\n const
tNode = getSelectedTNode(!);\n const element = getNativeByTNode(tNode, IView) as RElement | RComment;\n\n
// Restrict
any dynamic bindings of security-sensitive attributes/properties\n // on an <iframe> for security reasons.\n if
(tNode.type === TNodeType.Element && tagName.toLowerCase() === 'iframe') {\n const iframe = element as
HTMLIFrameElement;\n\n // Unset previously applied `src` and `srcdoc` if we come across a situation when\n //
a security-sensitive attribute is set later via an attribute/property binding.\n iframe.src = ";\n iframe.srcdoc =
trustedHTMLFromString("") as unknown as string;\n\n // Also remove the <iframe> from the document.\n
nativeRemoveNode(IView[RENDERER], iframe);\n\n const errorMessage = ngDevMode &&\n `Angular has
detected that the \\`${attrName}\\` was applied ` +\n `as a binding to an
<iframe>${getTemplateLocationDetails(IView)}. ` +\n `For security reasons, the \\`${attrName}\\` can be set
on an <iframe> ` +\n `as a static attribute only. \\` +\n `To fix this, switch the \\`${attrName}\\`
binding to a static attribute ` +\n `in a template or in host bindings section.`;\n throw new
RuntimeError(RuntimeErrorCode.UNSAFE_IFRAME_ATTRS, errorMessage);\n }\n return
attrValue;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n\n *\n * Most of the use of `document` in Angular is from within the DI system so it is possible to simply\n *\n
inject the `DOCUMENT` token and are done.\n *\n * Ivy is special because it does not rely upon the DI and must
get hold of the document some other\n * way.\n *\n * The solution is to define `getDocument()` and
`setDocument()` top-level functions for ivy.\n *\n * Wherever ivy needs the global document, it calls `getDocument()`
instead.\n *\n * When running ivy outside of a browser environment, it is necessary to call `setDocument()` to\n *\n
tell ivy what the global `document`
is.\n *\n * Angular does this for us in each of the standard platforms (`Browser`, `Server`, and `WebWorker`)\n *\n
calling `setDocument()` when providing the `DOCUMENT` token.\n *\n\nlet DOCUMENT: Document|undefined =
undefined;\n\n/**\n * Tell ivy what the `document` is for this platform.\n *\n * It is only necessary to call this if the
current platform is not a browser.\n *\n * @param document The object representing the global `document` in this
environment.\n */\nexport function setDocument(document: Document|undefined): void {\n DOCUMENT =
document;\n}\n\n/**\n * Access the object that represents the `document` for this platform.\n *\n * Ivy calls this
whenever it needs to access the `document` object.\n *\n * For example to create the renderer or to do sanitization.\n
*/\nexport function getDocument(): Document {\n if (DOCUMENT !== undefined) {\n return DOCUMENT;\n }\n
else if (typeof document !== 'undefined') {\n return document;\n }\n // No "document" can be found.

```

```

This should only happen if we are running ivy outside Angular and
// the current platform is not a browser. Since
this is not a supported scenario at the moment
// this should not happen in Angular apps.
// Once we support
running ivy outside of Angular we will need to publish `setDocument()` as a
// public API. Meanwhile we just
return `undefined` and let the application fail.
return undefined!;
}
"/**
 * @license
 * Copyright Google
 LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
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 */
 * @fileoverview
 * A module to facilitate use of a
 Trusted Types policy internally within
 * Angular specifically for bypassSecurityTrust* and custom sanitizers. It
 * lazily constructs the Trusted Types policy, providing helper utilities for
 * promoting strings to Trusted Types.
 When Trusted Types are not available,
 * strings are used as a fallback.
 * @security All use of this module is security-sensitive and should go through
 * security review.
 */
import
 {global} from './global';
import {TrustedHTML, TrustedScript, TrustedScriptURL, TrustedTypePolicy,
TrustedTypePolicyFactory} from './trusted_type_defs';
/**
 * The Trusted Types policy, or null if Trusted
Types are not
 * enabled/supported, or undefined if the policy has not been created yet.
 */
let policy:
TrustedTypePolicy|null|undefined;
/**
 * Returns the Trusted Types policy, or null if Trusted Types are not
 * enabled/supported. The first call to this function will create the policy.
 */
function getPolicy():
TrustedTypePolicy|null {
  if (policy === undefined) {
    policy = null;
    if (global.trustedTypes) {
      try {
        policy = (global.trustedTypes as TrustedTypePolicyFactory)
          .createPolicy('angular#unsafe-bypass',
            {
              createHTML: (s: string) => s,
              createScript:
                (s: string) => s,
              createScriptURL: (s: string) => s,
            });
      } catch {
        //
        trustedTypes.createPolicy throws if called with a name that is
        // already registered, even in report-only mode.
        Until the API changes,
        // catch the error not to break the applications functionally. In such
        // cases, the
        code will fall back to using strings.
      }
    }
    return policy;
  }
  /**
   * Unsafely promote a string to a
   TrustedHTML, falling back to strings when
   * Trusted Types are not available.
   * @security This is a security-
   sensitive function; any use of this function
   * must go through security review. In particular, it must be assured that
   it
   * is only passed strings that come directly from custom sanitizers or the
   * bypassSecurityTrust* functions.
   */
  export function trustedHTMLFromStringBypass(html: string): TrustedHTML|string {
    return
    getPolicy()?.createHTML(html) || html;
  }
  /**
   * Unsafely promote a string to a TrustedScript, falling back to strings when
   * Trusted Types are not available.
   * @security This is a security-sensitive function; any use of this function
   * must go through security review. In
   particular, it must be assured that it
   * is only passed strings that come directly from custom sanitizers or the
   * bypassSecurityTrust* functions.
   */
  export function trustedScriptFromStringBypass(script: string):
TrustedScript|string {
    return getPolicy()?.createScript(script) || script;
  }
  /**
   * Unsafely promote a string to a
   TrustedScriptURL, falling back to strings
   * when Trusted Types are not available.
   * @security This is a
   security-sensitive function; any use of this function
   * must go through security review. In particular, it must be
   assured that it
   * is only passed strings that come directly from custom sanitizers or the
   * bypassSecurityTrust*
   functions.
   */
  export function trustedScriptURLFromStringBypass(url: string): TrustedScriptURL|string
    {
      return getPolicy()?.createScriptURL(url) || url;
    }
}
"/**
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Reserved.
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 * found in the
LICENSE file at https://angular.io/license
 */
export const enum BypassType {
  Url = 'URL',
  Html =
'HTML',
  ResourceUrl = 'ResourceURL',
  Script = 'Script',
  Style = 'Style',
}
/**
 * Marker interface for a
value that's safe to use in a particular context.
 */
export interface SafeValue {}
/**
 * Marker interface for a value that's safe to use as HTML.
 */
export interface SafeHtml
extends SafeValue {}
/**
 * Marker interface for a value that's safe to use as style (CSS).
 */
export interface SafeStyle
extends SafeValue {}
/**
 * Marker interface for a value that's safe to use as
JavaScript.
 */
export interface SafeScript
extends SafeValue
{}
/**
 * Marker interface for a value that's safe to use as a URL linking to a document.
 */
export interface SafeUrl
extends SafeValue {}
/**
 * Marker interface for a value that's safe to use as a URL
to load executable code from.
 */
export interface SafeResourceUrl
extends SafeValue

```

```

}
abstract class SafeValueImpl implements SafeValue {
    constructor(public
changingThisBreaksApplicationSecurity: string) {}
    abstract getTypeName(): string;
    toString() {
        return
`SafeValue must use [property]=binding: ${this.changingThisBreaksApplicationSecurity}` +
        ` (see
https://g.co/ng/security#xss)`;
    }
}
class SafeHtmlImpl extends SafeValueImpl implements SafeHtml {
    override getTypeName() {
        return BypassType.Html;
    }
}
class SafeStyleImpl extends SafeValueImpl
implements SafeStyle {
    override getTypeName() {
        return BypassType.Style;
    }
}
class SafeScriptImpl
extends SafeValueImpl implements
SafeScript {
    override getTypeName() {
        return BypassType.Script;
    }
}
class SafeUrlImpl extends
SafeValueImpl implements SafeUrl {
    override getTypeName() {
        return BypassType.Url;
    }
}
class SafeResourceUrlImpl extends SafeValueImpl implements SafeResourceUrl {
    override getTypeName() {
        return BypassType.ResourceUrl;
    }
}
export function unwrapSafeValue(value: SafeValue): string;
export function unwrapSafeValue<T>(value: T): T;
export function unwrapSafeValue<T>(value: T|SafeValue): T {
    return value instanceof SafeValueImpl ? value.changingThisBreaksApplicationSecurity as any as T :
        value as any as T;
}
export function allowSanitizationBypassAndThrow(
    value: any, type:
BypassType.Html): value is SafeHtml;
export function allowSanitizationBypassAndThrow(
    value: any, type:
BypassType.ResourceUrl): value is SafeResourceUrl;
export function allowSanitizationBypassAndThrow(
    value:
any, type: BypassType.Script): value is SafeScript;
export function allowSanitizationBypassAndThrow(
    value:
any, type: BypassType.Style): value is SafeStyle;
export function allowSanitizationBypassAndThrow(
    value: any,
type: BypassType.Url): value is SafeUrl;
export function allowSanitizationBypassAndThrow(
    value: any, type:
BypassType): boolean;
export function allowSanitizationBypassAndThrow(
    value: any, type: BypassType):
boolean {
    const actualType = getSanitizationBypassType(value);
    if (actualType !== null && actualType !==
type) {
        // Allow ResourceURLs in URL contexts, they are strictly more trusted.
        if (actualType ===
BypassType.ResourceUrl && type === BypassType.Url) return true;
        throw new Error(
            `Required a safe
${type}, got a ${actualType} (see https://g.co/ng/security#xss)`);
    }
    return actualType === type;
}
export function getSanitizationBypassType(
    value: any): BypassType|null {
    return value instanceof SafeValueImpl &&
value.getTypeName()
as BypassType || null;
}
/**
 * Mark `html` string as trusted.
 * This function wraps the trusted string in
`String` and brands it in a way which makes it
recognizable to {@link htmlSanitizer} to be trusted implicitly.
 * @param trustedHtml `html` string which needs to be implicitly trusted.
 * @returns a `html` which has been
branded to be implicitly trusted.
 */
export function bypassSanitizationTrustHtml(
    trustedHtml: string): SafeHtml {
    return new SafeHtmlImpl(trustedHtml);
}
/**
 * Mark `style` string as trusted.
 * This function wraps the trusted string in
`String` and brands it in a way which makes it
recognizable to {@link styleSanitizer} to be
trusted implicitly.
 * @param trustedStyle `style` string which needs to be implicitly trusted.
 * @returns a
`style` hich has been branded to be implicitly trusted.
 */
export function
bypassSanitizationTrustStyle(
    trustedStyle: string): SafeStyle {
    return new SafeStyleImpl(trustedStyle);
}
/**
 * Mark `script` string as trusted.
 * This function wraps the trusted string in
`String` and brands it in a way
which makes it
recognizable to {@link scriptSanitizer} to be
trusted implicitly.
 * @param trustedScript
`script` string which needs to be implicitly trusted.
 * @returns a `script` which has been branded to be implicitly
trusted.
 */
export function
bypassSanitizationTrustScript(
    trustedScript: string): SafeScript {
    return new
SafeScriptImpl(trustedScript);
}
/**
 * Mark `url` string as trusted.
 * This function wraps the trusted string in
`String` and brands it in a way which makes it
recognizable to {@link urlSanitizer} to be
trusted implicitly.
 * @param trustedUrl `url` string which needs to be implicitly trusted.
 * @returns a `url` which has been
branded to be implicitly trusted.
 */
export function
bypassSanitizationTrustUrl(
    trustedUrl: string): SafeUrl {
    return new SafeUrlImpl(trustedUrl);
}
/**
 * Mark `url` string as trusted.
 * This function wraps the trusted string in
`String` and brands it in a way which
makes it
recognizable to {@link resourceUrlSanitizer} to be
trusted implicitly.
 * @param
trustedResourceUrl `url` string which needs to be implicitly trusted.
 * @returns a `url` which has been branded to

```

```

be implicitly trusted.\n */\nexport function bypassSanitizationTrustResourceUrl(trustedResourceUrl: string):
SafeResourceUrl {\n  return new SafeResourceUrlImpl(trustedResourceUrl);\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {trustedHTMLFromString} from
'./util/security/trusted_types';\n\n/**\n * This helper is used to get hold of an inert tree of DOM elements containing
dirty HTML\n * that needs sanitizing.\n * Depending upon browser support we use one of two strategies for doing
this.\n * Default: DOMParser strategy\n * Fallback: InertDocument strategy\n */\nexport function
getInertBodyHelper(defaultDoc: Document): InertBodyHelper {\n  const inertDocumentHelper = new
InertDocumentHelper(defaultDoc);\n  return isDOMParserAvailable() ? new
DOMParserHelper(inertDocumentHelper) : inertDocumentHelper;\n}\n\nexport interface InertBodyHelper {\n
/**\n * Get an inert DOM element containing DOM created from the dirty HTML string provided.\n */\n
getInertBodyElement: (html: string) => HTMLElement | null;\n}\n\n/**\n * Uses DOMParser to create and fill an
inert body element.\n * This is the default strategy used in browsers that support it.\n */\n\nclass DOMParserHelper
implements InertBodyHelper {\n  constructor(private inertDocumentHelper: InertBodyHelper) {}\n\n  getInertBodyElement(html: string): HTMLElement|null {\n    // We add these extra elements to ensure that the rest
of the content is parsed as expected\n    // e.g. leading whitespace is maintained and
tags like `<meta>` do not get hoisted to the\n    // `<head>` tag. Note that the `<body>` tag is closed implicitly to
prevent unclosed tags\n    // in `html` from consuming the otherwise explicit `</body>` tag.\n    html =
'<body><remove></remove>' + html;\n    try {\n      const body = new window.DOMParser()\n        .parseFromString(trustedHTMLFromString(html) as string, 'text/html')\n        .body as
HTMLBodyElement;\n      if (body === null) {\n        // In some browsers (e.g. Mozilla/5.0 iPad AppleWebKit
Mobile) the `body` property only\n        // becomes available in the following tick of the JS engine. In that case we
fall back to\n        // the `inertDocumentHelper` instead.\n        return
this.inertDocumentHelper.getInertBodyElement(html);\n      }\n      body.removeChild(body.firstChild!);\n      return
body;\n    } catch {\n      return null;\n    }\n  }\n}\n\n/**\n * Use an HTML5 `template` element, if supported, or an
inert body element created
via\n * `createHtmlDocument` to create and fill an inert DOM element.\n * This is the fallback strategy if the
browser does not support DOMParser.\n */\n\nclass InertDocumentHelper implements InertBodyHelper {\n  private
inertDocument: Document;\n\n  constructor(private defaultDoc: Document) {\n    this.inertDocument =
this.defaultDoc.implementation.createHTMLDocument('sanitization-inert');\n\n    if (this.inertDocument.body ==
null) {\n      // usually there should be only one body element in the document, but IE doesn't have any, so\n      // we
need to create one.\n      const inertHtml = this.inertDocument.createElement('html');\n      this.inertDocument.appendChild(inertHtml);\n      const inertBodyElement =
this.inertDocument.createElement('body');\n      inertHtml.appendChild(inertBodyElement);\n    }\n  }\n\n  getInertBodyElement(html: string): HTMLElement|null {\n    // Prefer using <template> element if supported.\n    const templateEl = this.inertDocument.createElement('template');\n\n    if ('content' in templateEl) {\n      templateEl.innerHTML = trustedHTMLFromString(html) as string;\n      return
templateEl;\n    }\n\n    // Note that previously we used to do something like `this.inertDocument.body.innerHTML
= html`\n    // and we returned the inert `body` node. This was changed, because IE seems to treat setting\n    //
`innerHTML` on an inserted element differently, compared to one that hasn't been inserted\n    // yet. In particular,
IE appears to split some of the text into multiple text nodes rather\n    // than keeping them in a single one which
ends up messing with Ivy's i18n parsing further\n    // down the line. This has been worked around by creating a new
inert `body` and using it as\n    // the root node in which we insert the HTML.\n    const inertBody =
this.inertDocument.createElement('body');\n    inertBody.innerHTML = trustedHTMLFromString(html) as
string;\n\n    // Support: IE 11 only\n    // strip custom-namespaced attributes on IE<=11\n    if ((this.defaultDoc as any).documentMode) {\n      this.stripCustomNsAttrs(inertBody);\n    }\n\n    return
inertBody;\n  }\n}\n\n/**\n * When IE11 comes across an unknown namespaced attribute e.g. 'xlink:foo' it adds
'xmlns:ns1'\n * attribute to declare ns1 namespace and prefixes the attribute with 'ns1' (e.g.\n * 'ns1:xlink:foo').\n

```

```
*\n * This is undesirable since we don't want to allow any of these custom attributes. This method\n * strips them all.\n *^\n private stripCustomNsAttrs(el: Element) {\n  const elAttrs = el.attributes;\n  // loop backwards so that we can support removals.\n  for (let i = elAttrs.length - 1; 0 < i; i--) {\n    const attrib = elAttrs.item(i);\n    const attrName = attrib!.name;\n    if (attrName === 'xmlns:ns1' || attrName.indexOf('ns1:') === 0) {\n      el.removeAttribute(attrName);\n    }\n  }\n  let childNode = el.firstChild as Node | null;\n  while (childNode) {\n    if (childNode.nodeType === Node.ELEMENT_NODE)\n      this.stripCustomNsAttrs(childNode as Element);\n    childNode = childNode.nextSibling;\n  }\n}\n\n/**\n * We need to determine whether the DOMParser exists in the global context and\n * supports parsing HTML; HTML parsing support is not as wide as other formats, see\n * https://developer.mozilla.org/en-US/docs/Web/API/DOMParser#Browser_compatibility.\n */\n * @suppress {uselessCode}\n *^\nexport function isDOMParserAvailable() {\n  try {\n    return !!new window.DOMParser().parseFromString(\n      trustedHTMLFromString("") as string, 'text/html');\n  } catch {\n    return false;\n  }\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n *^\n\n/**\n * A pattern that recognizes a commonly useful subset of URLs that are safe.\n * This regular expression matches a subset of URLs that will not cause script\n * execution if used in URL context within a HTML document. Specifically, this\n * regular expression matches if (comment from here on and regex copied from\n * Soy's EscapingConventions):\n * (1) Either an allowed protocol (http, https, mailto or ftp).\n * (2) or no protocol. A protocol must be followed by a colon. The below\n * allows that by allowing colons only after one of the characters [/?#].\n * A colon after a hash (#) must be in the fragment.\n * Otherwise, a colon after a (?) must be in a query.\n * Otherwise, a colon after a single solidus (/) must be in a path.\n * Otherwise, a colon after a double solidus (//) must be in the authority\n * (before port).\n * The pattern disallows &, used in HTML entity declarations before\n * one of the characters in [/?#]. This disallows HTML entities used in the\n * protocol name, which should never happen, e.g. \"h&#116;tp\" for\n * \"http\".\n * It also disallows HTML entities in the first path part of a relative\n * path,\n * e.g. \"foo&lt;bar/baz\". Our existing escaping functions should not produce\n * that. More importantly, it disallows masking of a colon,\n * e.g. \"javascript&#58;...\".\n */\n *^\n\n * This regular expression was taken from the Closure sanitization library.\n */\n *^\nconst SAFE_URL_PATTERN =\n  /^(?:(?:(https?)|mailto|data|ftp|tel|file|sms):|^&:/?#)*(?:[/?#])$/gi;\n\nexport function _sanitizeUrl(url: string): string {\n  url = String(url);\n  if (url.match(SAFE_URL_PATTERN)) return url;\n  if (typeof ngDevMode ===\n    'undefined' || ngDevMode) {\n    console.warn(`WARNING: sanitizing unsafe URL value ${url}` (see\n      https://g.co/ng/security#xss));\n  }\n  return 'unsafe:' + url;\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n *^\n\nimport {TrustedHTML} from\n  './util/security/trusted_type_defs';\nimport {trustedHTMLFromString} from\n  './util/security/trusted_types';\nimport {getInertBodyHelper, InertBodyHelper} from './inert_body';\nimport\n  {_sanitizeUrl} from './url_sanitizer';\n\nfunction tagSet(tags: string): {[k: string]: boolean} {\n  const res: {[k: string]: boolean} = {};\n  for (const t of tags.split(',')) res[t] = true;\n  return res;\n}\n\nfunction merge(...sets: {[k: string]: boolean}[]): {[k: string]: boolean} {\n  const res: {[k: string]: boolean} = {};\n  for (const s of sets) {\n    for (const v in s) {\n      if (s.hasOwnProperty(v)) res[v] = true;\n    }\n  }\n  return res;\n}\n\n// Good source of info about elements and attributes\n// https://html.spec.whatwg.org/#semantics\n// https://simon.html5.org/html-elements\n// Safe Void Elements - HTML5\n// https://html.spec.whatwg.org/#void-elements\nconst VOID_ELEMENTS = tagSet('area,br,col,hr,img,wbr');\n\n// Elements that you can, intentionally, leave open (and which close themselves)\n// https://html.spec.whatwg.org/#optional-tags\nconst OPTIONAL_END_TAG_BLOCK_ELEMENTS =\n  tagSet('colgroup,dd,dt,li,p,tbody,td,tfoot,th,thead,tr');\nconst OPTIONAL_END_TAG_INLINE_ELEMENTS =\n  tagSet('rp,rt');\nconst OPTIONAL_END_TAG_ELEMENTS =\n  merge(OPTIONAL_END_TAG_INLINE_ELEMENTS, OPTIONAL_END_TAG_BLOCK_ELEMENTS);\n\n
```

```

Safe Block Elements - HTML5\nconst BLOCK_ELEMENTS = merge(\n
OPTIONAL_END_TAG_BLOCK_ELEMENTS,\n tagSet(\n  'address,article,' +\n
'aside,blockquote,caption,center,del,details,dialog,dir,div,dl,figure,figcaption,footer,h1,h2,h3,h4,h5,' +\n
'h6,header,hgroup,hr,ins,main,map,menu,nav,ol,pre,section,summary,table,ul');\n\n// Inline Elements -
HTML5\nconst INLINE_ELEMENTS = merge(\n  OPTIONAL_END_TAG_INLINE_ELEMENTS,\n  tagSet(\n    'a,abbr,acronym,audio,b,' +\n
'bdi,bdo,big,br,cite,code,del,dfn,em,font,i,img,ins,kbd,label,map,mark,picture,q,ruby,rp,rt,s,' +\n
'samp,small,source,span,strike,strong,sub,sup,time,track,tt,u,var,video');\n\nexport const VALID_ELEMENTS =\nmerge(VOID_ELEMENTS,\n  BLOCK_ELEMENTS, INLINE_ELEMENTS, OPTIONAL_END_TAG_ELEMENTS);\n\n// Attributes that have
href and hence need to be sanitized\nexport const URI_ATTRS =
tagSet('background,cite,href,itemtype,longdesc,poster,src,xlink:href');\n\nconst HTML_ATTRS = tagSet(\n
'abbr,accesskey,align,alt,autoplay,axis,bgcolor,border,cellpadding,cellspacing,class,clear,color,cols,colspan,' +\n
'compact,controls,coords,datetime,default,dir,download,face,headers,height,hidden,hreflang,hspace,' +\n
'ismap,itemscope,itemprop,kind,label,lang,language,loop,media,muted,nohref,nowrap,open,preload,rel,rev,role,rows
, rowspan,rules,' +\n
'scope,scrolling,shape,size,sizes,span,srclang,srcset,start,summary,tabindex,target,title,translate,type,usemap,' +\n
'valign,value,vspace,width');\n\n// Accessibility attributes as per WAI-ARIA 1.1 (W3C Working Draft 14 December
2018)\nconst ARIA_ATTRS = tagSet(\n  'aria-activedescendant,aria-atomic,aria-autocomplete,aria-busy,aria-
checked,aria-colcount,aria-colindex,'
  +\n  'aria-colspan,aria-controls,aria-current,aria-describedby,aria-details,aria-disabled,aria-dropeffect,' +\n  'aria-
errormessage,aria-expanded,aria-flowto,aria-grabbed,aria-haspopup,aria-hidden,aria-invalid,' +\n  'aria-
keyshortcuts,aria-label,aria-labelledby,aria-level,aria-live,aria-modal,aria-multiline,' +\n  'aria-multiselectable,aria-
orientation,aria-owns,aria-placeholder,aria-posinset,aria-pressed,aria-readonly,' +\n  'aria-relevant,aria-
required,aria-roledescription,aria-rowcount,aria-rowindex,aria-rowspan,aria-selected,' +\n  'aria-setsize,aria-
sort,aria-valuemax,aria-valuemin,aria-valuenow,aria-valuetext');\n\n// NB: This currently consciously doesn't
support SVG. SVG sanitization has had several security\n// issues in the past, so it seems safer to leave it out if
possible. If support for binding SVG via\n// innerHTML is required, SVG attributes should be added here.\n\n// NB:
Sanitization does not allow <form> elements or other active elements (<button>
etc). Those\n// can be sanitized, but they increase security surface area without a legitimate use case, so they\n// are
left out here.\n\nexport const VALID_ATTRS = merge(URI_ATTRS, HTML_ATTRS, ARIA_ATTRS);\n\n// Elements whose content should not be traversed/preserved, if the elements themselves are invalid.\n\n// Typically,
`<invalid>Some content</invalid>` would traverse (and in this case preserve)\n// `Some content`, but strip `invalid-
element` opening/closing tags. For some elements, though, we\n// don't want to preserve the content, if the elements
themselves are going to be removed.\n\nconst SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS =
tagSet('script,style,template');\n\n/**\n * SanitizingHtmlSerializer serializes a DOM fragment, stripping out any
unsafe elements and unsafe\n * attributes.\n */\n\nexport class SanitizingHtmlSerializer {\n  // Explicitly track if something
was stripped, to avoid accidentally warning of sanitization just\n  // because characters were re-encoded.\n  public
sanitizedSomething = false;\n  private buf: string[] = [];\n\n  sanitizeChildren(el: Element): string {\n    // This
cannot use a TreeWalker, as it has to run on Angular's various DOM adapters.\n    // However this code never
accesses properties off of `document` before deleting its contents\n    // again, so it shouldn't be vulnerable to DOM
clobbering.\n    let current: Node = el.firstChild!;\n    let traverseContent = true;\n    while (current) {\n      if
(current.nodeType === Node.ELEMENT_NODE) {\n        traverseContent = this.startElement(current as
Element);\n      } else if (current.nodeType === Node.TEXT_NODE) {\n        this.chars(current.nodeValue!);\n      }
else {\n        // Strip non-element, non-text nodes.\n        this.sanitizedSomething = true;\n      }\n      if
(traverseContent && current.firstChild) {\n        current = current.firstChild!;\n        continue;\n      }\n      while
(current) {\n        // Leaving the element. Walk up and to the right, closing

```





```

getTemplateContent(inertBodyElement!) as Element || inertBodyElement);
  if ((typeof ngDevMode === 'undefined' || ngDevMode) && sanitizer.sanitizedSomething) {
    console.warn(
      'WARNING: sanitizing HTML stripped some content, see https://g.co/ng/security#xss');
  }
  return trustedHTMLFromString(safeHtml);
} finally {
  // In case anything goes wrong, clear out inertElement to reset
  the entire DOM structure.
  if (inertBodyElement) {
    const parent = getTemplateContent(inertBodyElement) ||
    inertBodyElement;
    while (parent.firstChild) {
      parent.removeChild(parent.firstChild);
    }
  }
}
}

export function getTemplateContent(el: Node): Node|null {
  return 'content' in el as any /**
  Microsoft/TypeScript#21517 */ && isTemplateElement(el) ?
  el.content :
  null;
}

function
isTemplateElement(el: Node): el is HTMLTemplateElement {
  return el.nodeType === Node.ELEMENT_NODE
  && el.nodeName === 'TEMPLATE';
}

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 */
 * A SecurityContext marks a location that has dangerous security
 * implications, e.g. a DOM property
 * like `innerHTML` that could cause Cross Site Scripting (XSS) security bugs
 * when improperly
 * handled.
 * See DomSanitizer for more details on security in Angular applications.
 */
 * @publicApi
 */
export enum SecurityContext {
  NONE = 0,
  HTML = 1,
  STYLE = 2,
  SCRIPT = 3,
  URL = 4,
  RESOURCE_URL = 5,
}

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 * found in the LICENSE file at
 * https://angular.io/license
 */
import { RuntimeError, RuntimeErrorCode } from '../errors';
import {
  getDocument } from '../render3/interfaces/document';
import { SANITIZER } from
../render3/interfaces/view;
import { getLView } from
../render3/state;
import { renderStringify } from
../render3/util/stringify_utils;
import { TrustedHTML,
TrustedScript, TrustedScriptURL } from
../util/security/trusted_type_defs;
import { trustedHTMLFromString,
trustedScriptURLFromString } from
../util/security/trusted_types;
import { trustedHTMLFromStringBypass,
trustedScriptFromStringBypass, trustedScriptURLFromStringBypass } from
../util/security/trusted_types_bypass;
import { allowSanitizationBypassAndThrow, BypassType,
unwrapSafeValue } from
../bypass;
import { _sanitizeHtml as _sanitizeHtml } from
../html_sanitizer;
import { Sanitizer } from
../sanitizer;
import { SecurityContext } from
../security;
import { _sanitizeUrl as _sanitizeUrl }
from
../url_sanitizer;
/**
 * An `html` sanitizer which converts untrusted `html` **string** into trusted
 * string by removing
 * dangerous content.
 * This method parses the `html` and locates potentially dangerous
 * content (such as urls and
 * javascript) and removes it.
 *
 * It is possible to mark a string as trusted by calling { @link
 * bypassSanitizationTrustHtml }.
 * @param unsafeHtml untrusted `html`, typically from the user.
 * @returns `html` string which is safe to display to user,
 * because all of the dangerous javascript
 * and urls have been removed.
 */
 * @codeGenApi
 */
export function
sanitizeHtml(unsafeHtml: any): TrustedHTML|string {
  const sanitizer = getSanitizer();
  if (sanitizer) {
    return trustedHTMLFromStringBypass(sanitizer.sanitize(SecurityContext.HTML,
    unsafeHtml) || "");
  }
  if (allowSanitizationBypassAndThrow(unsafeHtml, BypassType.Html)) {
    return
    trustedHTMLFromStringBypass(unwrapSafeValue(unsafeHtml));
  }
  return _sanitizeHtml(getDocument(),
  renderStringify(unsafeHtml));
}

/**
 * A `style` sanitizer which converts untrusted `style` **string** into
 * trusted string by removing
 * dangerous content.
 * It is possible to mark a string as trusted by calling { @link
 * bypassSanitizationTrustStyle }.
 *
 * @param unsafeStyle untrusted `style`, typically from the user.
 * @returns `style` string which is safe to
 * bind to the `style` properties.
 */
 * @codeGenApi
 */
export function
sanitizeStyle(unsafeStyle: any): string {
  const sanitizer = getSanitizer();
  if (sanitizer) {
    return sanitizer.sanitize(SecurityContext.STYLE, unsafeStyle)
    || "";
  }
  if (allowSanitizationBypassAndThrow(unsafeStyle, BypassType.Style)) {
    return
    unwrapSafeValue(unsafeStyle);
  }
  return renderStringify(unsafeStyle);
}

/**
 * A `url` sanitizer which
 * converts untrusted `url` **string** into trusted string by removing
 * dangerous
 * content.
 * This method
 * parses the `url` and locates potentially dangerous content (such as javascript) and
 * removes it.
 * It is
 * possible to mark a string as trusted by calling { @link
 * bypassSanitizationTrustUrl }.
 * @param unsafeUrl

```

untrusted `url`, typically from the user. `@returns` `url` string which is safe to bind to the `src` properties such as `

```

* @codeGenApi
*/
export function sanitizeUrl(unsafeUrl: any): string {
  const sanitizer = getSanitizer();
  if (sanitizer) {
    return sanitizer.sanitize(SecurityContext.URL, unsafeUrl) || "";
  }
  if (allowSanitizationBypassAndThrow(unsafeUrl, BypassType.Url)) {
    return unwrapSafeValue(unsafeUrl);
  }
  return _sanitizeUrl(renderStringify(unsafeUrl));
}

```

A `url` sanitizer which only lets trusted `url`s through. This passes only `url`s marked trusted by calling `{ @link bypassSanitizationTrustResourceUrl }`.

`@param` unsafeResourceUrl untrusted `url`, typically from the user. `@returns` `url` string which is safe to bind to the `src` properties such as `

```

* @codeGenApi
*/
export function sanitizeResourceUrl(unsafeResourceUrl: any): TrustedScriptURL|string {
  const sanitizer = getSanitizer();
  if (sanitizer) {
    return trustedScriptURLFromStringBypass(
      sanitizer.sanitize(SecurityContext.RESOURCE_URL, unsafeResourceUrl) || "");
  }
  if (allowSanitizationBypassAndThrow(unsafeResourceUrl, BypassType.ResourceUrl)) {
    return trustedScriptURLFromStringBypass(unwrapSafeValue(unsafeResourceUrl));
  }
  throw new RuntimeError(
    RuntimeErrorCode.UNSAFE_VALUE_IN_RESOURCE_URL,
    ngDevMode && 'unsafe value used in a resource URL context (see https://g.co/ng/security#xss);
  );
}

```

A `script` sanitizer which only lets trusted javascript through. This passes only `script`s marked trusted by calling `{ @link bypassSanitizationTrustScript }`.

`@param` unsafeScript untrusted `script`, typically from the user. `@returns` `url` string which is safe to bind to the `

```

* @codeGenApi
*/
export function sanitizeScript(unsafeScript: any): TrustedScript|string {
  const sanitizer = getSanitizer();
  if (sanitizer) {
    return trustedScriptFromStringBypass(
      sanitizer.sanitize(SecurityContext.SCRIPT, unsafeScript) || "");
  }
  if (allowSanitizationBypassAndThrow(unsafeScript, BypassType.Script)) {
    return trustedScriptFromStringBypass(unwrapSafeValue(unsafeScript));
  }
  throw new RuntimeError(
    RuntimeErrorCode.UNSAFE_VALUE_IN_SCRIPT,
    ngDevMode && 'unsafe value used in a script context');
}

```

A template tag function for promoting the associated constant literal to a TrustedHTML. Interpolation is explicitly not allowed.

`@param` html constant template literal containing trusted HTML. `@returns` TrustedHTML wrapping `html`.

`@security` This is a security-sensitive function and should only be used to convert constant values of attributes and properties found in application-provided Angular templates to TrustedHTML.

```

* @codeGenApi
*/
export function trustConstantHtml(html: TemplateStringsArray): TrustedHTML|string {
  // The following runtime check ensures that the function was called as a template tag
  // (e.g. trustConstantHtml`content`), without any interpolation (e.g. not trustConstantHtml`content ${variable}`).
  // A TemplateStringsArray is an array with a `raw` property that is also an array. The associated template
  // literal has no interpolation if and only if the length of the TemplateStringsArray is 1.
  if (ngDevMode && (!Array.isArray(html) || !Array.isArray(html.raw) || html.length !== 1)) {
    throw new Error(`Unexpected interpolation in trusted HTML constant: ${html.join('')}`);
  }
  return trustedHTMLFromString(html[0]);
}

```

A template tag function for promoting the associated constant literal to a TrustedScriptURL. Interpolation is explicitly not allowed.

`@param` url constant template literal containing a trusted script URL. `@returns` TrustedScriptURL wrapping `url`.

`@security` This is a security-sensitive function and should only be used to convert constant values of attributes and properties found in application-provided Angular templates to TrustedScriptURL.

```

* @codeGenApi
*/
export function trustConstantResourceUrl(url: TemplateStringsArray): TrustedScriptURL|string {
  // The following runtime check ensures that the function was called as a template tag
  // (e.g. trustConstantResourceUrl`content`), without any interpolation (e.g. not trustConstantResourceUrl`content ${variable}`).
  // A TemplateStringsArray is an array with a `raw` property that is also an array. The associated template
  // literal has no interpolation if and only if the length of the TemplateStringsArray is 1.
  if (ngDevMode && (!Array.isArray(url) || !Array.isArray(url.raw) || url.length !== 1)) {
    throw new Error(`Unexpected interpolation in trusted

```

```

URL constant: ${url.join('?')});\n } \n return trustedScriptURLFromString(url[0]);\n}\n\n/**\n * Detects which sanitizer to use for URL property, based on tag name and prop name.\n *\n * The rules are based on the RESOURCE_URL context config from\n * `packages/compiler/src/schema/dom_security_schema.ts`.\n * If tag and prop names don't match Resource URL schema, use URL sanitizer.\n */\nexport function getUrlSanitizer(tag: string, prop: string) {\n  if ((prop === 'src' &&\n    (tag === 'embed' || tag === 'frame' || tag === 'iframe' || tag === 'media' ||\n    tag === 'script')) ||\n    (prop === 'href' && (tag === 'base' || tag === 'link'))) {\n    return sanitizeResourceUrl;\n  }\n  return sanitizeUrl;\n}\n\n/**\n * Sanitizes URL, selecting sanitizer function based on tag and property names.\n *\n * This function is used in case we can't define security context at compile time, when only prop\n * name is available. This happens when we generate host bindings for Directives/Components. The\n * host element is unknown at compile time, so we defer calculation of specific sanitizer to\n * runtime.\n *\n * @param unsafeUrl untrusted `url`, typically from the user.\n * @param tag target element tag name.\n * @param prop name of the property that contains the value.\n * @returns `url` string which is safe to bind.\n */\n\n@codeGenApi\nexport function sanitizeUrlOrResourceUrl(unsafeUrl: any, tag: string, prop: string): any {\n  return getUrlSanitizer(tag, prop)(unsafeUrl);\n}\n\nexport function validateAgainstEventProperties(name: string) {\n  if (name.toLowerCase().startsWith('on')) {\n    const errorMessage =\n      `Binding to event property '${name}' is disallowed for security reasons,`\n      +\n      ` please use (${name.slice(2)})=...`\n      +\n      `\\nIf '${name}' is a directive input, make sure the directive is imported by the`\n      +\n      ` current module.`;\n    throw new\n      RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING, errorMessage);\n  }\n}\n\nexport function validateAgainstEventAttributes(name: string) {\n  if (name.toLowerCase().startsWith('on')) {\n    const\n      errorMessage =\n        `Binding to event attribute '${name}' is disallowed for security reasons,`\n        +\n        ` please use (${name.slice(2)})=...`;\n    throw new\n      RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING, errorMessage);\n  }\n}\n\nfunction getSanitizer(): Sanitizer|null {\n  const IView = getLView();\n  return IView &&\n    IView[SANITIZER];\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\nimport {InjectionToken} from './injection_token';\n\n/**\n * A multi-provider token for initialization functions that will run upon construction of an\n * environment injector.\n */\n\n@publicApi\nexport const ENVIRONMENT_INITIALIZER = new InjectionToken<() =>\n  void>('ENVIRONMENT_INITIALIZER');\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport\n  {InjectionToken} from './injection_token';\nimport {Injector} from './injector';\nimport {InjectorMarkers} from './injector_marker';\n\n/**\n * An InjectionToken that gets the current `Injector` for `createInjector`-style injectors.\n *\n * Requesting this token instead of `Injector` allows `StaticInjector` to be tree-shaken from a\n * project.\n */\n\n@publicApi\nexport const INJECTOR = new InjectionToken<Injector>(\n  'INJECTOR',\n  // Disable tslint because this is const enum which gets inlined not top level prop access.\n  // tslint:disable-next-line: no-toplevel-property-access\n  InjectorMarkers.Injector as any, // Special value used by Ivy to identify `Injector`.\n);\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\nimport {Type} from './interface/type';\nimport {InjectionToken} from './injection_token';\n\nexport const INJECTOR_DEF_TYPES = new\n  InjectionToken<Type<unknown>>('INJECTOR_DEF_TYPES');\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {stringify} from './util/stringify';\nimport {Injector} from './injector';\nimport {THROW_IF_NOT_FOUND} from './injector_compatibility';\n\nexport class NullInjector implements Injector {\n  get(token: any, notFoundValue: any = THROW_IF_NOT_FOUND): any {\n    if\n      (notFoundValue === THROW_IF_NOT_FOUND) {\n      const error = new Error(`NullInjectorError: No provider for\n        ${stringify(token)}!`);\n      error.name = 'NullInjectorError';\n      throw error;\n    }\n  }\n}

```

```

    }
    return notFoundValue;
  }
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
export {EMPTY_ARRAY} from './util/empty';
"/**
 * @license
 * Copyright
 * Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import {RuntimeError, RuntimeErrorCode} from
 './errors';
import {Type} from './interface/type';
import {getComponentDef} from './render3/definition';
import
 {getFactoryDef} from './render3/definition_factory';
import {throwCyclicDependencyError,
 throwInvalidProviderError} from './render3/errors_di';
import {stringifyForError} from
 './render3/util/stringify_utils';
import {deepForEach} from './util/array_utils';
import {getClosureSafeProperty}
 from './util/property';
import
 {stringify} from './util/stringify';
import {EMPTY_ARRAY} from './view';
import {resolveForwardRef} from
 './forward_ref';
import {ENVIRONMENT_INITIALIZER} from './initializer_token';
import {inject as inject}
 from './injector_compatibility';
import {getInjectorDef, InjectorType, InjectorTypeWithProviders} from
 './interface/defs';
import {ClassProvider, ConstructorProvider, ExistingProvider, FactoryProvider,
 ImportedNgModuleProviders, ModuleWithProviders, Provider, StaticClassProvider, TypeProvider, ValueProvider}
 from './interface/provider';
import {INJECTOR_DEF_TYPES} from './internal_tokens';
"/**
 * A source of
 * providers for the `importProvidersFrom` function.
 */
@developerPreview
 @publicApi
export type
 ImportProvidersSource =
 Type<unknown> | ModuleWithProviders<unknown> | Array<ImportProvidersSource>;
"/**
 * Collects providers
 * from all NgModules and standalone components, including transitively imported
 * ones.
 * Providers
 * extracted
 * via `importProvidersFrom` are only usable in an application injector or
 * another environment injector (such as a
 * route injector). They should not be used in component
 * providers.
 * More information about standalone
 * components can be found in [this
 * guide](guide/standalone-components).
 */
@usageNotes
 * The results of
 * the `importProvidersFrom` call can be used in the `bootstrapApplication` call:
 * ```typescript
 * await
 * bootstrapApplication(RootComponent, {
 *   providers: [
 *     importProvidersFrom(NgModuleOne,
 * NgModuleTwo)
 *   ]
 * });
 * ```
 * You can also use the `importProvidersFrom` results in the `providers`
 * field of a route, when a
 * standalone component is used:
 * ```typescript
 * export const ROUTES: Route[] =
 * [
 *   {
 *     path: 'foo',
 *     providers: [
 *       importProvidersFrom(NgModuleOne, NgModuleTwo)
 *     ],
 *     component: YourStandaloneComponent
 *   ]
 * ];
 * ```
 * @returns Collected providers
 * from the specified list of types.
 */
@publicApi
 @developerPreview
export function
 importProvidersFrom(...sources: ImportProvidersSource[]):
 ImportedNgModuleProviders {
  return {
    providers:
    internalImportProvidersFrom(true, sources);
  };
}
export function internalImportProvidersFrom(
  checkForStandaloneCmp: boolean, ...sources: ImportProvidersSource[]):
 Provider[] {
  const providersOut:
  SingleProvider[] = [];
  const dedup = new Set<Type<unknown>>(); // already seen types
  let
  injectorTypesWithProviders: InjectorTypeWithProviders<unknown>[] | undefined;
  deepForEach(sources, source
 => {
    if ((typeof ngDevMode === 'undefined' || ngDevMode) && checkForStandaloneCmp) {
      const
      cmpDef = getComponentDef(source);
      if (cmpDef?.standalone) {
        throw new RuntimeError(
          RuntimeErrorCode.IMPORT_PROVIDERS_FROM_STANDALONE,
          `Importing providers supports
          NgModule or ModuleWithProviders but got a standalone component` +
          stringifyForError(source));
      }
    }
    // Narrow `source` to access the internal type analogue
    for `ModuleWithProviders`
    const internalSource = source as Type<unknown> |
    InjectorTypeWithProviders<unknown>;
    if (walkProviderTree(internalSource, providersOut, [], dedup)) {
      injectorTypesWithProviders ||= [];
      injectorTypesWithProviders.push(internalSource);
    }
  });
  // Collect
  all providers from `ModuleWithProviders` types.
  if (injectorTypesWithProviders !== undefined) {
    processInjectorTypesWithProviders(injectorTypesWithProviders, providersOut);
  }
  return
  providersOut;
}
"/**
 * Collects all providers from the list of `ModuleWithProviders` and appends them to the
 * provided
 * array.
 */
function processInjectorTypesWithProviders(
  typesWithProviders:

```

```

InjectorTypeWithProviders<unknown>[], providersOut: Provider[]): void {\n for (let i = 0; i <
typesWithProviders.length; i++) {\n const {ngModule, providers}
= typesWithProviders[i];\n deepForEach(providers!, provider => {\n ngDevMode &&
validateProvider(provider, providers || EMPTY_ARRAY, ngModule);\n providersOut.push(provider);\n });\n
}\n}\n\n/*\n * Internal type for a single provider in a deep provider array.\n */\nexport type SingleProvider =
TypeProvider|ValueProvider|ClassProvider|ConstructorProvider|\n
ExistingProvider|FactoryProvider|StaticClassProvider;\n\n/*\n * The logic visits an `InjectorType`, an
`InjectorTypeWithProviders`, or a standalone\n * `ComponentType`, and all of its transitive providers and collects
providers.\n * If an `InjectorTypeWithProviders` that declares providers besides the type is specified,\n * the
function will return `true` to indicate that the providers of the type definition need\n * to be processed. This allows
us to process providers of injector types after all imports of\n * an injector definition are processed. (following View
Engine semantics: see FW-1349)\n */\nexport
function walkProviderTree(\n container: Type<unknown>|InjectorTypeWithProviders<unknown>, providersOut:
SingleProvider[],\n parents: Type<unknown>[],\n dedup: Set<Type<unknown>>): container is
InjectorTypeWithProviders<unknown> {\n container = resolveForwardRef(container);\n if (!container) return
false;\n\n // The actual type which had the definition. Usually `container`, but may be an unwrapped type\n // from
`InjectorTypeWithProviders`.\n let defType: Type<unknown>|null = null;\n let injDef =
getInjectorDef(container);\n const cmpDef = !injDef && getComponentDef(container);\n if (!injDef && !cmpDef)
{\n // `container` is not an injector type or a component type. It might be:\n // * An `InjectorTypeWithProviders`
that wraps an injector type.\n // * A standalone directive or pipe that got pulled in from a standalone
component's\n // dependencies.\n // Try to unwrap it as an `InjectorTypeWithProviders` first.\n const
ngModule: Type<unknown>|undefined
=\n (container as InjectorTypeWithProviders<any>).ngModule as Type<unknown>| undefined;\n injDef =
getInjectorDef(ngModule);\n if (injDef) {\n defType = ngModule!;\n } else {\n // Not a component or
injector type, so ignore it.\n return false;\n }\n } else if (cmpDef && !cmpDef.standalone) {\n return false;\n
} else {\n defType = container as Type<unknown>;\n }\n\n // Check for circular dependencies.\n if (ngDevMode
&& parents.indexOf(defType) !== -1) {\n const defName = stringify(defType);\n const path =
parents.map(stringify);\n throwCyclicDependencyError(defName, path);\n }\n\n // Check for multiple imports of
the same module\n const isDuplicate = dedup.has(defType);\n if (cmpDef) {\n if (isDuplicate) {\n // This
component definition has already been processed.\n return false;\n }\n dedup.add(defType);\n if
(cmpDef.dependencies) {\n const deps =\n typeof cmpDef.dependencies
=== 'function' ? cmpDef.dependencies() : cmpDef.dependencies;\n for (const dep of deps) {\n
walkProviderTree(dep, providersOut, parents, dedup);\n }\n }\n } else if (injDef) {\n // First, include
providers from any imports.\n if (injDef.imports !== null && !isDuplicate) {\n // Before processing defType's
imports, add it to the set of parents. This way, if it ends\n // up deeply importing itself, this can be detected.\n
ngDevMode && parents.push(defType);\n // Add it to the set of dedups. This way we can detect multiple imports
of the same module\n dedup.add(defType);\n\n let importTypesWithProviders:
(InjectorTypeWithProviders<any>|[])|undefined;\n try {\n deepForEach(injDef.imports, imported => {\n
if (walkProviderTree(imported, providersOut, parents, dedup)) {\n importTypesWithProviders ||= [];\n
\n // If the processed import is an injector type with providers, we store it in the\n
\n // list of import types with providers, so that we can process those afterwards.\n
importTypesWithProviders.push(imported);\n }\n });\n } finally {\n // Remove it from the parents
set when finished.\n ngDevMode && parents.pop();\n }\n\n // Imports which are declared with providers
(TypeWithProviders) need to be processed\n // after all imported modules are processed. This is similar to how
View Engine\n // processes/merges module imports in the metadata resolver. See: FW-1349.\n if
(importTypesWithProviders !== undefined) {\n
processInjectorTypesWithProviders(importTypesWithProviders, providersOut);\n }\n }\n\n if (!isDuplicate)
{\n // Track the InjectorType and add a provider for it.\n // It's important that this is done after the def's

```

```

imports.\n    const factory = getFactoryDef(defType) || (() => new defType!());\n\n    // Append extra providers to
make more info available
    for consumers (to retrieve an injector\n    // type), as well as internally (to calculate an injection scope correctly
and eagerly\n    // instantiate a `defType` when an injector is created).\n    providersOut.push(\n    // Provider
to create `defType` using its factory.\n    {provide: defType, useFactory: factory, deps: EMPTY_ARRAY},\n\n
    // Make this `defType` available to an internal logic that calculates injector scope.\n    {provide:
INJECTOR_DEF_TYPES, useValue: defType, multi: true},\n\n    // Provider to eagerly instantiate `defType` via
`ENVIRONMENT_INITIALIZER`.\n    {provide: ENVIRONMENT_INITIALIZER, useValue: () =>
inject(defType!), multi: true} //\n    );\n    }\n\n    // Next, include providers listed on the definition itself.\n    const
defProviders = injDef.providers;\n    if (defProviders != null && !isDuplicate) {\n    const injectorType = container
as InjectorType<any>;\n    deepForEach(defProviders, provider => {\n
        ngDevMode && validateProvider(provider, defProviders as SingleProvider[], injectorType);\n
providersOut.push(provider);\n    });\n    }\n    } else {\n    // Should not happen, but just in case.\n    return false;\n
}\n\n    return (\n    defType !== container &&\n    (container as InjectorTypeWithProviders<any>).providers !==
undefined);\n    }\n\n    function validateProvider(\n    provider: SingleProvider, providers: SingleProvider[],
containerType: Type<unknown>): void {\n    if (isTypeProvider(provider) || isValueProvider(provider) ||
isFactoryProvider(provider) ||\n    isExistingProvider(provider)) {\n    return;\n    }\n\n    // Here we expect the
provider to be a `useClass` provider (by elimination).\n    const classRef = resolveForwardRef(\n    provider &&
((provider as StaticClassProvider | ClassProvider).useClass || provider.provide));\n    if (!classRef) {\n
throwInvalidProviderError(containerType, providers, provider);\n    }\n    }\n\n    \nextport const USE_VALUE =\n    getClosureSafeProperty<ValueProvider>({provide:
String, useValue: getClosureSafeProperty});\n\n    \nextport function isValueProvider(value: SingleProvider): value is
ValueProvider {\n    return value !== null && typeof value == 'object' && USE_VALUE in value;\n    }\n\n    \nextport
function isExistingProvider(value: SingleProvider): value is ExistingProvider {\n    return !!(value && (value as
ExistingProvider).useExisting);\n    }\n\n    \nextport function isFactoryProvider(value: SingleProvider): value is
FactoryProvider {\n    return !!(value && (value as FactoryProvider).useFactory);\n    }\n\n    \nextport function
isTypeProvider(value: SingleProvider): value is TypeProvider {\n    return typeof value === 'function';\n    }\n\n    \nextport
function isClassProvider(value: SingleProvider): value is ClassProvider {\n    return !!(value as StaticClassProvider |
ClassProvider).useClass;\n    }\n\n    "/**\n    * @license\n    * Copyright Google LLC All Rights Reserved.\n    *\n    * Use of
this source code is governed by an MIT-style license that can be\n    * found in the
LICENSE file at https://angular.io/license\n    */\n\n    \nimport {InjectionToken} from './injection_token';\n\n    \nexport
type InjectorScope = 'root'|'platform'|'environment';\n\n    /**\n    * An internal token whose presence in an injector
indicates that the injector should treat itself\n    * as a root scoped injector when processing requests for unknown
tokens which may indicate\n    * they are provided in the root scope.\n    */\n\n    \nexport const INJECTOR_SCOPE = new
InjectionToken<InjectorScope|null>('Set injector scope.);\n\n    "/**\n    * @license\n    * Copyright Google LLC All
Rights Reserved.\n    *\n    * Use of this source code is governed by an MIT-style license that can be\n    * found in the
LICENSE file at https://angular.io/license\n    */\n\n    \nimport './util/ng_dev_mode';\n\n    \nimport {RuntimeError,
RuntimeErrorCode} from './errors';\n\n    \nimport {OnDestroy} from './interface/lifecycle_hooks';\n\n    \nimport {Type} from
'./interface/type';\n\n    \nimport {getComponentDef} from './render3/definition';\n\n    \nimport {FactoryFn, getFactoryDef}
from './render3/definition_factory';\n\n    \nimport {throwCyclicDependencyError, throwInvalidProviderError,
throwMixedMultiProviderError} from './render3/errors_di';\n\n    \nimport {newArray} from './util/array_utils';\n\n    \nimport
{EMPTY_ARRAY} from './util/empty';\n\n    \nimport {stringify} from './util/stringify';\n\n    \nimport {resolveForwardRef}
from './forward_ref';\n\n    \nimport {ENVIRONMENT_INITIALIZER} from './initializer_token';\n\n    \nimport
{setInjectImplementation} from './inject_switch';\n\n    \nimport {InjectionToken} from './injection_token';\n\n    \nimport
{Injector} from './injector';\n\n    \nimport {catchInjectorError, injectArgs, NG_TEMP_TOKEN_PATH,
setCurrentInjector, THROW_IF_NOT_FOUND, inject} from './injector_compatibility';\n\n    \nimport {INJECTOR} from
'./injector_token';\n\n    \nimport {getInheritedInjectableDef, getInjectableDef, InjectorType, InjectableDeclaration} from
'./interface/defs';\n\n    \nimport {InjectFlags} from './interface/injector';\n\n    \nimport {ClassProvider, ConstructorProvider,

```

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ImportedNgModuleProviders, Provider,
  StaticClassProvider} from './interface/provider';\nimport {INJECTOR_DEF_TYPES} from
'/internal_tokens';\nimport {NullInjector} from './null_injector';\nimport {importProvidersFrom, isExistingProvider,
isFactoryProvider, isTypeProvider, isValueProvider, SingleProvider} from './provider_collection';\nimport
{ProviderToken} from './provider_token';\nimport {INJECTOR_SCOPE, InjectorScope} from './scope';\n\n/**\n *
Marker which indicates that a value has not yet been created from the factory function.\n *\nconst NOT_YET =
{};\n\n/**\n * Marker which indicates that the factory function for a token is in the process of being called.\n *\n *
If the injector is asked to inject a token with its value set to CIRCULAR, that indicates\n * injection of a dependency
has recursively attempted to inject the original token, and there is\n * a circular dependency among the providers.\n
*\nconst CIRCULAR = {};\n\n/**\n * A lazily initialized NullInjector.\n *\nlet NULL_INJECTOR:
Injector|undefined
= undefined;\n\nexport function getNullInjector(): Injector {\n  if (NULL_INJECTOR === undefined) {\n
  NULL_INJECTOR = new NullInjector();\n  }\n  return NULL_INJECTOR;\n}\n\n/**\n * An entry in the injector
which tracks information about the given token, including a possible\n * current value.\n *\ninterface Record<T>
{\n  factory: (() => T)|undefined;\n  value: T|{};\n  multi: any[]|undefined;\n}\n\n/**\n * An `Injector` that's part of
the environment injector hierarchy, which exists outside of the\n * component tree.\n *\n * @developerPreview\n
*\nexport abstract class EnvironmentInjector implements Injector {\n  /**\n   * Retrieves an instance from the
injector based on the provided token.\n   * @returns The instance from the injector if defined, otherwise the
`notFoundValue`.\n   * @throws When the `notFoundValue` is `undefined` or
`Injector.THROW_IF_NOT_FOUND`.\n   *\n  abstract get<T>(token: ProviderToken<T>, notFoundValue?: T,
flags?: InjectFlags): T;\n  /**\n   * @deprecated
from v4.0.0 use ProviderToken<T>\n   * @suppress {duplicate}\n   *\n  abstract get(token: any, notFoundValue?:
any): any;\n\n  /**\n   * Runs the given function in the context of this `EnvironmentInjector`.\n   *\n   * Within the
function's stack frame, `inject` can be used to inject dependencies from this\n   * injector. Note that `inject` is only
usable synchronously, and cannot be used in any\n   * asynchronous callbacks or after any `await` points.\n   *\n   *
@param fn the closure to be run in the context of this injector\n   * @returns the return value of the function, if
any\n   *\n  abstract runInContext<ReturnT>(fn: () => ReturnT): ReturnT;\n\n  abstract destroy(): void;\n\n  /**\n
   * @internal\n   *\n  abstract onDestroy(callback: () => void): void;\n}\n\nexport class R3Injector extends
EnvironmentInjector {\n  /**\n   * Map of tokens to records which contain the instances of those tokens.\n   * -
`null` value implies that we don't have the record. Used by tree-shakable
injectors\n   * to prevent further searches.\n   *\n  private records = new Map<ProviderToken<any>,
Record<any>|null>();\n\n  /**\n   * Set of values instantiated by this injector which contain `ngOnDestroy` lifecycle
hooks.\n   *\n  private _ngOnDestroyHooks = new Set<OnDestroy>();\n\n  private _onDestroyHooks: Array<() =>
void> = [];\n\n  /**\n   * Flag indicating that this injector was previously destroyed.\n   *\n  get destroyed(): boolean
{\n    return this._destroyed;\n  }\n  private _destroyed = false;\n\n  private injectorDefTypes:
Set<Type<unknown>>;\n\n  constructor(\n    providers: Array<Provider|ImportedNgModuleProviders>, readonly
parent: Injector,\n    readonly source: string|null, readonly scopes: Set<InjectorScope>) {\n    super();\n    // Start
off by creating Records for every provider.\n    forEachSingleProvider(providers, provider =>
this.processProvider(provider));\n\n    // Make sure the INJECTOR token provides this injector.\n    this.records.set(INJECTOR,
makeRecord(undefined, this));\n\n    // And `EnvironmentInjector` if the current injector is supposed to be env-
scoped.\n    if (scopes.has('environment')) {\n      this.records.set(EnvironmentInjector, makeRecord(undefined,
this));\n    }\n\n    // Detect whether this injector has the APP_ROOT_SCOPE token and thus should provide\n    //
any injectable scoped to APP_ROOT_SCOPE.\n    const record = this.records.get(INJECTOR_SCOPE) as
Record<InjectorScope|null>;\n    if (record != null && typeof record.value === 'string') {\n
      this.scopes.add(record.value as InjectorScope);\n    }\n\n    this.injectorDefTypes =\n      new
Set(this.get(INJECTOR_DEF_TYPES.multi, EMPTY_ARRAY, InjectFlags.Self));\n  }\n\n  /**\n   * Destroy the
injector and release references to every instance or provider associated with it.\n   *\n   * Also calls the `OnDestroy`

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lifecycle hooks of every instance that was created for which a\n * hook was found.\n *\n override destroy(): void
{\n this.assertNotDestroyed();\n\n // Set destroyed = true first, in case lifecycle hooks re-enter destroy().\n this._destroyed = true;\n try {\n //
Call all the lifecycle hooks.\n for (const service of this._ngOnDestroyHooks) {\n service.ngOnDestroy();\n
}\n for (const hook of this._onDestroyHooks) {\n hook();\n }\n } finally {\n // Release all
references.\n this.records.clear();\n this._ngOnDestroyHooks.clear();\n this.injectorDefTypes.clear();\n
this._onDestroyHooks.length = 0;\n }\n }\n\n override onDestroy(callback: () => void): void {\n
this._onDestroyHooks.push(callback);\n }\n\n override runInContext<ReturnT>(fn: () => ReturnT): ReturnT {\n
this.assertNotDestroyed();\n\n const previousInjector = setCurrentInjector(this);\n const
previousInjectImplementation = setInjectImplementation(undefined);\n try {\n return fn();\n } finally {\n
setCurrentInjector(previousInjector);\n setInjectImplementation(previousInjectImplementation);\n
}\n }\n\n override get<T>(\n token: ProviderToken<T>, notFoundValue: any =
THROW_IF_NOT_FOUND,\n flags = InjectFlags.Default): T {\n this.assertNotDestroyed();\n // Set the
injection context.\n const previousInjector = setCurrentInjector(this);\n const previousInjectImplementation =
setInjectImplementation(undefined);\n try {\n // Check for the SkipSelf flag.\n if (!(flags &
InjectFlags.SkipSelf)) {\n // SkipSelf isn't set, check if the record belongs to this injector.\n let record:
Record<T>|undefined|null = this.records.get(token);\n if (record === undefined) {\n // No record, but
maybe the token is scoped to this injector. Look for an injectable\n // def with a scope matching this injector.\n
const def = couldBeInjectableType(token) && getInjectableDef(token);\n if (def &&
this.injectableDefInScope(def)) {\n // Found an injectable
def and it's scoped to this injector. Pretend as if it was here\n // all along.\n record =
makeRecord(injectableDefOrInjectorDefFactory(token), NOT_YET);\n } else {\n record = null;\n
}\n this.records.set(token, record);\n }\n // If a record was found, get the instance for it and return it.\n
if (record != null /* NOT null || undefined */) {\n return this.hydrate(token, record);\n }\n }\n\n //
Select the next injector based on the Self flag - if self is set, the next injector is\n // the NullInjector, otherwise it's
the parent.\n const nextInjector = !(flags & InjectFlags.Self) ? this.parent : getNullInjector();\n // Set the
notFoundValue based on the Optional flag - if optional is set and notFoundValue\n // is undefined, the value is
null, otherwise it's the notFoundValue.\n notFoundValue = (flags & InjectFlags.Optional) && notFoundValue
=== THROW_IF_NOT_FOUND
?\n null :\n notFoundValue;\n return nextInjector.get(token, notFoundValue);\n } catch (e: any) {\n
if (e.name === 'NullInjectorError') {\n const path: any[] = e[NG_TEMP_TOKEN_PATH] =
e[NG_TEMP_TOKEN_PATH] || [];\n path.unshift(stringify(token));\n if (previousInjector) {\n // We
still have a parent injector, keep throwing\n throw e;\n } else {\n // Format & throw the final error
message when we don't have any previous injector\n return catchInjectorError(e, token, 'R3InjectorError',
this.source);\n }\n } else {\n throw e;\n }\n } finally {\n // Lastly, restore the previous injection
context.\n setInjectImplementation(previousInjectImplementation);\n setCurrentInjector(previousInjector);\n
}\n }\n\n /** @internal *\n resolveInjectorInitializers() {\n const previousInjector = setCurrentInjector(this);\n
const previousInjectImplementation
= setInjectImplementation(undefined);\n try {\n const initializers =
this.get(ENVIRONMENT_INITIALIZER.multi, EMPTY_ARRAY, InjectFlags.Self);\n if (ngDevMode &&
!Array.isArray(initializers)) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_MULTI_PROVIDER,\n 'Unexpected type of the
`ENVIRONMENT_INITIALIZER` token value ' +\n `(expected an array, but got ${typeof initializers}).`
+\n 'Please check that the `ENVIRONMENT_INITIALIZER` token is configured as a '+\n
`multi: true` provider.);\n }\n for (const initializer of initializers) {\n initializer();\n }\n } finally {\n
setCurrentInjector(previousInjector);\n setInjectImplementation(previousInjectImplementation);\n }\n }\n\n
override toString() {\n const tokens: string[] = [];\n const records = this.records;\n for (const token of
records.keys()) {\n tokens.push(stringify(token));\n
}

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    }\n    return `R3Injector[${tokens.join(', ')}];\n  }\n\n  private assertNotDestroyed(): void {\n    if (this._destroyed) {\n      throw new RuntimeError(\n        RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,\n        ngDevMode && 'Injector has already been destroyed.);\n    }\n  }\n\n  /**\n   * Process a `SingleProvider` and add it.\n   */\n  private processProvider(provider: SingleProvider): void {\n    // Determine the token from the provider. Either it's its own token, or has a {provide: ...}\n    // property.\n    provider = resolveForwardRef(provider);\n    let token: any =\n      isTypeProvider(provider) ? provider : resolveForwardRef(provider && provider.provide);\n    // Construct a `Record` for the provider.\n    const record = providerToRecord(provider);\n\n    if (!isTypeProvider(provider) && provider.multi === true) {\n      // If the provider indicates that it's a multi-provider, process it specially.\n      // First check whether it's been defined already.\n\n      let multiRecord = this.records.get(token);\n      if (multiRecord) {\n        // It has. Throw a nice error if\n        if (ngDevMode && multiRecord.multi === undefined) {\n          throwMixedMultiProviderError();\n        }\n      } else {\n        multiRecord = makeRecord(undefined, NOT_YET, true);\n        multiRecord.factory = () => injectArgs(multiRecord!.multi!);\n        this.records.set(token, multiRecord);\n      }\n      token = provider;\n      multiRecord.multi!.push(provider);\n    } else {\n      const existing = this.records.get(token);\n      if (ngDevMode && existing && existing.multi !== undefined) {\n        throwMixedMultiProviderError();\n      }\n      this.records.set(token, record);\n    }\n\n    private hydrate<T>(token: ProviderToken<T>, record: Record<T>): T {\n      if (ngDevMode && record.value === CIRCULAR) {\n        throwCyclicDependencyError(stringify(token));\n      } else if (record.value === NOT_YET) {\n        record.value = CIRCULAR;\n        record.value = record.factory!();\n      }\n      if (typeof record.value === 'object' && record.value && hasOnDestroy(record.value)) {\n        this._ngOnDestroyHooks.add(record.value);\n      }\n      return record.value as T;\n    }\n\n    private injectableDefInScope(def: InjectableDeclaration<any>): boolean {\n      if (!def.providedIn) {\n        return false;\n      }\n      const providedIn = resolveForwardRef(def.providedIn);\n      if (typeof providedIn === 'string') {\n        return providedIn === 'any' || (this.scopes.has(providedIn));\n      } else {\n        return this.injectorDefTypes.has(providedIn);\n      }\n    }\n\n    function injectableDefOrInjectorDefFactory(token: ProviderToken<any>): FactoryFn<any> {\n      // Most tokens will have an injectable def directly on them, which specifies a factory directly.\n      const injectableDef = getInjectableDef(token);\n      const factory = injectableDef !== null ? injectableDef.factory : getFactoryDef(token);\n      if (factory !== null) {\n        return factory;\n      }\n\n      // InjectionTokens should have an injectable def (prov) and thus should be handled above.\n      // If it's missing that, it's an error.\n      if (token instanceof InjectionToken) {\n        throw new RuntimeError(\n          RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n          ngDevMode && `Token ${stringify(token)} is missing a prov definition.`);\n      }\n\n      // Undecorated types can sometimes be created if they have no constructor arguments.\n      if (token instanceof Function) {\n        return getUndecoratedInjectableFactory(token);\n      }\n\n      // There was no way to resolve a factory for this token.\n      throw new RuntimeError(\n        RuntimeErrorCode.INVALID_INJECTION_TOKEN, ngDevMode && 'unreachable');\n    }\n\n    function getUndecoratedInjectableFactory(token: Function) {\n      // If the token has parameters then it has dependencies that we cannot resolve implicitly.\n      const paramLength = token.length;\n      if (paramLength > 0) {\n        const args: string[] = newArray(paramLength, '?');\n        throw new RuntimeError(\n          RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n          ngDevMode && `Can't resolve all parameters for ${stringify(token)}: (${args.join(', ')}).`);\n      }\n\n      // The constructor function appears to have no parameters.\n      // This might be because it inherits from a super-class. In which case, use an injectable\n      // def from an ancestor if there is one.\n      // Otherwise this really is a simple class with no dependencies, so return a factory that\n      // just instantiates the zero-arg constructor.\n      const inheritedInjectableDef = getInheritedInjectableDef(token);\n      if (inheritedInjectableDef !== null) {\n        return () => inheritedInjectableDef.factory(token as Type<any>);\n      } else {\n        return () => new (token as Type<any>)();\n      }\n    }\n\n    function providerToRecord(provider: SingleProvider): Record<any> {\n      if (isValueProvider(provider)) {\n        return makeRecord(undefined, provider.useValue);\n      } else {\n        const factory: (() => any)|undefined = providerToFactory(provider);\n        return

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makeRecord(factory, NOT_YET);\n } }\n\n/**\n * Converts a `SingleProvider` into a factory function.\n *\n * @param provider provider to convert to factory\n */\nexport function providerToFactory(\n  provider: SingleProvider, ngModuleType?: InjectorType<any>, providers?: any[]): () => any {\n  let factory: (() => any)|undefined = undefined;\n  if (ngDevMode && isImportedNgModuleProviders(provider)) {\n    throwInvalidProviderError(undefined, providers, provider);\n  }\n  if (isTypeProvider(provider)) {\n    const unwrappedProvider = resolveForwardRef(provider);\n    return getFactoryDef(unwrappedProvider) || injectableDefOrInjectorDefFactory(unwrappedProvider);\n  } else {\n    if (isValueProvider(provider)) {\n      factory = () => resolveForwardRef(provider.useValue);\n    } else if (isFactoryProvider(provider)) {\n      factory = () => provider.useFactory(...injectArgs(provider.deps || []));\n    } else if (isExistingProvider(provider)) {\n      factory = () => inject(resolveForwardRef(provider.useExisting));\n    } else {\n      const classRef = resolveForwardRef(\n        provider &&\n        ((provider as StaticClassProvider | ClassProvider).useClass || provider.provider));\n      if (ngDevMode && !classRef) {\n        throwInvalidProviderError(ngModuleType, providers, provider);\n      }\n      if (hasDeps(provider)) {\n        factory = () => new (classRef)(...injectArgs(provider.deps));\n      } else {\n        return getFactoryDef(classRef) || injectableDefOrInjectorDefFactory(classRef);\n      }\n    }\n  }\n  return factory;\n}\n\nfunction makeRecord<T>(\n  factory: (() => T)|undefined, value: T|{ }, multi: boolean = false): Record<T> {\n  return {\n    factory: factory,\n    value: value,\n    multi: multi ? [] : undefined,\n  };\n}\n\nfunction hasDeps(value: ClassProvider|ConstructorProvider|\n  StaticClassProvider): value is ClassProvider&{ deps: any[] } {\n  return !(value as any).deps;\n}\n\nfunction hasOnDestroy(value: any): value is OnDestroy {\n  return value !== null && typeof value === 'object' &&\n    typeof (value as OnDestroy).ngOnDestroy === 'function';\n}\n\nfunction couldBeInjectableType(value: any): value is ProviderToken<any> {\n  return (typeof value === 'function') ||\n    (typeof value === 'object' && value instanceof InjectionToken);\n}\n\nfunction isImportedNgModuleProviders(provider: Provider|ImportedNgModuleProviders):\n  provider is ImportedNgModuleProviders {\n  return !(provider as ImportedNgModuleProviders).providers;\n}\n\nfunction forEachSingleProvider(\n  providers: Array<Provider|ImportedNgModuleProviders>,\n  fn: (provider: SingleProvider) => void): void {\n  for (const provider of providers) {\n    if (Array.isArray(provider)) {\n      forEachSingleProvider(provider, fn);\n    } else if (isImportedNgModuleProviders(provider)) {\n      forEachSingleProvider(provider.providers, fn);\n    } else {\n      fn(provider);\n    }\n  }\n}\n\n"/**\n * @license\n * Copyright\n * Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { ChangeDetectorRef } from\n './change_detection/change_detection';\nimport { Injector } from './di/injector';\nimport { EnvironmentInjector } from\n './di/r3_injector';\nimport { Type } from './interface/type';\nimport { ElementRef } from './element_ref';\nimport\n { NgModuleRef } from './ng_module_factory';\nimport { ViewRef } from './view_ref';\n\n/**\n * Represents a component created by a `ComponentFactory`.\n * Provides access to the component instance and related objects,\n * and provides the means of destroying the instance.\n *\n * @publicApi\n */\nexport abstract class ComponentRef<C> {\n  /**\n   * Updates a specified input name to a new value. Using this method will properly\n   * mark for check\n   * component using the `OnPush` change detection strategy. It will also assure that the\n   * `OnChanges` lifecycle\n   * hook runs when a dynamically created component is change-detected.\n   *\n   * @param name The name of an input.\n   * @param value The new value of an input.\n   */\n  abstract setInput(name: string, value: unknown): void;\n\n  /**\n   * The host or anchor [element](guide/glossary#element) for this component instance.\n   */\n  abstract getLocation(): ElementRef;\n\n  /**\n   * The [dependency injector](guide/glossary#injector) for this component instance.\n   */\n  abstract get injector(): Injector;\n\n  /**\n   * This component instance.\n   */\n  abstract get instance(): C;\n\n  /**\n   * The [host view](guide/glossary#view-tree) defined by the template\n   * for this component instance.\n   */\n  abstract get hostView(): ViewRef;\n\n  /**\n   * The change detector for this component instance.\n   */\n  abstract get changeDetectorRef(): ChangeDetectorRef;\n\n  /**\n   * The type of this component (as created by a `ComponentFactory` class).\n   */\n  abstract get componentType():

```



belongs\n \* @returns The ElementRef instance to use\n \* \nexport function createElementRef(tNode: TNode, IView: LView): ElementRef {\n return new ElementRef(getNativeByTNode(tNode, IView) as RElement);\n}\n\n/\*\*\n \* A wrapper around a native element inside of a View.\n \* \n \* An `ElementRef` is backed by a render-specific element. In the browser, this is usually a DOM\n \* element.\n \* \n \* @security Permitting direct access to the DOM can make your application more vulnerable to\n \* XSS attacks. Carefully review any use of `ElementRef` in your code. For more detail, see the\n \* [Security Guide](https://g.co/ng/security).\n \* \n \* @publicApi\n \* \n \* \n// Note: We don't expose things like `Injector`, `ViewContainer`, ... here,\n// i.e. users have to ask for what they need. With that, we can build better analysis tools\n// and could do better codegen in the future.\n\nexport class ElementRef<T = any> {\n /\*\*\n \* The underlying native element or `null` if direct access to native elements is not supported\n \* (e.g. when the application runs in a web worker).\n \* \n \* <div class=\"callout is-critical\">\n \* <header>Use with caution</header>\n \* <p>\n \* Use this API as the last resort when direct access to DOM is needed. Use templating and\n \* data-binding provided by Angular instead. Alternatively you can take a look at { @link\n \* Renderer2}\n \* which provides API that can safely be used even when direct access to native elements is not\n \* supported.\n \* </p>\n \* <p>\n \* Relying on direct DOM access creates tight coupling between your application and rendering\n \* layers which will make it impossible to separate the two and deploy your application into a\n \* web worker.\n \* </p>\n \* </div>\n \* \n \* \n public nativeElement: T;\n\n constructor(nativeElement: T) {\n this.nativeElement = nativeElement;\n }\n\n /\*\*\n \* @internal\n \* \n \* @nocollapse\n \* \n \* \n static \_\_NG\_ELEMENT\_ID\_\_: () => ElementRef = injectElementRef;\n}\n\n\n/\*\*\n \* Unwraps `ElementRef` and return the `nativeElement`.\n \* \n \* @param value value to unwrap\n \* \n \* @returns `nativeElement` if `ElementRef` otherwise returns value as is.\n \* \n \* \nexport function unwrapElementRef<T, R>(value: T|ElementRef<R>): T|R {\n return value instanceof ElementRef ? value.nativeElement : value;\n}\n\n\n/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* \n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \* \n \* \n\nimport {InjectionToken} from './di/injection\_token';\nimport {isLView} from './render3/interfaces/type\_checks';\nimport {RENDERER} from './render3/interfaces/view';\nimport {getCurrentTNode, getLView} from './render3/state';\nimport {getComponentLViewByIndex} from './render3/util/view\_utils';\n\nimport {RendererStyleFlags2, RendererType2} from './api\_flags';\n\n\nexport const Renderer2Interceptor = new InjectionToken<Renderer2[]>('Renderer2Interceptor');\n\n\n/\*\*\n \* Creates and initializes a custom renderer that implements the `Renderer2` base class.\n \* \n \* @publicApi\n \* \n \* \nexport abstract class RendererFactory2 {\n /\*\*\n \* Creates and initializes a custom renderer for a host DOM element.\n \* \n \* @param hostElement The element to render.\n \* \n \* @param type The base class to implement.\n \* \n \* @returns The new custom renderer instance.\n \* \n \* \n abstract createRenderer(hostElement: any, type: RendererType2|null): Renderer2;\n\n /\*\*\n \* A callback invoked when rendering has begun.\n \* \n \* \n abstract begin?(): void;\n\n /\*\*\n \* A callback invoked when rendering has completed.\n \* \n \* \n abstract end?(): void;\n\n /\*\*\n \* Use with animations test-only mode. Notifies the test when rendering has completed.\n \* \n \* \n @returns The asynchronous result of the developer-defined function.\n \* \n \* \n abstract whenRenderingDone?(): Promise<any>;\n}\n\n\n\n/\*\*\n \* Extend this base class to implement custom rendering. By default, Angular\n \* renders a template into DOM. You can use custom rendering to intercept\n \* rendering calls, or to render to something other than DOM.\n \* \n \* \n \* Create your custom renderer using `RendererFactory2`.\n \* \n \* \n \* Use a custom renderer to bypass Angular's templating and\n \* make custom UI changes that can't be expressed declaratively.\n \* \n \* For example if you need to set a property or an attribute whose name is\n \* not statically known, use the `setProperty()` or\n \* `setAttribute()` method.\n \* \n \* \n \* @publicApi\n \* \n \* \nexport abstract class Renderer2 {\n /\*\*\n \* Use to store arbitrary developer-defined data on a renderer instance,\n \* as an object containing key-value pairs.\n \* \n \* This is useful for renderers that delegate to other renderers.\n \* \n \* \n abstract get data(): {[key: string]: any};\n\n /\*\*\n \* Implement this callback to destroy the renderer or the host element.\n \* \n \* \n abstract destroy(): void;\n\n /\*\*\n \* Implement this callback to create an instance of the host element.\n \* \n \* @param name An identifying name for the

new element, unique within the namespace.\n \* @param namespace The namespace for the new element.\n \* @returns The new element.\n \*/\n abstract createElement(name: string, namespace?: string|null): any;\n /\*\*\n \* Implement this callback to add a comment to the DOM of the host element.\n \* @param value The comment text.\n \* @returns The modified element.\n \*/\n abstract createComment(value: string): any;\n\n /\*\*\n \* Implement this callback to add text to the DOM of the host element.\n \* @param value The text string.\n \* @returns The modified element.\n \*/\n abstract createText(value: string): any;\n /\*\*\n \* If null or undefined, the view engine won't call it.\n \* This is used as a performance optimization for production mode.\n \*/\n // TODO(issue/24571): remove '!.\n destroyNode!: ((node: any) => void)|null;\n /\*\*\n \* Appends a child to a given parent node in the host element DOM.\n \* @param parent The parent node.\n \* @param newChild The new child node.\n \*/\n abstract appendChild(parent: any, newChild: any): void;\n /\*\*\n \* Implement this callback to insert a child node at a given position in a parent node\n \* in the host element DOM.\n \* @param parent The parent node.\n \* @param newChild The new child nodes.\n \* @param refChild The existing child node before which `newChild` is inserted.\n \* @param isMove Optional argument which signifies if the current `insertBefore` is a result of a\n \* move. Animation uses this information to trigger move animations. In the past the Animation\n \* would always assume that any `insertBefore` is a move. This is not strictly true because\n \* with runtime i18n it is possible to invoke `insertBefore` as a result of i18n and it should\n \* not trigger an animation move.\n \*/\n abstract insertBefore(parent: any, newChild: any, refChild: any, isMove?: boolean): void;\n /\*\*\n \* Implement this callback to remove a child node from the host element's DOM.\n \* @param parent The parent node.\n \* @param oldChild The child node to remove.\n \* @param isHostElement Optionally signal to the renderer whether this element is a host element\n \* or not.\n \*/\n abstract removeChild(parent: any, oldChild: any, isHostElement?: boolean): void;\n /\*\*\n \* Implement this callback to prepare an element to be bootstrapped\n \* as a root element, and return the element instance.\n \* @param selectorOrNode The DOM element.\n \* @param preserveContent Whether the contents of the root element\n \* should be preserved, or cleared upon bootstrap (default behavior).\n \* Use with `ViewEncapsulation.ShadowDom` to allow simple native\n \* content projection via `` elements.\n \* @returns The root element.\n \*/\n abstract selectRootElement(selectorOrNode: string|any, preserveContent?: boolean): any;\n /\*\*\n \* Implement this callback to get the parent of a given node\n \* in the host element's DOM.\n \* @param node The child node to query.\n \* @returns The parent node, or null if there is no parent.\n \* For WebWorkers, always returns true.\n \* This is because the check is synchronous,\n \* and the caller can't rely on checking for null.\n \*/\n abstract parentNode(node: any): any;\n /\*\*\n \* Implement this callback to get the next sibling node of a given node\n \* in the host element's DOM.\n \* @returns The sibling node, or null if there is no sibling.\n \* For WebWorkers, always returns a value.\n \* This is because the check is synchronous,\n \* and the caller can't rely on checking for null.\n \*/\n abstract nextSibling(node: any): any;\n /\*\*\n \* Implement this callback to set an attribute value for an element in the DOM.\n \* @param el The element.\n \* @param name The attribute name.\n \* @param value The new value.\n \* @param namespace The namespace.\n \*/\n abstract setAttribute(el: any, name: string, value: string, namespace?: string|null): void;\n /\*\*\n \* Implement this callback to remove an attribute from an element in the DOM.\n \* @param el The element.\n \* @param name The attribute name.\n \* @param namespace The namespace.\n \*/\n abstract removeAttribute(el: any, name: string, namespace?: string|null): void;\n /\*\*\n \* Implement this callback to add a class to an element in the DOM.\n \* @param el The element.\n \* @param name The class name.\n \*/\n abstract addClass(el: any, name: string): void;\n /\*\*\n \* Implement this callback to remove a class from an element in the DOM.\n \* @param el The element.\n \* @param name The class name.\n \*/\n abstract removeClass(el: any, name: string): void;\n /\*\*\n \* Implement this callback to set a CSS style for an element in the DOM.\n \* @param el The element.\n \* @param style The name of the style.\n \* @param value The new value.\n \* @param flags Flags for style variations. No flags are set by default.\n \*/\n abstract setStyle(el: any, style: string, value: any, flags?: RendererStyleFlags2): void;\n\n /\*\*\n \* Implement this callback to remove the value from a CSS style for an element in the DOM.\n \* @param el The element.\n \* @param style

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The name of the style.\n * @param flags Flags for style variations to remove, if set. ???\n */\n abstract
removeStyle(el: any, style: string, flags?: RendererStyleFlags2): void;\n\n /**\n * Implement this callback to set
the value of a property of an element in the DOM.\n * @param el The element.\n * @param name The property
name.\n * @param value The new value.\n */\n abstract setProperty(el: any, name: string, value: any): void;\n\n
/**\n * Implement this callback to set the value of a node in the host element.\n * @param node The node.\n *
@param value The new value.\n */\n abstract setValue(node: any, value: string): void;\n\n /**\n * Implement
this callback to start an event listener.\n * @param target The context in which to listen for events. Can be\n * the
entire window or document, the body of the document, or a specific\n * DOM element.\n * @param eventName
The event to listen for.\n * @param callback A handler function to invoke when
the event occurs.\n * @returns An "unlisten" function for disposing of this handler.\n */\n abstract listen(\n
target: 'window'|'document'|'body'|any, eventName: string,\n   callback: (event: any) => boolean | void): () =>
void;\n\n /**\n * @internal\n * @nocollapse\n */\n static __NG_ELEMENT_ID__: () => Renderer2 = () =>
injectRenderer2();\n}\n\n/** Injects a Renderer2 for the current component. */\nexport function injectRenderer2():
Renderer2 {\n // We need the Renderer to be based on the component that it's being injected into, however since\n
// DI happens before we've entered its view, `getLView` will return the parent view instead.\n const IView =
getLView();\n const tNode = getCurrentTNode()!;\n const nodeAtIndex =
getComponentLViewByIndex(tNode.index, IView);\n return (isLView(nodeAtIndex) ? nodeAtIndex :
IView)[RENDERER] as Renderer2;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by
an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{defineInjectable} from './di/interface/defs';\nimport {SecurityContext} from './security';\n\n/**\n * Sanitizer is
used by the views to sanitize potentially dangerous values.\n *\n * @publicApi\n */\nexport abstract class Sanitizer
{\n abstract sanitize(context: SecurityContext, value: {}|string|null): string|null;\n /** @nocollapse */\n static prov
= /** @pureOrBreakMyCode */ defineInjectable({\n token: Sanitizer,\n providedIn: 'root',\n factory: () =>
null,\n });\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n/**\n * @description Represents the version of Angular\n *\n * @publicApi\n */\nexport class Version {\n
public readonly major: string;\n public readonly minor: string;\n public readonly
patch: string;\n\n constructor(public full: string) {\n this.major = full.split('.')[0];\n this.minor =
full.split('.')[1];\n this.patch = full.split('.')[2].join('.');\n }\n}\n\n/**\n * @publicApi\n */\nexport const
VERSION = new Version('14.3.0');\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n// This default value is when checking the hierarchy for a token.\n\n// It means
both:\n// - the token is not provided by the current injector,\n// - only the element injectors should be checked (ie do
not check module injectors\n\n// mod1\n// \n\n// el1 mod2\n// \n\n// el2\n\n// When
requesting el2.injector.get(token), we should check in the following order and return the\n// first found value:\n// -
el2.injector.get(token, default)\n// - el1.injector.get(token,
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR) -> do not check the module\n// -
mod2.injector.get(token, default)\n\nexport const NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR =
{};\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nexport const ERROR_ORIGINAL_ERROR = 'ngOriginalError';\n\nexport function wrappedError(message:
string, originalError: any): Error {\n const msg = `${message} caused by: ${\n   originalError instanceof Error ?
originalError.message : originalError}`;\n const error = Error(msg);\n (error as
any)[ERROR_ORIGINAL_ERROR] = originalError;\n return error;\n}\n\nexport function getOriginalError(error:
Error): Error {\n return (error as any)[ERROR_ORIGINAL_ERROR];\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by an MIT-style license that can

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be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {getOriginalError} from
'./util/errors';\n\n/**\n * Provides a hook for centralized exception handling.\n *\n * The default implementation of
`ErrorHandler` prints error messages to the `console`. To\n * intercept error handling, write a custom exception
handler that replaces this default as\n * appropriate for your app.\n *\n * @usageNotes\n * ### Example\n *\n *
```\n * class MyErrorHandler implements ErrorHandler {\n *   handleError(error) {\n *     // do something with the
exception\n *   }\n * }\n *\n * @NgModule({\n *   providers: [{provide: ErrorHandler, useClass:
MyErrorHandler}]\n * })\n * class MyModule {\n *   ```\n *\n * @publicApi\n *\n * ^\n * export class ErrorHandler {\n
/**\n * @internal\n *\n * ^\n * _console: Console = console;\n\n * handleError(error: any): void {\n *   const originalError
= this._findOriginalError(error);\n\n *   this._console.error('ERROR', error);\n *   if (originalError) {\n
this._console.error('ORIGINAL
ERROR', originalError);\n *   }\n * }\n\n * /** @internal\n *\n * ^\n * _findOriginalError(error: any): Error|null {\n *   let e =
error && getOriginalError(error);\n *   while (e && getOriginalError(e)) {\n *     e = getOriginalError(e);\n *   }\n\n *   return e || null;\n * }\n\n * },"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n * ^\n * export function normalizeDebugBindingName(name: string) {\n * // Attribute names
with `$` (eg `x-y$`) are valid per spec, but unsupported by some browsers\n * name =
camelCaseToDashCase(name.replace(/[$@]/g, '_'));\n * return `ng-reflect-${name}`;\n * }\n\n * const
CAMEL_CASE_REGEXP = /[A-Z]/g;\n\n * function camelCaseToDashCase(input: string): string {\n *   return
input.replace(CAMEL_CASE_REGEXP, (...m: any[]) => '-' + m[1].toLowerCase());\n * }\n\n * export function
normalizeDebugBindingValue(value: any):
string {\n *   try {\n *     // Limit the size of the value as otherwise the DOM just gets polluted.\n *     return value != null ?
value.toString().slice(0, 30) : value;\n *   } catch (e) {\n *     return '[ERROR] Exception while trying to serialize the
value';\n *   }\n * }\n\n * },"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n * ^\n * import {RElement} from './interfaces/renderer_dom';\n\n * ^\n * @codeGenApi\n *\n * ^\n * export function
resolveWindow(element: RElement&{ownerDocument: Document}) {\n *   return
element.ownerDocument.defaultView;\n * }\n\n * ^\n * @codeGenApi\n *\n * ^\n * export function
resolveDocument(element: RElement&{ownerDocument: Document}) {\n *   return
element.ownerDocument;\n * }\n\n * ^\n * @codeGenApi\n *\n * ^\n * export function resolveBody(element:
RElement&{ownerDocument: Document}) {\n *   return element.ownerDocument.body;\n * }\n\n * ^\n *
* The special delimiter we use to separate property names, prefixes, and suffixes\n * in property binding metadata.
See storeBindingMetadata().\n *\n * We intentionally use the Unicode `REPLACEMENT CHARACTER`
(U+FFFD) as a delimiter\n * because it is a very uncommon character that is unlikely to be part of a user's\n *
property names or interpolation strings. If it is in fact used in a property\n * binding, DebugElement.properties will
not return the correct value for that\n * binding. However, there should be no runtime effect for real applications.\n
*\n * This character is typically rendered as a question mark inside of a diamond.\n * See
https://en.wikipedia.org/wiki/Specials_(Unicode_block)\n *\n * ^\n * export const INTERPOLATION_DELIMITER =
``;\n\n * ^\n * Unwrap a value which might be behind a closure (for forward declaration reasons).\n *\n * ^\n * export
function maybeUnwrapFn<T>(value: T|(() => T)): T {\n *   if (value instanceof Function) {\n *     return value();\n *   }
else {\n *     return value;\n *   }\n * }\n\n * },"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n * ^\n * import {RuntimeError, RuntimeErrorCode} from './errors';\n\n * import {Type} from './interface/type';\n\n * import
{getComponentDef} from './definition';\n\n * import {TNode} from './interfaces/node';\n\n * import {LView, TVIEW} from
'./interfaces/view';\n\n * import {INTERPOLATION_DELIMITER} from './util/misc_utils';\n\n * import {stringifyForError}
from './util/stringify_utils';\n\n * ^\n * Verifies that a given type is a Standalone Component. *\n * ^\n * export function
assertStandaloneComponentType(type: Type<unknown>) {\n *   assertComponentDef(type);\n *   const componentDef =
getComponentDef(type);\n *   if (!componentDef.standalone) {\n *     throw new RuntimeError(\n

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RuntimeErrorCode.TYPE_IS_NOT_STANDALONE,\n    `The ${stringifyForError(type)} component is not
marked as standalone, ` +\n
    `but Angular expects to have a standalone component here. ` +\n    `Please make sure the
${stringifyForError(type)} component has ` +\n    `the `standalone: true` flag in the decorator.`);\n
}\n}\n\n/** Verifies whether a given type is a component */\nexport function assertComponentDef(type:
Type<unknown>) {\n  if (!getComponentDef(type)) {\n    throw new RuntimeError(\n
RuntimeErrorCode.MISSING_GENERATED_DEF,\n    `The ${stringifyForError(type)} is not an Angular
component, ` +\n    `make sure it has the `@Component` decorator.`);\n  }\n}\n\n/** Called when there are
multiple component selectors that match a given node */\nexport function throwMultipleComponentError(\n
tNode: TNode, first: Type<unknown>, second: Type<unknown>): never {\n  throw new RuntimeError(\n
RuntimeErrorCode.MULTIPLE_COMPONENTS_MATCH,\n    `Multiple components match node with tagname
${tNode.value}: ` +\n    `${stringifyForError(first)} and `
+\n    `${stringifyForError(second)}`);\n}\n\n/** Throws an ExpressionChangedAfterChecked error if
checkNoChanges mode is on. */\nexport function throwErrorIfNoChangesMode(\n  creationMode: boolean,
oldValue: any, currValue: any, propName?: string): never {\n  const field = propName ? ` for '${propName}' ` :
'';\n  let msg =\n    `ExpressionChangedAfterItHasBeenCheckedError: Expression has changed after it was checked.
Previous value${\n      field}: '${oldValue}'. Current value: '${currValue}'.`;\n  if (creationMode) {\n    msg +=\n      ` It seems like the view has been created after its parent and its children have been dirty checked.` +\n      ` Has
it been created in a change detection hook?`;\n  }\n  throw new
RuntimeError(RuntimeErrorCode.EXPRESSION_CHANGED_AFTER_CHECKED, msg);\n}\n\nfunction
constructDetailsForInterpolation(\n  lView: LView, rootIndex: number, expressionIndex: number, meta: string,
changedValue: any) {\n  const [propName, prefix, ...chunks]
= meta.split(INTERPOLATION_DELIMITER);\n  let oldValue = prefix, newValue = prefix;\n  for (let i = 0; i <
chunks.length; i++) {\n    const slotIdx = rootIndex + i;\n    oldValue += `${lView[slotIdx]}${chunks[i]}`;\n
newValue += `${slotIdx === expressionIndex ? changedValue : lView[slotIdx]}${chunks[i]}`;\n  }\n  return
{propName, oldValue, newValue};\n}\n\n/**\n * Constructs an object that contains details for the
ExpressionChangedAfterItHasBeenCheckedError:\n * - property name (for property bindings or interpolations)\n * -
old and new values, enriched using information from metadata\n * - More information on the metadata storage
format can be found in `storePropertyBindingMetadata`\n * - function description.\n */\nexport function
getExpressionChangedErrorDetails(\n  lView: LView, bindingIndex: number, oldValue: any,\n  newValue: any):
{propName?: string, oldValue: any, newValue: any} {\n  const tData = lView[TVIEW].data;\n  const metadata =
tData[bindingIndex];\n  if (typeof
metadata === 'string') {\n    // metadata for property interpolation\n    if
(metadata.indexOf(INTERPOLATION_DELIMITER) > -1) {\n      return constructDetailsForInterpolation(\n
lView, bindingIndex, bindingIndex, metadata, newValue);\n    }\n    // metadata for property binding\n    return
{propName: metadata, oldValue, newValue};\n  }\n  // metadata is not available for this expression, check if this
expression is a part of the\n  // property interpolation by going from the current binding index left and look for a
string that\n  // contains INTERPOLATION_DELIMITER, the layout in tView.data for this case will look like
this:\n  // [..., 'idPrefix and suffix', null, null, null, ...]\n  if (metadata === null) {\n    let idx = bindingIndex - 1;\n
while (typeof tData[idx] !== 'string' && tData[idx + 1] === null) {\n      idx--;\n    }\n    const meta = tData[idx];\n
if (typeof meta === 'string') {\n      const matches = meta.match(new RegExp(INTERPOLATION_DELIMITER,
'g'));\n      // first interpolation delimiter separates property name from interpolation parts (in case of\n      // property
interpolations), so we subtract one from total number of found delimiters\n      if (matches && (matches.length - 1)
> bindingIndex - idx) {\n        return constructDetailsForInterpolation(lView, idx, bindingIndex, meta, newValue);\n
      }\n    }\n  }\n  return {propName: undefined, oldValue, newValue};\n}\n\n", "*/\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\nimport {assertNotEqual} from
'./../util/assert';\nimport {CharCode} from './../util/char_code';\n\n/**\n * Returns an index of `classToSearch` in

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against the node.\n \* @param isProjectionMode if `true` we are matching for content projection, otherwise we are doing\n \* directive matching.\n \* @returns true if node matches the selector.\n \*/\nexport function isNodeMatchingSelector(\n tNode: TNode, selector: CssSelector, isProjectionMode: boolean): boolean {\n ngDevMode && assertDefined(selector[0], 'Selector should have a tag name');\n let mode: SelectorFlags = SelectorFlags.ELEMENT;\n const nodeAttrs = tNode.attrs || [];\n // Find the index of first attribute that has no value, only a name.\n const nameOnlyMarkerIdx = getNameOnlyMarkerIndex(nodeAttrs);\n // When processing `:not` selectors, we skip to the next `:not` if the\n // current one doesn't match\n let skipToNextSelector = false;\n for (let i = 0; i < selector.length; i++) {\n const current = selector[i];\n if (typeof current === 'number') {\n // If we finish processing a :not selector and it hasn't failed, return false\n if (!skipToNextSelector && !isPositive(mode) && !isPositive(current)) {\n return false;\n }\n // If we are skipping to the next :not() and this mode flag is positive,\n // it's a part of the current :not() selector, and we should keep skipping\n if (skipToNextSelector && isPositive(current)) continue;\n skipToNextSelector = false;\n mode = (current as number) | (mode & SelectorFlags.NOT);\n continue;\n }\n if (skipToNextSelector) continue;\n if (mode & SelectorFlags.ELEMENT) {\n mode = SelectorFlags.ATTRIBUTE | mode & SelectorFlags.NOT;\n if (current !== " && !hasTagAndTypeMatch(tNode, current, isProjectionMode) ||\n current === " && selector.length === 1) {\n if (isPositive(mode)) return false;\n skipToNextSelector = true;\n }\n } else {\n const selectorAttrValue = mode & SelectorFlags.CLASS ? current : selector[++i];\n // special case for matching against classes when a tNode has been instantiated with\n // class and style values as separate attribute values (e.g. ['title', CLASS, 'foo'])\n if ((mode & SelectorFlags.CLASS) && tNode.attrs !== null) {\n if (!isCssClassMatching(tNode.attrs, selectorAttrValue as string, isProjectionMode)) {\n if (isPositive(mode)) return false;\n skipToNextSelector = true;\n }\n continue;\n }\n const attrName = (mode & SelectorFlags.CLASS) ? 'class' : current;\n const attrIndexInNode = findAttrIndexInNode(attrName, nodeAttrs, isInlineTemplate(tNode), isProjectionMode);\n if (attrIndexInNode === -1) {\n if (isPositive(mode)) return false;\n skipToNextSelector = true;\n continue;\n }\n if (selectorAttrValue !== "") {\n let nodeAttrValue: string;\n if (attrIndexInNode > nameOnlyMarkerIdx) {\n nodeAttrValue = ";\n } else {\n ngDevMode && assertNotEqual(\n nodeAttrs[attrIndexInNode], AttributeMarker.NamespaceURI,\n 'We do not match directives on namespaced attributes');\n // we lowercase the attribute value to be able to match\n // selectors without case-sensitivity\n // (selectors are already in lowercase when generated)\n nodeAttrValue = (nodeAttrs[attrIndexInNode + 1] as string).toLowerCase();\n }\n const compareAgainstClassName = mode & SelectorFlags.CLASS ? nodeAttrValue : null;\n if (compareAgainstClassName && classIndexOf(compareAgainstClassName, selectorAttrValue as string, 0) !== -1 ||\n mode & SelectorFlags.ATTRIBUTE && selectorAttrValue !== nodeAttrValue) {\n if (isPositive(mode)) return false;\n skipToNextSelector = true;\n }\n }\n }\n }\n return isPositive(mode) || skipToNextSelector;\n }\n\nfunction isPositive(mode: SelectorFlags): boolean {\n return (mode & SelectorFlags.NOT) === 0;\n }\n\n/\*\*\n \* Examines the attribute's definition array for a node to find the index of the\n \* attribute that matches the given `name`.\n \* NOTE: This will not match namespaced attributes.\n \* Attribute matching depends upon `isInlineTemplate` and `isProjectionMode`.\n \* The following table summarizes which types of attributes we attempt to match:\n \*/\n

=====					
=====					
\n * Modes					
		Normal Attributes	Bindings Attributes	Template Attributes	
\n * Attributes					
=====					
=====					
		Inline + Projection	YES	YES	NO
\n * Inline +					
YES	NO	NO	YES	NO	
\n * Directive					
		Non-inline + Projection	YES	YES	
-----					

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| NO          | YES\n * -----
-----\n * Non-inline + Directive | YES          | YES          | NO          | YES\n *
=====
=====
\n *\n * @param name the name of the attribute to find\n * @param attrs the
attribute array to examine\n * @param isInlineTemplate true if the node being matched is an inline template (e.g.
`*ngFor`)\n * rather than a manually expanded template node (e.g. ``).\n * @param isProjectionMode
true if we are matching against content projection otherwise we are\n * matching against directives.\n */\nfunction
findAttrIndexInNode(\n  name: string, attrs: TAttributes|null, isInlineTemplate: boolean,\n  isProjectionMode:
boolean): number {\n  if (attrs === null) return -1;\n  let i = 0;\n  if (isProjectionMode || !isInlineTemplate)
{\n  let bindingsMode = false;\n  while (i < attrs.length) {\n  const maybeAttrName = attrs[i];\n  if
(maybeAttrName === name) {\n  return i;\n  } else if (\n  maybeAttrName ===
AttributeMarker.Bindings || maybeAttrName === AttributeMarker.I18n) {\n  bindingsMode = true;\n  } else if
(\n  maybeAttrName === AttributeMarker.Classes || maybeAttrName === AttributeMarker.Styles) {\n  let
value = attrs[++i];\n  // We should skip classes here because we have a separate mechanism for\n  //
matching classes in projection mode.\n  while (typeof value === 'string') {\n  value = attrs[++i];\n  }\n
continue;\n  } else if (maybeAttrName === AttributeMarker.Template) {\n  // We do not care about
Template attributes in this scenario.\n  break;\n  } else if (maybeAttrName ===
AttributeMarker.NamespaceURI) {\n  // Skip the whole namespaced attribute and value. This is by
design.\n  i += 4;\n  continue;\n  }\n  // In binding mode there are only names, rather than name-value
pairs.\n  i += bindingsMode ? 1 : 2;\n  }\n  // We did not match the attribute\n  return -1;\n } else {\n  return
matchTemplateAttribute(attrs, name);\n }\n}\n\nexport function isNodeMatchingSelectorList(\n  tNode: TNode,
selector: CssSelectorList, isProjectionMode: boolean = false): boolean {\n  for (let i = 0; i < selector.length; i++) {\n
if (isNodeMatchingSelector(tNode, selector[i], isProjectionMode)) {\n  return true;\n  }\n }\n\n  return
false;\n }\n\nexport function getProjectAsAttrValue(tNode: TNode): CssSelector|null {\n  const nodeAttrs =
tNode.attrs;\n  if (nodeAttrs != null) {\n  const ngProjectAsAttrIdx =
nodeAttrs.indexOf(AttributeMarker.ProjectAs);\n  // only check for ngProjectAs in attribute names, don't
accidentally match attribute's value\n  // (attribute names are stored at even indexes)\n  if ((ngProjectAsAttrIdx
& 1) === 0) {\n  return nodeAttrs[ngProjectAsAttrIdx + 1] as CssSelector;\n  }\n }\n\n  return
null;\n }\n\nfunction getNameOnlyMarkerIndex(nodeAttrs: TAttributes) {\n  for (let i = 0; i < nodeAttrs.length; i++)
{\n  const nodeAttr = nodeAttrs[i];\n  if (isNameOnlyAttributeMarker(nodeAttr)) {\n  return i;\n  }\n }\n\n
return nodeAttrs.length;\n }\n\nfunction matchTemplateAttribute(attrs: TAttributes, name: string): number {\n  let i =
attrs.indexOf(AttributeMarker.Template);\n  if (i > -1) {\n  i++;\n  while (i < attrs.length) {\n  const attr =
attrs[i];\n  // Return in case we checked all template attrs and are switching to the next section in the\n  // attrs
array (that starts with a number that represents an attribute marker).\n  if (typeof attr === 'number') return -1;\n
if (attr === name) return i;\n  i++;\n  }\n }\n\n  return -1;\n }\n\n/**\n * Checks whether a selector is inside a
CssSelectorList\n * @param selector Selector to be
checked.\n * @param list List in which to look for the selector.\n */\nexport function
isSelectorInSelectorList(selector: CssSelector, list: CssSelectorList): boolean {\n  selectorListLoop: for (let i = 0; i <
list.length; i++) {\n  const currentSelectorInList = list[i];\n  if (selector.length !== currentSelectorInList.length)
{\n  continue;\n  }\n  for (let j = 0; j < selector.length; j++) {\n  if (selector[j] !== currentSelectorInList[j])
{\n  continue selectorListLoop;\n  }\n }\n\n  return true;\n }\n\n  return false;\n }\n\nfunction
maybeWrapInNotSelector(isNegativeMode: boolean, chunk: string): string {\n  return isNegativeMode ? 'not(' +
chunk.trim() + ')': chunk;\n }\n\nfunction stringifyCSSSelector(selector: CssSelector): string {\n  let result =
selector[0] as string;\n  let i = 1;\n  let mode = SelectorFlags.ATTRIBUTE;\n  let currentChunk = ";\n  let
isNegativeMode = false;\n  while (i < selector.length) {\n  let valueOrMarker = selector[i];\n  if (typeof valueOrMarker === 'string') {\n  if (mode & SelectorFlags.ATTRIBUTE) {\n  const attrValue =
selector[++i] as string;\n  currentChunk += '[' + valueOrMarker + (attrValue.length > 0 ? '=' +
attrValue + '\"' : ')';\n  } else if (mode & SelectorFlags.CLASS) {\n  currentChunk += '.' +

```

```

valueOrMarker;\n    } else if (mode & SelectorFlags.ELEMENT) {\n        currentChunk += ' ' + valueOrMarker;\n    }\n  } else {\n    /\n    // Append current chunk to the final result in case we come across SelectorFlag, which\n    // indicates that the previous section of a selector is over. We need to accumulate content\n    // between flags to\n    // make sure we wrap the chunk later in :not() selector if needed, e.g.\n    // ``\n    // ['', Flags.CLASS, '.classA',\n    Flags.CLASS | Flags.NOT, '.classB', '.classC']\n    // ``\n    // should be transformed to `.classA :not(.classB\n    .classC)`.\n    /\n    // Note: for negative selector\n    part, we accumulate content between flags until we find the\n    // next negative flag. This is needed to support a\n    case where `:not()` rule contains more than\n    // one chunk, e.g. the following selector:\n    // ``\n    // ['',\n    Flags.ELEMENT | Flags.NOT, 'p', Flags.CLASS, 'foo', Flags.CLASS | Flags.NOT, 'bar']\n    // ``\n    // should be\n    stringified to `:not(p.foo) :not(.bar)`\n    /\n    if (currentChunk !== " && !isPositive(valueOrMarker)) {\n    result += maybeWrapInNotSelector(isNegativeMode, currentChunk);\n    currentChunk = ";\n    }\n    mode =\n    valueOrMarker;\n    // According to CssSelector spec, once we come across `SelectorFlags.NOT` flag, the\n    negative\n    // mode is maintained for remaining chunks of a selector.\n    isNegativeMode = isNegativeMode ||\n    !isPositive(mode);\n    }\n    i++;\n  }\n  if (currentChunk !== "") {\n    result +=\n    maybeWrapInNotSelector(isNegativeMode, currentChunk);\n  }\n  return result;\n}\n\n/**\n * Generates string representation of CSS selector in parsed form.\n * ComponentDef and DirectiveDef are\n * generated with the selector in parsed form to avoid doing\n * additional parsing at runtime (for example, for\n * directive matching). However in some cases (for\n * example, while bootstrapping a component), a string version of\n * the selector is required to query\n * for the host element on the page. This function takes the parsed form of a\n * selector and returns\n * its string representation.\n * @param selectorList selector in parsed form\n * @returns\n * string representation of a given selector\n */\nexport function stringifyCSSSelector(selectorList:\n CssSelectorList): string {\n  return selectorList.map(stringifyCSSSelector).join(',');\n}\n\n/**\n * Extracts attributes\n * and classes information from a given CSS selector.\n * This function is used while creating a component\n * dynamically. In this case, the host element\n * (that is created dynamically) should contain attributes and\n * classes specified in component's CSS\n * selector.\n * @param selector CSS selector in parsed form (in a form\n * of array)\n * @returns object with `attrs` and `classes` fields that contain extracted information\n */\nexport function\n extractAttrsAndClassesFromSelector(selector: CssSelector):\n { attrs: string[], classes: string[] } {\n  const attrs:\n  string[] = [];\n  const classes: string[] = [];\n  let i = 1;\n  let mode = SelectorFlags.ATTRIBUTE;\n  while (i <\n  selector.length) {\n    let valueOrMarker = selector[i];\n    if (typeof valueOrMarker === 'string') {\n      if (mode\n      === SelectorFlags.ATTRIBUTE) {\n        if (valueOrMarker !== "") {\n          attrs.push(valueOrMarker,\n          selector[++i] as string);\n        }\n      } else if (mode === SelectorFlags.CLASS) {\n        classes.push(valueOrMarker);\n      }\n    } else {\n      // According to CssSelector spec, once we come across\n      `SelectorFlags.NOT` flag, the negative\n      // mode is maintained for remaining chunks of a selector.\n      Since attributes and classes are\n      // extracted only for "positive" part of the selector, we can stop here.\n      if\n      (!isPositive(mode)) break;\n      mode = valueOrMarker;\n    }\n    i++;\n  }\n  return { attrs, classes};\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-\n * style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nexport interface\n NO_CHANGE {\n  // This is a brand that ensures that this type can never match anything else\n  __brand__:\n  'NO_CHANGE';\n}\n\n/**\n * A special value which designates that a value has not changed.\n */\nexport const\n NO_CHANGE: NO_CHANGE =\n (typeof ngDevMode === 'undefined' || ngDevMode) ? { __brand__:\n 'NO_CHANGE' } : ({} as NO_CHANGE);\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\nimport { assertGreaterThan } from '../util/assert';\nimport { assertIndexInDeclRange } from '../assert';\nimport\n { executeCheckHooks, executeInitAndCheckHooks } from '../hooks';\nimport { FLAGS, InitPhaseState, LView,\n LViewFlags, TView } from '../interfaces/view';\nimport { getLView, getSelectedIndex, getTView,\n isInCheckNoChangesMode, setSelectedIndex } from '../state';\n\n/**\n * Advances to an element for later binding\n * instructions.\n * Used in conjunction with instructions like { @link property } to act on elements with specified\n
```





provided in one of the following injectors:

- 'root': The application-level injector in most apps.
- 'platform': A special singleton platform injector shared by all applications on the page.
- 'any': Provides a unique instance in each lazy loaded module while all eagerly loaded modules share one instance.

```
Type<any>|'root'|'platform'|'any'|null;
```

**Injectable decorator and metadata.**

```
@Annotation
@publicApi
export const Injectable:
InjectableDecorator = makeDecorator(
  'Injectable', undefined, undefined, undefined,
  (type: Type<any>,
  meta: Injectable) => compileInjectable(type as any, meta));
```

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```
import {flatten} from './util/array_utils';
import {EMPTY_ARRAY} from './util/empty';
import {stringify} from './util/stringify';
import {Injector} from './injector';
import {StaticProvider} from './interface/provider';
import {importProvidersFrom} from './provider_collection';
import {getNullInjector, R3Injector} from './r3_injector';
import {InjectorScope} from './scope';
```

Create a new `Injector` which is configured using a `defType` of `InjectorType<any>`.

```
@publicApi
export function createInjector(
  defType: /* InjectorType<any> */ any, parent: Injector|null = null,
  additionalProviders: StaticProvider[]|null = null, name?: string): Injector {
  const injector =
  createInjectorWithoutInjectorInstances(defType, parent, additionalProviders, name);
  injector.resolveInjectorInitializers();
  return injector;
}
```

Creates a new injector without eagerly resolving its injector types. Can be used in places where resolving the injector types immediately can lead to an infinite loop. The injector types should be resolved at a later point by calling `_resolveInjectorDefTypes`.

```
export function createInjectorWithoutInjectorInstances(
  defType: /* InjectorType<any> */ any, parent:
  Injector|null = null,
  additionalProviders: StaticProvider[]|null = null, name?: string,
  scopes = new Set<InjectorScope>(): R3Injector {
  const providers = [
    additionalProviders || EMPTY_ARRAY,
    importProvidersFrom(defType),
  ];
  name = name || (typeof defType === 'object' ? stringify(defType));
  return new
  R3Injector(providers, parent || getNullInjector(), name || null, scopes);
}
```

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```
import {createInjector} from './create_injector';
import {THROW_IF_NOT_FOUND, inject} from './injector_compatibility';
import {InjectorMarkers} from './injector_marker';
import {INJECTOR} from './injector_token';
import {defineInjectable} from './interface/defs';
import {InjectFlags} from './interface/injector';
import {StaticProvider} from './interface/provider';
import {NullInjector} from './null_injector';
import {ProviderToken} from './provider_token';
```

Concrete injectors implement this interface. Injectors are configured with `providers` ([guide/glossary#provider](#)) that associate dependencies of various types with `injection tokens` ([guide/glossary#di-token](#)).

**Usage:** See `StaticProvider` and `usageNotes`.

The following example creates a service injector instance.

```
region='ConstructorProvider'
### Usage example
region='Injector'
Injector returns itself when given Injector as a token:
region='injectInjector'
```

```
@publicApi
export abstract class Injector {
  static THROW_IF_NOT_FOUND = THROW_IF_NOT_FOUND;
  static NULL: Injector = (/* @__PURE__ */ new
  NullInjector());
  Retrieves an instance from the injector based on the provided token.
  @returns The instance from the injector if defined, otherwise the notFoundValue.
  @throws When the notFoundValue is undefined or
  Injector.THROW_IF_NOT_FOUND.
  abstract get<T>(token: ProviderToken<T>, notFoundValue?: T,
  flags?: InjectFlags): T;
  @deprecated from v4.0.0 use ProviderToken<T>
  @suppress {duplicate}
  abstract get(token: any, notFoundValue?: any): any;
  @deprecated from v5 use the new signature
  Injector.create(options)
  static create(providers: StaticProvider[], parent?: Injector): Injector;
```



Creates a new injector instance that provides one or more dependencies, according to a given type or types of `StaticProvider`.

**@param options** An object with the following properties:

- providers**: An array of providers of the [StaticProvider type](api/core/StaticProvider).
- parent**: (optional) A parent injector.
- name**: (optional) A developer-defined identifying name for the new injector.

**@returns** The new injector instance.

```

static create(options: { providers: StaticProvider[],
parent?: Injector, name?: string }): Injector;

static create(options: StaticProvider[] | { providers:
StaticProvider[], parent?: Injector, name?: string },
parent?: Injector): Injector {
  if (Array.isArray(options))
    return createInjector({ name: "" }, parent, options, "");
  else {
    const name = options.name ?? "";
    return createInjector({ name }, options.parent, options.providers, name);
  }
}

/** @nocollapse */
static prov = /** @pureOrBreakMyCode */ defineInjectable({
  token: Injector,
  providedIn: 'any',
  factory: () =>
inject(INJECTOR),
});

/** @internal */
/** @nocollapse */
static __NG_ELEMENT_ID__ =
InjectorMarkers.Injector;

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https://angular.io/license

import { Type } from '../interface/type';
import { ERROR_ORIGINAL_ERROR, wrappedError } from '../util/errors';
import { stringify } from '../util/stringify';
import { ReflectiveInjector } from './reflective_injector';
import { ReflectiveKey } from './reflective_key';

function findFirstClosedCycle(keys: any[]): any[] {
  const res: any[] = [];
  for (let i = 0; i < keys.length; ++i) {
    if (res.indexOf(keys[i]) > -1) {
      res.push(keys[i]);
      return res;
    }
    res.push(keys[i]);
  }
  return res;
}

function constructResolvingPath(keys: any[]): string {
  if (keys.length > 1) {
    const reversed = findFirstClosedCycle(keys.slice().reverse());
    const tokenStrs = reversed.map(k => stringify(k.token));
    return '(' + tokenStrs.join(' -> ') + ')';
  }
  return "";
}

export interface InjectionError extends Error {
  keys: ReflectiveKey[];
  injectors: ReflectiveInjector[];
  constructResolvingMessage: (keys: ReflectiveKey[]) => string;
  addKey(injector: ReflectiveInjector, key: ReflectiveKey): void;
}

function injectionError(injector: ReflectiveInjector, key: ReflectiveKey,
constructResolvingMessage: (keys: ReflectiveKey[]) => string,
originalError?: Error): InjectionError {
  const keys = [key];
  const errMsg = constructResolvingMessage(keys);
  const error = new (originalError ? wrappedError(errMsg, originalError) : Error(errMsg)) as InjectionError;
  error.addKey = addKey;
  error.keys = keys;
  error.injectors = [injector];
  error.constructResolvingMessage = constructResolvingMessage;
  (error as any)[ERROR_ORIGINAL_ERROR] = originalError;
  return error;
}

function addKey(this: InjectionError, injector: ReflectiveInjector, key: ReflectiveKey): void {
  this.injectors.push(injector);
  this.keys.push(key);
}

// Note: This updated message won't be reflected in the `stack` property
this.constructResolvingMessage(this.keys);

/** Thrown when trying to retrieve a dependency by key from { @link Injector }, but the { @link Injector } does not have a { @link Provider } for the given key.

Example


```

class A {
  constructor(b: B) {}
}
expect(() => Injector.resolveAndCreate([A]).toThrowError());

export function noProviderError(injector: ReflectiveInjector, key: ReflectiveKey): InjectionError {
  return injectionError(injector, key, function(keys: ReflectiveKey[]) {
    const first = stringify(keys[0].token);
    return `No provider for ${first}!${constructResolvingPath(keys)}`;
  });
}

/** Thrown when dependencies form a cycle.

Example


```

var injector = Injector.resolveAndCreate([
  { provide: 'one', useFactory: (two) => 'two', deps: [[new Inject('two')]] },
  { provide: 'two', useFactory: (one) => 'one', deps: [[new Inject('one')]] }
]);
expect(() => injector.get('one')).toThrowError();

Retrieving `A` or `B` throws a `CyclicDependencyError` as the graph above cannot be constructed.

export function cyclicDependencyError(injector: ReflectiveInjector, key: ReflectiveKey): InjectionError {
  return injectionError(injector, key, function(keys: ReflectiveKey[]) {
    return `Cannot instantiate cyclic dependency!${constructResolvingPath(keys)}`;
  });
}

/** Thrown when a constructing type returns with an Error.

The `InstantiationError` class contains the original error plus the dependency graph which caused

```


```


```





```

ResolvedReflectiveProvider {\n return new ResolvedReflectiveProvider_(\n
ReflectiveKey.get(provider.provide), [resolveReflectiveFactory(provider)],\n provider.multi || false);\n}\n\n/**\n
* Resolve a list of Providers.\n */\nexport function resolveReflectiveProviders(providers:
Provider[]): ResolvedReflectiveProvider[] {\n const normalized = _normalizeProviders(providers, []);\n const
resolved = normalized.map(resolveReflectiveProvider);\n const resolvedProviderMap =
mergeResolvedReflectiveProviders(resolved, new Map());\n return
Array.from(resolvedProviderMap.values());\n}\n\n/**\n * Merges a list of ResolvedProviders into a list where each
key is contained exactly once and\n * multi providers have been merged.\n */\nexport function
mergeResolvedReflectiveProviders(\n providers: ResolvedReflectiveProvider[],\n normalizedProvidersMap:
Map<number, ResolvedReflectiveProvider>):\n Map<number, ResolvedReflectiveProvider> {\n for (let i = 0; i <
providers.length; i++) {\n const provider = providers[i];\n const existing =
normalizedProvidersMap.get(provider.key.id);\n if (existing) {\n if (provider.multiProvider !==
existing.multiProvider) {\n throw mixingMultiProvidersWithRegularProvidersError(existing, provider);\n
}\n
if (provider.multiProvider) {\n for (let j = 0; j < provider.resolvedFactories.length; j++) {\n
existing.resolvedFactories.push(provider.resolvedFactories[j]);\n }\n } else {\n
normalizedProvidersMap.set(provider.key.id, provider);\n }\n } else {\n let resolvedProvider:
ResolvedReflectiveProvider;\n if (provider.multiProvider) {\n resolvedProvider = new
ResolvedReflectiveProvider_(\n provider.key, provider.resolvedFactories.slice(), provider.multiProvider);\n
} else {\n resolvedProvider = provider;\n }\n normalizedProvidersMap.set(provider.key.id,
resolvedProvider);\n }\n }\n return normalizedProvidersMap;\n}\n\nfunction _normalizeProviders(\n providers:
Provider[], res: NormalizedProvider[]): NormalizedProvider[] {\n providers.forEach(b => {\n if (b instanceof
Type) {\n res.push({provide: b, useClass: b} as NormalizedProvider);\n } else if (b && typeof b === 'object'
&&
(b as any).provide !== undefined) {\n res.push(b as NormalizedProvider);\n } else if (Array.isArray(b)) {\n
_normalizeProviders(b, res);\n } else {\n throw invalidProviderError(b);\n }\n });\n return
res;\n}\n\nexport function constructDependencies(\n typeOrFunc: any, dependencies?: any[]):
ReflectiveDependency[] {\n if (!dependencies) {\n return _dependenciesFor(typeOrFunc);\n } else {\n const
params: any[][] = dependencies.map(t => [t]);\n return dependencies.map(t => _extractToken(typeOrFunc, t,
params));\n }\n}\n\nfunction _dependenciesFor(typeOrFunc: any): ReflectiveDependency[] {\n const params =
getReflect().parameters(typeOrFunc);\n\n if (!params) return [];\n if (params.some(p => p == null)) {\n throw
noAnnotationError(typeOrFunc, params);\n }\n return params.map(p => _extractToken(typeOrFunc, p,
params));\n}\n\nfunction _extractToken(\n typeOrFunc: any, metadata: any[]|any, params: any[][]):
ReflectiveDependency {\n
let token: any = null;\n let optional = false;\n\n if (!Array.isArray(metadata)) {\n if (metadata instanceof Inject)
{\n return _createDependency(metadata.token, optional, null);\n } else {\n return
_createDependency(metadata, optional, null);\n }\n }\n\n let visibility: Self|SkipSelf|null = null;\n\n for (let i = 0;
i < metadata.length; ++i) {\n const paramMetadata = metadata[i];\n\n if (paramMetadata instanceof Type) {\n
token = paramMetadata;\n } else if (paramMetadata instanceof Inject) {\n token = paramMetadata.token;\n
} else if (paramMetadata instanceof Optional) {\n optional = true;\n } else if (paramMetadata instanceof Self
|| paramMetadata instanceof SkipSelf) {\n visibility = paramMetadata;\n } else if (paramMetadata instanceof
InjectionToken) {\n token = paramMetadata;\n }\n }\n\n token = resolveForwardRef(token);\n\n if (token !==
null) {\n return _createDependency(token, optional, visibility);\n
} else {\n throw noAnnotationError(typeOrFunc, params);\n }\n}\n\nfunction _createDependency(\n token:
any, optional: boolean, visibility: Self|SkipSelf|null): ReflectiveDependency {\n return new
ReflectiveDependency(ReflectiveKey.get(token), optional, visibility);\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {Injector} from './injector';\nimport

```

```

{THROW_IF_NOT_FOUND} from './injector_compatibility';\nimport {Provider} from
 './interface/provider';\nimport {Self, SkipSelf} from './metadata';\nimport {cyclicDependencyError,
 instantiationError, noProviderError, outOfBoundsError} from './reflective_errors';\nimport {ReflectiveKey} from
 './reflective_key';\nimport {ReflectiveDependency, ResolvedReflectiveFactory, ResolvedReflectiveProvider,
 resolveReflectiveProviders} from './reflective_provider';\n\n\n//
 Threshold for the dynamic version\nconst UNDEFINED = {};\n\n/**\n * A ReflectiveDependency injection
 container used for instantiating objects and resolving\n * dependencies.\n * An `Injector` is a replacement for a
 `new` operator, which can automatically resolve the\n * constructor dependencies.\n * In typical use, application
 code asks for the dependencies in the constructor and they are\n * resolved by the `Injector`.\n * @usageNotes\n
 * ### Example\n * The following example creates an `Injector` configured to create `Engine` and `Car`.\n *
 ```typescript\n * @Injectable()\n * class Engine {\n * }\n * @Injectable()\n * class Car {\n *   constructor(public
 engine:Engine) {}\n * }\n * var injector = ReflectiveInjector.resolveAndCreate([Car, Engine]);\n * var car =
 injector.get(Car);\n * expect(car instanceof Car).toBe(true);\n * expect(car.engine instanceof Engine).toBe(true);\n
 * ```\n * Notice, we don't use the `new` operator because we explicitly want
 to have the `Injector`\n * resolve all of the object's dependencies automatically.\n * TODO: delete in v14.\n *
 @deprecated from v5 - slow and brings in a lot of code, Use `Injector.create` instead.\n * @publicApi\n *
 abstract class ReflectiveInjector implements Injector {\n /**\n * Turns an array of provider definitions into an
 array of resolved providers.\n * A resolution is a process of flattening multiple nested arrays and converting
 individual\n * providers into an array of `ResolvedReflectiveProvider`s.\n * @usageNotes\n * ###
 Example\n *
 ```typescript\n * @Injectable()\n * class Engine {\n * }\n * @Injectable()\n * class
 Car {\n *   constructor(public engine:Engine) {}\n * }\n * var providers = ReflectiveInjector.resolve([Car,
 [[Engine]]]);\n * expect(providers.length).toEqual(2);\n * expect(providers[0] instanceof
 ResolvedReflectiveProvider).toBe(true);\n * expect(providers[0].key.displayName).toBe("Car");\n
 * expect(providers[0].dependencies.length).toEqual(1);\n * expect(providers[0].factory).toBeDefined();\n *
 expect(providers[1].key.displayName).toBe("Engine");\n * });\n *
 ```\n *
 @n static resolve(providers:
 Provider[]): ResolvedReflectiveProvider[] {\n return resolveReflectiveProviders(providers);\n }\n /**\n *
 Resolves an array of providers and creates an injector from those providers.\n * The passed-in providers can
 be an array of `Type`, `Provider`,\n * or a recursive array of more providers.\n * @usageNotes\n * ###
 Example\n *
 ```typescript\n * @Injectable()\n * class Engine {\n * }\n * @Injectable()\n * class
 Car {\n *   constructor(public engine:Engine) {}\n * }\n * var injector =
 ReflectiveInjector.resolveAndCreate([Car, Engine]);\n * expect(injector.get(Car) instanceof Car).toBe(true);\n
 *
 ```\n *
 @n static resolveAndCreate(providers: Provider[], parent?:
 Injector): ReflectiveInjector {\n const ResolvedReflectiveProviders = ReflectiveInjector.resolve(providers);\n
 return ReflectiveInjector.fromResolvedProviders(ResolvedReflectiveProviders, parent);\n }\n /**\n * Creates an
 injector from previously resolved providers.\n * This API is the recommended way to construct injectors in
 performance-sensitive parts.\n * @usageNotes\n * ### Example\n *
 ```typescript\n * @Injectable()\n * class Engine {\n * }\n * @Injectable()\n * class
 Car {\n *   constructor(public engine:Engine) {}\n * }\n * var providers = ReflectiveInjector.resolve([Car, Engine]);\n
 * var injector =
 ReflectiveInjector.fromResolvedProviders(providers);\n * expect(injector.get(Car) instanceof Car).toBe(true);\n
 *
 ```\n *
 @n static fromResolvedProviders(providers: ResolvedReflectiveProvider[], parent?: Injector):\n
 ReflectiveInjector {\n return new ReflectiveInjector_(providers, parent);\n
 }\n\n /**\n * Parent of this injector.\n * <!-- TODO: Add a link to the section of the user guide talking
 about hierarchical injection.\n * -->\n *
 @n abstract get parent(): Injector|null;\n\n /**\n * Resolves an array of
 providers and creates a child injector from those providers.\n * <!-- TODO: Add a link to the section of the
 user guide talking about hierarchical injection.\n * -->\n *
 @n The passed-in providers can be an array of `Type`,
 `Provider`,\n * or a recursive array of more providers.\n * @usageNotes\n * ### Example\n *
 ```typescript\n * class ParentProvider {}\n * class ChildProvider {}\n * var parent =
 ReflectiveInjector.resolveAndCreate([ParentProvider]);\n * var child =

```

```

parent.resolveAndCreateChild([ChildProvider]);\n *\n * expect(child.get(ParentProvider) instanceof
ParentProvider).toBe(true);\n * expect(child.get(ChildProvider) instanceof ChildProvider).toBe(true);\n *
expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));\n
* ```\n *\n abstract resolveAndCreateChild(providers: Provider[]): ReflectiveInjector;\n\n /**\n * Creates a
child injector from previously resolved providers.\n *\n * <!-- TODO: Add a link to the section of the user guide
talking about hierarchical injection.\n * -->\n *\n * This API is the recommended way to construct injectors in
performance-sensitive parts.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * class
ParentProvider {\n * class ChildProvider {\n *\n * var parentProviders =
ReflectiveInjector.resolve([ParentProvider]);\n * var childProviders =
ReflectiveInjector.resolve([ChildProvider]);\n *\n * var parent =
ReflectiveInjector.fromResolvedProviders(parentProviders);\n * var child =
parent.createChildFromResolved(childProviders);\n *\n * expect(child.get(ParentProvider) instanceof
ParentProvider).toBe(true);\n * expect(child.get(ChildProvider) instanceof ChildProvider).toBe(true);\n
* expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));\n * ```\n *\n abstract
createChildFromResolved(providers: ResolvedReflectiveProvider[]): ReflectiveInjector;\n\n /**\n * Resolves a
provider and instantiates an object in the context of the injector.\n *\n * The created object does not get cached by
the injector.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * @Injectable()\n * class Engine
{\n * }\n *\n * @Injectable()\n * class Car {\n * constructor(public engine:Engine) {\n * }\n *\n * var
injector = ReflectiveInjector.resolveAndCreate([Engine]);\n *\n * var car = injector.resolveAndInstantiate(Car);\n
* expect(car.engine).toBe(injector.get(Engine));\n * expect(car).not.toBe(injector.resolveAndInstantiate(Car));\n
* ```\n *\n abstract resolveAndInstantiate(provider: Provider): any;\n\n /**\n * Instantiates an object using a
resolved provider in the context of the injector.\n
*\n * The created object does not get cached by the injector.\n *\n * @usageNotes\n * ### Example\n *\n *
```typescript\n * @Injectable()\n * class Engine {\n * }\n *\n * @Injectable()\n * class Car {\n *
constructor(public engine:Engine) {\n * }\n *\n * var injector =
ReflectiveInjector.resolveAndCreate([Engine]);\n *\n * var carProvider = ReflectiveInjector.resolve([Car])[0];\n
* var car = injector.instantiateResolved(carProvider);\n * expect(car.engine).toBe(injector.get(Engine));\n *
expect(car).not.toBe(injector.instantiateResolved(carProvider));\n * ```\n *\n abstract
instantiateResolved(provider: ResolvedReflectiveProvider): any;\n\n abstract get(token: any, notFoundValue?:
any): any;\n}\n\nexport class ReflectiveInjector_ implements ReflectiveInjector {\n private static INJECTOR_KEY
= (/ * @__PURE__ */ ReflectiveKey.get(Injector));\n /** @internal *\n _constructionCounter: number = 0;\n /**
@internal *\n public _providers:
ResolvedReflectiveProvider[];\n public readonly parent: Injector|null;\n\n keyIds: number[];\n objs: any[];\n
/**\n * Private\n *\n constructor(_providers: ResolvedReflectiveProvider[], _parent?: Injector) {\n
this._providers = _providers;\n this.parent = _parent || null;\n\n const len = _providers.length;\n\n this.keyIds =
[];\n this.objs = [];\n\n for (let i = 0; i < len; i++) {\n this.keyIds[i] = _providers[i].key.id;\n this.objs[i] =
UNDEFINED;\n }\n }\n\n get(token: any, notFoundValue: any = THROW_IF_NOT_FOUND): any {\n return
this._getByKey(ReflectiveKey.get(token), null, notFoundValue);\n }\n\n resolveAndCreateChild(providers:
Provider[]): ReflectiveInjector {\n const ResolvedReflectiveProviders = ReflectiveInjector.resolve(providers);\n
return this.createChildFromResolved(ResolvedReflectiveProviders);\n }\n\n createChildFromResolved(providers:
ResolvedReflectiveProvider[]): ReflectiveInjector {\n const inj = new
ReflectiveInjector_(providers);\n (inj as {parent: Injector | null}).parent = this;\n return inj;\n }\n\n
resolveAndInstantiate(provider: Provider): any {\n return
this.instantiateResolved(ReflectiveInjector.resolve([provider])[0]);\n }\n\n instantiateResolved(provider:
ResolvedReflectiveProvider): any {\n return this._instantiateProvider(provider);\n }\n\n
getProviderAtIndex(index: number): ResolvedReflectiveProvider {\n if (index < 0 || index >=
this._providers.length) {\n throw outOfBoundsError(index);\n }\n return this._providers[index];\n }\n\n /**
@internal *\n _new(provider: ResolvedReflectiveProvider): any {\n if (this._constructionCounter++ >

```

```

this._getMaxNumberOfObjects() {\n  throw cyclicDependencyError(this, provider.key);\n } return
this._instantiateProvider(provider);\n }\n\n private _getMaxNumberOfObjects(): number {\n  return
this.objs.length;\n }\n\n private _instantiateProvider(provider: ResolvedReflectiveProvider):
any {\n  if (provider.multiProvider) {\n    const res = [];\n    for (let i = 0; i < provider.resolvedFactories.length;
++i) {\n      res[i] = this._instantiate(provider, provider.resolvedFactories[i]);\n    }\n    return res;\n  } else {\n
return this._instantiate(provider, provider.resolvedFactories[0]);\n }\n }\n\n private _instantiate(\n  provider:
ResolvedReflectiveProvider,\n  ResolvedReflectiveFactory: ResolvedReflectiveFactory): any {\n  const factory
= ResolvedReflectiveFactory.factory;\n\n  let deps: any[];\n  try {\n    deps =\n
ResolvedReflectiveFactory.dependencies.map(dep => this._getByReflectiveDependency(dep));\n  } catch (e: any)
{\n    if (e.addKey) {\n      e.addKey(this, provider.key);\n    }\n    throw e;\n  }\n\n  let obj: any;\n  try {\n
obj = factory(...deps);\n  } catch (e) {\n    throw instantiationError(this, e, (e as Error).stack, provider.key);\n
}\n\n  return obj;\n }\n\n
private _getByReflectiveDependency(dep: ReflectiveDependency): any {\n  return this._getKey(dep.key,
dep.visibility, dep.optional ? null : THROW_IF_NOT_FOUND);\n }\n\n private _getKey(key: ReflectiveKey,
visibility: Self|SkipSelf|null, notFoundValue: any): any {\n  if (key === ReflectiveInjector._INJECTOR_KEY) {\n
return this;\n }\n\n  if (visibility instanceof Self) {\n    return this._getKeySelf(key, notFoundValue);\n\n
}\n\n  else {\n    return this._getKeyDefault(key, notFoundValue, visibility);\n  }\n }\n\n private
_getObjByKeyId(keyId: number): any {\n  for (let i = 0; i < this.keyIds.length; i++) {\n    if (this.keyIds[i] ===
keyId) {\n      if (this.objs[i] === UNDEFINED) {\n        this.objs[i] = this._new(this._providers[i]);\n      }\n
return this.objs[i];\n    }\n  }\n\n  return UNDEFINED;\n }\n\n /** @internal */\n _throwOrNull(key:
ReflectiveKey, notFoundValue: any): any {\n  if (notFoundValue !== THROW_IF_NOT_FOUND)
{\n    return notFoundValue;\n  } else {\n    throw noProviderError(this, key);\n  }\n }\n\n /** @internal */\n
_getByKeySelf(key: ReflectiveKey, notFoundValue: any): any {\n  const obj = this._getObjByKeyId(key.id);\n
return (obj !== UNDEFINED) ? obj : this._throwOrNull(key, notFoundValue);\n }\n\n /** @internal */\n
_getByKeyDefault(key: ReflectiveKey, notFoundValue: any, visibility: Self|SkipSelf|null): any {\n  let inj:
Injector|null;\n\n  if (visibility instanceof SkipSelf) {\n    inj = this.parent;\n  } else {\n    inj = this;\n  }\n\n
while (inj instanceof ReflectiveInjector_) {\n    const inj_ = <ReflectiveInjector_>inj;\n    const obj =
inj._getObjByKeyId(key.id);\n    if (obj !== UNDEFINED) return obj;\n    inj = inj_.parent;\n  }\n\n  if (inj !==
null) {\n    return inj.get(key.token, notFoundValue);\n  } else {\n    return this._throwOrNull(key,
notFoundValue);\n  }\n }\n\n get displayName(): string {\n  const
providers =\n    _mapProviders(this, (b: ResolvedReflectiveProvider) => `\" + b.key.displayName + `\" )\n
.join(', ');\n  return `ReflectiveInjector(providers: [${providers}]);`\n }\n\n toString(): string {\n  return
this.displayName;\n }\n\n\nfunction _mapProviders(injector: ReflectiveInjector_, fn: Function): any[] {\n  const
res: any[] = [];\n  for (let i = 0; i < injector._providers.length; ++i) {\n    res[i] =
fn(injector.getProviderAtIndex(i));\n  }\n  return res;\n }\n\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n */\n * @module\n * @description\n * The `di` module provides
dependency injection container services.\n *\n */\nexport * from './metadata';\nexport {InjectFlags} from
'/interface/injector';\nexport {defineInjectable, defineInjectable, defineInjector, InjectableType, InjectorType}
from './interface/defs';\nexport {forwardRef, resolveForwardRef, ForwardRefFn} from './forward_ref';\nexport
{Injectable, InjectableDecorator, InjectableProvider} from './injectable';\nexport {Injector} from './injector';\nexport
{EnvironmentInjector} from './r3_injector';\nexport {importProvidersFrom, ImportProvidersSource} from
'/provider_collection';\nexport {ENVIRONMENT_INITIALIZER} from './initializer_token';\nexport
{ProviderToken} from './provider_token';\nexport {inject, inject, InjectOptions, invalidFactoryDep} from
'/injector_compatibility';\nexport {INJECTOR} from './injector_token';\nexport {ReflectiveInjector} from
'/reflective_injector';\nexport {ClassProvider, ModuleWithProviders, ClassSansProvider,
ImportedNgModuleProviders, ConstructorProvider, ConstructorSansProvider, ExistingProvider,
ExistingSansProvider, FactoryProvider, FactorySansProvider, Provider, StaticClassProvider,

```

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StaticClassSansProvider, StaticProvider, TypeProvider, ValueProvider, ValueSansProvider}
from './interface/provider';\nextport {ResolvedReflectiveFactory, ResolvedReflectiveProvider} from
'/reflective_provider';\nextport {ReflectiveKey} from './reflective_key';\nextport {InjectionToken} from
'/injection_token';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n/*\n * This file should not be necessary because node resolution should just default to `./di/index`!\n *\n *
However it does not seem to work and it breaks:\n * - //packages/animations/browser/test:test_web_chromium-
local\n * - //packages/compiler-cli/test:extract_i18n\n * - //packages/compiler-cli/test:ngc\n * -
//packages/compiler-cli/test:perform_watch\n * - //packages/compiler-cli/test/diagnostics:check_types\n * -
//packages/compiler-cli/test/transformers:test\n * - //packages/compiler/test:test\n * -
//tools/public_api_guard:core_api\n
*\n * Remove this file once the above is solved or wait until `ngc` is deleted and then it should be\n * safe to delete
this file.\n *\n\nexport * from './di/index';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {InjectFlags, resolveForwardRef} from './di';\nimport
{assertInjectImplementationNotEqual} from './di/inject_switch';\nimport {inject} from
'./di/injector_compatibility';\nimport {ProviderToken} from './di/provider_token';\nimport
{getOrCreateInjectable} from './di';\nimport {TDirectiveHostNode} from './interfaces/node';\nimport
{getCurrentTNode, getLView} from './state';\n\n/*\n * Returns the value associated to the given token from the
injectors.\n *\n * `directiveInject` is intended to be used for directive, component and pipe factories.\n * All other
injection use `inject` which
does not walk the node injector tree.\n *\n * Usage example (in factory function):\n *\n * ``\n * class
SomeDirective {\n *   constructor(directive: DirectiveA) {\n *\n *     static dir = defineDirective({\n *       type:
SomeDirective,\n *       factory: () => new SomeDirective(directiveInject(DirectiveA))\n *\     });\n *   }\n * }\n * ``\n *
@param token the type or token to inject\n * @param flags Injection flags\n * @returns the value from the injector
or `null` when not found\n *\n * @codeGenApi\n *\nextport function directiveInject<T>(token:
ProviderToken<T>): T;\nextport function directiveInject<T>(token: ProviderToken<T>, flags: InjectFlags):
T;\nextport function directiveInject<T>(token: ProviderToken<T>, flags = InjectFlags.Default): T|null {\n const
lView = getLView();\n // Fall back to inject() if view hasn't been created. This situation can happen in tests\n // if
inject utilities are used before bootstrapping.\n if (lView === null) {\n // Verify that we will not
get into infinite loop.\n ngDevMode && assertInjectImplementationNotEqual(directiveInject);\n return
inject(token, flags);\n }\n const tNode = getCurrentTNode();\n return getOrCreateInjectable<T>(\n tNode as
TDirectiveHostNode, lView, resolveForwardRef(token), flags);\n}\n\n/*\n * Throws an error indicating that a
factory function could not be generated by the compiler for a\n * particular class.\n *\n * This instruction allows the
actual error message to be optimized away when ngDevMode is turned\n * off, saving bytes of generated code while
still providing a good experience in dev mode.\n *\n * The name of the class is not mentioned here, but will be in
the generated factory function name\n * and thus in the stack trace.\n *\n * @codeGenApi\n *\nextport function
invalidFactory(): never {\n const msg =\n ngDevMode ? `This constructor was not compatible with Dependency
Injection.` : 'invalid';\n throw new Error(msg);\n}\n", "\n\n/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\nimport './ng_dev_mode';\nimport
{newTrustedFunctionForDev} from './security/trusted_types';\n\n/*\n * THIS FILE CONTAINS CODE WHICH
SHOULD BE TREE SHAKEN AND NEVER CALLED FROM PRODUCTION CODE!!!\n *\n\n/*\n * Creates
an `Array` construction with a given name. This is useful when\n * looking for memory consumption to see what
time of array it is.\n *\n * @param name Name to give to the constructor\n * @returns A subclass of `Array` if
possible. This can only be done in\n * environments which support `class` construct.\n *\nextport function
createNamedArrayType(name: string): typeof Array {\n // This should never be called in prod mode, so let's verify
that is the case.\n if (ngDevMode) {\n try {\n // If this function were compromised the following could lead to

```



```

arbitrary\n // script
execution. We bless it with Trusted Types anyway since this\n // function is stripped out of production
binaries.\n return (newTrustedFunctionForDev('Array', `return class ${name} extends Array{}`))(Array);\n }
catch (e) {\n // If it does not work just give up and fall back to regular Array.\n return Array;\n }\n } else
{\n throw new Error(\n 'Looks like we are in \\`prod mode\\`, but we are creating a named Array type, which is
wrong! Check your code');\n }\n }\n",`/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {KeyValueArray} from '../util/array_utils';\nimport {assertNumber,
assertNumberInRange} from '../util/assert';\n\n/**\n * Value stored in the `TData` which is needed to re-
concatenate the styling.\n *\n * See: `TStylingKeyPrimitive` and `TStylingStatic`\n */\nexport
type TStylingKey = TStylingKeyPrimitive|TStylingStatic;\n\n/**\n * The primitive portion (`TStylingStatic`
removed) of the value stored in the `TData` which is\n * needed to re-concatenate the styling.\n *\n * - `string`:
Stores the property name. Used with `styleProp`/`classProp` instruction.\n * - `null`: Represents map, so there is no
name. Used with `styleMap`/`classMap`.\n * - `false`: Represents an ignore case. This happens when
`styleProp`/`classProp` instruction\n * is combined with directive which shadows its input `@Input('class')`. That
way the binding\n * should not participate in the styling resolution.\n */\nexport type TStylingKeyPrimitive =
string|null|false;\n\n/**\n * Store the static values for the styling binding.\n *\n * The `TStylingStatic` is just
`KeyValueArray` where key `\"\"` (stored at location 0) contains the\n * `TStylingKey` (stored at location 1). In
other words this wraps the `TStylingKey` such that the\n * `\"\"` contains the wrapped
value.\n *\n * When instructions are resolving styling they may need to look forward or backwards in the linked\n *
list to resolve the value. For this reason we have to make sure that the linked list also contains\n * the static values.
However the list only has space for one item per styling instruction. For this\n * reason we store the static values
here as part of the `TStylingKey`. This means that the\n * resolution function when looking for a value needs to first
look at the binding value, and then\n * at `TStylingKey` (if it exists).\n *\n * Imagine we have:\n *\n * <div
class=\"TEMPLATE\" my-dir>\n *\n * @Directive({\n *\n * host: {\n *\n * class: 'DIR',\n *\n * [class.dynamic]: 'exp' //
classProp('dynamic', ctx.exp);\n *\n * })\n *\n * })\n *\n * In the above case the linked list will contain one item:\n
*\n * <TStylingStatic>[\n *\n * 'dynamic', // This is the wrapped
value of `TStylingKey`\n *\n * 'DIR': true, // This is the default static value of directive binding.\n *\n * ];\n *
tData[10 + 1] = 0; // We don't have prev/next.\n *\n * IView[10] = undefined; // assume `ctx.exp` is
`undefined`\n *\n * IView[10 + 1] = undefined; // Just normalized `IView[10]`\n *\n * So when the function is
resolving styling value, it first needs to look into the linked list\n * (there is none) and then into the static
`TStylingStatic` too see if there is a default value for\n * `dynamic` (there is not). Therefore it is safe to remove it.\n
*\n * If setting `true` case:\n *\n * IView[10] = true; // assume `ctx.exp` is `true`\n *\n * IView[10 + 1] = true; //
Just normalized `IView[10]`\n *\n * So when the function is resolving styling value, it first needs to look into the
linked list\n * (there is none) and then into `TNode.residualClass` (TNode.residualStyle) which contains\n *\n *
tNode.residualClass = [\n *\n * 'TEMPLATE': true,\n
*\n * ];\n *\n * This means that it is safe to add class.\n */\nexport interface TStylingStatic extends
KeyValueArray<any> {\n\n/**\n * This is a branded number which contains previous and next index.\n *\n * When we
come across styling instructions we need to store the `TStylingKey` in the correct\n * order so that we can
re-concatenate the styling value in the desired priority.\n *\n * The insertion can happen either at the:\n * - end of
template as in the case of coming across additional styling instruction in the template\n * - in front of the template
in the case of coming across additional instruction in the\n * `hostBindings`.\n *\n * We use `TStylingRange` to store
the previous and next index into the `TData` where the template\n * bindings can be found.\n *\n * - bit 0 is used to
mark that the previous index has a duplicate for current value.\n * - bit 1 is used to mark that the next index has a
duplicate for the current value.\n * - bits 2-16 are used to encode
the next/tail of the template.\n * - bits 17-32 are used to encode the previous/head of template.\n *\n * NODE:
*duplicate* false implies that it is statically known that this binding will not collide\n * with other bindings and

```

therefore there is no need to check other bindings. For example the `<div [style.color]=\"exp\" [style.width]=\"exp\">` will never collide and will have their bits set accordingly. Previous duplicate means that we may need to check previous if the current binding is `null`. Next duplicate means that we may need to check next bindings if the current binding is not `null`. `0` has special significance and represents `null` as in no additional pointer. `^` next export interface `TStylingRange` { `__brand__`: 'TStylingRange'; `__next__`: `TStylingRange`; `__prev__`: `TStylingRange`; `__mask__`: `number`; `__shift__`: `number`; } `enum StylingRange` { `PREV_SHIFT`: `number`; `PREV_MASK`: `number`; `NEXT_SHIFT`: `number`; `NEXT_MASK`: `number`; `UNSIGNED_MASK`: `number`; `PREV_DUPLICATE`: `number`; `NEXT_DUPLICATE`: `number`; }

```

PREV_SHIFT = 17, // Previous pointer mask.
PREV_MASK = 0xFFFE0000, // Number of bits to shift
for the next pointer
NEXT_SHIFT = 2, // Next pointer mask.
NEXT_MASK = 0x001FFFC, // Mask to
remove negative bit. (interpret number as positive)
UNSIGNED_MASK = 0x7FFF, // This bit is set if
the previous bindings contains a binding which could possibly cause a
duplicate. For example: <div
[style]=\"map\" [style.width]=\"width\">, the `width` binding will
have previous duplicate set. The implication
is that if `width` binding becomes `null`, it is necessary to defer the
value to `map.width`. (Because `width`
overwrites `map.width`.)
PREV_DUPLICATE = 0x02, // This bit is set to if the next binding
contains a binding which could possibly cause a
duplicate. For example: <div [style]=\"map\"
[style.width]=\"width\">, the `map` binding will
have next duplicate set. The implication
is that if `map.width` binding becomes not `null`, it is necessary to
defer the value to `width`. (Because `width`
overwrites `map.width`.)
NEXT_DUPLICATE = 0x01, // This bit is set to if the next binding
contains a binding which could possibly cause a
duplicate. For example: <div [style]=\"map\"
[style.width]=\"width\">, the `width` binding will
have next duplicate set. The implication
is that if `width` binding becomes not `null`, it is necessary to
defer the value to `map.width`. (Because `width`
overwrites `map.width`.)
}

export function toTStylingRange(prev: number, next:
number): TStylingRange {
  ngDevMode && assertNumberInRange(prev, 0,
StylingRange.UNSIGNED_MASK);
  ngDevMode && assertNumberInRange(next, 0,
StylingRange.UNSIGNED_MASK);
  return (prev << StylingRange.PREV_SHIFT | next <<
StylingRange.NEXT_SHIFT) as any;
}

export function getTStylingRangePrev(tStylingRange: TStylingRange):
number {
  ngDevMode && assertNumber(tStylingRange, 'expected number');
  return ((tStylingRange as any as
number) >> StylingRange.PREV_SHIFT) & StylingRange.UNSIGNED_MASK;
}

export function
getTStylingRangePrevDuplicate(tStylingRange: TStylingRange): boolean {
  ngDevMode &&
assertNumber(tStylingRange, 'expected number');
  return ((tStylingRange as any as
number) &
StylingRange.PREV_DUPLICATE) === StylingRange.PREV_DUPLICATE;
}

export
function setTStylingRangePrev(tStylingRange: TStylingRange, previous:
number): TStylingRange {
  ngDevMode && assertNumber(tStylingRange, 'expected number');
  ngDevMode &&
assertNumberInRange(previous, 0, StylingRange.UNSIGNED_MASK);
  return (((tStylingRange as any as
number) & ~StylingRange.PREV_MASK) |
(previous << StylingRange.PREV_SHIFT)) as
any;
}

export function setTStylingRangePrevDuplicate(tStylingRange: TStylingRange):
TStylingRange {
  ngDevMode && assertNumber(tStylingRange, 'expected number');
  return ((tStylingRange as any as
number) |
StylingRange.PREV_DUPLICATE) as any;
}

export function getTStylingRangeNext(tStylingRange:
TStylingRange): number {
  ngDevMode && assertNumber(tStylingRange, 'expected number');
  return
((tStylingRange as any as
number) & StylingRange.NEXT_MASK) >> StylingRange.NEXT_SHIFT;
}

export
function setTStylingRangeNext(tStylingRange: TStylingRange, next:
number): TStylingRange {
  ngDevMode
&&
assertNumber(tStylingRange, 'expected number');
  ngDevMode && assertNumberInRange(next, 0,
StylingRange.UNSIGNED_MASK);
  return (((tStylingRange as any as
number) &
~StylingRange.NEXT_MASK) |
(next << StylingRange.NEXT_SHIFT) as any);
}

export function
getTStylingRangeNextDuplicate(tStylingRange: TStylingRange): boolean {
  ngDevMode &&
assertNumber(tStylingRange, 'expected number');
  return ((tStylingRange as any as
number) &
StylingRange.NEXT_DUPLICATE) === StylingRange.NEXT_DUPLICATE;
}

export
function setTStylingRangeNextDuplicate(tStylingRange: TStylingRange):
TStylingRange {
  ngDevMode &&
assertNumber(tStylingRange, 'expected number');
  return ((tStylingRange as any as
number) |
StylingRange.NEXT_DUPLICATE) as any;
}

export function getTStylingRangeTail(tStylingRange:
TStylingRange): number {
  ngDevMode && assertNumber(tStylingRange, 'expected number');
  const next =

```

```

getTStylingRangeNext(tStylingRange);\n return next === 0 ? getTStylingRangePrev(tStylingRange)
: next;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n**\n * Patch a `debug` property on top of the existing object.\n *\n * NOTE: always call this method with
`ngDevMode` && attachDebugObject(...)\n *\n * @param obj Object to patch\n * @param debug Value to patch\n
*/\n\nexport function attachDebugObject(obj: any, debug: any): void {\n if (ngDevMode) {\n
Object.defineProperty(obj, 'debug', {value: debug, enumerable: false});\n } else {\n throw new Error(\n
This method should be guarded with `ngDevMode` so that it can be tree shaken in production!);\n
})\n}\n\n**\n * Patch a `debug` property getter on top of the existing object.\n *\n * NOTE: always call this method with `ngDevMode`
&& attachDebugObject(...)\n *\n * @param obj Object to patch\n * @param debugGetter Getter
returning a value to patch\n *\n\nexport function attachDebugGetter<T>(obj: T, debugGetter: (this: T) => any): void
{\n if (ngDevMode) {\n Object.defineProperty(obj, 'debug', {get: debugGetter, enumerable: false});\n } else {\n
throw new Error(\n This method should be guarded with `ngDevMode` so that it can be tree shaken in
production!);\n })\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Injector} from '../di/injector';\nimport {Type} from
'../interface/type';\nimport {SchemaMetadata} from '../metadata/schema';\nimport {Sanitizer} from
'../sanitization/sanitizer';\nimport {KeyValueArray} from '../util/array_utils';\nimport {assertDefined} from
'../util/assert';\nimport {createNamedArrayType} from '../util/named_array_type';\nimport {assertNodeInjector}
from './assert';\nimport
{getInjectorIndex, getParentInjectorLocation} from './di';\nimport {CONTAINER_HEADER_OFFSET,
HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS, NATIVE} from './interfaces/container';\nimport
{ComponentTemplate, DirectiveDef, DirectiveDefList, PipeDefList, ViewQueriesFunction} from
'./interfaces/definition';\nimport {NO_PARENT_INJECTOR, NodeInjectorOffset} from
'./interfaces/injector';\nimport {AttributeMarker, InsertBeforeIndex, PropertyAliases, TConstants, TContainerNode,
TElementNode, TNode as ITNode, TNodeFlags, TNodeProviderIndexes, TNodeType, toTNodeTypeAsString} from
'./interfaces/node';\nimport {SelectorFlags} from './interfaces/projection';\nimport {LQueries, TQueries} from
'./interfaces/query';\nimport {Renderer, RendererFactory} from './interfaces/renderer';\nimport {RComment,
RElement, RNode} from './interfaces/renderer_dom';\nimport {getTStylingRangeNext,
getTStylingRangeNextDuplicate, getTStylingRangePrev, getTStylingRangePrevDuplicate, TStylingKey,
TStylingRange}
from './interfaces/styling';\nimport {CHILD_HEAD, CHILD_TAIL, CLEANUP, CONTEXT, DebugNode,
DECLARATION_VIEW, DestroyHookData, FLAGS, HEADER_OFFSET, HookData, HOST,
HostBindingOpCodes, ID, INJECTOR, LContainerDebug as ILContainerDebug, LView, LViewDebug as
ILViewDebug, LViewDebugRange, LViewDebugRangeContent, LViewFlags, NEXT, NodeInjectorDebug,
PARENT, QUERIES, RENDERER, RENDERER_FACTORY, SANITIZER, T_HOST, TData, TView as ITView,
TVIEW, TView, TViewType, TViewTypeAsString} from './interfaces/view';\nimport {attachDebugObject} from
'../util/debug_utils';\nimport {getParentInjectorIndex, getParentInjectorView} from '../util/injector_utils';\nimport
{unwrapRNode} from '../util/view_utils';\n\n*\n * This file contains conditionally attached classes which provide
human readable (debug) level\n * information for `LView`, `LContainer` and other internal data structures. These
data structures\n * are stored internally as array which makes it very difficult during debugging to reason
about the\n * current state of the system.\n *\n * Patching the array with extra property does change the array's
hidden class' but it does not\n * change the cost of access, therefore this patching should not have significant if any
impact in\n * `ngDevMode` mode. (see: https://jsperf.com/array-vs-monkey-patch-array)\n *\n * So instead of
seeing:\n * ``\n * Array(30) [Object, 659, null, ...]\n * ``\n *\n * You get to see:\n * ``\n * LViewDebug {\n *
views: [...],\n * flags: {attached: true, ...}\n * nodes: [\n * {html: '<div id=\"123\">', ..., nodes: [\n *
{html: '<span>', ..., nodes: null}\n * ]}\n * ]\n * }\n * ``\n *\n * \n\nlet LVIEW_COMPONENT_CACHE:
Map<string|null, Array<any>>|undefined;\nlet LVIEW_EMBEDDED_CACHE: Map<string|null,

```

```

Array<any>>|undefined;\nlet LVIEW_ROOT: Array<any>|undefined;\nlet LVIEW_COMPONENT:
Array<any>|undefined;\nlet LVIEW_EMBEDDED: Array<any>|undefined;\n\ninterface TViewDebug extends
ITView {\n  type: TViewType;\n}\n\n/**\n * This function
  clones a blueprint and creates LView.\n * Simple slice will keep the same type, and we need it to be LView\n
*/\nexport function cloneToLViewFromTViewBlueprint<T>(tView: TView): LView<T> {\n  const debugTView =
tView as TViewDebug;\n  const IView = getLViewToClone(debugTView.type, tView.template &&
tView.template.name);\n  return IView.concat(tView.blueprint) as any;\n}\n\nclass LRootView extends Array
{} \nclass LComponentView extends Array {} \nclass LEmbeddedView extends Array {} \n\nfunction
getLViewToClone(type: TViewType, name: string|null): Array<any> {\n  switch (type) {\n    case
TViewType.Root:\n      if (LVIEW_ROOT === undefined) LVIEW_ROOT = new LRootView();\n      return
LVIEW_ROOT;\n    case TViewType.Component:\n      if (!ngDevMode || !ngDevMode.namedConstructors) {\n
if (LVIEW_COMPONENT === undefined) LVIEW_COMPONENT = new LComponentView();\n      return
LVIEW_COMPONENT;\n    }\n    if (LVIEW_COMPONENT_CACHE === undefined)
LVIEW_COMPONENT_CACHE =
new Map();\n    let componentArray = LVIEW_COMPONENT_CACHE.get(name);\n    if (componentArray
=== undefined) {\n      componentArray = new (createNamedArrayType('LComponentView' +
nameSuffix(name)))();\n      LVIEW_COMPONENT_CACHE.set(name, componentArray);\n    }\n    return
componentArray;\n    case TViewType.Embedded:\n      if (!ngDevMode || !ngDevMode.namedConstructors) {\n
if (LVIEW_EMBEDDED === undefined) LVIEW_EMBEDDED = new LEmbeddedView();\n      return
LVIEW_EMBEDDED;\n    }\n    if (LVIEW_EMBEDDED_CACHE === undefined)
LVIEW_EMBEDDED_CACHE = new Map();\n    let embeddedArray =
LVIEW_EMBEDDED_CACHE.get(name);\n    if (embeddedArray === undefined) {\n      embeddedArray =
new (createNamedArrayType('LEmbeddedView' + nameSuffix(name)))();\n      LVIEW_EMBEDDED_CACHE.set(name, embeddedArray);\n    }\n    return embeddedArray;\n  }\n}\n\nfunction nameSuffix(text: string|null|undefined): string {\n  if (text == null) return '';\n  const index =
text.lastIndexOf('_Template');\n  return '_' + (index === -1 ? text : text.slice(0, index));\n}\n\n/**\n * This class is a
debug version of Object literal so that we can have constructor name show up\n * in\n * debug tools in
ngDevMode.\n */\nexport const TViewConstructor = class TView implements ITView {\n  constructor(\n    public
type: TViewType,\n    public blueprint: LView,\n    public template: ComponentTemplate<{}>|null,\n    public
queries: TQueries|null,\n    public viewQuery: ViewQueriesFunction<{}>|null,\n    public declTNode:
ITNode|null,\n    public data: TData,\n    public bindingStartIndex: number,\n    public expandoStartIndex:
number,\n    public hostBindingOpCodes: HostBindingOpCodes|null,\n    public firstCreatePass: boolean,\n    public
firstUpdatePass: boolean,\n    public staticViewQueries: boolean,\n    public staticContentQueries:
boolean,\n    public preOrderHooks: HookData|null,\n    public preOrderCheckHooks: HookData|null,\n
    public contentHooks: HookData|null,\n    public contentCheckHooks: HookData|null,\n    public viewHooks:
HookData|null,\n    public viewCheckHooks: HookData|null,\n    public destroyHooks: DestroyHookData|null,\n
    public cleanup: any[]|null,\n    public contentQueries: number[]|null,\n    public components: number[]|null,\n
    public directiveRegistry: DirectiveDefList|null,\n    public pipeRegistry: PipeDefList|null,\n    public firstChild:
ITNode|null,\n    public schemas: SchemaMetadata[]|null,\n    public consts: TConstants|null,\n    public
incompleteFirstPass: boolean,\n    public _decls: number,\n    public _vars: number,\n  ) {} \n  get template_():
string {\n    const buf: string[] = [];\n    processTNodeChildren(this.firstChild, buf);\n    return buf.join('');\n  }\n  get type_(): string {\n    return TViewTypeAsString[this.type] || `TViewType.${this.type}`;\n  }\n}\n\nclass
TNode implements ITNode {\n  constructor(\n    public tView_:
TView,\n    //\n    public type: TNodeType,\n    //\n    public index: number,\n    //\n    public insertBeforeIndex: InsertBeforeIndex,\n
    //\n    public injectorIndex: number,\n    //\n    public directiveStart:
number,\n    //\n    public directiveEnd: number,\n    //\n    public directiveStylingLast: number,\n    //\n    public propertyBindings: number[]|null,

```

```

        /\n    public flags: TNodeFlags,                /\n    public providerIndexes:
TNodeProviderIndexes,                /\n    public value: string|null,
        /\n    public attrs: (string|AttributeMarker|(string|SelectorFlags)[])[]|null,    /\n
public mergedAttrs: (string|AttributeMarker|(string|SelectorFlags)[])[]|null, /\n    public localNames:
(string|number)[]|null,                /\n    public initialInputs: (string[]|null)[]|null|undefined,
    /\n    public inputs: PropertyAliases|null,                /\n    public outputs: PropertyAliases|null,
        /\n    public tViews: ITView|ITView[]|null,                /\n    public next:
ITNode|null,                /\n    public projectionNext: ITNode|null,
    /\n    public child: ITNode|null,                /\n    public parent:
TElementNode|TContainerNode|null,
        /\n    public projection: number|(ITNode|RNode[])[]|null,                /\n    public styles:
string|null,                /\n    public stylesWithoutHost: string|null,                /\n
    public residualStyles: KeyValueArray<any>|undefined|null,                /\n    public classes: string|null,
        /\n    public classesWithoutHost: string|null,                /\n    public
residualClasses: KeyValueArray<any>|undefined|null,                /\n    public classBindings: TStylingRange,
        /\n    public styleBindings: TStylingRange,                /\n ) {} \n \n /** \n *
Return a human debug version of the set of `NodeInjector`s which will be consulted when \n * resolving tokens
from this `TNode`. \n * \n * When
debugging applications, it is often difficult to determine which `NodeInjector`s will be \n * consulted. This method
shows a list of `DebugNode`s representing the `TNode`s which will be \n * consulted in order when resolving a
token starting at this `TNode`. \n * \n * The original data is stored in `LView` and `TView` with a lot of offset
indexes, and so it is \n * difficult to reason about. \n * \n * @param IView The `LView` instance for this
`TNode`. \n * \n debugNodeInjectorPath(IView: LView): DebugNode[] { \n    const path: DebugNode[] = []; \n
injectorIndex = getInjectorIndex(this, IView); \n    if (injectorIndex === -1) { \n        // Looks like the current `TNode`
does not have `NodeInjector` associated with it => look for \n        // parent NodeInjector. \n        const parentLocation =
getParentInjectorLocation(this, IView); \n        if (parentLocation !== NO_PARENT_INJECTOR) { \n            // We
found a parent, so start searching from the parent location. \n            injectorIndex
= getParentInjectorIndex(parentLocation); \n            IView = getParentInjectorView(parentLocation, IView); \n        }
else { \n            // No parents have been found, so there are no `NodeInjector`s to consult. \n        } \n    } \n
while (injectorIndex !== -1) { \n        ngDevMode && assertNodeInjector(IView, injectorIndex); \n        const tNode =
IView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] as TNode; \n
path.push(buildDebugNode(tNode, IView)); \n        const parentLocation = IView[injectorIndex +
NodeInjectorOffset.PARENT]; \n        if (parentLocation === NO_PARENT_INJECTOR) { \n            injectorIndex = -
1; \n        } else { \n            injectorIndex = getParentInjectorIndex(parentLocation); \n            IView =
getParentInjectorView(parentLocation, IView); \n        } \n    } \n    return path; \n } \n \n get type_(): string { \n    return
toTNodeTypeAsString(this.type) || `TNodeType.${this.type}`; \n } \n \n get flags_(): string { \n    const flags:
string[] = []; \n    if (this.flags & TNodeFlags.hasClassInput)
flags.push('TNodeFlags.hasClassInput'); \n    if (this.flags & TNodeFlags.hasContentQuery)
flags.push('TNodeFlags.hasContentQuery'); \n    if (this.flags & TNodeFlags.hasStyleInput)
flags.push('TNodeFlags.hasStyleInput'); \n    if (this.flags & TNodeFlags.hasHostBindings)
flags.push('TNodeFlags.hasHostBindings'); \n    if (this.flags & TNodeFlags.isComponentHost)
flags.push('TNodeFlags.isComponentHost'); \n    if (this.flags & TNodeFlags.isDirectiveHost)
flags.push('TNodeFlags.isDirectiveHost'); \n    if (this.flags & TNodeFlags.isDetached)
flags.push('TNodeFlags.isDetached'); \n    if (this.flags & TNodeFlags.isProjected)
flags.push('TNodeFlags.isProjected'); \n    return flags.join('|'); \n } \n \n get template_(): string { \n    if (this.type &
TNodeType.Text) return this.value!; \n    const buf: string[] = []; \n    const tagName = typeof this.value === 'string'
&& this.value || this.type_; \n    buf.push('<', tagName); \n    if (this.flags) { \n        buf.push(' ', this.flags_); \n

```

```

    }
    if (this.attrs) {
      for (let i = 0; i < this.attrs.length; i++) {
        const attrName = this.attrs[i++];
        if (typeof attrName === 'number') {
          break;
        }
        const attrValue = this.attrs[i++];
        buf.push(' ', attrName as string, '=', attrValue as string, '"');
      }
      buf.push('>');
      processTNodeChildren(this.child, buf);
      buf.push('</', tagName, '>');
      return buf.join('');
    }
    get styleBindings_(): DebugStyleBindings {
      return toDebugStyleBinding(this, false);
    }
    get classBindings_(): DebugStyleBindings {
      return toDebugStyleBinding(this, true);
    }
    get providerIndexStart_(): number {
      return this.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;
    }
    get providerIndexEnd_(): number {
      return this.providerIndexStart_ + (this.providerIndexes >>> TNodeProviderIndexes.CptViewProvidersCountShift);
    }
  }
  export const TNodeDebug = TNode;
  export type TNodeDebug = TNode;
  export interface DebugStyleBindings extends Array<KeyValueArray<any>|DebugStyleBinding|string|null> {}
  export interface DebugStyleBinding {
    key: TStylingKey;
    index: number;
    isTemplate: boolean;
    prevDuplicate: boolean;
    nextDuplicate: boolean;
    prevIndex: number;
    nextIndex: number;
  }
  function toDebugStyleBinding(tNode: TNode, isClassBased: boolean): DebugStyleBindings {
    const tData = tNode.tView_.data;
    const bindings: DebugStyleBindings = [] as any;
    const range = isClassBased ? tNode.classBindings : tNode.styleBindings;
    const prev = getTStylingRangePrev(range);
    const next = getTStylingRangeNext(range);
    let isTemplate = next !== 0;
    let cursor = isTemplate ? next : prev;
    while (cursor !== 0) {
      const itemKey = tData[cursor] as TStylingKey;
      const itemRange = tData[cursor + 1] as TStylingRange;
      bindings.unshift({
        key: itemKey,
        index: cursor,
        isTemplate: isTemplate,
        prevDuplicate: getTStylingRangePrevDuplicate(itemRange),
        nextDuplicate: getTStylingRangeNextDuplicate(itemRange),
        nextIndex: getTStylingRangeNext(itemRange),
        prevIndex: getTStylingRangePrev(itemRange)
      });
      if (cursor === prev) isTemplate = false;
      cursor = getTStylingRangePrev(itemRange);
    }
    bindings.push((isClassBased ? tNode.residualClasses : tNode.residualStyles) || null);
    return bindings;
  }
  function processTNodeChildren(tNode: ITNode|null, buf: string[]) {
    while (tNode) {
      buf.push((tNode as any as {template_: string}).template_);
      tNode = tNode.next;
    }
  }
  class TViewData extends Array {}
  let TVIEWDATA_EMPTY: unknown[]; // can't initialize here or it will not be tree shaken, because
  // `LView` constructor could have side-effects.
  * This function clones a blueprint and creates TData.
  * Simple slice will keep the same type, and we need it to be TData
  *
  export function cloneToTViewData(list: any[]): TData {
    if (TVIEWDATA_EMPTY === undefined) TVIEWDATA_EMPTY = new TViewData();
    return TVIEWDATA_EMPTY.concat(list) as any;
  }
  export class LViewBlueprint extends Array {}
  export class MatchesArray extends Array {}
  export class TViewComponents extends Array {}
  export class TNodeLocalNames extends Array {}
  export class TNodeInitialInputs extends Array {}
  export class LCleanup extends Array {}
  export class TCleanup extends Array {}
  export function attachLViewDebug(IView: LView) {
    attachDebugObject(IView, new LViewDebug(IView));
  }
  export function attachLContainerDebug(IContainer: LContainer) {
    attachDebugObject(IContainer, new LContainerDebug(IContainer));
  }
  export function toDebug<T>(obj: LView<T>): ILViewDebug<T> {
    return toDebug<T>(obj);
  }
  export function toDebug<T>(obj: LView<T>|null): ILViewDebug<T>|null {
    return toDebug<T>(obj);
  }
  export function toDebug<T>(obj: LView<T>|LContainer|null): ILViewDebug<T>|ILContainerDebug|null {
    return toDebug(obj);
  }
  export function toDebug(obj: any) {
    if (obj) {
      const debug = (obj as any).debug;
      assertDefined(debug, 'Object does not have a debug representation.');
```

```

$ {(node as Comment).textContent}-->`;
    case Node.ELEMENT_NODE:
        const outerHTML = (node as
Element).outerHTML;
        if (includeChildren) {
            return outerHTML;
        } else {
            const innerHTML = '>' + (node as
Element).innerHTML + '<';
            return (outerHTML.split(innerHTML)[0] + '>');
        }
    }
    return
null;
}
export class LViewDebug<T = unknown> implements ILViewDebug<T> {
    constructor(private
readonly _raw_IView: LView<T>) {}
    /**
     * Flags associated with the `LView` unpacked into a more
readable state.
     */
    get flags(): {
        const flags = this._raw_IView[FLAGS];
        return {
            __raw__flags__:
flags,
            initPhaseState: flags & LViewFlags.InitPhaseStateMask,
            creationMode: !(flags &
LViewFlags.CreationMode),
            firstViewPass: !(flags & LViewFlags.FirstLViewPass),
            checkAlways:
!(flags & LViewFlags.CheckAlways),
            dirty: !(flags & LViewFlags.Dirty),
            attached: !(flags &
LViewFlags.Attached),
            destroyed: !(flags & LViewFlags.Destroyed),
            isRoot: !(flags &
LViewFlags.IsRoot),
            indexWithinInitPhase: flags >> LViewFlags.IndexWithinInitPhaseShift,
        };
    }
    get parent():
ILViewDebug<T>|ILContainerDebug|null {
        return toDebug<T>(this._raw_IView[PARENT] as LView<T>|
LContainer | null);
    }
    get hostHTML(): string|null {
        return toHtml(this._raw_IView[HOST], true);
    }
    get html(): string {
        return (this.nodes || []).map(mapToHTML).join("");
    }
    get context(): T {
        return
this._raw_IView[CONTEXT];
    }
    /**
     * The tree of nodes associated with the current `LView`. The nodes
have been normalized into
     * a tree structure with relevant details pulled out for readability.
     */
    get nodes():
DebugNode[] {
        const IView = this._raw_IView;
        const tNode = IView[TVIEW].firstChild;
        return
toDebugNodes(tNode, IView);
    }
    get template(): string {
        return (this.tView as any as {template_:
string}).template_;
    }
    get tView(): ITView {
        return this._raw_IView[TVIEW];
    }
    get cleanup():
any[]|null {
        return this._raw_IView[CLEANUP];
    }
    get injector(): Injector|null {
        return
this._raw_IView[INJECTOR];
    }
    get rendererFactory(): RendererFactory {
        return
this._raw_IView[RENDERER_FACTORY];
    }
    get renderer(): Renderer {
        return
this._raw_IView[RENDERER];
    }
    get sanitizer(): Sanitizer|null {
        return this._raw_IView[SANITIZER];
    }
    get childHead(): ILViewDebug|ILContainerDebug|null {
        return
toDebug(this._raw_IView[CHILD_HEAD]);
    }
    get next(): ILViewDebug<T>|ILContainerDebug|null {
        return
toDebug<T>(this._raw_IView[NEXT] as LView<T>| LContainer | null);
    }
    get childTail():
ILViewDebug|ILContainerDebug|null {
        return toDebug(this._raw_IView[CHILD_TAIL]);
    }
    get
declarationView(): ILViewDebug|null {
        return toDebug(this._raw_IView[DECLARATION_VIEW]);
    }
    get
queries(): LQueries|null {
        return this._raw_IView[QUERIES];
    }
    get tHost(): ITNode|null {
        return
this._raw_IView[T_HOST];
    }
    get id(): number {
        return this._raw_IView[ID];
    }
    get decls(): LViewDebugRange {
        return
toLViewRange(this.tView, this._raw_IView, HEADER_OFFSET, this.tView.bindingStartIndex);
    }
    get
vars(): LViewDebugRange {
        return toLViewRange(
            this.tView, this._raw_IView,
            this.tView.bindingStartIndex, this.tView.expandoStartIndex);
    }
    get
expando(): LViewDebugRange {
        return toLViewRange(
            this.tView, this._raw_IView, this.tView.expandoStartIndex,
            this._raw_IView.length);
    }
    /**
     * Normalized view of child views (and containers) attached at this
location.
     */
    get childViews():
Array<ILViewDebug<T>|ILContainerDebug> {
        const childViews:
Array<ILViewDebug<T>|ILContainerDebug> = [];
        let child = this.childHead;
        while (child) {
            childViews.push(child as ILViewDebug<T>|
ILContainerDebug);
            child = child.next;
        }
        return
childViews;
    }
    function mapToHTML(node: DebugNode): string {
        if (node.type
=== 'ElementContainer') {
            return (node.children || []).map(mapToHTML).join("");
        } else if (node.type ===
'IcuContainer') {
            throw new Error('Not implemented');
        } else {
            return toHtml(node.native, true) || "";
        }
    }
    function toLViewRange(tView: TView, IView: LView, start: number, end: number): LViewDebugRange {
        let content: LViewDebugRangeContent[] = [];
        for (let index = start; index < end; index++) {
            content.push({index: index, t: tView.data[index], l: IView[index]});
        }
        return {start: start, end: end, length: end -
start, content: content};
    }
    /**
     * Turns a flat list of nodes into a tree by walking the associated `TNode` tree.

```

```

*\n * @param tNode\n * @param IView\n */\nexport function toDebugNodes(tNode: ITNode|null, IView: LView):
DebugNode[] {\n if (tNode) {\n const debugNodes: DebugNode[] = [];\n let tNodeCursor: ITNode|null =
tNode;\n while (tNodeCursor) {\n debugNodes.push(buildDebugNode(tNodeCursor, IView));\n
tNodeCursor = tNodeCursor.next;\n }\n return debugNodes;\n } else {\n return [];\n }\n}\n\nexport
function buildDebugNode(tNode: ITNode, IView: LView): DebugNode {\n const rawValue =
IView[tNode.index];\n const native = unwrapRNode(rawValue);\n const factories: Type<any>[] = [];\n const
instances: any[] = [];\n const tView = IView[TVIEW];\n for (let i = tNode.directiveStart; i < tNode.directiveEnd;
i++) {\n const def = tView.data[i] as DirectiveDef<any>;\n factories.push(def.type);\n
instances.push(IView[i]);\n }\n return {\n html: toHtml(native),\n type: toTNodeTypeAsString(tNode.type),\n
tNode,\n native: native as any,\n children: toDebugNodes(tNode.child, IView),\n factories,\n instances,\n
injector: buildNodeInjectorDebug(tNode, tView, IView),\n get injectorResolutionPath() {\n return (tNode as
TNode).debugNodeInjectorPath(IView);\n },\n };\n}\n\nfunction buildNodeInjectorDebug(tNode: ITNode,
tView: ITView, IView:
LView): NodeInjectorDebug {\n const viewProviders: Type<any>[] = [];\n for (let i = (tNode as
TNode).providerIndexStart_; i < (tNode as TNode).providerIndexEnd_; i++) {\n
viewProviders.push(tView.data[i] as Type<any>);\n }\n const providers: Type<any>[] = [];\n for (let i = (tNode as
TNode).providerIndexEnd_; i < (tNode as TNode).directiveEnd; i++) {\n providers.push(tView.data[i] as
Type<any>);\n }\n const nodeInjectorDebug = {\n bloom: toBloom(IView, tNode.injectorIndex),\n
cumulativeBloom: toBloom(tView.data, tNode.injectorIndex),\n providers,\n viewProviders,\n
parentInjectorIndex: IView[(tNode as TNode).providerIndexStart_ - 1],\n }\n return
nodeInjectorDebug;\n}\n\n/**\n * Convert a number at `idx` location in `array` into binary representation.\n */\n *
@param array\n * @param idx\n */\nfunction binary(array: any[], idx: number): string {\n const value =
array[idx];\n // If not a number we print 8 ` ` to retain alignment but let user know that
it was called on\n // wrong type.\n if (typeof value !== 'number') return '????????';\n // We prefix 0s so that we
have constant length number\n const text = '00000000' + value.toString(2);\n return text.substring(text.length -
8);\n}\n\n/**\n * Convert a bloom filter at location `idx` in `array` into binary representation.\n */\n * @param
array\n * @param idx\n */\nfunction toBloom(array: any[], idx: number): string {\n if (idx < 0) {\n return
'NO_NODE_INJECTOR';\n }\n return `${binary(array, idx + 7)}_${binary(array, idx + 6)}_${binary(array, idx +
5)}_${binary(array, idx + 4)}_${binary(array, idx + 3)}_${binary(array, idx + 2)}_${binary(array, idx +
1)}_${binary(array, idx + 0)}`;\n}\n\nexport class LContainerDebug implements ILContainerDebug {\n
constructor(private readonly _raw_IContainer: LContainer) {\n}\n\n get hasTransplantedViews(): boolean {\n
return this._raw_IContainer[HAS_TRANSPLANTED_VIEWS];\n }\n\n get views(): ILViewDebug[] {\n return
this._raw_IContainer.slice(CONTAINER_HEADER_OFFSET)\n
.map(toDebug as (l: LView) => ILViewDebug);\n }\n\n get parent(): ILViewDebug|null {\n return
toDebug(this._raw_IContainer[PARENT]);\n }\n\n get movedViews(): LView[]|null {\n return
this._raw_IContainer[MOVED_VIEWS];\n }\n\n get host(): RElement|RComment|LView {\n return
this._raw_IContainer[HOST];\n }\n\n get native(): RComment {\n return this._raw_IContainer[NATIVE];\n }\n\n
get next() {\n return toDebug(this._raw_IContainer[NEXT]);\n }\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {Injector} from './di/injector';\nimport
{ErrorHandler} from './error_handler';\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport
{DoCheck, OnChanges, OnInit} from './interface/lifecycle_hooks';\nimport {SchemaMetadata} from
'./metadata/schema';\nimport {ViewEncapsulation} from './metadata/view';\nimport
{validateAgainstEventAttributes, validateAgainstEventProperties} from './sanitization/sanitization';\nimport
{Sanitizer} from './sanitization/sanitizer';\nimport {assertDefined, assertEqual, assertGreaterThanOrEqual,
assertIndexInRange, assertNotEqual, assertNotSame, assertSame, assertString} from './util/assert';\nimport
{escapeCommentText} from './util/dom';\nimport {normalizeDebugBindingName,
normalizeDebugBindingValue} from './util/ng_reflect';\nimport {stringify} from './util/stringify';\nimport

```



```

{assertFirstCreatePass, assertFirstUpdatePass, assertLContainer, assertLView, assertTNodeForLView,
assertTNodeForTView} from './assert';\nimport {attachPatchData, readPatchedLView} from
'./context_discovery';\nimport {getFactoryDef} from './definition_factory';\nimport {diPublicInInjector,
getNodeInjectable, getOrCreateNodeInjectorForNode} from './di';\nimport {throwMultipleComponentError}
from './errors';\nimport {executeCheckHooks, executeInitAndCheckHooks, incrementInitPhaseFlags} from
'./hooks';\nimport {CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer,
MOVED_VIEWS} from './interfaces/container';\nimport {ComponentDef, ComponentTemplate, DirectiveDef,
DirectiveDefListOrFactory, HostBindingsFunction, PipeDefListOrFactory, RenderFlags, ViewQueriesFunction}
from './interfaces/definition';\nimport {NodeInjectorFactory} from './interfaces/injector';\nimport
{getUniqueLViewId} from './interfaces/lview_tracking';\nimport {AttributeMarker, InitialInputData, InitialInputs,
LocalRefExtractor, PropertyAliases, PropertyAliasValue, TAttributes, TConstantsOrFactory, TContainerNode,
TDirectiveHostNode, TElementContainerNode, TElementNode, TIcuContainerNode, TNode, TNodeFlags,
TNodeType, TProjectionNode} from './interfaces/node';\nimport {Renderer, RendererFactory} from
'./interfaces/renderer';\nimport {RComment, RElement, RNode, RText} from './interfaces/renderer_dom';\nimport
{SanitizerFn} from './interfaces/sanitization';\nimport {isComponentDef, isComponentHost, isContentQueryHost,
isRootView} from './interfaces/type_checks';\nimport {CHILD_HEAD, CHILD_TAIL, CLEANUP, CONTEXT,
DECLARATION_COMPONENT_VIEW, DECLARATION_VIEW, EMBEDDED_VIEW_INJECTOR, FLAGS,
HEADER_OFFSET, HOST, HostBindingOpCodes, ID, InitPhaseState, INJECTOR, LView, LViewFlags, NEXT,
PARENT, RENDERER, RENDERER_FACTORY, SANITIZER, T_HOST, TData,
TRANSPLANTED_VIEWS_TO_REFRESH, TVIEW, TView, TViewType} from './interfaces/view';\nimport
{assertPureTNodeType, assertTNodeType} from './node_assert';\nimport {updateTextNode} from
'./node_manipulation';\nimport {isInlineTemplate, isNodeMatchingSelectorList} from
'./node_selector_matcher';\nimport {profiler, ProfilerEvent} from './profiler';\nimport {enterView,
getBindingsEnabled, getCurrentDirectiveIndex, getCurrentParentTNode, getCurrentTNode,
getCurrentTNodePlaceholderOk, getSelectedIndex, isCurrentTNodeParent,
isInCheckNoChangesMode, isInI18nBlock, leaveView, setBindingIndex, setBindingRootForHostBindings,
setCurrentDirectiveIndex, setCurrentQueryIndex, setCurrentTNode, setIsInCheckNoChangesMode,
setSelectedIndex} from './state';\nimport {NO_CHANGE} from './tokens';\nimport {mergeHostAttrs} from
'./util/attrs_utils';\nimport {INTERPOLATION_DELIMITER} from './util/misc_utils';\nimport {renderStringify,
stringifyForError} from './util/stringify_utils';\nimport {getFirstLContainer, getLViewParent, getNextLContainer}
from './util/view_traversal_utils';\nimport {getComponentLViewByIndex, getNativeByIndex, getNativeByTNode,
isCreationMode, resetPreOrderHookFlags, unwrapLView, updateTransplantedViewCount,
viewAttachedToChangeDetector} from './util/view_utils';\n\nimport {selectIndexInternal} from './advance';\nimport
{directiveInject} from './di';\nimport {handleUnknownPropertyError, isPropertyValid, matchingSchemas} from
'./element_validation';\nimport {attachLContainerDebug, attachLViewDebug,
cloneToLViewFromTViewBlueprint, cloneToTViewData, LCleanup, LViewBlueprint, MatchesArray, TCleanup,
TNodeDebug, TNodeInitialInputs, TNodeLocalNames, TViewComponents, TViewConstructor} from
'./lview_debug';\n\n/**\n * Invoke `HostBindingsFunction`s for view.\n * This methods executes
`TView.hostBindingOpCodes`. It is used to execute the\n * `HostBindingsFunction`s associated with the current
`LView`.\n * @param tView Current `TView`.\n * @param lView Current `LView`.\n */\nexport function
processHostBindingOpCodes(tView: TView, lView: LView): void {\n  const hostBindingOpCodes =
tView.hostBindingOpCodes;\n  if (hostBindingOpCodes === null) return;\n  try {\n    for (let i = 0; i <
hostBindingOpCodes.length; i++) {\n      const opCode = hostBindingOpCodes[i] as number;\n      if (opCode < 0)
{\n        // Negative numbers are element indexes.\n        setSelectedIndex(~opCode);\n      } else {\n        // Positive
numbers are NumberTuple which store bindingRootIndex and directiveIndex.\n
        const directiveIdx = opCode;\n        const bindingRootIdx = hostBindingOpCodes[++i] as number;\n
const hostBindingFn = hostBindingOpCodes[++i] as HostBindingsFunction<any>;\n
setBindingRootForHostBindings(bindingRootIdx, directiveIdx);\n        const context = lView[directiveIdx];\n

```



```

index: number, type: TNodeType.Icu, name: null,\n  attrs: TAttributes|null): TElementContainerNode;\nexport
function getOrCreateTNode(\n  tView: TView, index: number, type: TNodeType, name: string|null, attrs:
TAttributes|null):\n
TElementNode&TContainerNode&TElementContainerNode&TProjectionNode&TIcuContainerNode {\n
ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See `createContainerRef` in\n
  // `view_engine_compatibility` for additional context.\n  assertGreaterThanOrEqual(index,
HEADER_OFFSET, `TNodes can't be in the LView header.`);\n // Keep this function short, so that the VM will
inline it.\n ngDevMode && assertPureTNodeType(type);\n let tNode = tView.data[index] as TNode;\n if (tNode
=== null) {\n  tNode = createTNodeAtIndex(tView, index, type, name, attrs);\n  if (isInI18nBlock()) {\n   // If
we are in i18n block then all elements should be pre declared through `Placeholder`\n   // See
`TNodeType.Placeholder`
and `LFrame.inI18n` for more context.\n   // If the `TNode` was not pre-declared than it means it was not
mentioned which means it was\n   // removed, so we mark it as detached.\n   tNode.flags |=
TNodeFlags.isDetached;\n  }\n } else if (tNode.type & TNodeType.Placeholder) {\n  tNode.type = type;\n
tNode.value = name;\n  tNode.attrs = attrs;\n  const parent = getCurrentParentTNode();\n  tNode.injectorIndex =
parent === null ? -1 : parent.injectorIndex;\n  ngDevMode && assertTNodeForTVIEW(tNode, tView);\n
ngDevMode && assertEquals(index, tNode.index, `Expecting same index`);\n }\n setCurrentTNode(tNode, true);\n
return tNode as TElementNode & TContainerNode & TElementContainerNode & TProjectionNode &\n
TIcuContainerNode;\n}\n\nexport function createTNodeAtIndex(\n  tView: TView, index: number, type:
TNodeType, name: string|null, attrs: TAttributes|null) {\n  const currentTNode =
getCurrentTNodePlaceholderOk();\n  const isParent = isCurrentTNodeParent();\n
const parent = isParent ? currentTNode : currentTNode.parent;\n // Parents cannot cross
component boundaries because components will be used in multiple places.\n  const tNode = tView.data[index] =\n
createTNode(tView, parent as TElementNode | TContainerNode, type, index, name, attrs);\n // Assign a pointer to
the first child node of a given view. The first node is not always the one\n // at index 0, in case of i18n, index 0 can
be the instruction `i18nStart` and the first node has\n // the index 1 or more, so we can't just check node index.\n
if (tView.firstChild === null) {\n  tView.firstChild = tNode;\n }\n if (currentTNode !== null) {\n  if (isParent) {\n
// FIXME(misko): This logic looks unnecessarily complicated. Could we simplify?\n  if (currentTNode.child ===
null && tNode.parent !== null) {\n   // We are in the same view, which means we are adding content node to the
parent view.\n   currentTNode.child = tNode;\n
}\n } else {\n  if (currentTNode.next === null) {\n   // In the case of i18n the `currentTNode` may already
be linked, in which case we don't want\n   // to break the links which i18n created.\n   currentTNode.next =
tNode;\n  }\n }\n }\n return tNode;\n}\n\n/**\n * When elements are created dynamically after a view
blueprint is created (e.g. through\n * i18nApply()), we need to adjust the blueprint for future\n * template passes.\n
*\n * @param tView `TVIEW` associated with `LVIEW`\n * @param IVIEW The `LVIEW` containing the blueprint to
adjust\n * @param numSlotsToAlloc The number of slots to alloc in the LVIEW, should be >0\n * @param
initialValue Initial value to store in blueprint\n */\nexport function allocExpando(\n  tView: TVIEW, IVIEW: LVIEW,
numSlotsToAlloc: number, initialValue: any): number {\n  if (numSlotsToAlloc === 0) return -1;\n  if
(ngDevMode) {\n    assertFirstCreatePass(tView);\n    assertEquals(tView, IVIEW[TVIEW], `LVIEW`
must be associated with `TVIEW`!);\n    assertEquals(tView.data.length, IVIEW.length, `Expecting LVIEW to be same
size as TVIEW`);\n    assertEquals(\n      tView.data.length, tView.blueprint.length, `Expecting Blueprint to be same
size as TVIEW`);\n    assertFirstUpdatePass(tView);\n  }\n  const allocIdx = IVIEW.length;\n  for (let i = 0; i <
numSlotsToAlloc; i++) {\n    IVIEW.push(initialValue);\n    tView.blueprint.push(initialValue);\n
tView.data.push(null);\n  }\n  return allocIdx;\n}\n\n\n//////////\n\n/// Render\n//////////\n\n/**\n *
Processes a view in the creation mode. This includes a number of steps in a specific order:\n * - creating view query
functions (if any);\n * - executing a template function in the creation mode;\n * - updating static queries (if any);\n *
- creating child components defined in a given view.\n */\nexport function renderView<T>(tView: TVIEW, IVIEW:
LVIEW<T>, context: T): void {\n  ngDevMode && assertEquals(isCreationMode(IVIEW),

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true, 'Should be run in creation mode');\n  enterView(IView);\n  try {\n    const viewQuery = tView.viewQuery;\n    if (viewQuery !== null) {\n      executeViewQueryFn<T>(RenderFlags.Create, viewQuery, context);\n    }\n    // Execute a template associated with this view, if it exists. A template function might not be\n    // defined for the root component views.\n    const templateFn = tView.template;\n    if (templateFn !== null) {\n      executeTemplate<T>(tView, IView, templateFn, RenderFlags.Create, context);\n    }\n    // This needs to be set before children are processed to support recursive components.\n    // This must be set to false immediately after the first creation run because in an\n    // ngFor loop, all the views will be created together before update mode runs and\n    // turns\n    // off firstCreatePass. If we don't set it here, instances will perform directive\n    // matching, etc again and again.\n    if (tView.firstCreatePass) {\n      tView.firstCreatePass = false;\n    }\n    // We resolve content queries specifically marked as `static` in creation mode. Dynamic\n    // content queries are resolved during change detection (i.e. update mode), after embedded\n    // views are refreshed (see block above).\n    if (tView.staticContentQueries) {\n      refreshContentQueries(tView, IView);\n    }\n    // We must materialize query results before child components are processed\n    // in case a child component has projected a container. The LContainer needs\n    // to exist so the embedded views are properly attached by the container.\n    if (tView.staticViewQueries) {\n      executeViewQueryFn<T>(RenderFlags.Update, tView.viewQuery!, context);\n    }\n    // Render child component views.\n    const components = tView.components;\n    if (components !== null) {\n      renderChildComponents(IView, components);\n    }\n  } catch (error) {\n    // If we didn't manage to get past the first template pass due to\n    // an error, mark the view as corrupted so we can try to recover.\n    if (tView.firstCreatePass) {\n      tView.incompleteFirstPass = true;\n      tView.firstCreatePass = false;\n    }\n    throw error;\n  } finally {\n    IView[FLAGS] &= ~LViewFlags.CreationMode;\n    leaveView();\n  }\n}\n\n/**\n * Processes a view in update mode. This includes a number of steps in a specific order:\n * - executing a template function in update mode;\n * - executing hooks;\n * - refreshing queries;\n * - setting host bindings;\n * - refreshing child (embedded and component) views.\n */\nexport function refreshView<T>(\n  tView: TView, IView: LView, templateFn: ComponentTemplate<T> | null, context: T) {\n  ngDevMode && assertEqual(isCreationMode(IView), false, 'Should be run in update mode');\n  const flags = IView[FLAGS];\n  if ((flags & LViewFlags.Destroyed) === LViewFlags.Destroyed) return;\n  enterView(IView);\n  // Check no changes mode is a dev only mode used to verify that bindings have not changed\n  // since they were assigned. We do not want to execute lifecycle hooks in that mode.\n  const isInCheckNoChangesPass = ngDevMode && isInCheckNoChangesMode();\n  try {\n    resetPreOrderHookFlags(IView);\n    setBindingIndex(tView.bindingStartIndex);\n    if (templateFn !== null) {\n      executeTemplate(tView, IView, templateFn, RenderFlags.Update, context);\n    }\n    const hooksInitPhaseCompleted = (flags & LViewFlags.InitPhaseStateMask) ===\n      InitPhaseState.InitPhaseCompleted;\n    // execute pre-order hooks (OnInit, OnChanges, DoCheck)\n    // PERF WARNING: do NOT extract this to a separate function without running benchmarks\n    if (!isInCheckNoChangesPass) {\n      if (hooksInitPhaseCompleted) {\n        const preOrderCheckHooks = tView.preOrderCheckHooks;\n        if (preOrderCheckHooks !== null) {\n          executeCheckHooks(IView, preOrderCheckHooks, null);\n        }\n      } else {\n        const preOrderHooks = tView.preOrderHooks;\n        if (preOrderHooks !== null) {\n          executeInitAndCheckHooks(IView, preOrderHooks, InitPhaseState.OnInitHooksToBeRun, null);\n        }\n        incrementInitPhaseFlags(IView, InitPhaseState.OnInitHooksToBeRun);\n      }\n    }\n    // First mark transplanted views that are declared in this IView as needing a refresh at their\n    // insertion points. This is needed to avoid the situation where the template is defined in this\n    // `LView` but its declaration appears after the insertion component.\n    markTransplantedViewsForRefresh(IView);\n    refreshEmbeddedViews(IView);\n    // Content query results must be refreshed before content hooks are called.\n    if (tView.contentQueries !== null) {\n      refreshContentQueries(tView, IView);\n    }\n    // execute content hooks (AfterContentInit, AfterContentChecked)\n    // PERF WARNING: do NOT extract this to a separate function without running benchmarks\n    if (!isInCheckNoChangesPass) {\n      if (hooksInitPhaseCompleted) {\n        const

```



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TView, IView: LView, tNode: TDirectiveHostNode) {\n if (!getBindingsEnabled()) return;\n
instantiateAllDirectives(tView, IView, tNode, getNativeByTNode(tNode, IView));\n if ((tNode.flags &
TNodeFlags.hasHostBindings) === TNodeFlags.hasHostBindings) {\n  invokeDirectivesHostBindings(tView,
IView, tNode);\n }\n}\n\n/**\n * Takes a list of local names and indices and pushes the resolved local variable
values\n * to LView in the same order as they are loaded in the template with load().\n *\n * export function
saveResolvedLocalsInData(\n  viewData: LView, tNode: TDirectiveHostNode,\n  localRefExtractor:
LocalRefExtractor = getNativeByTNode): void {\n  const localNames = tNode.localNames;\n  if (localNames !==
null) {\n    let localIndex = tNode.index + 1;\n    for (let i = 0; i < localNames.length; i += 2) {\n      const index =
localNames[i + 1] as number;\n      const value = index === -1 ?\n        localRefExtractor(\n          tNode as
TElementNode | TContainerNode
| TElementContainerNode, viewData) :\n          viewData[index];\n      viewData[localIndex++] = value;\n    }\n  }\n}\n\n/**\n * Gets TView from a template function or creates a new TView\n * if it doesn't already exist.\n *\n * @param def ComponentDef\n * @returns TView\n *\n * export function getOrCreateComponentTView(def:
ComponentDef<any>): TView {\n  const tView = def.tView;\n  \n  // Create a TView if there isn't one, or recreate it if
the first create pass didn't\n  // complete successfully since we can't know for sure whether it's in a usable shape.\n  if
(tView === null || tView.incompleteFirstPass) {\n    // Declaration node here is null since this function is called
when we dynamically create a\n    // component and hence there is no declaration.\n    const declTNode = null;\n    return def.tView = createTView(\n      TViewType.Component, declTNode, def.template, def.decls, def.vars,
def.directiveDefs,\n      def.pipeDefs, def.viewQuery, def.schemas, def.consts);\n  }\n}\n\n return tView;\n}\n\n\n/**\n * Creates a TView instance\n *\n * @param type Type of `TView`.\n * @param declTNode Declaration location of this `TView`.\n * @param templateFn Template function\n * @param decls The
number of nodes, local refs, and pipes in this template\n * @param directives Registry of directives for this view\n *
@param pipes Registry of pipes for this view\n * @param viewQuery View queries for this view\n * @param
schemas Schemas for this view\n * @param consts Constants for this view\n *\n * export function createTView(\n
type: TViewType, declTNode: TNode|null, templateFn: ComponentTemplate<any>|null, decls: number,\n  vars:
number, directives: DirectiveDefListOrFactory|null, pipes: PipeDefListOrFactory|null,\n  viewQuery:
ViewQueriesFunction<any>|null, schemas: SchemaMetadata[]|null,\n  constsOrFactory:
TConstantsOrFactory|null): TView {\n  ngDevMode && ngDevMode.tView++;\n  const bindingStartIndex =
HEADER_OFFSET + decls;\n  \n  // This length
does not yet contain host bindings from child directives because at this point,\n  // we don't know which directives
are active on this template. As soon as a directive is matched\n  // that has a host binding, we will update the
blueprint with that def's hostVars count.\n  const initialViewLength = bindingStartIndex + vars;\n  const blueprint =
createViewBlueprint(bindingStartIndex, initialViewLength);\n  const consts = typeof constsOrFactory ===
'function' ? constsOrFactory() : constsOrFactory;\n  const tView = blueprint[TVIEW as any] = ngDevMode ?\n
new TViewConstructor(\n    type, // type: TViewType,\n    blueprint, // blueprint: LView,\n    templateFn, // template: ComponentTemplate<{}>|null,\n    null, // queries: TQueries|null\n    viewQuery, // viewQuery: ViewQueriesFunction<{}>|null,\n    declTNode, // declTNode: TNode|null,\n    cloneToTViewData(blueprint).fill(null, bindingStartIndex), // data: TData,\n    bindingStartIndex, // bindingStartIndex: number,\n    initialViewLength,\n    // expandoStartIndex: number,\n    null, // hostBindingOpCodes:
HostBindingOpCodes,\n    true, // firstCreatePass: boolean,\n    true, // firstUpdatePass: boolean,\n    false, // staticViewQueries: boolean,\n    false, // staticContentQueries: boolean,\n    null, // preOrderHooks: HookData|null,\n    null, // preOrderCheckHooks: HookData|null,\n    null, // contentHooks:
HookData|null,\n    null, // contentCheckHooks: HookData|null,\n    null, // viewHooks: HookData|null,\n    null, // viewCheckHooks: HookData|null,\n    null, // destroyHooks:
DestroyHookData|null,\n    null, // cleanup: any[]|null,\n    null, //

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contentQueries: number[]|null,\n      null, // components: number[]|null,\n      typeof
directives === 'function' ? /\n      directives() : //\n      directives, //
directiveRegistry: DirectiveDefList|null,\n      typeof pipes === 'function' ? pipes() : pipes, // pipeRegistry:
PipeDefList|null,\n      null, // firstChild: TNode|null,\n      schemas,
// schemas: SchemaMetadata[]|null,\n      consts, // consts: TConstants|null\n
false,
// incompleteFirstPass: boolean\n      decls, // ngDevMode only: decls\n
vars, // ngDevMode only: vars\n      ):\n      {\n      type: type,\n      blueprint:
blueprint,\n      template: templateFn,\n      queries: null,\n      viewQuery: viewQuery,\n      declTNode:
declTNode,\n      data: blueprint.slice().fill(null, bindingStartIndex),\n      bindingStartIndex: bindingStartIndex,\n
expandoStartIndex: initialViewLength,\n      hostBindingOpCodes: null,\n      firstCreatePass: true,\n
firstUpdatePass: true,\n      staticViewQueries: false,\n      staticContentQueries: false,\n      preOrderHooks:
null,\n      preOrderCheckHooks: null,\n      contentHooks: null,\n      contentCheckHooks: null,\n
viewHooks: null,\n      viewCheckHooks: null,\n      destroyHooks: null,\n      cleanup: null,\n
contentQueries: null,\n
      components: null,\n      directiveRegistry: typeof directives === 'function' ? directives() : directives,\n
      pipeRegistry: typeof pipes === 'function' ? pipes() : pipes,\n      firstChild: null,\n      schemas: schemas,\n
      consts: consts,\n      incompleteFirstPass: false\n    };\n    if (ngDevMode) {\n      // For performance reasons it is
important that the tView retains the same shape during runtime.\n      // (To make sure that all of the code is
monomorphic.) For this reason we seal the object to\n      // prevent class transitions.\n      Object.seal(tView);\n    }\n
return tView;\n  }\n\nfunction createViewBlueprint(bindingStartIndex: number, initialViewLength: number): LView
{\n  const blueprint = ngDevMode ? new LViewBlueprint() : [];\n  for (let i = 0; i < initialViewLength; i++) {\n
blueprint.push(i < bindingStartIndex ? null : NO_CHANGE);\n  }\n  return blueprint as LView;\n}\n\nfunction
createError(text: string, token: any) {\n  return new Error(`Renderer:
${text} [${stringifyForError(token)}]`);\n}\n\n/**\n * Locates the host native element, used for bootstrapping
existing nodes into rendering pipeline.\n * @param rendererFactory Factory function to create renderer
instance.\n * @param elementOrSelector Render element or CSS selector to locate the element.\n * @param
encapsulation View Encapsulation defined for component that requests host element.\n */\nexport function
locateHostElement(\n  renderer: Renderer, elementOrSelector: RElement|string,\n  encapsulation:
ViewEncapsulation): RElement {\n  // When using native Shadow DOM, do not clear host element to allow native
slot projection\n  const preserveContent = encapsulation === ViewEncapsulation.ShadowDom;\n  return
renderer.selectRootElement(elementOrSelector, preserveContent);\n}\n\n/**\n * Saves context for this cleanup
function in LView.cleanupInstances.\n * @param On the first template pass, saves in TView:\n * - Cleanup function\n * -
Index of context we just saved\n
in LView.cleanupInstances\n * @param This function can also be used to store instance specific cleanup fns. In that case
the `context` is `null` and the function is store in `LView` (rather than it `TView`).\n */\nexport function
storeCleanupWithContext(\n  tView: TView, lView: LView, context: any, cleanupFn: Function): void {\n  const
ICleanup = getOrCreateLViewCleanup(lView);\n  if (context === null) {\n    // If context is null that this is instance
specific callback. These callbacks can only be\n    // inserted after template shared instances. For this reason in
ngDevMode we freeze the TView.\n    if (ngDevMode) {\n      Object.freeze(getOrCreateTViewCleanup(tView));\n
    }\n    ICleanup.push(cleanupFn);\n  } else {\n    ICleanup.push(context);\n  }\n  if (tView.firstCreatePass) {\n
getOrCreateTViewCleanup(tView).push(cleanupFn, ICleanup.length - 1);\n  }\n}\n\n/**\n * Constructs a
TNode object from the arguments.\n * @param tView `TView` to which this `TNode`
belongs (used only in `ngDevMode`)\n * @param tParent Parent `TNode`\n * @param type The type of the node\n
* @param index The index of the TNode in TView.data, adjusted for HEADER_OFFSET\n * @param tagName
The tag name of the node\n * @param attrs The attributes defined on this node\n * @param tViews Any TViews
attached to this node\n * @returns the TNode object\n */\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.Container,\n  index: number, tagName: string|null, attrs:

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```

TAttributes|null): TContainerNode;\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.Element|TNodeType.Text,\n  index: number, tagName:
string|null, attrs: TAttributes|null): TElementNode;\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.ElementContainer,\n  index: number, tagName: string|null,
attrs: TAttributes|null): TElementContainerNode;\nexport
function createTNode(\n  tView: TView, tParent: TElementNode|TContainerNode|null, type: TNodeType.Icu,
index: number,\n  tagName: string|null, attrs: TAttributes|null): TIcuContainerNode;\nexport function
createTNode(\n  tView: TView, tParent: TElementNode|TContainerNode|null, type: TNodeType.Projection,\n
index: number, tagName: string|null, attrs: TAttributes|null): TProjectionNode;\nexport function createTNode(\n
tView: TView, tParent: TElementNode|TContainerNode|null, type: TNodeType, index: number,\n  tagName:
string|null, attrs: TAttributes|null): TNode;\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType, index: number,\n  value: string|null, attrs:
TAttributes|null): TNode {\n  ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See
`createContainerRef` in\n                                ``view_engine_compatibility` for additional context.\n
assertGreaterThanOrEqual(index,
HEADER_OFFSET, 'TNodes can\\'t be in the LView header.);\n  ngDevMode && assertNotSame(attrs, undefined,
`\\'undefined\\' is not valid value for \\'attrs\\');\n  ngDevMode && ngDevMode.tNode++; \n  ngDevMode &&
tParent && assertTNodeForTView(tParent, tView);\n  let injectorIndex = tParent ? tParent.injectorIndex : -1;\n
const tNode = ngDevMode ?\n    new TNodeDebug(\n      tView,          // tView_: TView\n      type,          //
type: TNodeType\n      index,          // index: number\n      null,          // insertBeforeIndex: null|-
1|number|number[]\n      injectorIndex, // injectorIndex: number\n      -1,          // directiveStart: number\n
-1,          // directiveEnd: number\n      -1,          // directiveStylingLast: number\n      null,          //
propertyBindings: number[]|null\n      0,          // flags: TNodeFlags\n      0,          // providerIndexes:
TNodeProviderIndexes\n      value,\n      // value: string|null\n      attrs,          // attrs: (string|AttributeMarker|(string|SelectorFlags)[])[]|null\n
null,\n      // mergedAttrs\n      null,          // localNames: (string|number)[]|null\n
undefined,          // initialInputs:
(string[]|null)[]|null|undefined\n      null,          // inputs: PropertyAliases|null\n
null,          // outputs:
PropertyAliases|null\n      null,          // tViews: ITView|ITView[]|null\n
null,          // next: ITNode|null\n
null,          // projectionNext: ITNode|null\n
null,          // child: ITNode|null\n
tParent,          // parent:
TElementNode|TContainerNode|null\n      null,          // projection: number|(ITNode|RNode)[]|null\n
null,\n      // styles: string|null\n
null,          // stylesWithoutHost: string|null\n
undefined,          // residualStyles:
string|null\n      null,          // classes: string|null\n
null,          // classesWithoutHost: string|null\n
undefined,          // residualClasses: string|null\n
0 as any,\n      // classBindings: TStylingRange;\n
0 as any,          // styleBindings: TStylingRange;\n
) : \n  {\n    type,\n    index,\n    insertBeforeIndex: null,\n    injectorIndex,\n    directiveStart: -1,\n
directiveEnd: -1,\n    directiveStylingLast: -1,\n    propertyBindings: null,\n    flags: 0,\n
providerIndexes: 0,\n    value: value,\n    attrs: attrs,\n    mergedAttrs: null,\n    localNames: null,\n
initialInputs: undefined,\n    inputs: null,\n    outputs: null,\n    tViews: null,\n    next: null,\n
projectionNext: null,\n    child: null,\n    parent: tParent,\n    projection: null,\n    styles: null,\n
stylesWithoutHost: null,\n    residualStyles: undefined,\n    classes: null,\n    classesWithoutHost:
null,\n    residualClasses: undefined,\n    classBindings: 0 as any,\n    styleBindings: 0 as any,\n  };\n  if
(ngDevMode) {\n    // For performance reasons it is important that the tNode retains the same shape during
runtime.\n    // (To make sure that all of the code is monomorphic.) For this reason we seal the object to\n    //
prevent class transitions.\n    Object.seal(tNode);\n  }\n  return tNode;\n}\n\nfunction generatePropertyAliases(\n
inputAliasMap: {[publicName: string]: string}, directiveDefIdx: number,\n  propStore: PropertyAliases|null):
PropertyAliases|null {\n  for (let publicName in inputAliasMap) {\n    if
(inputAliasMap.hasOwnProperty(publicName)) {\n      propStore = propStore === null ? {} : propStore;\n      const
internalName = inputAliasMap[publicName];\n      if (propStore.hasOwnProperty(publicName)) {\n

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propStore[publicName].push(directiveDefIdx, internalName);\n    } else {\n        (propStore[publicName] =
[directiveDefIdx,
    internalName]);\n    }\n    }\n    }\n    return propStore;\n}\n\n/**\n * Initializes data structures required to work with
directive inputs and outputs.\n * Initialization is done for all directives matched on a given TNode.\n */\n\nexport
function initializeInputAndOutputAliases(tView: TView, tNode: TNode): void {\n    ngDevMode &&
assertFirstCreatePass(tView);\n    const start = tNode.directiveStart;\n    const end = tNode.directiveEnd;\n    const
tViewData = tView.data;\n    const tNodeAttrs = tNode.attrs;\n    const inputsFromAttrs: InitialInputData =
ngDevMode ? new TNodeInitialInputs() : [];\n    let inputsStore: PropertyAliases|null = null;\n    let outputsStore:
PropertyAliases|null = null;\n    for (let i = start; i < end; i++) {\n        const directiveDef = tViewData[i] as
DirectiveDef<any>;\n        const directiveInputs = directiveDef.inputs;\n        // Do not use unbound attributes as inputs to
structural directives, since structural\n        // directive inputs can only be set using microsyntax (e.g.
`<div *dir="exp">`).\n        // TODO(FW-1930): microsyntax expressions may also contain unbound/static attributes,
which\n        // should be set for inline templates.\n        const initialInputs = (tNodeAttrs !== null &&
!isInlineTemplate(tNode)) ?\n            generateInitialInputs(directiveInputs, tNodeAttrs) :\n            null;\n        inputsFromAttrs.push(initialInputs);\n        inputsStore = generatePropertyAliases(directiveInputs, i, inputsStore);\n        outputsStore = generatePropertyAliases(directiveDef.outputs, i, outputsStore);\n    }\n    if (inputsStore !== null) {\n        if (inputsStore.hasOwnProperty('class')) {\n            tNode.flags |= TNodeFlags.hasClassInput;\n        }\n        if
(inputsStore.hasOwnProperty('style')) {\n            tNode.flags |= TNodeFlags.hasStyleInput;\n        }\n    }\n    tNode.initialInputs = inputsFromAttrs;\n    tNode.inputs = inputsStore;\n    tNode.outputs = outputsStore;\n}\n\n/**\n * Mapping between attributes names that don't correspond to their element property names.\n */\n * Performance
note: this function is written as a series of if checks (instead of, say, a property\n * object lookup) for performance
reasons - the series of `if` checks seems to be the fastest way of\n * mapping property names. Do NOT change
without benchmarking.\n */\n * Note: this mapping has to be kept in sync with the equally named mapping in the
template\n * type-checking machinery of ngts.\n */\n\nfunction mapPropName(name: string): string {\n    if (name
=== 'class') return 'className';\n    if (name === 'for') return 'htmlFor';\n    if (name === 'formaction') return
'formAction';\n    if (name === 'innerHTML') return 'innerHTML';\n    if (name === 'readonly') return 'readOnly';\n    if
(name === 'tabindex') return 'tabIndex';\n    return name;\n}\n\nexport function elementPropertyInternal<T>(n
tView: TView, tNode: TNode, IView: LView, propName: string, value: T, renderer: Renderer,\n sanitizer:
SanitizerFn|null|undefined, nativeOnly: boolean): void {\n    ngDevMode && assertNotSame(value, NO_CHANGE
as any, 'Incoming value should never be NO_CHANGE.);\n    const element = getNativeByTNode(tNode, IView) as
RElement | RComment;\n    let inputData = tNode.inputs;\n    let dataValue: PropertyAliasValue|undefined;\n    if
(!nativeOnly && inputData != null && (dataValue = inputData[propName])) {\n        setInputsForProperty(tView,
IView, dataValue, propName, value);\n        if (isComponentHost(tNode)) markDirtyIfOnPush(IView, tNode.index);\n    }\n    if (ngDevMode) {\n        setNgReflectProperties(IView, element, tNode.type, dataValue, value);\n    }\n    } else if
(tNode.type & TNodeType.AnyRNode) {\n        propName = mapPropName(propName);\n        if (ngDevMode) {\n            validateAgainstEventProperties(propName);\n            if (!isPropertyValid(element, propName, tNode.value,
tView.schemas)) {\n                handleUnknownPropertyError(propName, tNode.value, tNode.type, IView);\n            }\n        }\n        ngDevMode.renderer.setProperty++;\n    }\n    // It is assumed that the sanitizer is only added when the compiler
determines
that the\n    // property is risky, so sanitization can be done without further checks.\n    value = sanitizer != null ?
(sanitizer(value, tNode.value || '', propName) as any) : value;\n    renderer.setProperty(element as RElement,
propName, value);\n    } else if (tNode.type & TNodeType.AnyContainer) {\n        // If the node is a container and the
property didn't\n        // match any of the inputs or schemas we should throw.\n        if (ngDevMode &&
!matchingSchemas(tView.schemas, tNode.value)) {\n            handleUnknownPropertyError(propName, tNode.value,
tNode.type, IView);\n        }\n    }\n}\n\n/**\n * If node is an OnPush component, marks its LView dirty.\n */\n\nexport
function markDirtyIfOnPush(IView: LView, viewIndex: number): void {\n    ngDevMode &&
assertLView(IView);\n    const childComponentLView = getComponentLViewByIndex(viewIndex, IView);\n    if
(!(childComponentLView[FLAGS] & LViewFlags.CheckAlways)) {\n        childComponentLView[FLAGS] |=

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LViewFlags.Dirty;\n };\n\nfunction setNgReflectProperty(\n
  IView: LView, element: RElement|RComment, type: TNodeType, attrName: string, value: any) {\n  const renderer
= IView[RENDERER];\n  attrName = normalizeDebugBindingName(attrName);\n  const debugValue =
normalizeDebugBindingValue(value);\n  if (type & TNodeType.AnyRNode) {\n    if (value == null) {\n
renderer.removeAttribute((element as RElement), attrName);\n    } else {\n      renderer.setAttribute((element as
RElement), attrName, debugValue);\n    }\n  } else {\n    const textContent =\n
escapeCommentText(`bindings=${JSON.stringify({[attrName]: debugValue}, null, 2)}`);\n
renderer.setValue((element as RComment), textContent);\n  };\n}\n\nexport function setNgReflectProperties(\n
  IView: LView, element: RElement|RComment, type: TNodeType, dataValue: PropertyAliasValue, value: any)
{\n  if (type & (TNodeType.AnyRNode | TNodeType.Container)) {\n    /**\n     * dataValue is an array containing
runtime input or output names for the directives:\n     * i+0: directive instance
index\n     * i+1: privateName\n     * e.g. [0, 'change', 'change-minified']\n     * we want to set the reflected
property with the privateName: dataValue[i+1]\n     */\n    for (let i = 0; i < dataValue.length; i += 2) {\n
setNgReflectProperty(IView, element, type, dataValue[i + 1] as string, value);\n    }\n  }\n}\n\n/**\n * Instantiate a
root component.\n */\nexport function instantiateRootComponent<T>(tView: TView, IView: LView, def:
ComponentDef<T>): T {\n  const rootTNode = getCurrentTNode();\n  if (tView.firstCreatePass) {\n    if
(def.providersResolver) def.providersResolver(def);\n    const directiveIndex = allocExpando(tView, IView, 1,
null);\n    ngDevMode &&\n      assertEquals(\n        directiveIndex, rootTNode.directiveStart,\n        'Because
this is a root component the allocated expando should match the TNode component.);\n
configureViewWithDirective(tView, rootTNode, IView, directiveIndex, def);\n
initializeInputAndOutputAliases(tView,\n  rootTNode);\n  }\n  const directive =\n    getNodeInjectable(IView, tView, rootTNode.directiveStart, rootTNode as
TElementNode);\n  attachPatchData(directive, IView);\n  const native = getNativeByTNode(rootTNode, IView);\n
if (native) {\n    attachPatchData(native, IView);\n  }\n  return directive;\n}\n\n/**\n * Resolve the matched
directives on a node.\n */\nexport function resolveDirectives(\n  tView: TView, IView: LView, tNode:
TElementNode|TContainerNode|TElementContainerNode, localRefs: string[]|null): boolean {\n  // Please make
sure to have explicit type for `exportsMap`. Inferred type triggers bug in\n  // tsickle.\n  ngDevMode &&\n
assertFirstCreatePass(tView);\n  let hasDirectives = false;\n  if (getBindingsEnabled()) {\n    const directiveDefs:
DirectiveDef<any>[]|null = findDirectiveDefMatches(tView, IView, tNode);\n    const exportsMap: ({[key: string]:
number})|null = localRefs === null ? null : {'': -1};\n    if (directiveDefs !== null) {\n      hasDirectives
= true;\n      initTNodeFlags(tNode, tView.data.length, directiveDefs.length);\n      // When the same token is
provided by several directives on the same node, some rules apply in\n      // the viewEngine:\n      // - viewProviders
have priority over providers\n      // - the last directive in NgModule.declarations has priority over the previous one\n
      // So to match these rules, the order in which providers are added in the arrays is very\n      // important.\n
for (let i = 0; i < directiveDefs.length; i++) {\n        const def = directiveDefs[i];\n        if (def.providersResolver)
def.providersResolver(def);\n      }\n      let preOrderHooksFound = false;\n      let preOrderCheckHooksFound =
false;\n      let directiveIdx = allocExpando(tView, IView, directiveDefs.length, null);\n      ngDevMode &&\n
assertSame(\n        directiveIdx, tNode.directiveStart,\n        'TNode.directiveStart should point to just
allocated space');\n      for (let
i = 0; i < directiveDefs.length; i++) {\n        const def = directiveDefs[i];\n        // Merge the attrs in the order of
matches. This assumes that the first directive is the\n        // component itself, so that the component has the least
priority.\n        tNode.mergedAttrs = mergeHostAttrs(tNode.mergedAttrs, def.hostAttrs);\n      }\n      configureViewWithDirective(tView, tNode, IView, directiveIdx, def);\n      saveNameToExportMap(directiveIdx,
def, exportsMap);\n      if (def.contentQueries !== null) tNode.flags |= TNodeFlags.hasContentQuery;\n      if
(def.hostBindings !== null || def.hostAttrs !== null || def.hostVars !== 0)\n        tNode.flags |=
TNodeFlags.hasHostBindings;\n      const lifeCycleHooks: OnChanges&OnInit&DoCheck =
def.type.prototype;\n      // Only push a node index into the preOrderHooks array if this is the first\n      // pre-
order hook found on this node.\n      if (!preOrderHooksFound &&\n        (lifeCycleHooks.ngOnChanges ||

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lifeCycleHooks.ngOnInit
  || lifeCycleHooks.ngDoCheck)) {\n      // We will push the actual hook function into this array later during dir
instantiation.\n      // We cannot do it now because we must ensure hooks are registered in the same\n      // order
that directives are created (i.e. injection order).\n      (tView.preOrderHooks || (tView.preOrderHooks =
[])).push(tNode.index);\n      preOrderHooksFound = true;\n      }\n      if (!preOrderCheckHooksFound &&
(lifeCycleHooks.ngOnChanges || lifeCycleHooks.ngDoCheck)) {\n      (tView.preOrderCheckHooks ||
(tView.preOrderCheckHooks = [])).push(tNode.index);\n      preOrderCheckHooksFound = true;\n      }\n      directiveIdx++;\n      }\n      initializeInputAndOutputAliases(tView, tNode);\n      }\n      if (exportsMap)
cacheMatchingLocalNames(tNode, localRefs, exportsMap);\n      }\n      // Merge the template attrs last so that they have
the highest priority.\n      tNode.mergedAttrs = mergeHostAttrs(tNode.mergedAttrs,
tNode.attrs);\n      return hasDirectives;\n      }\n      }\n      }\n      * Add `hostBindings` to the `TView.hostBindingOpCodes`.\n      *
@param tView `TView` to which the `hostBindings` should be added.\n      * @param tNode `TNode` the element
which contains the directive\n      * @param IView `LView` current `LView`\n      * @param directiveIdx Directive index
in view.\n      * @param directiveVarsIdx Where will the directive's vars be stored\n      * @param def
`ComponentDef`/`DirectiveDef`, which contains the `hostVars`/`hostBindings` to add.\n      * ^next export function
registerHostBindingOpCodes(\n      tView: TView, tNode: TNode, IView: LView, directiveIdx: number,
directiveVarsIdx: number,\n      def: ComponentDef<any>|DirectiveDef<any>): void {\n      ngDevMode &&
assertFirstCreatePass(tView);\n      const hostBindings = def.hostBindings;\n      if (hostBindings) {\n      let
hostBindingOpCodes = tView.hostBindingOpCodes;\n      if (hostBindingOpCodes === null) {\n
hostBindingOpCodes = tView.hostBindingOpCodes = [] as any as HostBindingOpCodes;\n
      }\n      const elementIdx = ~tNode.index;\n      if (lastSelectedElementIdx(hostBindingOpCodes) != elementIdx)
{\n      // Conditionally add select element so that we are more efficient in execution.\n      // NOTE: this is strictly
not necessary and it trades code size for runtime perf.\n      // (We could just always add it.)\n
hostBindingOpCodes.push(elementIdx);\n      }\n      hostBindingOpCodes.push(directiveIdx, directiveVarsIdx,
hostBindings);\n      }\n      }\n      }\n      * Returns the last selected element index in the `HostBindingOpCodes`.\n      * For
perf reasons we don't need to update the selected element index in `HostBindingOpCodes` only\n      * if it changes.
This method returns the last index (or '0' if not found.)\n      * Selected element index are only the ones which are
negative.\n      * ^function lastSelectedElementIdx(hostBindingOpCodes: HostBindingOpCodes): number {\n      let i =
hostBindingOpCodes.length;\n      while (i > 0) {\n      const value = hostBindingOpCodes[--i];\n
      if (typeof value === 'number' && value < 0) {\n      return value;\n      }\n      }\n      return 0;\n      }\n      }\n      }\n      * Instantiate
all the directives that were previously resolved on the current node.\n      * ^function instantiateAllDirectives(\n
tView: TView, IView: LView, tNode: TDirectiveHostNode, native: RNode) {\n      const start = tNode.directiveStart;\n
      const end = tNode.directiveEnd;\n      if (!tView.firstCreatePass) {\n      getOrCreateNodeInjectorForNode(tNode,
IView);\n      }\n      attachPatchData(native, IView);\n      const initialInputs = tNode.initialInputs;\n      for (let i = start; i <
end; i++) {\n      const def = tView.data[i] as DirectiveDef<any>;\n      const isComponent = isComponentDef(def);\n
      if (isComponent) {\n      ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode);\n
      addComponentLogic(IView, tNode as TElementNode, def as ComponentDef<any>);\n      }\n      const directive =
getNodeInjectable(IView, tView, i, tNode);\n      attachPatchData(directive, IView);\n      if (initialInputs
!== null) {\n      setInputsFromAttrs(IView, i - start, directive, def, tNode, initialInputs!);\n      }\n      if
(isComponent) {\n      const componentView = getComponentLViewByIndex(tNode.index, IView);\n
      componentView[CONTEXT] = directive;\n      }\n      }\n      }\n      ^function invokeDirectivesHostBindings(tView: TView,
IView: LView, tNode: TNode) {\n      const start = tNode.directiveStart;\n      const end = tNode.directiveEnd;\n      const
elementIndex = tNode.index;\n      const currentDirectiveIndex = getCurrentDirectiveIndex();\n      try {\n
      setSelectedIndex(elementIndex);\n      for (let dirIndex = start; dirIndex < end; dirIndex++) {\n      const def =
tView.data[dirIndex] as DirectiveDef<unknown>;\n      const directive = IView[dirIndex];\n
      setCurrentDirectiveIndex(dirIndex);\n      if (def.hostBindings !== null || def.hostVars !== 0 || def.hostAttrs !== null)
{\n      invokeHostBindingsInCreationMode(def, directive);\n      }\n      }\n      } finally {\n      setSelectedIndex(-1);\n
      setCurrentDirectiveIndex(currentDirectiveIndex);\n

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    }
}

/**
 * Invoke the host bindings in creation mode.
 * @param def `DirectiveDef` which may contain the `hostBindings` function.
 * @param directive Instance of directive.
 */
export function invokeHostBindingsInCreationMode(def: DirectiveDef<any>, directive: any) {
    if (def.hostBindings !== null) {
        def.hostBindings!(RenderFlags.Create, directive);
    }
}

/**
 * Matches the current node against all available selectors.
 * If a component is matched (at most one), it is returned in first position in the array.
 */
function findDirectiveDefMatches(
    tView: TView, viewData: LView, tNode: TElementNode|TContainerNode|TElementContainerNode): DirectiveDef<any>[]|null {
    const ngDevMode && assertFirstCreatePass(tView);
    const ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.AnyContainer);
    const registry = tView.directiveRegistry;
    let matches: any[]|null = null;
    if (registry) {
        for (let i = 0; i < registry.length; i++) {
            const def = registry[i] as ComponentDef<any>|DirectiveDef<any>;
            if (isNodeMatchingSelectorList(tNode, def.selectors!, /* isProjectionMode */ false)) {
                matches || (matches = ngDevMode ? new MatchesArray() : []);
                diPublicInInjector(getOrCreateNodeInjectorForNode(tNode, viewData, tView, def.type));
                if (isComponentDef(def)) {
                    if (ngDevMode) {
                        assertTNodeType(tNode, TNodeType.Element, `"$${tNode.value}" tags cannot be used as component hosts. ` + `Please use a different tag to activate the ${stringify(def.type)} component.`);
                    }
                    if (tNode.flags & TNodeFlags.isComponentHost) {
                        // If another component has been matched previously, it's the first element in the `matches` array, see how we store components/directives in `matches` below.
                        throwMultipleComponentError(tNode, matches[0].type, def.type);
                    }
                    markAsComponentHost(tView, tNode);
                    // The component is always stored first with directives after.
                    matches.unshift(def);
                } else {
                    matches.push(def);
                }
            }
        }
    }
    return matches;
}

/**
 * Marks a given TNode as a component's host. This consists of:
 * - setting appropriate TNode flags;
 * - storing index of component's host element so it will be queued for view refresh during CD.
 */
export function markAsComponentHost(tView: TView, hostTNode: TNode): void {
    const ngDevMode && assertFirstCreatePass(tView);
    hostTNode.flags |= TNodeFlags.isComponentHost;
    (tView.components || (tView.components = ngDevMode ? new TViewComponents() : []))
        .push(hostTNode.index);
}

/**
 * Caches local names and their matching directive indices for query and template lookups.
 */
function cacheMatchingLocalNames(
    tNode: TNode, localRefs: string[]|null, exportsMap: {[key: string]: number}): void {
    if (localRefs) {
        const localNames: (string|number)[] = tNode.localNames = ngDevMode ? new TNodeLocalNames() : [];
        // Local names must be stored in tNode in the same order that localRefs are defined // in the template to ensure the data is loaded in the same slots as their refs // in the template (for template queries).
        for (let i = 0; i < localRefs.length; i += 2) {
            const index = exportsMap[localRefs[i + 1]];
            if (index == null) {
                throw new RuntimeError(
                    RuntimeErrorCode.EXPORT_NOT_FOUND,
                    ngDevMode && `Export of name '${localRefs[i + 1]}' not found!`);
            }
            localNames.push(localRefs[i], index);
        }
    }
}

/**
 * Builds up an export map as directives are created, so local refs can be quickly mapped to their directive instances.
 */
function saveNameToExportMap(
    directiveIdx: number, def: DirectiveDef<any>|ComponentDef<any>, exportsMap: {[key: string]: number}|null) {
    if (exportsMap) {
        if (def.exportAs) {
            for (let i = 0; i < def.exportAs.length; i++) {
                exportsMap[def.exportAs[i]] = directiveIdx;
            }
        }
        if (isComponentDef(def)) {
            exportsMap[""] = directiveIdx;
        }
    }
}

/**
 * Initializes the flags on the current node, setting all indices to the initial index, the directive count to 0, and adding the isComponent flag.
 * @param index the initial index
 */
export function initTNodeFlags(
    tNode: TNode, index: number, numberOfDirectives: number) {
    const ngDevMode && assertNotEqual(
        numberOfDirectives, tNode.directiveEnd - tNode.directiveStart,
        'Reached the max number of directives');
    tNode.flags |= TNodeFlags.isDirectiveHost;
    // When the first directive is created on a node, save the index
    tNode.directiveStart = index;
    tNode.directiveEnd = index + numberOfDirectives;
    tNode.providerIndexes = index;
}

/**
 * Setup directive for instantiation.
 */
export function We

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need to create a `NodeInjectorFactory` which is then inserted in both the `Blueprint` as well as `LView`.
`TView` gets the `DirectiveDef`.
\n * @param tView `TView`
\n * @param tNode `TNode`
\n * @param IView
`LView`
\n * @param directiveIndex Index where the directive will be stored in the Expando.
\n * @param def
`DirectiveDef`
\n * ^\nfunction configureViewWithDirective<T>(\n  tView: TView, tNode: TNode, IView: LView,
directiveIndex: number, def: DirectiveDef<T>): void {\n  ngDevMode &&\n
assertGreaterThanOrEqual(directiveIndex, HEADER_OFFSET, 'Must be in Expando section');\n
tView.data[directiveIndex] = def;\n  const directiveFactory =\n    def.factory || ((def as {factory: Function}).factory
= getFactoryDef(def.type, true));\n  // Even though `directiveFactory` will already be using `directiveInject` in its
generated code,\n  // we also want to support `inject()` directly from the directive constructor context so we set\n  //
`directiveInject` as the inject implementation
here too.\n  const nodeInjectorFactory =\n    new NodeInjectorFactory(directiveFactory, isComponentDef(def),
directiveInject);\n  tView.blueprint[directiveIndex] = nodeInjectorFactory;\n  IView[directiveIndex] =
nodeInjectorFactory;\n\n  registerHostBindingOpCodes(\n    tView, tNode, IView, directiveIndex,
allocExpando(tView, IView, def.hostVars, NO_CHANGE),\n    def);\n\n\nfunction
addComponentLogic<T>(IView: LView, hostTNode: TElementNode, def: ComponentDef<T>): void {\n  const
native = getNativeByTNode(hostTNode, IView) as RElement;\n  const tView =
getOrCreateComponentTView(def);\n  // Only component views should be added to the view tree directly.
Embedded views are\n  // accessed through their containers because they may be removed / re-added later.\n  const
rendererFactory = IView[RENDERER_FACTORY];\n  const componentView = addToViewTree(\n    IView,\n  createLView(\n    IView, tView, null, def.onPush ? LViewFlags.Dirty : LViewFlags.CheckAlways, native,\n
hostTNode as TElementNode, rendererFactory, rendererFactory.createRenderer(native, def),\n    null, null,
null));\n  // Component view will always be created before any injected LContainers,\n  // so this is a regular
element, wrap it with the component view\n  IView[hostTNode.index] = componentView;\n\n\n\nexport function
elementAttributeInternal(\n  tNode: TNode, IView: LView, name: string, value: any, sanitizer:
SanitizerFn|null|undefined,\n  namespace: string|null|undefined) {\n  if (ngDevMode) {\n    assertNotSame(value,
NO_CHANGE as any, 'Incoming value should never be NO_CHANGE.);\n
validateAgainstEventAttributes(name);\n    assertTNodeType(\n      tNode, TNodeType.Element,\n      `Attempted
to set attribute \`${name}\`` on a container node. ` +\n      `Host bindings are not valid on ng-container or ng-
template.);\n  }\n  const element = getNativeByTNode(tNode, IView) as RElement;\n
setElementAttribute(IView[RENDERER], element, namespace,
tNode.value, name, value, sanitizer);\n\n\n\nexport function setElementAttribute(\n  renderer: Renderer, element:
RElement, namespace: string|null|undefined, tagName: string|null,\n  name: string, value: any, sanitizer:
SanitizerFn|null|undefined) {\n  if (value == null) {\n    ngDevMode &&
ngDevMode.rendererRemoveAttribute++;\n    renderer.removeAttribute(element, name, namespace);\n  } else {\n
ngDevMode && ngDevMode.rendererSetAttribute++;\n    const strValue =\n      sanitizer == null ?
renderStringify(value) : sanitizer(value, tagName || '', name);\n\n    renderer.setAttribute(element, name, strValue
as string, namespace);\n  }\n}\n\n\n/**\n * Sets initial input properties on directive instances from attribute data\n *
\n * @param IView Current LView that is being processed.\n * @param directiveIndex Index of the directive in
directives array\n * @param instance Instance of the directive on which to set the initial inputs\n * @param def The
directive def that contains
the list of inputs\n * @param tNode The static data for this node\n * ^\nfunction setInputsFromAttrs<T>(\n  IView:
LView, directiveIndex: number, instance: T, def: DirectiveDef<T>, tNode: TNode,\n  initialInputData:
InitialInputData): void {\n  const initialInputs: InitialInputs|null = initialInputData![directiveIndex];\n  if
(initialInputs !== null) {\n    const setInput = def.setInput;\n    for (let i = 0; i < initialInputs.length;) {\n    const
publicName = initialInputs[i++];\n    const privateName = initialInputs[i++];\n    const value =
initialInputs[i++];\n    if (setInput !== null) {\n      def.setInput!(instance, value, publicName, privateName);\n
} else {\n      (instance as any)[privateName] = value;\n    }\n    if (ngDevMode) {\n      const nativeElement =
getNativeByTNode(tNode, IView) as RElement;\n      setNgReflectProperty(IView, nativeElement, tNode.type,

```









```

processed.\n // Since we don't have a concept of the "first update pass" we need to check for presence of the\n //
binding meta-data to decide if one
should be stored (or if was stored already).\n if (tData[bindingIndex] === null) {\n   if (tNode.inputs == null ||
!tNode.inputs[propertyName]) {\n     const propBindingIdxs = tNode.propertyBindings || (tNode.propertyBindings
= []);\n     propBindingIdxs.push(bindingIndex);\n     let bindingMetadata = propertyName;\n     if
(interpolationParts.length > 0) {\n       bindingMetadata +=\n         INTERPOLATION_DELIMITER +
interpolationParts.join(INTERPOLATION_DELIMITER);\n     }\n     tData[bindingIndex] = bindingMetadata;\n
}\n }\n}\n\nexport function getOrCreateLViewCleanup(view: LView): any[] {\n // top level variables should not be
exported for performance reasons (PERF_NOTES.md)\n return view[CLEANUP] || (view[CLEANUP] =
ngDevMode ? new LCleanup() : []);\n}\n\nexport function getOrCreateTViewCleanup(tView: TView): any[] {\n
return tView.cleanup || (tView.cleanup = ngDevMode ? new TCleanup() : []);\n}\n\n/**\n * There are cases where
the sub component's renderer needs
to be included\n * instead of the current renderer (see the componentSyntheticHost* instructions).\n */\nexport
function loadComponentRenderer(\n  currentDef: DirectiveDef<any>|null, tNode: TNode, IView: LView):
Renderer {\n // TODO(FW-2043): the `currentDef` is null when host bindings are invoked while creating root\n //
component (see packages/core/src/render3/component.ts). This is not consistent with the process\n // of creating
inner components, when current directive index is available in the state. In order\n // to avoid relying on current def
being `null` (thus special-casing root component creation), the\n // process of creating root component should be
unified with the process of creating inner\n // components.\n if (currentDef === null ||
isComponentDef(currentDef)) {\n   IView = unwrapLView(IView[tNode.index]);\n }\n return
IView[RENDERER];\n}\n\n/** Handles an error thrown in an LView. */\nexport function handleError(IView:
LView, error: any): void {\n const
injector = IView[INJECTOR];\n const errorHandler = injector ? injector.get(ErrorHandler, null) : null;\n
errorHandler && errorHandler.handleError(error);\n}\n\n/**\n * Set the inputs of directives at the current node to
corresponding value.\n *\n * @param tView The current TView\n *\n * @param IView the `LView` which contains the
directives.\n *\n * @param inputs mapping between the public "input" name and privately-known,\n *\n * possibly
minified, property names to write to.\n *\n * @param value Value to set.\n */\nexport function setInputsForProperty(\n
tView: TView, IView: LView, inputs: PropertyAliasValue, publicName: string, value: any): void {\n for (let i = 0; i
< inputs.length;) {\n   const index = inputs[i++] as number;\n   const privateName = inputs[i++] as string;\n   const
instance = IView[index];\n   ngDevMode && assertIndexInRange(IView, index);\n   const def = tView.data[index]
as DirectiveDef<any>;\n   if (def.setInput !== null) {\n     def.setInput!(instance,
value, publicName, privateName);\n   } else {\n     instance[privateName] = value;\n   }\n }\n}\n\n/**\n *
Updates a text binding at a given index in a given LView.\n */\nexport function textBindingInternal(IView: LView,
index: number, value: string): void {\n ngDevMode && assertString(value, 'Value should be a string');\n
ngDevMode && assertNotSame(value, NO_CHANGE as any, 'value should not be NO_CHANGE');\n
ngDevMode && assertIndexInRange(IView, index);\n const element = getNativeByIndex(index, IView) as any as
RText;\n ngDevMode && assertDefined(element, 'native element should exist');\n
updateTextNode(IView[RENDERER], element, value);\n}\n\n", "*/\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {concatStringsWithSpace} from
'./../util/stringify';\nimport {assertFirstCreatePass} from './assert';\nimport {AttributeMarker,
TAttributes, TNode} from './interfaces/node';\nimport {getTView} from './state';\n\n/**\n * Compute the static
styling (class/style) from `TAttributes`.\n *\n * This function should be called during `firstCreatePass` only.\n *\n *
@param tNode The `TNode` into which the styling information should be loaded.\n *\n * @param attrs `TAttributes`
containing the styling information.\n *\n * @param writeToHost Where should the resulting static styles be written?\n *
- `false` Write to `TNode.stylesWithoutHost` / `TNode.classesWithoutHost`\n * - `true` Write to `TNode.styles` /
`TNode.classes`\n */\nexport function computeStaticStyling(\n  tNode: TNode, attrs: TAttributes|null,
writeToHost: boolean): void {\n ngDevMode &&\n   assertFirstCreatePass(getTView(), 'Expecting to be called in

```

```

first template pass only');\n let styles: string|null = writeToHost ? tNode.styles : null;\n let classes: string|null =
writeToHost ? tNode.classes : null;\n let mode: AttributeMarker|0 = 0;\n
  if (attrs !== null) {\n    for (let i = 0; i < attrs.length; i++) {\n      const value = attrs[i];\n      if (typeof value ===
'number') {\n        mode = value;\n      } else if (mode === AttributeMarker.Classes) {\n        classes =
concatStringsWithSpace(classes, value as string);\n      } else if (mode === AttributeMarker.Styles) {\n        const
style = value as string;\n        const styleValue = attrs[++i] as string;\n        styles = concatStringsWithSpace(styles,
style + ': ' + styleValue + ');'\n      }\n    }\n    writeToHost ? tNode.styles = styles : tNode.stylesWithoutHost =
styles;\n    writeToHost ? tNode.classes = classes : tNode.classesWithoutHost = classes;\n  }\n  "/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {assertParentView} from
'./assert';\nimport {IcuContainerIterate} from './i18n/i18n_tree_shaking';\nimport
{CONTAINER_HEADER_OFFSET} from './interfaces/container';\nimport {TIcuContainerNode, TNode,
TNodeType} from './interfaces/node';\nimport {RNode} from './interfaces/renderer_dom';\nimport {isLContainer}
from './interfaces/type_checks';\nimport {DECLARATION_COMPONENT_VIEW, LView, T_HOST, TVIEW,
TView} from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {getProjectionNodes}
from './node_manipulation';\nimport {getViewParent} from './util/view_traversal_utils';\nimport {unwrapRNode}
from './util/view_utils';\n\nexport function collectNativeNodes(\n  tView: TView, IView: LView, tNode:
TNode|null, result: any[],\n  isProjection: boolean = false): any[] {\n  while (tNode !== null) {\n    ngDevMode
&&\n    assertTNodeType(\n      tNode,\n      TNodeType.AnyRNode | TNodeType.AnyContainer |
TNodeType.Projection | TNodeType.Icu);\n\n    const lNode = IView[tNode.index];\n    if (lNode !== null) {\n
result.push(unwrapRNode(lNode));\n
  }\n\n  // A given lNode can represent either a native node or a LContainer (when it is a host of a\n //
ViewContainerRef). When we find a LContainer we need to descend into it to collect root nodes\n // from the
views in this container.\n  if (isLContainer(lNode)) {\n    for (let i = CONTAINER_HEADER_OFFSET; i <
lNode.length; i++) {\n      const lViewInAContainer = lNode[i];\n      const lViewFirstChildTNode =
lViewInAContainer[TVIEW].firstChild;\n      if (lViewFirstChildTNode !== null) {\n        collectNativeNodes(\n
lViewInAContainer[TVIEW], lViewInAContainer, lViewFirstChildTNode, result);\n      }\n    }\n\n    const tNodeType = tNode.type;\n    if (tNodeType & TNodeType.ElementContainer) {\n
collectNativeNodes(tView, IView, tNode.child, result);\n    } else if (tNodeType & TNodeType.Icu) {\n      const
nextRNode = icuContainerIterate(tNode as TIcuContainerNode, IView);\n      let rNode: RNode|null;\n      while
(rNode
= nextRNode()) {\n        result.push(rNode);\n      }\n    } else if (tNodeType & TNodeType.Projection) {\n      const
nodesInSlot = getProjectionNodes(IView, tNode);\n      if (Array.isArray(nodesInSlot)) {\n
result.push(...nodesInSlot);\n      } else {\n        const parentView =
getViewParent(IView[DECLARATION_COMPONENT_VIEW]);\n        ngDevMode &&\n        assertParentView(parentView);\n        collectNativeNodes(parentView[TVIEW], parentView, nodesInSlot, result,
true);\n      }\n    }\n\n    tNode = isProjection ? tNode.projectionNext : tNode.next;\n  }\n\n  return result;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{ChangeDetectorRef as viewEngine_ChangeDetectorRef} from './change_detection/change_detector_ref';\nimport
{RuntimeError, RuntimeErrorCode} from './errors';\nimport {EmbeddedViewRef
as viewEngine_EmbeddedViewRef, InternalViewRef as viewEngine_InternalViewRef, ViewRefTracker} from
'./linker/view_ref';\nimport {removeFromArray} from './util/array_utils';\nimport {assertEqual} from
'./util/assert';\nimport {collectNativeNodes} from './collect_native_nodes';\nimport {checkNoChangesInternal,
detectChangesInternal, markViewDirty, storeCleanupWithContext} from './instructions/shared';\nimport
{CONTAINER_HEADER_OFFSET, VIEW_REFS} from './interfaces/container';\nimport {isLContainer} from
'./interfaces/type_checks';\nimport {CONTEXT, FLAGS, LView, LViewFlags, PARENT, TVIEW} from
'./interfaces/view';\nimport {destroyLView, detachView, renderDetachView} from './node_manipulation';\n\n\n//

```

Needed due to tsickle downleveling where multiple `implements` with classes creates multiple @extends in Closure annotations, which is illegal. This workaround fixes the multiple @extends by making the annotation @implements instead

```

export interface viewEngine_ChangeDetectorRef_interface
  extends viewEngine_ChangeDetectorRef {}
export class ViewRef<T> implements
  viewEngine_EmbeddedViewRef<T>, viewEngine_InternalViewRef,
  viewEngine_ChangeDetectorRef_interface {
  private _appRef: ViewRefTracker|null = null;
  private
  _attachedToViewContainer = false;
  get rootNodes(): any[] {
    const IView = this._IView;
    const tView =
    IView[TVIEW];
    return collectNativeNodes(tView, IView, tView.firstChild, []);
  }
  constructor(
    /**
     * This represents `LView` associated with the component when ViewRef is a ChangeDetectorRef.
     *
     * When ViewRef is created for a dynamic component, this also represents the `LView` for the
     * component.
     *
     * For a "regular" ViewRef created for an embedded view, this is the `LView` for the embedded
     * view.
     *
     * @internal
     */
    public _IView: LView,
    /**
     * This represents the `LView`
     * associated with the point where `ChangeDetectorRef` was
     * requested.
     *
     * This may be different
     * from `_IView` if the `_cdRefInjectingView` is an embedded view.
     */
    private _cdRefInjectingView?:
    LView) {}
  get context(): T {
    return this._IView[CONTEXT] as unknown as T;
  }
  set context(value:
  T) {
    this._IView[CONTEXT] = value as unknown as {};
  }
  get destroyed(): boolean {
    return
    (this._IView[FLAGS] & LViewFlags.Destroyed) === LViewFlags.Destroyed;
  }
  destroy(): void {
    if
    (this._appRef) {
      this._appRef.detachView(this);
    }
    else if (this._attachedToViewContainer) {
      const
      parent = this._IView[PARENT];
      if (isLContainer(parent)) {
        const viewRefs = parent[VIEW_REFS] as
        ViewRef<unknown>[] | null;
        const index = viewRefs ? viewRefs.indexOf(this) : -1;
        if (index > -1) {
          ngDevMode &&
          assertEqual(
            index, parent.indexOf(this._IView)
            - CONTAINER_HEADER_OFFSET,
            'An attached view should be in the same position within its
            container as its ViewRef in the VIEW_REFS array.');
```

```

ChangeDetectorRef, private dataProvider: DataProvider) {\n *   ref.detach();\n
  *   setInterval(() => {\n *     this.ref.detectChanges();\n *     }, 5000);\n *   }\n * }\n *\n *
@Component({\n *   selector: 'app',\n *   providers: [DataProvider],\n *   template: `<giant-list><giant-
list>\n *   `,\n *   })\n * class App {\n * }\n *
Re-attaches a view to the change detection tree.\n * This can be
used to re-attach views that were previously detached from the tree\n * using { @link ChangeDetectorRef#detach
detach}. Views are attached to the tree by default.\n * <!-- TODO: Add a link to a chapter on
detach/reattach/local digest -->\n * @usageNotes\n * ### Example\n * The following example creates
a component displaying `live` data. The component will detach\n * its change detector from the main change
detector tree when the component's live property\n * is set to false.\n *
typescript\n
  * class DataProvider {\n *   data = 1;\n *   constructor() {\n *     setInterval(() => {\n *       this.data =
this.data * 2;\n *     }, 500);\n *   }\n * }\n *
@Component({\n *   selector: 'live-data',\n *   inputs:
['live'],\n *   template: 'Data: {{dataProvider.data}}'\n * })\n * class LiveData {\n *   constructor(private ref:
ChangeDetectorRef, private dataProvider: DataProvider) {\n *     set live(value) {\n *       if (value) {\n *
this.ref.reattach();\n *     } else {\n *       this.ref.detach();\n *     }\n *   }\n * }\n *
@Component({\n *   selector: 'app-root',\n *   providers: [DataProvider],\n *   template: `<div>
Live Update: <input
type="checkbox" [(ngModel)]="live">\n *   <live-data [live]="live"></live-data>\n *   `,\n *   })\n * class
AppComponent {\n *   live = true;\n * }\n *
Reattach(): void {\n *   this._IView[FLAGS] |=
LViewFlags.Attached;\n
  }\n *
Checks the view and its children.\n * This can also be used in combination with { @link
ChangeDetectorRef#detach detach} to implement\n * local change detection checks.\n * <!-- TODO: Add a
link to a chapter on detach/reattach/local digest -->\n * <!-- TODO: Add a live demo once ref.detectChanges is
merged into master -->\n * @usageNotes\n * ### Example\n * The following example defines a
component with a large list of readonly data.\n * Imagine, the data changes constantly, many times per second. For
performance reasons,\n * we want to check and update the list every five seconds.\n * We can do that by
detaching the component's change detector and doing a local change detection\n * check every five seconds.\n *
See { @link ChangeDetectorRef#detach detach} for more information.\n *
detectChanges(): void {\n *   detectChangesInternal(this._IView[TVIEW], this._IView, this.context as unknown as {});
}\n *
Checks the change detector and its children, and throws if any changes are detected.\n * This
is used in development mode to verify that running change detection doesn't\n * introduce other changes.\n *
checkNoChanges(): void {\n *   if (ngDevMode) {\n *     checkNoChangesInternal(this._IView[TVIEW], this._IView,
this.context as unknown as {});\n *   }\n * }\n *
attachToViewContainerRef() {\n *   if (this._appRef) {\n *     throw new
RuntimeError(\n *       RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n *       ngDevMode && 'This view is
already attached directly to the ApplicationRef!');\n *   }\n *   this._attachedToViewContainer = true;\n * }\n *
detachFromAppRef() {\n *   this._appRef = null;\n *   renderDetachView(this._IView[TVIEW], this._IView);\n * }\n *
attachToAppRef(appRef: ViewRefTracker) {\n *   if (this._attachedToViewContainer) {\n *     throw new
RuntimeError(\n *       RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n *       ngDevMode && 'This view is
already attached to a ViewContainer!');\n *   }\n *   this._appRef = appRef;\n * }\n *
@internal\n * export class
RootViewRef<T> extends ViewRef<T> {\n *   constructor(public _view: LView) {\n *     super(_view);\n *   }\n *
override detectChanges(): void {\n *   const IView = this._view;\n *   const tView = IView[TVIEW];\n *   const context
= IView[CONTEXT];\n *   detectChangesInternal(tView, IView, context, false);\n * }\n *
override
checkNoChanges(): void {\n *   if (ngDevMode) {\n *     const IView = this._view;\n *     const tView =
IView[TVIEW];\n *     const context = IView[CONTEXT];\n *     checkNoChangesInternal(tView, IView, context,
false);\n *   }\n * }\n *
override get context(): T {\n *   return null!;\n * }\n *
}"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n * import { ChangeDetectorRef } from
'./change_detection/change_detector_ref';\n * import

```

```

{Injector} from './di/injector';\nimport {InjectFlags} from './di/interface/injector';\nimport {ProviderToken} from
 './di/provider_token';\nimport {EnvironmentInjector} from './di/r3_injector';\nimport {RuntimeError,
 RuntimeErrorCode} from './errors';\nimport {Type} from './interface/type';\nimport {ComponentFactory as
 AbstractComponentFactory, ComponentRef as AbstractComponentRef} from './linker/component_factory';\nimport
 {ComponentFactoryResolver as AbstractComponentFactoryResolver} from
 './linker/component_factory_resolver';\nimport {createElementRef, ElementRef} from
 './linker/element_ref';\nimport {NgModuleRef} from './linker/ng_module_factory';\nimport {RendererFactory2}
 from './render/api';\nimport {Sanitizer} from './sanitization/sanitizer';\nimport {assertDefined, assertIndexInRange}
 from './util/assert';\nimport {VERSION} from './version';\nimport
 {NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR} from './view/provider_flags';\n\nimport
 {assertComponentType}
 from './assert';\nimport {GetComponentDef} from './definition';\nimport {diPublicInInjector,
 getOrCreateNodeInjectorForNode, NodeInjector} from './di';\nimport {throwProviderNotFoundError} from
 './errors_di';\nimport {registerPostOrderHooks} from './hooks';\nimport {reportUnknownPropertyError} from
 './instructions/element_validation';\nimport {addToViewTree, createLView, createTView,
 getOrCreateComponentTView, getOrCreateTNode, initTNodeFlags, instantiateRootComponent,
 invokeHostBindingsInCreationMode, locateHostElement, markAsComponentHost, markDirtyIfOnPush,
 registerHostBindingOpCodes, renderView, setInputsForProperty} from './instructions/shared';\nimport
 {ComponentDef, RenderFlags} from './interfaces/definition';\nimport {PropertyAliasValue, TContainerNode,
 TElementContainerNode, TElementNode, TNode, TNodeType} from './interfaces/node';\nimport {Renderer,
 RendererFactory} from './interfaces/renderer';\nimport {RElement, RNode} from
 './interfaces/renderer_dom';\nimport {CONTEXT,
 HEADER_OFFSET, LView, LViewFlags, TVIEW, TViewType} from './interfaces/view';\nimport
 {MATH_ML_NAMESPACE, SVG_NAMESPACE} from './namespaces';\nimport {createElementNode,
 writeDirectClass, writeDirectStyle} from './node_manipulation';\nimport {extractAttrsAndClassesFromSelector,
 stringifyCSSSelectorList} from './node_selector_matcher';\nimport {enterView, getCurrentTNode, getLView,
 leaveView, setSelectedIndex} from './state';\nimport {computeStaticStyling} from './styling/static_styling';\nimport
 {setUpAttributes} from './util/attrs_utils';\nimport {stringifyForError} from './util/stringify_utils';\nimport
 {getTNode} from './util/view_utils';\nimport {RootViewRef, ViewRef} from './view_ref';\n\nexport class
 ComponentFactoryResolver extends AbstractComponentFactoryResolver {\n  /**\n   * @param NgModule The
 NgModuleRef to which all resolved factories are bound.\n   * ^\n   * constructor(private NgModule?:
 NgModuleRef<any>) {\n   *   super();\n   * }\n   * \n   * override resolveComponentFactory<T>(component:
 Type<T>): AbstractComponentFactory<T> {\n   *   ngDevMode && assertComponentType(component);\n   *   const
 componentDef = GetComponentDef(component!);\n   *   return new ComponentFactory(componentDef,
 this.ngModule);\n   * }\n   * \n   * function toRefArray(map: {[key: string]: string}): {propName: string; templateName:
 string;}[] {\n   *   const array: {propName: string; templateName: string;}[] = [];\n   *   for (let nonMinified in map) {\n   *     if
 (map.hasOwnProperty(nonMinified)) {\n   *       const minified = map[nonMinified];\n   *       array.push({propName:
 minified, templateName: nonMinified});\n   *     }\n   *   }\n   *   return array;\n   * }\n   * \n   * function getNamespace(elementName:
 string): string|null {\n   *   const name = elementName.toLowerCase();\n   *   return name === 'svg' ? SVG_NAMESPACE
 : (name === 'math' ? MATH_ML_NAMESPACE : null);\n   * }\n   * \n   * Injector that looks up a value using a
 specific injector, before falling back to the module\n   * injector. Used primarily when creating components or
 embedded views dynamically.\n   * ^\n   * class
 ChainedInjector implements Injector {\n   *   constructor(private injector: Injector, private parentInjector: Injector)
 {\n   *   }\n   *   get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T {\n   *     const value =
 this.injector.get<T|typeof NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR>(token,
 NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR, flags);\n   *     if (value !==
 NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR ||\n   *         notFoundValue ===
 (NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR as unknown as T)) {\n   *       // Return the value from the

```



```

    setUpAttributes(hostRenderer, hostRNode, attrs);
  }
  if (classes && classes.length > 0) {
    writeDirectClass(hostRenderer, hostRNode, classes.join(' '));
  }
  tElementNode =
  getTNode(rootTView, HEADER_OFFSET) as TElementNode;
  if (projectableNodes !== undefined) {
    const projection: (TNode|RNode[]|null)[]
    = tElementNode.projection = [];
    for (let i = 0; i < this.ngContentSelectors.length; i++) {
      const
      nodesforSlot = projectableNodes[i];
      // Projectable nodes can be passed as array of arrays or an array of
      iterables (ngUpgrade
      // case). Here we do normalize passed data structure to be an array of arrays to avoid
      // complex checks down the line.
      // We also normalize the length of the passed in projectable nodes (to
      match the number of
      // <ng-container> slots defined by a component).
      projection.push(nodesforSlot
      != null ? Array.from(nodesforSlot) : null);
    }
    // TODO: should LifecycleHooksFeature and other
    host features be generated by the compiler and
    // executed here?
    // Angular 5 reference:
    https://stackblitz.com/edit/lifecycle-hooks-vcref
    component =
    createRootComponent(componentView,
    this.componentDef, rootLView, [LifecycleHooksFeature]);
    renderView(rootTView, rootLView, null);
  } finally {
    leaveView();
  }
  return new
  ComponentRef(
    this.componentType, component, createElementRef(tElementNode, rootLView),
    rootLView,
    tElementNode);
}
const componentFactoryResolver: ComponentFactoryResolver = new
ComponentFactoryResolver();
/**
 * Creates a ComponentFactoryResolver and stores it on the injector. Or, if
 the
 * ComponentFactoryResolver
 * already exists, retrieves the existing ComponentFactoryResolver.
 *
 * @returns The ComponentFactoryResolver instance to use
 */
export function injectComponentFactoryResolver():
AbstractComponentFactoryResolver {
  return componentFactoryResolver;
}
/**
 * Represents an instance of
 a Component created via a { @link ComponentFactory}.
 *
 * ComponentRef provides access to the Component
 Instance as well other objects related to this
 * Component Instance and allows you to destroy the Component
 Instance via the { @link
 #destroy}
 * method.
 */
export class ComponentRef<T> extends AbstractComponentRef<T> {
  override
  instance: T;
  override hostView: ViewRef<T>;
  override changeDetectorRef: ChangeDetectorRef;
  override
  componentType: Type<T>;
  constructor(
    componentType: Type<T>, instance: T, public location:
    ElementRef, private _rootLView: LView,
    private _tNode:
    TElementNode|TContainerNode|TElementContainerNode) {
    super();
    this.instance = instance;
    this.hostView = this.changeDetectorRef = new RootViewRef<T>(_rootLView);
    this.componentType =
    componentType;
  }
  override setInput(name: string, value: unknown): void {
    const inputData =
    this._tNode.inputs;
    let dataValue: PropertyAliasValue|undefined;
    if (inputData !== null && (dataValue =
    inputData[name])) {
      const IView = this._rootLView;
      setInputsForProperty(IView[TVIEW], IView,
      dataValue, name, value);
      markDirtyIfOnPush(IView, this._tNode.index);
    } else {
      if (ngDevMode) {
        const cmpNameForError = stringifyForError(this.componentType);
        let message
        =
        `Can't set value of the '${name}' input on the '${cmpNameForError}' component.`;
        message +=
        `Make sure that the '${
          name}' property is annotated with @Input() or a mapped @Input('${name}')
          exists.`;
        reportUnknownPropertyError(message);
      }
    }
  }
  override get injector(): Injector {
    return new NodeInjector(this._tNode, this._rootLView);
  }
  override destroy(): void {
    this.hostView.destroy();
  }
  override onDestroy(callback: () => void): void {
    this.hostView.onDestroy(callback);
  }
}
/** Represents a HostFeature function.
 */
export type HostFeature =
(<T>(component: T, componentDef: ComponentDef<T>) => void);
// TODO: A hack to not pull in the
NullInjector from @angular/core.
export const NULL_INJECTOR: Injector = {
  get: (token: any,
  notFoundValue?: any) => {
    throw ProviderNotFoundError(token,
    'NullInjector');
  }
};
/**
 * Creates the root component view and the root component node.
 */
export @param
rNode Render host element.
 * @param def ComponentDef
 * @param rootView The parent view where the host
 node is stored
 * @param rendererFactory Factory to be used for creating child renderers.
 * @param
hostRenderer The current renderer
 * @param sanitizer The sanitizer, if provided
 */
export @returns Component
view created
 */
export function createRootComponentView(
  rNode: RElement|null, def:

```

```

ComponentDef<any>, rootView: LView, rendererFactory: RendererFactory,\n  hostRenderer: Renderer, sanitizer?:
Sanitizer|null): LView {\n  const tView = rootView[TVIEW];\n  const index = HEADER_OFFSET;\n  ngDevMode
&& assertIndexInRange(rootView, index);\n  rootView[index] = rNode;\n  // '#host' is added here as we don't know
the real host DOM name (we don't want to read it) and at\n  // the same time we want to communicate the debug
`TNode` that this is
  a special `TNode`\n  // representing a host element.\n  const tNode: TElementNode = getOrCreateTNode(tView,
index, TNodeType.Element, '#host', null);\n  const mergedAttrs = tNode.mergedAttrs = def.hostAttrs;\n  if
(mergedAttrs !== null) {\n  computeStaticStyling(tNode, mergedAttrs, true);\n  if (rNode !== null) {\n
setUpAttributes(hostRenderer, rNode, mergedAttrs);\n  if (tNode.classes !== null) {\n
writeDirectClass(hostRenderer, rNode, tNode.classes);\n  }\n  if (tNode.styles !== null) {\n
writeDirectStyle(hostRenderer, rNode, tNode.styles);\n  }\n  }\n  }\n\n  const viewRenderer =
rendererFactory.createRenderer(rNode, def);\n  const componentView = createLView(\n  rootView,
getOrCreateComponentTView(def), null,\n  def.onPush ? LViewFlags.Dirty : LViewFlags.CheckAlways,
rootView[index], tNode,\n  rendererFactory, viewRenderer, sanitizer || null, null, null);\n\n  if
(tView.firstCreatePass) {\n  diPublicInInjector(getOrCreateNodeInjectorForNode(tNode,
rootView), tView, def.type);\n  markAsComponentHost(tView, tNode);\n  initTNodeFlags(tNode,
rootView.length, 1);\n  }\n\n  addToViewTree(rootView, componentView);\n\n  // Store component view at node
index, with node as the HOST\n  return rootView[index] = componentView;\n  }\n\n  /**\n   * Creates a root component
and sets it up with features and host bindings.Shared by\n   * renderComponent() and
ViewContainerRef.createComponent().\n   */\n  export function createRootComponent<T>(\n  componentView:
LView, componentDef: ComponentDef<T>, rootLView: LView,\n  hostFeatures: HostFeature[]|null): any {\n
const tView = rootLView[TVIEW];\n  // Create directive instance with factory() and store at next index in
viewData\n  const component = instantiateRootComponent(tView, rootLView, componentDef);\n\n  // Root view
only contains an instance of this component,\n  // so we use a reference to that component instance as a context.\n
componentView[CONTEXT] = rootLView[CONTEXT] =
  component;\n\n  if (hostFeatures !== null) {\n  for (const feature of hostFeatures) {\n  feature(component,
componentDef);\n  }\n  }\n\n  // We want to generate an empty QueryList for root content queries for backwards\n
// compatibility with ViewEngine.\n  if (componentDef.contentQueries) {\n  const tNode = getCurrentTNode();\n
ngDevMode && assertDefined(tNode, 'TNode expected');\n  componentDef.contentQueries(RenderFlags.Create,
component, tNode.directiveStart);\n  }\n\n  const rootTNode = getCurrentTNode();\n  ngDevMode &&
assertDefined(rootTNode, 'TNode should have been already created');\n  if (tView.firstCreatePass &&\n
(componentDef.hostBindings !== null || componentDef.hostAttrs !== null)) {\n
setSelectedIndex(rootTNode.index);\n\n  const rootTView = rootLView[TVIEW];\n
registerHostBindingOpCodes(\n  rootTView, rootTNode, rootLView, rootTNode.directiveStart,
rootTNode.directiveEnd,\n  componentDef);\n\n  invokeHostBindingsInCreationMode(componentDef,
component);\n  }\n  return component;\n  }\n\n  /**\n   * Used to enable lifecycle hooks on the root component.\n   */\n
Include this feature when calling `renderComponent` if the root component\n   * you are rendering has lifecycle
hooks defined. Otherwise, the hooks won't\n   * be called properly.\n   * Example:\n   * ```\n   *
renderComponent(AppComponent, {hostFeatures: [LifecycleHooksFeature]});\n   * ```\n   */\n  export function
LifecycleHooksFeature(): void {\n  const tNode = getCurrentTNode();\n  ngDevMode && assertDefined(tNode,
'TNode is required');\n  registerPostOrderHooks(getLView()[TVIEW], tNode);\n  }\n\n  /**\n   * @license\n   *
Copyright Google LLC All Rights Reserved.\n   * Use of this source code is governed by an MIT-style license
that can be\n   * found in the LICENSE file at https://angular.io/license\n   */\n  import { RuntimeError,
RuntimeErrorCode } from '../errors';\n  import { Type, Writable } from '../interface/type';\n  import
{ EMPTY_ARRAY, EMPTY_OBJ } from '../util/empty';\n  import
{ fillProperties } from '../util/property';\n  import { ComponentDef, ContentQueriesFunction, DirectiveDef,
DirectiveDefFeature, HostBindingsFunction, RenderFlags, ViewQueriesFunction } from
'../interfaces/definition';\n  import { TAttributes } from '../interfaces/node';\n  import { isComponentDef } from

```



```

../interfaces/type_checks';\nimport {mergeHostAttrs} from '../util/attrs_utils';\nimport {stringifyForError} from
../util/stringify_utils';\n\nexport function getSuperType(type: Type<any>): Type<any>&\n {cmp?:
ComponentDef<any>, dir?: DirectiveDef<any>} {\n return
Object.getPrototypeOf(type.prototype).constructor;\n}\n\ntype WritableDef =
Writable<DirectiveDef<any>|ComponentDef<any>>;\n\n/**\n * Merges the definition from a super class to a sub
class.\n * @param definition The definition that is a SubClass of another directive of component\n *\n *
@codeGenApi\n */\nexport function InheritDefinitionFeature(definition:
DirectiveDef<any>|ComponentDef<any>): void {\n
let superType = getSuperType(definition.type);\n let shouldInheritFields = true;\n const inheritanceChain:
WritableDef[] = [definition];\n\n while (superType) {\n let superDef:
DirectiveDef<any>|ComponentDef<any>|undefined = undefined;\n if (isComponentDef(definition)) {\n //
Don't use getComponentDef/getDirectiveDef. This logic relies on inheritance.\n superDef = superType.cmp ||
superType.dir;\n } else {\n if (superType.cmp) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_INHERITANCE,\n ngDevMode &&\n `Directives cannot inherit
Components. Directive ${\n stringifyForError(definition.type)} is attempting to extend component ${\n
stringifyForError(superType)}`);\n }\n // Don't use getComponentDef/getDirectiveDef. This logic
relies on inheritance.\n superDef = superType.dir;\n }\n\n if (superDef) {\n if (shouldInheritFields) {\n
inheritanceChain.push(superDef);\n
// Some fields in the definition may be empty, if there were no values to put in them that\n // would've
justified object creation. Unwrap them if necessary.\n const writeableDef = definition as WritableDef;\n
writeableDef.inputs = maybeUnwrapEmpty(definition.inputs);\n writeableDef.declaredInputs =
maybeUnwrapEmpty(definition.declaredInputs);\n writeableDef.outputs =
maybeUnwrapEmpty(definition.outputs);\n\n // Merge hostBindings\n const superHostBindings =
superDef.hostBindings;\n superHostBindings && inheritHostBindings(definition, superHostBindings);\n\n
// Merge queries\n const superViewQuery = superDef.viewQuery;\n const superContentQueries =
superDef.contentQueries;\n superViewQuery && inheritViewQuery(definition, superViewQuery);\n
superContentQueries && inheritContentQueries(definition, superContentQueries);\n\n // Merge inputs and
outputs\n
fillProperties(definition.inputs, superDef.inputs);\n fillProperties(definition.declaredInputs,
superDef.declaredInputs);\n fillProperties(definition.outputs, superDef.outputs);\n\n // Merge animations
metadata.\n // If `superDef` is a Component, the `data` field is present (defaults to an empty object).\n if
(isComponentDef(superDef) && superDef.data.animation) {\n // If super def is a Component, the `definition`
is also a Component, since Directives can\n // not inherit Components (we throw an error above and cannot
reach this code).\n const defData = (definition as ComponentDef<any>).data;\n defData.animation =
(defData.animation || []).concat(superDef.data.animation);\n }\n }\n\n // Run parent features\n const
features = superDef.features;\n if (features) {\n for (let i = 0; i < features.length; i++) {\n const feature
= features[i];\n if (feature && feature.ngInherit)
{\n (feature as DirectiveDefFeature)(definition);\n }\n // If `InheritDefinitionFeature` is a part of
the current `superDef`, it means that this\n // def already has all the necessary information inherited from its
super class(es), so we\n // can stop merging fields from super classes. However we need to iterate through
the\n // prototype chain to look for classes that might contain other `features` (like\n // NgOnChanges),
which we should invoke for the original `definition`. We set the\n // `shouldInheritFields` flag to indicate that,
essentially skipping fields inheritance\n // logic and only invoking functions from the `features` list.\n if
(feature === InheritDefinitionFeature) {\n shouldInheritFields = false;\n }\n }\n }\n }\n\n superType = Object.getPrototypeOf(superType);\n }\n
mergeHostAttrsAcrossInheritance(inheritanceChain);\n}\n\n/**\n * Merge the `hostAttrs` and `hostVars` from the inherited parent to the base class.\n *\n * @param
inheritanceChain A list of `WritableDefs` starting at the top most type and listing\n * sub-types in order. For each

```

```

type take the `hostAttrs` and `hostVars` and merge it with the child\n * type.\n *\nfunction
mergeHostAttrsAcrossInheritance(inheritanceChain: WritableDef[]) {\n let hostVars: number = 0;\n let hostAttrs:
TAttributes|null = null;\n // We process the inheritance order from the base to the leaves here.\n for (let i =
inheritanceChain.length - 1; i >= 0; i--) {\n const def = inheritanceChain[i];\n // For each `hostVars`, we need to
add the superclass amount.\n def.hostVars = (hostVars += def.hostVars);\n // for each `hostAttrs` we need to
merge it with superclass.\n def.hostAttrs =\n mergeHostAttrs(def.hostAttrs, hostAttrs =
mergeHostAttrs(hostAttrs, def.hostAttrs));\n }\n}\n\nfunction maybeUnwrapEmpty<T>(value: T[]): T[];\nfunction
maybeUnwrapEmpty<T>(value:
T): T;\nfunction maybeUnwrapEmpty(value: any): any {\n if (value === EMPTY_OBJ) {\n return {};\n } else if
(value === EMPTY_ARRAY) {\n return [];\n } else {\n return value;\n }\n}\n\nfunction
inheritViewQuery(definition: WritableDef, superViewQuery: ViewQueriesFunction<any>) {\n const
prevViewQuery = definition.viewQuery;\n if (prevViewQuery) {\n definition.viewQuery = (rf, ctx) => {\n
superViewQuery(rf, ctx);\n prevViewQuery(rf, ctx);\n }; \n } else {\n definition.viewQuery =
superViewQuery;\n }\n}\n\nfunction inheritContentQueries(\n definition: WritableDef, superContentQueries:
ContentQueriesFunction<any>) {\n const prevContentQueries = definition.contentQueries;\n if
(prevContentQueries) {\n definition.contentQueries = (rf, ctx, directiveIndex) => {\n
superContentQueries(rf,
ctx, directiveIndex);\n prevContentQueries(rf, ctx, directiveIndex);\n }; \n } else {\n
definition.contentQueries = superContentQueries;\n
}\n}\n\nfunction inheritHostBindings(\n definition: WritableDef, superHostBindings:
HostBindingsFunction<any>) {\n const prevHostBindings = definition.hostBindings;\n if (prevHostBindings) {\n
definition.hostBindings = (rf: RenderFlags, ctx: any) => {\n
superHostBindings(rf, ctx);\n
prevHostBindings(rf, ctx);\n }; \n } else {\n definition.hostBindings = superHostBindings;\n }\n}\n\n"
/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { ComponentDef,
DirectiveDef } from './interfaces/definition';\nimport { isComponentDef } from './interfaces/type_checks';\nimport
{ getSuperType } from './inherit_definition_feature';\n\n/**\n * Fields which exist on either directive or component
definitions, and need to be copied from\n * parent to child classes by the `CopyDefinitionFeature`.\n *\nconst
COPY_DIRECTIVE_FIELDS: (keyof DirectiveDef<unknown>>[] = [\n // The child class should use the providers
of its parent.\n 'providersResolver',\n\n // Not listed here are any fields which are handled by the
`InheritDefinitionFeature`, such\n // as inputs, outputs, and host binding functions.\n];\n\n/**\n * Fields which exist
only on component definitions, and need to be copied from parent to child\n * classes by the
`CopyDefinitionFeature`.\n *\n * The type here allows any field of `ComponentDef` which is not also a property of
`DirectiveDef`,\n * since those should go in `COPY_DIRECTIVE_FIELDS` above.\n *\nconst
COPY_COMPONENT_FIELDS: Exclude<keyof ComponentDef<unknown>, keyof DirectiveDef<unknown>>[] =
[\n // The child class should use the template function of its parent, including all template\n // semantics.\n
'template',\n 'decls',\n 'consts',\n 'vars',\n 'onPush',\n 'ngContentSelectors',\n\n // The child class should use the
CSS styles of its parent, including all
styling semantics.\n 'styles',\n 'encapsulation',\n\n // The child class should be checked by the runtime in the same
way as its parent.\n 'schemas',\n];\n\n/**\n * Copies the fields not handled by the `InheritDefinitionFeature` from
the supertype of a\n * definition.\n *\n * This exists primarily to support ngcc migration of an existing View Engine
pattern, where an\n * entire decorator is inherited from a parent to a child class. When ngcc detects this case, it\n *
generates a skeleton definition on the child class, and applies this feature.\n *\n * The `CopyDefinitionFeature` then
copies any needed fields from the parent class' definition,\n * including things like the component template
function.\n *\n * @param definition The definition of a child class which inherits from a parent class with its\n *
own definition.\n *\n * @codeGenApi\n */\nexport function CopyDefinitionFeature(definition:
DirectiveDef<any>|ComponentDef<any>): void {\n let superType = getSuperType(definition.type)!;\n\n
let superDef: DirectiveDef<any>|ComponentDef<any>|undefined = undefined;\n if (isComponentDef(definition))
{\n // Don't use getComponentDef/getDirectiveDef. This logic relies on inheritance.\n superDef =

```



```

never be NO_CHANGE.);\n return IView[bindingIndex];\n}\n\n/**\n * Updates binding if changed, then returns
whether it was updated.\n *\n * This function also checks the `CheckNoChangesMode` and throws if changes are
made.\n *\n * Some changes (Objects/iterables) during `CheckNoChangesMode` are exempt to comply with VE\n *
behavior.\n *\n * @param IView current `LView`\n * @param bindingIndex The binding in the `LView` to check\n
* @param value New value to check against `IView[bindingIndex]`\n * @returns `true` if the bindings has changed.
(Throws if binding has
changed during\n *      `CheckNoChangesMode`)\n */\nexport function bindingUpdated(IView: LView,
bindingIndex: number, value: any): boolean {\n  ngDevMode && assertNotSame(value, NO_CHANGE, 'Incoming
value should never be NO_CHANGE.);\n  ngDevMode &&\n    assertLessThan(bindingIndex, IView.length, `Slot
should have been initialized to NO_CHANGE`);\n  const oldValue = IView[bindingIndex];\n  \n  if
(Object.is(oldValue, value)) {\n    return false;\n  } else {\n    if (ngDevMode && isInCheckNoChangesMode()) {\n
// View engine didn't report undefined values as changed on the first checkNoChanges pass\n    // (before the
change detection was run).\n    const oldValueToCompare = oldValue !== NO_CHANGE ? oldValue :
undefined;\n    if (!devModeEqual(oldValueToCompare, value)) {\n      const details =\n        getExpressionChangedErrorDetails(IView, bindingIndex, oldValueToCompare, value);\n      throwErrorIfNoChangesMode(\n        oldValue === NO_CHANGE, details.oldValue,
details.newValue, details.propName);\n    }\n    // There was a change, but the `devModeEqual` decided that the
change is exempt from an error.\n    // For this reason we exit as if no change. The early exit is needed to prevent
the changed\n    // value to be written into `LView` (If we would write the new value that we would not see it\n
// as change on next CD.)\n    return false;\n  }\n  IView[bindingIndex] = value;\n  return true;\n }\n}\n\n/**
Updates 2 bindings if changed, then returns whether either was updated. */\nexport function
bindingUpdated2(IView: LView, bindingIndex: number, exp1: any, exp2: any): boolean {\n  const different =
bindingUpdated(IView, bindingIndex, exp1);\n  return bindingUpdated(IView, bindingIndex + 1, exp2) ||
different;\n }\n\n/** Updates 3 bindings if changed, then returns whether any was updated. */\nexport function
bindingUpdated3(\n  IView: LView, bindingIndex: number, exp1: any, exp2: any, exp3: any): boolean {\n
  const different = bindingUpdated2(IView, bindingIndex, exp1, exp2);\n  return bindingUpdated(IView,
bindingIndex + 2, exp3) || different;\n }\n\n/** Updates 4 bindings if changed, then returns whether any was updated.
*/\nexport function bindingUpdated4(\n  IView: LView, bindingIndex: number, exp1: any, exp2: any, exp3: any,
exp4: any): boolean {\n  const different = bindingUpdated2(IView, bindingIndex, exp1, exp2);\n  return
bindingUpdated2(IView, bindingIndex + 2, exp3, exp4) || different;\n }\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\nimport { bindingUpdated } from './bindings';\nimport
{ SanitizerFn } from './interfaces/sanitization';\nimport { getLView, getSelectedTNode, getTView,
nextBindingIndex } from './state';\nimport { elementAttributeInternal, storePropertyBindingMetadata } from
'./shared';\n\n\n/**\n * Updates
the value of or removes a bound attribute on an Element.\n *\n * Used in the case of `[attr.title]="value"`\n *\n *
@param name name The name of the attribute.\n * @param value value The attribute is removed when value is
`null` or `undefined`.\n *      Otherwise the attribute value is set to the stringified value.\n * @param sanitizer
An optional function used to sanitize the value.\n * @param namespace Optional namespace to use when setting the
attribute.\n *\n * @codeGenApi\n */\nexport function attribute(\n  name: string, value: any, sanitizer?:
SanitizerFn|null,\n  namespace?: string): typeof attribute {\n  const IView = getLView();\n  const bindingIndex =
nextBindingIndex();\n  if (bindingUpdated(IView, bindingIndex, value)) {\n    const tView = getTView();\n    const
tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, name, value, sanitizer, namespace);\n
    ngDevMode && storePropertyBindingMetadata(tView.data, tNode, 'attr.' + name,
bindingIndex);\n  }\n  return attribute;\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { assertEqual, assertLessThan } from './util/assert';\nimport
{ bindingUpdated, bindingUpdated2, bindingUpdated3, bindingUpdated4 } from './bindings';\nimport { LView } from

```

```

'./interfaces/view';\nimport {getBindingIndex, incrementBindingIndex, nextBindingIndex, setBindingIndex} from
'./state';\nimport {NO_CHANGE} from './tokens';\nimport {renderStringify} from
'./util/stringify_utils';\n\n/**\n * Create interpolation bindings with a variable number of expressions.\n * If
there are 1 to 8 expressions `interpolation1()` to `interpolation8()` should be used instead.\n * Those are faster
because there is no need to create an array of expressions and iterate over it.\n * `values` - has static text at
even indexes,\n
* - has evaluated expressions at odd indexes.\n * Returns the concatenated string when any of the arguments
changes, `NO_CHANGE` otherwise.\n */\nexport function interpolationV(LView: LView, values: any[]):
string|\n NO_CHANGE {\n  ngDevMode && assertLessThan(2, values.length, 'should have at least 3 values');\n
ngDevMode && assertEquals(values.length % 2, 1, 'should have an odd number of values');\n  let isBindingUpdated
= false;\n  let bindingIndex = getBindingIndex();\n\n  for (let i = 1; i < values.length; i += 2) {\n    // Check if
bindings (odd indexes) have changed\n    isBindingUpdated = bindingUpdated(LView, bindingIndex++, values[i]) ||
isBindingUpdated;\n  }\n  setBindingIndex(bindingIndex);\n\n  if (!isBindingUpdated) {\n    return
NO_CHANGE;\n  }\n\n  // Build the updated content\n  let content = values[0];\n  for (let i = 1; i < values.length; i
+= 2) {\n    content += renderStringify(values[i]) + values[i + 1];\n  }\n\n  return content;\n}\n\n/**\n * Creates an
interpolation binding with 1 expression.\n * @param prefix static value used for concatenation only.\n *
@param v0 value checked for change.\n * @param suffix static value used for concatenation only.\n */\nexport
function interpolation1(LView: LView, prefix: string, v0: any, suffix: string): string|\n NO_CHANGE {\n  const
different = bindingUpdated(LView, nextBindingIndex(), v0);\n  return different ? prefix + renderStringify(v0) +
suffix : NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 2 expressions.\n */\nexport function
interpolation2(LView: LView, prefix: string, v0: any, i0: string, v1: any, suffix: string): string|\n NO_CHANGE {\n
const bindingIndex = getBindingIndex();\n  const different = bindingUpdated2(LView, bindingIndex, v0, v1);\n
  incrementBindingIndex(2);\n\n  return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + suffix :
NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 3 expressions.\n */\nexport function
interpolation3(LView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string):
string|\n NO_CHANGE {\n  const bindingIndex = getBindingIndex();\n  const different = bindingUpdated3(LView,
bindingIndex, v0, v1, v2);\n  incrementBindingIndex(3);\n\n  return different ?\n    prefix + renderStringify(v0) +
i0 + renderStringify(v1) + i1 + renderStringify(v2) + suffix :\n    NO_CHANGE;\n}\n\n/**\n * Create an
interpolation binding with 4 expressions.\n */\nexport function interpolation4(LView: LView, prefix: string, v0:
any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, suffix: string): string|\n NO_CHANGE {\n  const
bindingIndex = getBindingIndex();\n  const different = bindingUpdated4(LView, bindingIndex, v0, v1, v2, v3);\n
  incrementBindingIndex(4);\n\n  return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n
  renderStringify(v2) + i2 + renderStringify(v3) + suffix :\n
  NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 5 expressions.\n */\nexport function
interpolation5(LView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3:
any, i3: string, v4: any, suffix: string): string|\n NO_CHANGE {\n  const bindingIndex = getBindingIndex();\n  let
different = bindingUpdated4(LView, bindingIndex, v0, v1, v2, v3);\n  different = bindingUpdated(LView,
bindingIndex + 4, v4) || different;\n  incrementBindingIndex(5);\n\n  return different ? prefix + renderStringify(v0) +
i0 + renderStringify(v1) + i1 +\n    renderStringify(v2) + i2 + renderStringify(v3) + i3 + renderStringify(v4) +
suffix :\n    NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 6 expressions.\n */\nexport
function interpolation6(LView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,
i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string):
string|\n NO_CHANGE {\n  const bindingIndex = getBindingIndex();\n  let different = bindingUpdated4(LView,
bindingIndex, v0, v1, v2, v3);\n  different = bindingUpdated2(LView, bindingIndex + 4, v4, v5) || different;\n
  incrementBindingIndex(6);\n\n  return different ?\n    prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +
renderStringify(v2) + i2 +\n    renderStringify(v3) + i3 + renderStringify(v4) + i4 + renderStringify(v5) + suffix
:\n    NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 7 expressions.\n */\nexport function
interpolation7(LView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3:

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any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): string|n NO_CHANGE {\n const
bindingIndex = getBindingIndex();\n let different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n
different = bindingUpdated3(IView, bindingIndex + 4, v4, v5, v6) || different;\n
incrementBindingIndex(7);\n\n return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n
renderStringify(v2) + i2 + renderStringify(v3) + i3 + renderStringify(v4) + i4 +\n renderStringify(v5) + i5 +
renderStringify(v6) + suffix :\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 8
expressions.\n */\nexport function interpolation8(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1:
string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n
suffix: string): string|NO_CHANGE {\n const bindingIndex = getBindingIndex();\n let different =
bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n different = bindingUpdated4(IView, bindingIndex + 4,
v4, v5, v6, v7) || different;\n incrementBindingIndex(8);\n\n return different ? prefix + renderStringify(v0) + i0 +
renderStringify(v1) + i1 +\n renderStringify(v2)
+ i2 + renderStringify(v3) + i3 + renderStringify(v4) + i4 +\n renderStringify(v5) + i5 + renderStringify(v6) +
i6 + renderStringify(v7) + suffix :\n NO_CHANGE;\n}\n\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\nimport { SanitizerFn } from './interfaces/sanitization';\nimport
{ getBindingIndex, getLView, getSelectedTNode, getTView } from './state';\nimport { NO_CHANGE } from
'./tokens';\nimport { interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6,
interpolation7, interpolation8, interpolationV } from './interpolation';\nimport { elementAttributeInternal,
storePropertyBindingMetadata } from './shared';\n\n\n/**\n * Update an interpolated attribute on an element
with single bound value surrounded by text.\n */\n * Used when the value passed to a property
has 1 interpolated value in it:\n *\n * ```html\n * <div attr.title="\n * prefix { {v0} } suffix">\n * </div>\n * ```\n * Its
compiled representation is:\n *\n * ```ts\n * attributeInterpolate1('title', 'prefix', v0, 'suffix');\n * ```\n * @param
attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param
sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport function attributeInterpolate1(\n attrName: string, prefix: string, v0: any, suffix: string, sanitizer?:
SanitizerFn,\n namespace?: string): typeof attributeInterpolate1 {\n const IView = getLView();\n const
interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n if (interpolatedValue !== NO_CHANGE) {\n
const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue,
sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode,
'attr.' + attrName, getBindingIndex() - 1, prefix, suffix);\n }\n return attributeInterpolate1;\n}\n\n\n/**\n * Update
an interpolated attribute on an element with 2 bound values surrounded by text.\n */\n * Used when the value passed
to a property has 2 interpolated values in it:\n *\n * ```html\n * <div attr.title="\n * prefix { {v0} }-\n *
{ {v1} } suffix">\n * </div>\n * ```\n * Its compiled representation is:\n *\n * ```ts\n * attributeInterpolate2('title',
'prefix', v0, '-', v1, 'suffix');\n * ```\n * @param attrName The name of the attribute to update\n * @param prefix
Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value
used for concatenation only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @param sanitizer An optional sanitizer function\n
* @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport function attributeInterpolate2(\n
attrName: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n sanitizer?: SanitizerFn, namespace?:
string): typeof attributeInterpolate2 {\n const IView = getLView();\n const interpolatedValue =
interpolation2(IView, prefix, v0, i0, v1, suffix);\n if (interpolatedValue !== NO_CHANGE) {\n const tNode =
getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer,
namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' +
attrName, getBindingIndex() - 2, prefix, i0, suffix);\n }\n return attributeInterpolate2;\n}\n\n\n/**\n * Update an
interpolated attribute on an element with 3 bound values surrounded by text.\n */\n * Used when the value passed to
a property has 3 interpolated values in it:\n *\n * ```html\n * <div attr.title="\n * prefix { {v0} }- { {v1} }-\n *
{ {v2} } suffix">\n * </div>\n * ```\n * Its compiled representation is:\n *

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{{v2}}suffix"></div>\n
 * ```\n *\n * Its compiled representation is::\n *\n * ```\n * attributeInterpolate3(\n * 'title', 'prefix', v0, '-', v1, '-',
v2, 'suffix');\n * ```\n *\n * @param attrName The name of the attribute to update\n * @param prefix Static value
used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.\n * @param v2 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport function attributeInterpolate3(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any,\n  suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate3 {\n  const IView
= getLView();\n  const interpolatedValue
= interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n  const
tNode = getSelectedTNode();\n  elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer,
namespace);\n  ngDevMode &&\n  storePropertyBindingMetadata(\n    getTView().data, tNode, 'attr.' +
attrName, getBindingIndex() - 3, prefix, i0, i1,\n    suffix);\n  }\n  return attributeInterpolate3;\n }\n\n/**\n *\n * Update an interpolated attribute on an element with 4 bound values surrounded by text.\n *\n * Used when the value
passed to a property has 4 interpolated values in it:\n *\n * ```\n * <div attr.title="prefix{{v0}}-{{v1}}-
{{v2}}-{{v3}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```\n * attributeInterpolate4(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ```\n *\n * @param attrName The name
of the attribute to update\n * @param prefix Static value used
for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n *
@param v3 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param
sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\nexport function attributeInterpolate4(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any, i2: string,\n  v3: any, suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string): typeof
attributeInterpolate4 {\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0,
i0, v1, i1, v2, i2, v3, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n  const tNode =
getSelectedTNode();\n
  elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n  ngDevMode
&&\n  storePropertyBindingMetadata(\n    getTView().data, tNode, 'attr.' + attrName, getBindingIndex() -
4, prefix, i0, i1, i2,\n    suffix);\n  }\n  return attributeInterpolate4;\n }\n\n/**\n *\n * Update an interpolated
attribute on an element with 5 bound values surrounded by text.\n *\n * Used when the value passed to a property
has 5 interpolated values in it:\n *\n * ```\n * <div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```\n * attributeInterpolate5(\n *
'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ```\n *\n * @param attrName The name of the attribute to
update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n *
@param i0 Static value used for concatenation only.\n * @param v1 Value
checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for
change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n *
@param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param suffix
Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so
that it may be chained.\n * @codeGenApi\n
*/\nexport function attributeInterpolate5(\n  attrName: string, prefix:
string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, suffix: string,
sanitizer?: SanitizerFn,\n  namespace?: string): typeof attributeInterpolate5 {\n  const IView = getLView();\n  const
interpolatedValue =\n  interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n  if
(interpolatedValue !== NO_CHANGE) {\n  const tNode = getSelectedTNode();\n
  elementAttributeInternal(tNode,

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    IView, attrName, interpolatedValue, sanitizer, namespace);
    ngDevMode &&
    storePropertyBindingMetadata(
        getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 5, prefix,
        i0, i1, i2,
        i3, suffix);
    }
    return attributeInterpolate5;
}

/**
 * Update an interpolated attribute on an element with 6 bound values surrounded by text.
 * Used when the value passed to a property has 6 interpolated values in it:
 * `html`
 * <div attr.title="prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}suffix"></div>
 * Its compiled representation is:
 * `ts`
 * attributeInterpolate6(
 * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');
 * @param attrName The name of the attribute to update
 * @param prefix Static value used for concatenation only.
 * @param v0 Value checked for change.
 * @param i0 Static value used for concatenation only.
 * @param v1 Value checked for change.
 * @param i1 Static value used for concatenation only.
 * @param v2 Value checked for change.
 * @param i2 Static value used for concatenation only.
 * @param v3 Value checked for change.
 * @param i3 Static value used for concatenation only.
 * @param v4 Value checked for change.
 * @param i4 Static value used for concatenation only.
 * @param v5 Value checked for change.
 * @param suffix Static value used for concatenation only.
 * @param sanitizer An optional sanitizer function
 * @returns itself, so that it may be chained.
 * @codeGenApi
 */
export function attributeInterpolate6(
    attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,
    v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string, sanitizer?: SanitizerFn,
    namespace?: string): typeof attributeInterpolate6 {
    const IView = getLView();
    const interpolatedValue =
        interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);
    if (interpolatedValue !== NO_CHANGE) {
        const tNode = getSelectedTNode();
        elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer,
            namespace);
        ngDevMode &&
        storePropertyBindingMetadata(
            getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 6, prefix, i0, i1, i2,
            i3, i4, suffix);
    }
    return attributeInterpolate6;
}

/**
 * Update an interpolated attribute on an element with 7 bound values surrounded by text.
 * Used when the value passed to a property has 7 interpolated values in it:
 * `html`
 * <div attr.title="prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}suffix"></div>
 * Its compiled representation is:
 * `ts`
 * attributeInterpolate7(
 * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');
 * @param attrName The name of the attribute to update
 * @param prefix Static value used for concatenation only.
 * @param v0 Value checked for change.
 * @param i0 Static value used for concatenation only.
 * @param v1 Value checked for change.
 * @param i1 Static value used for concatenation only.
 * @param v2 Value checked for change.
 * @param i2 Static value used for concatenation only.
 * @param v3 Value checked for change.
 * @param i3 Static value used for concatenation only.
 * @param v4 Value checked for change.
 * @param i4 Static value used for concatenation only.
 * @param v5 Value checked for change.
 * @param i5 Static value used for concatenation only.
 * @param v6 Value checked for change.
 * @param suffix Static value used for concatenation only.
 * @param sanitizer An optional sanitizer function
 * @returns itself, so that it may be chained.
 * @codeGenApi
 */
export function attributeInterpolate7(
    attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string,
    v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string, sanitizer?: SanitizerFn,
    namespace?: string): typeof attributeInterpolate7 {
    const IView = getLView();
    const interpolatedValue =
        interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);
    if (interpolatedValue !== NO_CHANGE) {
        const tNode = getSelectedTNode();
        elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);
        ngDevMode &&
        storePropertyBindingMetadata(
            getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 7, prefix,
            i0, i1, i2,
            i3, i4, i5, suffix);
    }
    return attributeInterpolate7;
}

/**
 * Update an interpolated attribute on an element with 8 bound values surrounded by text.
 * Used when the value passed to a property has 8 interpolated values in it:
 * `html`
 * <div attr.title="prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}-{v7}suffix"></div>

```



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* ```\n *\n * Its compiled representation is::\n *\n * ```\ts\n * attributeInterpolate8(\n * 'title', 'prefix', v0, '-', v1, '-',
v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * ```\n *\n * @param attrName The name of the attribute to
update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n *
@param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1
Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value
used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for
concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation
only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n *
@param v6 Value checked for change.\n * @param
i6 Static value used for concatenation only.\n * @param v7 Value checked for change.\n * @param suffix Static
value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it
may be chained.\n * @codeGenApi\n * ^\nexport function attributeInterpolate8(\n  attrName: string, prefix: string,
v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, i5: string,
v6: any, i6: string, v7: any,\n  suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof
attributeInterpolate8 {\n  const IView = getLView();\n  const interpolatedValue = interpolation8(\n    IView, prefix,
v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n  const
tNode = getSelectedTNode();\n  elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer,
namespace);\n  ngDevMode &&\n    storePropertyBindingMetadata(\n      getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 8, prefix, i0, i1, i2,\n      i3, i4, i5, i6,
suffix);\n  }\n  return attributeInterpolate8;\n}\n\n/**\n * Update an interpolated attribute on an element with 9 or
more bound values surrounded by text.\n * \n * Used when the number of interpolated values exceeds 8.\n *\n * ```\html\n * <div\n * title=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-
{{v9}}suffix\"\n * ></div>\n * ```\n *\n * Its compiled representation is::\n *\n * ```\ts\n * attributeInterpolateV(\n * 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n * 'suffix'];\n * @param
attrName The name of the attribute to update.\n * @param values The collection of values and the strings in-
between those values, beginning with\n * a string prefix and ending with a string suffix.\n * (e.g. `[prefix', value0, '-
', value1, '-', value2, ..., value99, 'suffix']`)\n
*\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n *
@codeGenApi\n * ^\nexport function attributeInterpolateV(\n  attrName: string, values: any[], sanitizer?:
SanitizerFn,\n  namespace?: string): typeof attributeInterpolateV {\n  const IView = getLView();\n  const
interpolated = interpolationV(IView, values);\n  if (interpolated !== NO_CHANGE) {\n  const tNode =
getSelectedTNode();\n  elementAttributeInternal(tNode, IView, attrName, interpolated, sanitizer, namespace);\n
if (ngDevMode) {\n  const interpolationInBetween = [values[0]]; // prefix\n    for (let i = 2; i < values.length; i
+= 2) {\n  interpolationInBetween.push(values[i]);\n  }\n  storePropertyBindingMetadata(\n    getTView().data, tNode, 'attr.' + attrName,\n    getBindingIndex() - interpolationInBetween.length + 1,
...interpolationInBetween);\n  }\n  }\n  return attributeInterpolateV;\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
*\n * found in the LICENSE file at https://angular.io/license\n *\nimport {getComponentViewByInstance} from
'./context_discovery';\nimport {TVIEW} from './interfaces/view';\nimport {detectChangesInternal} from
'./shared';\n\n/**\n * Synchronously perform change detection on a component (and possibly its sub-components).\n
*\n * This function triggers change detection in a synchronous way on a component.\n *\n * @param component
The component which the change detection should be performed on.\n *\nexport function
detectChanges(component: {}): void {\n  const view = getComponentViewByInstance(component);\n  detectChangesInternal(view[TVIEW], view, component);\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nimport
{assertFirstCreatePass} from './assert';\nimport {attachPatchData} from './context_discovery';\nimport
{registerPostOrderHooks} from './hooks';\nimport {ComponentTemplate} from './interfaces/definition';\nimport

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{LocalRefExtractor, TAttributes, TContainerNode, TNodeType} from './interfaces/node';\nimport
{isDirectiveHost} from './interfaces/type_checks';\nimport {HEADER_OFFSET, LView, RENDERER, TView,
TViewType} from './interfaces/view';\nimport {appendChild} from './node_manipulation';\nimport {getLView,
getTView, setCurrentTNode} from './state';\nimport {getConstant} from './util/view_utils';\nimport
{addToViewTree, createDirectivesInstances, createLContainer, createTView, getOrCreateTNode, resolveDirectives,
saveResolvedLocalsInData} from './shared';\n\n\nfunction templateFirstCreatePass(\n  index: number, tView:
TView, IView: LView, templateFn: ComponentTemplate<any>|null,\n  decls: number, vars: number, tagName?:
string|null, attrsIndex?: number|null,\n
  localRefsIndex?: number|null): TContainerNode {\n  ngDevMode && assertFirstCreatePass(tView);\n  ngDevMode && ngDevMode.firstCreatePass++;\n  const tViewConsts = tView.consts;\n  // TODO(pk): refactor
getOrCreateTNode to have the \"create\" only version\n  const tNode = getOrCreateTNode(\n    tView, index,
TNodeType.Container, tagName || null,\n    getConstant<TAttributes>(tViewConsts, attrsIndex));\n\n  resolveDirectives(tView, IView, tNode, getConstant<string[]>(tViewConsts, localRefsIndex));\n
  registerPostOrderHooks(tView, tNode);\n\n  const embeddedTView = tNode.tViews = createTView(\n
    TViewType.Embedded, tNode, templateFn, decls, vars, tView.directiveRegistry,\n    tView.pipeRegistry, null,
tView.schemas, tViewConsts);\n\n  if (tView.queries !== null) {\n    tView.queries.template(tView, tNode);\n
    embeddedTView.queries = tView.queries.embeddedTView(tNode);\n  }\n\n  return tNode;\n}\n\n/**\n * Creates an
LContainer for an ng-template (dynamically-inserted view), e.g.\n
  *\n * <ng-template #foo>\n *   <div></div>\n * </ng-template>\n * @param index The index of the container
in the data array\n * @param templateFn Inline template\n * @param decls The number of nodes, local refs, and
pipes for this template\n * @param vars The number of bindings for this template\n * @param tagName The name
of the container element, if applicable\n * @param attrsIndex Index of template attributes in the `const` array.\n *
  * @param localRefs Index of the local references in the `const` array.\n * @param localRefExtractor A function
which extracts local-refs values from the template.\n *   Defaults to the current element associated with the local-
ref.\n *\n * @codeGenApi\n */\nexport function template(\n  index: number, templateFn:
ComponentTemplate<any>|null, decls: number, vars: number,\n  tagName?: string|null, attrsIndex?: number|null,
localRefsIndex?: number|null,\n  localRefExtractor?: LocalRefExtractor) {\n  const IView = getLView();\n  const
tView = getTView();\n  const adjustedIndex = index + HEADER_OFFSET;\n\n  const tNode =
tView.firstCreatePass ? templateFirstCreatePass(\n
    adjustedIndex, tView, IView,
templateFn, decls, vars,\n
    tagName, attrsIndex, localRefsIndex) :\n
    tView.data[adjustedIndex] as TContainerNode;\n  setCurrentTNode(tNode, false);\n\n  const comment =
IView[RENDERER].createComment(ngDevMode ? 'container' : '');\n  appendChild(tView, IView, comment,
tNode);\n  attachPatchData(comment, IView);\n\n  addToViewTree(IView, IView[adjustedIndex] =
createLContainer(comment, IView, comment, tNode));\n\n  if (isDirectiveHost(tNode)) {\n
    createDirectivesInstances(tView, IView, tNode);\n  }\n\n  if (localRefsIndex !== null) {\n
    saveResolvedLocalsInData(IView, tNode, localRefExtractor);\n  }\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport {HEADER_OFFSET, LView, TView} from './interfaces/view';\nimport {getContextLView} from
 './state';\nimport {load} from './util/view_utils';\n\n\n/** Store a value in the `data` at a given `index`. */\nexport
function store<T>(tView: TView, IView: LView, index: number, value: T): void {\n  // We don't store any static
data for local variables, so the first time\n  // we see the template, we should store as null to avoid a sparse array\n
  if (index >= tView.data.length) {\n    tView.data[index] = null;\n    tView.blueprint[index] = null;\n  }\n  IView[index]
= value;\n}\n\n\n/** Retrieves a local reference from the current contextViewData.\n *\n * If the reference to
retrieve is in a parent view, this instruction is used in conjunction\n * with a nextContext() call, which walks up the
tree and updates the contextViewData instance.\n *\n * @param index The index of
the local ref in contextViewData.\n *\n * @codeGenApi\n */\nexport function reference<T>(index: number) {\n
  const contextLView = getContextLView();\n  return load<T>(contextLView, HEADER_OFFSET +

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index);\n}\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n \*\nimport { bindingUpdated } from './bindings';\nimport { TNode } from './interfaces/node';\nimport { SanitizerFn } from './interfaces/sanitization';\nimport { LView, RENDERER, TView } from './interfaces/view';\nimport { getLView, getSelectedTNode, getTView, nextBindingIndex } from './state';\nimport { elementPropertyInternal, setInputsForProperty, storePropertyBindingMetadata } from './shared';\n\n/\*\*\n \* Update a property on a selected element.\n \*\n \* Operates on the element selected by index via the { @link select } instruction.\n \*\n \* If the property name also exists as

an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled\n \*\n \* @param propName Name of property. Because it is going to DOM, this is not subject to\n \* renaming as part of minification.\n \* @param value New value to write.\n \* @param sanitizer An optional function used to sanitize the value.\n \* @returns This function returns itself so that it may be chained\n \* (e.g.

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`property('name', ctx.name)(`title`, ctx.title)`)\n *\n * @codeGenApi\n */\nexport function property<T>(\n  propName: string, value: T, sanitizer?: SanitizerFn|null): typeof property {\n  const lView = getLView();\n  const bindingIndex = nextBindingIndex();\n  if (bindingUpdated(lView, bindingIndex, value)) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, lView, propName, value, lView[RENDERER], sanitizer, false);\n    ngDevMode && storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n  }\n  return property;\n}\n\n/**\n * Given `

` and `MyDir` with `@Input('style')` we need to write to\n * directive input.\n *\n * @export function setDirectiveInputsWhichShadowsStyling(\n  tView: TView, tNode: TNode, lView: LView, value: any, isClassBased: boolean) {\n  const inputs = tNode.inputs!;\n  const property = isClassBased ? 'class' : 'style';\n  // We support both 'class' and `className` hence the fallback.\n  setInputsForProperty(tView, lView, inputs[property], property, value);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport { assertDefined, assertEqual, assertIndexInRange } from './util/assert';\nimport { assertFirstCreatePass, assertHasParent } from './assert';\nimport { attachPatchData } from './context_discovery';\nimport { registerPostOrderHooks } from './hooks';\nimport { hasClassInput, hasStyleInput, TAttributes, TElementNode, TNodeFlags, TNodeType } from './interfaces/node';\nimport { RElement } from './interfaces/renderer_dom';\nimport { isContentQueryHost, isDirectiveHost } from './interfaces/type_checks';\nimport { HEADER_OFFSET, LView, RENDERER, TView } from './interfaces/view';\nimport { assertTNodeType } from './node_assert';\nimport { appendChild, createElementNode, writeDirectClass, writeDirectStyle } from './node_manipulation';\nimport { decreaseElementDepthCount, getBindingIndex, getCurrentTNode, getElementDepthCount, getLView, getNamespace, getTView, increaseElementDepthCount, isCurrentTNodeParent, setCurrentTNode, setCurrentTNodeAsNotParent } from './state';\nimport { computeStaticStyling } from './styling/static_styling';\nimport { setUpAttributes } from './util/attrs_utils';\nimport { getConstant } from './util/view_utils';\nimport { validateElementIsKnown } from './element_validation';\nimport { setDirectiveInputsWhichShadowsStyling } from './property';\nimport { createDirectivesInstances, executeContentQueries, getOrCreateTNode, resolveDirectives, saveResolvedLocalsInData } from './shared';\n\nfunction elementStartFirstCreatePass(\n  index: number, tView: TView, lView: LView, native: RElement, name: string,\n  attrsIndex?: number|null, localRefsIndex?: number): TElementNode {\n  ngDevMode && assertFirstCreatePass(tView);\n  ngDevMode && ngDevMode.firstCreatePass++;\n\n  const tViewConsts = tView.consts;\n  const attrs = getConstant<TAttributes>(tViewConsts, attrsIndex);\n  const tNode = getOrCreateTNode(tView, index, TNodeType.Element, name, attrs);\n\n  const hasDirectives =\n    resolveDirectives(tView, lView, tNode, getConstant<string[]>(tViewConsts, localRefsIndex));\n  if (ngDevMode) {\n    validateElementIsKnown(native, lView, tNode.value, tView.schemas, hasDirectives);\n  }\n}


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    }\n\n if (tNode.attrs !== null) {\n  computeStaticStyling(tNode, tNode.attrs, false);\n }\n\n if
(tNode.mergedAttrs !== null) {\n  computeStaticStyling(tNode, tNode.mergedAttrs, true);\n }\n\n if
(tView.queries !== null) {\n  tView.queries.elementStart(tView, tNode);\n }\n\n return tNode;\n}\n\n/**\n *
Create DOM element. The instruction must later be followed by `elementEnd()` call.\n *\n * @param index Index of
the element in the LView array\n * @param name Name of the DOM Node\n * @param attrsIndex Index of the
element's attributes in the `consts` array.\n * @param localRefsIndex Index of the element's local references in the
`consts` array.\n * @returns This function returns itself so that it may be chained.\n *\n * Attributes and localRefs
are passed as an array of strings where elements with an even index\n * hold an attribute name and elements with an
odd index hold an attribute value, ex.: \n * ['id', 'warning5', 'class', 'alert']\n *\n * @codeGenApi\n
*/\n\nexport function elementStart(\n  index: number, name: string, attrsIndex?: number|null,\n  localRefsIndex?:
number): typeof elementStart {\n  const lView = getLView();\n  const tView = getTView();\n  const adjustedIndex =
HEADER_OFFSET + index;\n\n  ngDevMode &&\n    assertEquals(\n      getBindingIndex(),
tView.bindingStartIndex,\n      'elements should be created before any bindings');\n  ngDevMode &&
assertIndexInRange(lView, adjustedIndex);\n\n  const renderer = lView[RENDERER];\n  const native =
lView[adjustedIndex] = createElementNode(renderer, name, getNamespace());\n  const tNode =
tView.firstCreatePass ?\n    elementStartFirstCreatePass(\n      adjustedIndex, tView, lView, native, name,
attrsIndex, localRefsIndex) :\n    tView.data[adjustedIndex] as TElementNode;\n  setCurrentTNode(tNode,
true);\n\n  const mergedAttrs = tNode.mergedAttrs;\n  if (mergedAttrs !== null) {\n    setUpAttributes(renderer,
native, mergedAttrs);\n  }\n\n  const classes =
tNode.classes;\n  if (classes !== null) {\n    writeDirectClass(renderer, native, classes);\n  }\n\n  const styles =
tNode.styles;\n  if (styles !== null) {\n    writeDirectStyle(renderer, native, styles);\n  }\n\n  if ((tNode.flags &
TNodeFlags.isDetached) !== TNodeFlags.isDetached) {\n    // In the i18n case, the translation may have removed
this element, so only add it if it is not\n    // detached. See `TNodeType.Placeholder` and `LFrame.inI18n` for more
context.\n    appendChild(tView, lView, native, tNode);\n  }\n\n  // any immediate children of a component or
template container must be pre-emptively\n  // monkey-patched with the component view data so that the element
can be inspected\n  // later on using any element discovery utility methods (see `element_discovery.ts`)\n  if
(getElementDepthCount() === 0) {\n    attachPatchData(native, lView);\n  }\n  increaseElementDepthCount();\n\n\n  if
(isDirectiveHost(tNode)) {\n    createDirectivesInstances(tView, lView, tNode);\n\n    executeContentQueries(tView,
tNode, lView);\n  }\n  if (localRefsIndex !== null) {\n    saveResolvedLocalsInData(lView, tNode);\n  }\n  return
elementStart;\n}\n\n/**\n * Mark the end of the element.\n *\n * @returns This function returns itself so that it may be
chained.\n *\n * @codeGenApi\n */\n\nexport function elementEnd(): typeof elementEnd {\n  let currentTNode =
getCurrentTNode();\n  ngDevMode && assertDefined(currentTNode, 'No parent node to close.);\n  if
(isCurrentTNodeParent()) {\n    setCurrentTNodeAsNotParent();\n  } else {\n    ngDevMode &&
assertHasParent(getCurrentTNode());\n    currentTNode = currentTNode.parent!;\n\n    setCurrentTNode(currentTNode, false);\n  }\n\n  const tNode = currentTNode;\n  ngDevMode &&
assertTNodeType(tNode, TNodeType.AnyRNode);\n\n  decreaseElementDepthCount();\n\n  const tView =
getTView();\n  if (tView.firstCreatePass) {\n    registerPostOrderHooks(tView, currentTNode);\n  }\n  if
(isContentQueryHost(currentTNode)) {\n    tView.queries!.elementEnd(currentTNode);\n\n    }\n  }\n\n  if (tNode.classesWithoutHost != null && hasClassInput(tNode)) {\n\n    setDirectiveInputsWhichShadowsStyling(tView, tNode, getLView(), tNode.classesWithoutHost, true);\n  }\n\n  if
(tNode.stylesWithoutHost != null && hasStyleInput(tNode)) {\n    setDirectiveInputsWhichShadowsStyling(tView,
tNode, getLView(), tNode.stylesWithoutHost, false);\n  }\n\n  return elementEnd;\n}\n\n/**\n * Creates an empty
element using { @link elementStart } and { @link elementEnd }\n *\n * @param index Index of the element in the
data array\n * @param name Name of the DOM Node\n * @param attrsIndex Index of the element's attributes in the
`consts` array.\n * @param localRefsIndex Index of the element's local references in the `consts` array.\n * @returns
This function returns itself so that it may be chained.\n *\n * @codeGenApi\n */\n\nexport function element(\n
index: number, name: string, attrsIndex?: number|null,\n  localRefsIndex?: number): typeof element {\n

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elementStart(index,
  name, attrsIndex, localRefsIndex);\n elementEnd();\n return element;\n}\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\nimport {assertEqual, assertIndexInRange} from
'./../util/assert';\nimport {assertHasParent} from './assert';\nimport {attachPatchData} from
'./context_discovery';\nimport {registerPostOrderHooks} from './hooks';\nimport {TAttributes,
TElementContainerNode, TNodeType} from './interfaces/node';\nimport {isContentQueryHost, isDirectiveHost}
from './interfaces/type_checks';\nimport {HEADER_OFFSET, LView, RENDERER, TView} from
'./interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {appendChild} from
'./node_manipulation';\nimport {getBindingIndex, getCurrentTNode, getLView, getTView, isCurrentTNodeParent,
setCurrentTNode, setCurrentTNodeAsNotParent} from './state';\nimport
{computeStaticStyling} from './styling/static_styling';\nimport {getConstant} from './util/view_utils';\n\nimport
{createDirectivesInstances, executeContentQueries, getOrCreateTNode, resolveDirectives,
saveResolvedLocalsInData} from './shared';\n\nfunction elementContainerStartFirstCreatePass(\n  index: number,
tView: TView, lView: LView, attrsIndex?: number|null,\n  localRefsIndex?: number): TElementContainerNode
{\n  ngDevMode && ngDevMode.firstCreatePass++;\n  const tViewConsts = tView.consts;\n  const attrs =
getConstant<TAttributes>(tViewConsts, attrsIndex);\n  const tNode = getOrCreateTNode(tView, index,
TNodeType.ElementContainer, 'ng-container', attrs);\n  // While ng-container doesn't necessarily support styling,
we use the style context to identify\n  // and execute directives on the ng-container.\n  if (attrs !== null) {\n
computeStaticStyling(tNode, attrs, true);\n  }\n  const localRefs = getConstant<string[]>(tViewConsts,
localRefsIndex);\n
  resolveDirectives(tView, lView, tNode, localRefs);\n  if (tView.queries !== null) {\n
tView.queries.elementStart(tView, tNode);\n  }\n  return tNode;\n}\n\n/**\n * Creates a logical container for other
nodes (<ng-container>) backed by a comment node in the DOM.\n * The instruction must later be followed by
`elementContainerEnd()` call.\n * @param index Index of the element in the LView array\n * @param
attrsIndex Index of the container attributes in the `consts` array.\n * @param localRefsIndex Index of the container's
local references in the `consts` array.\n * @returns This function returns itself so that it may be chained.\n *\n * Even if this instruction accepts a set of attributes no actual attribute values are propagated to\n * the DOM (as a
comment node can't have attributes). Attributes are here only for directive\n * matching purposes and setting initial
inputs of directives.\n *\n * @codeGenApi\n */\nexport function elementContainerStart(\n  index: number,
attrsIndex?:
  number|null,\n  localRefsIndex?: number): typeof elementContainerStart {\n  const lView = getLView();\n  const
tView = getTView();\n  const adjustedIndex = index + HEADER_OFFSET;\n  ngDevMode &&
assertIndexInRange(lView, adjustedIndex);\n  ngDevMode &&\n  assertEquals(\n    getBindingIndex(),
tView.bindingStartIndex,\n    `element containers should be created before any bindings`);\n  const tNode =
tView.firstCreatePass ?\n    elementContainerStartFirstCreatePass(\n      adjustedIndex, tView, lView, attrsIndex,
localRefsIndex) :\n    tView.data[adjustedIndex] as TElementContainerNode;\n  setCurrentTNode(tNode, true);\n  ngDevMode && ngDevMode.rendererCreateComment++;\n  const native = lView[adjustedIndex] =\n
lView[RENDERER].createComment(ngDevMode ? 'ng-container' : '');\n  appendChild(tView, lView, native,
tNode);\n  attachPatchData(native, lView);\n  if (isDirectiveHost(tNode)) {\n    createDirectivesInstances(tView,
lView, tNode);\n
    executeContentQueries(tView, tNode, lView);\n  }\n  if (localRefsIndex !== null) {\n
saveResolvedLocalsInData(lView, tNode);\n  }\n  return elementContainerStart;\n}\n\n/**\n * Mark the end of the
<ng-container>.\n * @returns This function returns itself so that it may be chained.\n *\n * @codeGenApi\n
*/\nexport function elementContainerEnd(): typeof elementContainerEnd {\n  let currentTNode =
getCurrentTNode();\n  const tView = getTView();\n  if (isCurrentTNodeParent()) {\n
setCurrentTNodeAsNotParent();\n  } else {\n    ngDevMode && assertHasParent(currentTNode);\n    currentTNode
= currentTNode.parent!\n    setCurrentTNode(currentTNode, false);\n  }\n  ngDevMode &&

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assertTNodeType(currentTNode, TNodeType.ElementContainer);\n\n if (tView.firstCreatePass) {\n
registerPostOrderHooks(tView, currentTNode);\n\n if (isContentQueryHost(currentTNode)) {\n
tView.queries!.elementEnd(currentTNode);\n\n }\n\n return elementContainerEnd;\n\n}\n\n/**\n * Creates
an empty logical container using { @link elementContainerStart}\n * and { @link elementContainerEnd}\n *\n * @param index Index of the element in the LView array\n * @param attrsIndex Index of the container attributes in
the `const` array.\n * @param localRefsIndex Index of the container's local references in the `const` array.\n *
@returns This function returns itself so that it may be chained.\n *\n * @codeGenApi\n */\n\nexport function
elementContainer(\n\n  index: number, attrsIndex?: number|null, localRefsIndex?: number): typeof elementContainer
{\n\n  elementContainerStart(index, attrsIndex, localRefsIndex);\n\n  elementContainerEnd();\n\n  return
elementContainer;\n\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport { OpaqueViewState } from './interfaces/view';\n\nimport { getLView } from
'./state';\n\n/**\n * Returns the current OpaqueViewState instance.\n *\n * Used in conjunction with the restoreView() instruction to
save a snapshot\n * of the current view and restore it when listeners are invoked. This allows\n * walking the
declaration view tree in listeners to get vars from parent views.\n *\n * @codeGenApi\n */\n\nexport function
getCurrentView(): OpaqueViewState {\n\n  return getLView() as any as OpaqueViewState;\n\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { Observable, Subscriber }
from 'rxjs';\n\n/**\n * Determine if the argument is shaped like a Promise\n */\n\nexport function isPromise<T =
any>(obj: any): obj is Promise<T> {\n\n  // allow any Promise/A+ compliant thenable.\n  // It's up to the caller to
ensure that obj.then conforms to the spec\n\n  return !!obj && typeof obj.then === 'function';\n\n}\n\n/**\n * Determine if the argument is a Subscriber\n */\n\nexport function isSubscribable(obj: any|Subscriber<any>):
obj is Subscriber<any> {\n\n  return !!obj && typeof obj.subscribe === 'function';\n\n}\n\n/**\n * Determine if the
argument is an Observable\n *\n * Strictly this tests that the `obj` is `Subscriber`, since `Observable` types
need additional methods, such as `lift()`. But it is adequate for our\n * needs since within the Angular framework
code we only ever need to use the\n * `subscribe()` method, and RxJS has mechanisms to wrap `Subscriber`
objects\n * into `Observable` as needed.\n */\n\nexport const isObservable = (\n\n  isSubscribable as ((obj:
any|Observable<any>) => obj is Observable<any>);\n\n), "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport { assertIndexInRange } from './util/assert';\n\nimport
{ isObservable }
from './util/lang';\n\nimport { PropertyAliasValue, TNode, TNodeFlags, TNodeType } from
'./interfaces/node';\n\nimport { GlobalTargetResolver, Renderer } from './interfaces/renderer';\n\nimport { RElement }
from './interfaces/renderer_dom';\n\nimport { isDirectiveHost } from './interfaces/type_checks';\n\nimport { CLEANUP,
CONTEXT, LView, RENDERER, TView } from './interfaces/view';\n\nimport { assertTNodeType } from
'./node_assert';\n\nimport { profiler, ProfilerEvent } from './profiler';\n\nimport { getCurrentDirectiveDef,
getCurrentTNode, getLView, getTView } from './state';\n\nimport { getComponentLViewByIndex,
getNativeByTNode, unwrapRNode } from './util/view_utils';\n\nimport { getOrCreateLViewCleanup,
getOrCreateTViewCleanup, handleError, loadComponentRenderer, markViewDirty } from './shared';\n\n}\n\n/**\n *
Adds an event listener to the current node.\n *\n * If an output exists on one of the node's directives, it also
subscribes to the output\n * and saves the subscription for later cleanup.\n\n *\n * @param eventName Name of the event\n * @param listenerFn The function to be called when event emits\n\n * @param useCapture Whether or not to use capture in event listener\n * @param eventTargetResolver Function
that returns global target information in case this listener\n * should be attached to a global object like window,
document or body\n *\n * @codeGenApi\n */\n\nexport function listener(\n\n  eventName: string, listenerFn: (e?: any)
=> any, useCapture?: boolean,\n\n  eventTargetResolver?: GlobalTargetResolver): typeof listener {\n\n  const lView =
getLView<{}|null>();\n\n  const tView = getTView();\n\n  const tNode = getCurrentTNode(!);\n\n  listenerInternal(\n

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tView, IView, IView[RENDERER], tNode, eventName, listenerFn, !!useCapture, \n    eventTargetResolver); \n
return listener; \n} \n \n /** \n * Registers a synthetic host listener (e.g. `@foo.start`) on a component or directive. \n
*\n * This instruction is for compatibility purposes and is designed to ensure that a \n
*\n * synthetic host listener (e.g. `@HostListener('@foo.start')`) properly gets rendered \n * in the component's renderer.
Normally all host listeners are evaluated with the \n * parent component's renderer, but, in the case of animation
@triggers, they need \n * to be evaluated with the sub component's renderer (because that's where the \n * animation
triggers are defined). \n * \n * Do not use this instruction as a replacement for `listener`. This instruction \n * only
exists to ensure compatibility with the ViewEngine's host binding behavior. \n * \n * @param eventName Name of
the event \n * @param listenerFn The function to be called when event emits \n * @param useCapture Whether or
not to use capture in event listener \n * @param eventTargetResolver Function that returns global target information
in case this listener \n * should be attached to a global object like window, document or body \n * \n *
@codeGenApi \n * ^\nexport function syntheticHostListener(\n    eventName: string, listenerFn: (e?:
any) => any): typeOf syntheticHostListener { \n    const tNode = getCurrentTNode(); \n    const IView =
getLView<{}|null>(); \n    const tView = getTView(); \n    const currentDef = getCurrentDirectiveDef(tView.data); \n
const renderer = loadComponentRenderer(currentDef, tNode, IView); \n    listenerInternal(tView, IView, renderer,
tNode, eventName, listenerFn, false); \n    return syntheticHostListener; \n} \n \n /** \n * A utility function that checks if
a given element has already an event handler registered for an \n * event with a specified name. The TView.cleanup
data structure is used to find out which events \n * are registered for a given element. \n * \nfunction
findExistingListener(\n    tView: TView, IView: LView, eventName: string, tNodeIdx: number): ((e?: any) =>
any)|null { \n    const tCleanup = tView.cleanup; \n    if (tCleanup != null) { \n        for (let i = 0; i < tCleanup.length - 1; i
+= 2) { \n            const cleanupEventName = tCleanup[i]; \n            if (cleanupEventName === eventName && tCleanup[i
+ 1] === tNodeIdx) { \n                // We have found a matching event name on the same node but it might not have
been \n                // registered yet, so we must explicitly verify entries in the LView cleanup data \n                // structures. \n
const lCleanup = IView[CLEANUP]!; \n                const listenerIdxInLCleanup = tCleanup[i + 2]; \n                return
lCleanup.length > listenerIdxInLCleanup ? lCleanup[listenerIdxInLCleanup] : null; \n            } \n            // TView.cleanup
can have a mix of 4-elements entries (for event handler cleanups) or \n            // 2-element entries (for directive and
queries destroy hooks). As such we can encounter \n            // blocks of 4 or 2 items in the tView.cleanup and this is why
we iterate over 2 elements \n            // first and jump another 2 elements if we detect listeners cleanup (4 elements). Also
check \n            // documentation of TView.cleanup for more details of this data structure layout. \n            if (typeOf
cleanupEventName === 'string') { \n                i += 2; \n            } \n        } \n    } \n    return null; \n} \n \nfunction listenerInternal(\n    tView: TView, IView: LView<{}|null>, renderer: Renderer, tNode:
TNode, eventName: string, \n    listenerFn: (e?: any) => any, useCapture: boolean, \n    eventTargetResolver?:
GlobalTargetResolver): void { \n    const isTNodeDirectiveHost = isDirectiveHost(tNode); \n    const firstCreatePass =
tView.firstCreatePass; \n    const tCleanup: false|any[] = firstCreatePass && getOrCreateTViewCleanup(tView); \n
const context = IView[CONTEXT]; \n    // When the listener instruction was generated and is executed we know
that there is either a \n    // native listener or a directive output on this element. As such we we know that we will have
to \n    // register a listener and store its cleanup function on LView. \n    const lCleanup =
getOrCreateLViewCleanup(IView); \n    ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode |
TNodeType.AnyContainer); \n    let processOutputs = true; \n    // Adding a native event listener is applicable
when: \n    // - The corresponding
TNode represents a DOM element. \n    // - The event target has a resolver (usually resulting in a global object, \n    //
such as `window` or `document`). \n    if ((tNode.type & TNodeType.AnyRNode) || eventTargetResolver) { \n        const
native = getNativeByTNode(tNode, IView) as RElement; \n        const target = eventTargetResolver ?
eventTargetResolver(native) : native; \n        const lCleanupIndex = lCleanup.length; \n        const idxOrTargetGetter =
eventTargetResolver ? \n            (_IView: LView) => eventTargetResolver(unwrapRNode(_IView[tNode.index])) : \n
tNode.index; \n        // In order to match current behavior, native DOM event listeners must be added for all \n        //
events (including outputs). \n        // There might be cases where multiple directives on the same element try to
register an event \n        // handler function for the same event. In this situation we want to avoid registration of \n        //

```

```

several native listeners as each registration would be intercepted by NgZone and
// trigger
change detection. This would mean that a single user action would result in several
// change detections being
invoked. To avoid this situation we want to have only one call to
// native handler registration (for the same
element and same type of event).\n //\n // In order to have just one native event handler in presence of multiple
handler functions,\n // we just register a first handler function as a native event listener and then chain
//
(coalesce) other handler functions on top of the first native handler function.\n let existingListener = null;\n //
Please note that the coalescing described here doesn't happen for events specifying an
// alternative target (ex.
(document:click)) - this is to keep backward compatibility with the
// view engine.\n // Also, we don't have to
search for existing listeners if there are no directives
// matching on a given node as we can't register multiple
event handlers for the same event in
\n
// a template (this would mean having duplicate attributes).\n if (!eventTargetResolver &&
isTNodeDirectiveHost) {\n existingListener = findExistingListener(tView, IView, eventName, tNode.index);\n
}\n if (existingListener !== null) {\n // Attach a new listener to coalesced listeners list, maintaining the order in
which
// listeners are registered. For performance reasons, we keep a reference to the last
// listener in that
list (in `__ngLastListenerFn__` field), so we can avoid going through
// the entire set each time we need to add
a new listener.\n const lastListenerFn = (<any>existingListener).__ngLastListenerFn__ || existingListener;\n
lastListenerFn.__ngNextListenerFn__ = listenerFn;\n (<any>existingListener).__ngLastListenerFn__ =
listenerFn;\n processOutputs = false;\n } else {\n listenerFn = wrapListener(tNode, IView, context,
listenerFn, false /** preventDefault */);\n const cleanupFn = renderer.listen(target
as RElement, eventName, listenerFn);\n ngDevMode && ngDevMode.rendererAddEventListener++;\n\n
ICleanup.push(listenerFn, cleanupFn);\n tCleanup && tCleanup.push(eventName, idxOrTargetGetter,
ICleanupIndex, ICleanupIndex + 1);\n }\n\n } else {\n // Even if there is no native listener to add, we still need
to wrap the listener so that OnPush
// ancestors are marked dirty when an event occurs.\n listenerFn =
wrapListener(tNode, IView, context, listenerFn, false /** preventDefault */);\n }\n\n // subscribe to directive
outputs\n const outputs = tNode.outputs;\n let props: PropertyAliasValue|undefined;\n if (processOutputs &&
outputs !== null && (props = outputs[eventName])) {\n const propsLength = props.length;\n if (propsLength)
{\n for (let i = 0; i < propsLength; i += 2) {\n const index = props[i] as number;\n ngDevMode &&
assertIndexInRange(IView, index);\n const minifiedName = props[i + 1];\n const directiveInstance
= IView[index];\n const output = directiveInstance[minifiedName];\n\n if (ngDevMode &&
!isObservable(output)) {\n throw new Error(`@Output ${minifiedName} not initialized in '${\n
directiveInstance.constructor.name}'`);\n }\n\n const subscription = output.subscribe(listenerFn);\n
const idx = ICleanup.length;\n ICleanup.push(listenerFn, subscription);\n tCleanup &&
tCleanup.push(eventName, tNode.index, idx, -(idx + 1));\n }\n }\n }\n\n\nfunction
executeListenerWithErrorHandling(\n IView: LView, context: {}|null, listenerFn: (e?: any) => any, e: any):
boolean {\n try {\n profiler(ProfilerEvent.OutputStart, context, listenerFn);\n // Only explicitly returning false
from a listener should preventDefault\n return listenerFn(e) !== false;\n } catch (error) {\n handleError(IView,
error);\n return false;\n } finally {\n profiler(ProfilerEvent.OutputEnd, context, listenerFn);\n
}\n}\n\n/**\n * Wraps an event listener with a function that marks ancestors dirty and prevents default behavior,\n
* if applicable.\n * @param tNode The TNode associated with this listener\n * @param IView The LView that
contains this listener\n * @param listenerFn The listener function to call\n * @param wrapWithPreventDefault
Whether or not to prevent default behavior\n * (the procedural renderer does this already, so in those cases, we
should skip)\n */\nfunction wrapListener(\n tNode: TNode, IView: LView<{}|null>, context: {}|null, listenerFn:
(e?: any) => any,\n wrapWithPreventDefault: boolean): EventListener {\n // Note: we are performing most of the
work in the listener function itself\n // to optimize listener registration.\n return function
wrapListenerIn_markDirtyAndPreventDefault(e: any) {\n // Ivy uses `Function` as a special token that allows us to
unwrap the function\n // so that it can be invoked programmatically by `DebugNode.triggerEventHandler`\n
if (e === Function) {\n return listenerFn;\n }\n\n // In order to be backwards compatible with View Engine,
events on component host nodes\n // must also mark the component view itself dirty (i.e. the view that it owns).\n

```



```

const startView = tNode.flags & TNodeFlags.isComponentHost ?\n    getComponentLViewByIndex(tNode.index,
IView) :\n    IView;\n markViewDirty(startView);\n\n let result = executeListenerWithErrorHandling(IView,
context, listenerFn, e);\n // A just-invoked listener function might have coalesced listeners so we need to check
for\n // their presence and invoke as needed.\n let nextListenerFn =
(<any>wrapListenerIn_markDirtyAndPreventDefault).__ngNextListenerFn__;\n while (nextListenerFn) {\n //
We should prevent default if any of the listeners explicitly return false\n    result =
executeListenerWithErrorHandling(IView, context, nextListenerFn, e) && result;\n    nextListenerFn =
(<any>nextListenerFn).__ngNextListenerFn__;\n
    }\n\n if (wrapWithPreventDefault && result === false) {\n    e.preventDefault();\n    // Necessary for legacy
browsers that don't support preventDefault (e.g. IE)\n    e.returnValue = false;\n  }\n\n return result;\n
};\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nexport {namespaceHTML, namespaceMathML, namespaceSVG} from './state';\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {nextContextImpl} from
'./state';\n\n/**\n * Retrieves a context at the level specified and saves it as the global, contextViewData.\n * Will
get the next level up if level is not specified.\n *\n * This is used to save contexts of parent
views so they can be bound in embedded views, or\n * in conjunction with reference() to bind a ref from a parent
view.\n *\n * @param level The relative level of the view from which to grab context compared to
contextViewData\n * @returns context\n *\n * @codeGenApi\n */\n\nexport function nextContext<T = any>(level:
number = 1): T {\n  return nextContextImpl(level);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {newArray} from './util/array_utils';\nimport {TAttributes,
TElementNode, TNode, TNodeFlags, TNodeType} from './interfaces/node';\nimport {ProjectionSlots} from
'./interfaces/projection';\nimport {DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, T_HOST} from
'./interfaces/view';\nimport {applyProjection} from './node_manipulation';\nimport {getProjectAsAttrValue,
isNodeMatchingSelectorList, isSelectorInSelectorList}
from './node_selector_matcher';\nimport {getLView, getTView, setCurrentTNodeAsNotParent} from
'./state';\nimport {getOrCreateTNode} from './shared';\n\n\n/**\n * Checks a given node against matching
projection slots and returns the\n * determined slot index. Returns \"null\" if no slot matched the given node.\n *\n * This function takes into account the parsed ngProjectAs selector from the\n * node's attributes. If present, it will
check whether the ngProjectAs selector\n * matches any of the projection slot selectors.\n */\n\nexport function
matchingProjectionSlotIndex(tNode: TNode, projectionSlots: ProjectionSlots): number\n  null {\n  let
wildcardNgContentIndex = null;\n  const ngProjectAsAttrVal = getProjectAsAttrValue(tNode);\n  for (let i = 0; i <
projectionSlots.length; i++) {\n    const slotValue = projectionSlots[i];\n    // The last wildcard projection slot should
match all nodes which aren't matching\n    // any selector. This is necessary to be backwards
compatible with view engine.\n    if (slotValue === '*') {\n      wildcardNgContentIndex = i;\n      continue;\n    }\n
// If we ran into an `ngProjectAs` attribute, we should match its parsed selector\n    // to the list of selectors,
otherwise we fall back to matching against the node.\n    if (ngProjectAsAttrVal === null ?\n      isNodeMatchingSelectorList(tNode, slotValue, /* isProjectionMode */ true) :\n      isSelectorInSelectorList(ngProjectAsAttrVal, slotValue)) {\n      return i; // first matching selector \"captures\" a
given node\n    }\n  }\n  return wildcardNgContentIndex;\n}\n\n"/**\n * Instruction to distribute projectable nodes
among <ng-content> occurrences in a given template.\n *\n * It takes all the selectors from the entire component's
template and decides where\n * each projected node belongs (it re-distributes nodes among \"buckets\" where each
\"bucket\" is\n * backed by a selector).\n *\n * This function requires CSS selectors to be provided in 2
forms: parsed (by a compiler) and text,\n * un-parsed form.\n *\n * The parsed form is needed for efficient
matching of a node against a given CSS selector.\n * The un-parsed, textual form is needed for support of the
ngProjectAs attribute.\n *\n * Having a CSS selector in 2 different formats is not ideal, but alternatives have even

```



```

```ts\n * propertyInterpolate1('title', 'prefix', v0, 'suffix');\n * ```\n *\n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function propertyInterpolate1(\n  propName: string, prefix: string, v0: any, suffix: string,\n  sanitizer?: SanitizerFn): typeof propertyInterpolate1 {\n  const IView = getLView();\n  const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        tView.data, tNode, propName, getBindingIndex() - 1, prefix, suffix);\n  }\n  return propertyInterpolate1;\n}\n\n/**\n *\n * Update an interpolated property on an element with 2 bound values surrounded by text.\n *\n * Used when the value passed to a property has 2 interpolated values in it:\n *\n * ```html\n * <div title="prefix{{v0}}-{{v1}}suffix"></div>\n *\n * Its compiled representation is::\n *\n * ```ts\n * propertyInterpolate2('title', 'prefix', v0, '-', v1, 'suffix');\n * ```\n *\n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function propertyInterpolate2(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n  sanitizer?: SanitizerFn): typeof propertyInterpolate2 {\n  const IView = getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        tView.data, tNode, propName, getBindingIndex() - 2, prefix, i0, suffix);\n  }\n  return propertyInterpolate2;\n}\n\n/**\n *\n * Update an interpolated property on an element with 3 bound values surrounded by text.\n *\n * Used when the value passed to a property has 3 interpolated values in it:\n *\n * ```html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}suffix"></div>\n *\n * Its compiled representation is::\n *\n * ```ts\n * propertyInterpolate3(\n *   'title', 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ```\n *\n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function propertyInterpolate3(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n  suffix: string, sanitizer?: SanitizerFn): typeof propertyInterpolate3 {\n  const IView = getLView();\n  const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        tView.data, tNode, propName, getBindingIndex() - 3, prefix, i0, i1, suffix);\n  }\n  return

```

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propertyInterpolate3;\n}\n\n/**\n *\n * Update an interpolated property on an element with 4 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 4 interpolated values in it:\n *\n *
```html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n * ```\n *\n * Its compiled
representation is:\n *\n
* ```ts\n * propertyInterpolate4(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ```\n *\n * If the property
name also exists as an input property on one of the element's directives,\n * the component property will be set
instead of the element property. This check must\n * be conducted at runtime so child components that add new
`@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n * @param
prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static
value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for
concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation
only.\n * @param v3 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n
* @codeGenApi\n */\nexport function propertyInterpolate4(\n  propName: string, prefix: string, v0: any, i0:
string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, suffix: string, sanitizer?: SanitizerFn): typeof
propertyInterpolate4 {\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0,
i0, v1, i1, v2, i2, v3, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const
tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName,
interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n      tView.data, tNode, propName, getBindingIndex() - 4, prefix, i0, i1, i2,
suffix);\n  }\n  return propertyInterpolate4;\n}\n\n/**\n *\n * Update an interpolated property on an element with 5
bound values surrounded by text.\n *\n * Used when the value passed to a property has 5 interpolated values in it:\n
*\n *
```html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix"></div>\n * ```\n *\n * Its compiled
representation is:\n *\n *
```ts\n * propertyInterpolate5(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n *
```\n *\n * If the property name also exists as an input property on one of the element's directives,\n * the
component property will be set instead of the element property. This check must\n * be conducted at runtime so
child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the
property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for
change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2
Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param
i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param suffix Static
value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that
it may be chained.\n * @codeGenApi\n */\nexport function propertyInterpolate5(\n  propName: string, prefix: string,
v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, suffix: string,\n  sanitizer?:
SanitizerFn): typeof propertyInterpolate5 {\n  const IView = getLView();\n  const interpolatedValue =\n
interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n  if (interpolatedValue !== NO_CHANGE)
{\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView,
tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n      tView.data, tNode, propName,
getBindingIndex() - 5, prefix, i0, i1, i2, i3, suffix);\n  }\n  return propertyInterpolate5;\n}\n\n/**\n *\n * Update an
interpolated property on an element with 6 bound values surrounded by text.\n *\n * Used when the value passed to
a property has 6 interpolated values in it:\n *\n *
```html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}-{{v5}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n *
```ts\n *
propertyInterpolate6(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n *
```\n *\n * If the property name also exists as an input property on one of the element's directives,\n * the
component property will be set instead of the element property. This check must\n * be conducted at runtime so
child components that add new

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`@Inputs` don't have to be re-compiled.\n * \n * @param propName The name of the property to update\n * @param
prefix Static value used for concatenation only.\n * @param v0 Value checked for
change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2
Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value
used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for
concatenation only.\n * @param v5 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be
chained.\n * @codeGenApi\n * \nexport function propertyInterpolate6(\n  propName: string, prefix: string, v0:
any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, suffix:
string,\n  sanitizer?: SanitizerFn): typeof propertyInterpolate6 {\n  const IView = getLView();\n  const
interpolatedValue
    =\n    interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n  if (interpolatedValue !==
NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n
elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer,
false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        tView.data, tNode, propName,
getBindingIndex() - 6, prefix, i0, i1, i2, i3, i4, suffix);\n  }\n  return propertyInterpolate6;\n}\n\n/**\n * \n * Update
an interpolated property on an element with 7 bound values surrounded by text.\n * \n * Used when the value passed
to a property has 7 interpolated values in it:\n * \n * ``html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}-{{v5}}-{{v6}}suffix"></div>\n * ``\n * \n * Its compiled representation is:\n * \n * ``ts\n *
propertyInterpolate7(\n *   'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n
*   ``\n * \n * If the property name also exists as an input property on one of the element's directives,\n * the
component property will be set instead of the element property. This check must\n * be conducted at runtime so
child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param propName The name of the
property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for
change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2
Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value
used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for
concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation
only.\n * @param
v6 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An
optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * \nexport function
propertyInterpolate7(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n
  v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n  sanitizer?: SanitizerFn): typeof
propertyInterpolate7 {\n  const IView = getLView();\n  const interpolatedValue =\n    interpolation7(IView, prefix,
v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView
= getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView,
propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n
        tView.data, tNode, propName,
getBindingIndex() - 7, prefix, i0, i1, i2, i3, i4, i5,\n        suffix);\n  }\n  return propertyInterpolate7;\n}\n\n/**\n * \n * Update
an interpolated property on an element with 8 bound values surrounded by text.\n * \n * Used when the value passed
to a property has 8 interpolated values in it:\n * \n * ``html\n * <div title="prefix{{v0}}-{{v1}}-
{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n * ``\n * \n * Its compiled representation is:\n * \n *
``ts\n * propertyInterpolate8(\n *   'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n
*   ``\n * \n * If the property name also exists as an input property on one of the element's directives,\n * the
component property will be set instead of the element property. This check must\n * be conducted at runtime so
child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param propName The name of the

```

property to update.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolate8(\n propName: string, prefix: string, v0:

any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, sanitizer?: SanitizerFn): typeof propertyInterpolate8 {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 8, prefix, i0, i1, i2, i3, i4, i5, i6,\n suffix);\n }\n return propertyInterpolate8;\n}\n\n/\*\*\n \* Update an interpolated property on an element with 9 or more bound values surrounded by text.\n \* \n \* Used when the number of

interpolated values exceeds 8.\n \* \n \* ```html\n \* <div\n \* title=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix\"></div>\n \* ```\n \* \n \* Its compiled representation is:\n \* \n \* ```ts\n \* propertyInterpolateV(\n \* 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']\n \* )\n \* \n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* \n \* @param propName The name of the property to update.\n \* @param values The collection of values and the strings in between those values, beginning with a\n \* string prefix and ending with a string suffix. (e.g. `[ 'prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix' ]`)\n \* @param sanitizer An optional sanitizer

function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolateV(\n propName: string, values: any[], sanitizer?: SanitizerFn): typeof propertyInterpolateV {\n const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n if (ngDevMode) {\n const interpolationInBetween = [values[0]]; // prefix\n for (let i = 2; i < values.length; i += 2) {\n interpolationInBetween.push(values[i]);\n }\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - interpolationInBetween.length + 1,\n ...interpolationInBetween);\n }\n }\n return propertyInterpolateV;\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC

All Rights Reserved.\n \* \n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n \* \nimport { KeyValueArray, keyValueArrayIndexOf } from '././util/array\_utils';\nimport { assertEquals, assertIndexInRange, assertNotEqual } from '././util/assert';\nimport { assertFirstUpdatePass } from './assert';\nimport { TNode } from './interfaces/node';\nimport { getTStylingRangeNext, getTStylingRangePrev, setTStylingRangeNext, setTStylingRangeNextDuplicate, setTStylingRangePrev, setTStylingRangePrevDuplicate, toTStylingRange, TStylingKey, TStylingKeyPrimitive, TStylingRange } from './interfaces/styling';\nimport { TData } from './interfaces/view';\nimport { getTView } from './state';\n\n\n/\*\*\n \* NOTE: The word `styling` is used interchangeably as style or class styling.\n \* \n \* This file contains code to link styling instructions together so that they can be replayed in\n \* priority order. The file exists

because Ivy styling

instruction execution order does not match that of the priority order. The purpose of this code is to create a linked list so that the instructions can be traversed in priority order when computing the styles. Assume we are dealing with the following code:

```
@Component({\n *  template: \n *  <my-cmp [style]=\" \n *  {color: '#001'} \n *  [style.color]=\" #002 \n *  dir-style-color-1 \n *  dir-style-color-2> \n *  })\n *  class ExampleComponent {\n *  static ngComp = ... {\n *  ... \n *  // Compiler ensures that `styleProp` is after `styleMap`\n *  styleMap({color: '#001'});\n *  styleProp('color', '#002');\n *  ... \n *  }\n *  }\n *  @Directive({\n *  selector: `[dir-style-color-1]`,\n *  })\n *  class Style1Directive {\n *  @HostBinding('style') style = {color: '#005'};\n *  @HostBinding('style.color') color = '#006';\n *  static ngDir = ... {\n *  ... \n *  // Compiler ensures that
```

```
`styleProp` is after `styleMap`\n *  styleMap({color: '#005'});\n *  styleProp('color', '#006');\n *  ... \n *  }\n *  }\n *  @Directive({\n *  selector: `[dir-style-color-2]`,\n *  })\n *  class Style2Directive {\n *  @HostBinding('style') style = {color: '#007'};\n *  @HostBinding('style.color') color = '#008';\n *  static ngDir = ... {\n *  ... \n *  // Compiler ensures that `styleProp` is after `styleMap`\n *  styleMap({color: '#007'});\n *  styleProp('color', '#008');\n *  ... \n *  }\n *  }\n *  @Directive({\n *  selector: `my-cmp`,\n *  })\n *  class MyComponent {\n *  @HostBinding('style') style = {color: '#003'};\n *  @HostBinding('style.color') color = '#004';\n *  static ngComp = ... {\n *  ... \n *  // Compiler ensures that `styleProp` is after `styleMap`\n *  styleMap({color: '#003'});\n *  styleProp('color', '#004');\n *  ... \n *  }\n *  }\n *  }\n *  The Order of instruction execution is:
```

```
* NOTE: the comment binding location is for illustrative purposes only.\n * \n * \n * // Template: (ExampleComponent)\n * styleMap({color: '#001'}); // Binding index: 10\n * styleProp('color', '#002'); // Binding index: 12\n * // MyComponent\n * styleMap({color: '#003'}); // Binding index: 20\n * styleProp('color', '#004'); // Binding index: 22\n * // Style1Directive\n * styleMap({color: '#005'}); // Binding index: 24\n * styleProp('color', '#006'); // Binding index: 26\n * // Style2Directive\n * styleMap({color: '#007'}); // Binding index: 28\n * styleProp('color', '#008'); // Binding index: 30\n * \n * \n * The correct priority order of concatenation is:\n * \n * \n * // MyComponent\n * styleMap({color: '#003'}); // Binding index: 20\n * styleProp('color', '#004'); // Binding index: 22\n * // Style1Directive\n * styleMap({color: '#005'}); // Binding index: 24\n * styleProp('color', '#006');
```

```
// Binding index: 26\n * // Style2Directive\n * styleMap({color: '#007'}); // Binding index: 28\n * styleProp('color', '#008'); // Binding index: 30\n * // Template: (ExampleComponent)\n * styleMap({color: '#001'}); // Binding index: 10\n * styleProp('color', '#002'); // Binding index: 12\n * \n * \n * What color should be rendered?\n * \n * \n * Once the items are correctly sorted in the list, the answer is simply the last item in the concatenation list which is `#002`.\n * \n * \n * To do so we keep a linked list of all of the bindings which pertain to this element.\n * \n * Notice that the bindings are inserted in the order of execution, but the `TVView.data` allows us to traverse them in the order of priority.
```

```
* \n * |Idx|TVView.data|LView|Notes\n * |---|-----|-----|\n * ----|-----\n * |... | | |10| null | {color: '#001'}| `styleMap('color', {color: '#001'})`\n * |11| 30 | 12`\n * |... | |12| `color` | `#002` | `styleProp('color', '#002')`\n * |13| 10 | 0` |... | |...| | \n * |20| null | {color: '#003'}| `styleMap('color', {color: '#003'})`\n * |21| 0 | 22` |... | |...| \n * |22| `color` | `#004` | `styleProp('color', '#004')`\n * |23| 20 | 24` |... | |24| null | {color: '#005'}| `styleMap('color', {color: '#005'})`\n * |25| 22 | 26` |... | |26| `color` | `#006` | \n * `styleProp('color', '#006')`\n * |27| 24 | 28` |... | |28| null | {color: '#007'}| `styleMap('color', {color: '#007'})`\n * |29| 26 | 30` |... | |30| `color` | `#008` | `styleProp('color', '#008')`\n * |31| 28 | 10` |... | \n * \n * \n * The above data structure allows us to re-concatenate the styling no matter which data binding changes.\n * \n * NOTE:
```

in addition to keeping track of next/previous index the `TVView.data` also stores prev/next duplicate bit. The duplicate bit if true says there either is a binding with the same name or there is a map (which may contain the name). This information is useful in knowing if other styles with higher priority need to be searched for

```

overwrites.\n *\n * NOTE: See `should support example in 'tnode_linked_list.ts' documentation` in\n *
`tnode_linked_list_spec.ts` for working example.\n */\nlet
__unused_const_as_closure_does_not_like_standalone_comment_blocks__: undefined;\n\n/**\n * Insert new
`tStyleValue` at `TData` and link existing style bindings such that we maintain linked\n * list of styles and compute
the duplicate flag.\n *\n * Note: this function is executed during `firstUpdatePass` only to populate the
`TView.data`.\n *\n * The function works by keeping track of `tStylingRange` which contains two pointers pointing
to\n * the head/tail of the template portion of the styles.\n
* - if `isHost === false` (we are template) then insertion is at tail of `TStylingRange`\n * - if `isHost === true` (we
are host binding) then insertion is at head of `TStylingRange`\n *\n * @param tData The `TData` to insert into.\n *
@param tNode `TNode` associated with the styling element.\n * @param tStylingKey See `TStylingKey`.\n *
@param index location of where `tStyleValue` should be stored (and linked into list.)\n * @param isHostBinding
`true` if the insertion is for a `hostBinding`. (insertion is in front of\n *
template.)\n * @param
isClassBinding True if the associated `tStylingKey` as a `class` styling.\n *
`tNode.classBindings`
should be used (or `tNode.styleBindings` otherwise.)\n */\nexport function insertTStylingBinding(\n tData: TData,
tNode: TNode, tStylingKeyWithStatic: TStylingKey, index: number,\n isHostBinding: boolean, isClassBinding:
boolean): void {\n ngDevMode && assertFirstUpdatePass(getTView());\n let
tBindings = isClassBinding ? tNode.classBindings : tNode.styleBindings;\n let tmpHead =
getTStylingRangePrev(tBindings);\n let tmpTail = getTStylingRangeNext(tBindings);\n\n tData[index] =
tStylingKeyWithStatic;\n let isKeyDuplicateOfStatic = false;\n let tStylingKey: TStylingKeyPrimitive;\n if
(Array.isArray(tStylingKeyWithStatic)) {\n // We are case when the `TStylingKey` contains static fields as well.\n
const staticKeyValueArray = tStylingKeyWithStatic as KeyValueArray<any>;\n tStylingKey =
staticKeyValueArray[1]; // unwrap.\n // We need to check if our key is present in the static so that we can mark it
as duplicate.\n if (tStylingKey === null ||\n keyValueArrayIndexOf(staticKeyValueArray, tStylingKey as
string) > 0) {\n // tStylingKey is present in the statics, need to mark it as duplicate.\n isKeyDuplicateOfStatic
= true;\n }\n } else {\n tStylingKey = tStylingKeyWithStatic;\n }\n if (isHostBinding) {\n // We are inserting
host
bindings\n\n // If we don't have template bindings then `tail` is 0.\n const hasTemplateBindings = tmpTail !==
0;\n // This is important to know because that means that the `head` can't point to the first\n // template bindings
(there are none.) Instead the head points to the tail of the template.\n if (hasTemplateBindings) {\n // template
head's "prev" will point to last host binding or to 0 if no host bindings yet\n const previousNode =
getTStylingRangePrev(tData[tmpHead + 1] as TStylingRange);\n tData[index + 1] =
toTStylingRange(previousNode, tmpHead);\n // if a host binding has already been registered, we need to update
the next of that host\n // binding to point to this one\n if (previousNode !== 0) {\n // We need to update
the template-tail value to point to us.\n tData[previousNode + 1] =\n
setTStylingRangeNext(tData[previousNode + 1] as TStylingRange, index);\n } } // The "previous" of the
template binding head should point to this host binding\n tData[tmpHead + 1] =
setTStylingRangePrev(tData[tmpHead + 1] as TStylingRange, index);\n } else {\n tData[index + 1] =
toTStylingRange(tmpHead, 0);\n // if a host binding has already been registered, we need to update the next of
that host\n // binding to point to this one\n if (tmpHead !== 0) {\n // We need to update the template-tail
value to point to us.\n tData[tmpHead + 1] = setTStylingRangeNext(tData[tmpHead + 1] as TStylingRange,
index);\n } } // if we don't have template, the head points to template-tail, and needs to be advanced.\n
tmpHead = index;\n } } else {\n // We are inserting in template section.\n // We need to set this binding's
"previous" to the current template tail\n tData[index + 1] = toTStylingRange(tmpTail, 0);\n ngDevMode &&\n
assertEqual(\n tmpHead !== 0 && tmpTail === 0, false,\n 'Adding
template bindings after hostBindings is not allowed.);\n if (tmpHead === 0) {\n tmpHead = index;\n } else
{\n // We need to update the previous value "next" to point to this binding\n tData[tmpTail + 1] =
setTStylingRangeNext(tData[tmpTail + 1] as TStylingRange, index);\n } } tmpTail = index;\n }\n\n // Now
we need to update / compute the duplicates.\n // Starting with our location search towards head (least priority)\n if

```



```

(isKeyDuplicateOfStatic) {\n  tData[index + 1] = setTStylingRangePrevDuplicate(tData[index + 1] as
TStylingRange);\n } \n markDuplications(tData, tStylingKey, index, true, isClassBinding);\n markDuplications(tData,
tStylingKey, index, false, isClassBinding);\n markDuplicateOfResidualStyling(tNode, tStylingKey, tData, index,
isClassBinding);\n\n tBindings = toTStylingRange(tmpHead, tmpTail);\n if (isClassBinding) {\n
tNode.classBindings = tBindings;\n } else {\n  tNode.styleBindings = tBindings;\n }\n}\n\n/**\n * Look
into the residual styling to see if the current `tStylingKey` is duplicate of residual.\n *\n * @param tNode `TNode`
where the residual is stored.\n *\n * @param tStylingKey `TStylingKey` to store.\n *\n * @param tData `TData` associated
with the current `LView`.\n *\n * @param index location of where `tStyleValue` should be stored (and linked into
list).\n *\n * @param isClassBinding True if the associated `tStylingKey` as a `class` styling.\n *\n
`tNode.classBindings` should be used (or `tNode.styleBindings` otherwise.)\n */\n\nfunction
markDuplicateOfResidualStyling(\n  tNode: TNode, tStylingKey: TStylingKey, tData: TData, index: number,
isClassBinding: boolean) {\n  const residual = isClassBinding ? tNode.residualClasses : tNode.residualStyles;\n  if
(residual != null /* or undefined */ && typeof tStylingKey === 'string' &&\n    keyValueArrayIndexOf(residual,
tStylingKey) >= 0) {\n    // We have duplicate in the residual so mark ourselves as duplicate.\n    tData[index + 1]
= setTStylingRangeNextDuplicate(tData[index + 1] as TStylingRange);\n  }\n}\n\n\n/**\n * Marks `TStyleValue`s
as duplicates if another style binding in the list has the same\n *\n * `TStyleValue`.\n *\n * NOTE: this function is
intended to be called twice once with `isPrevDir` set to `true` and once\n *\n * with it set to `false` to search both the
previous as well as next items in the list.\n *\n * No duplicate case\n *\n * ```\n * [style.color]\n * [style.width.px]
<<- index\n * [style.height.px]\n * ```\n *\n * In the above case adding `[style.width.px]` to the existing
`[style.color]` produces no\n *\n * duplicates because `width` is not found in any other part of the linked list.\n *\n *
Duplicate case\n *\n * ```\n * [style.color]\n * [style.width.em]\n * [style.width.px] <<- index\n * ```\n *\n * In the
above case adding `[style.width.px]` will produce a duplicate with `[style.width.em]`\n *\n * because `width` is found in
the chain.\n *\n * Map case 1\n *\n * ```\n * [style.width.px]\n * [style.color]\n
* [style] <<- index\n * ```\n *\n * In the above case adding `[style]` will produce a duplicate with any other bindings
because\n *\n * `[style]` is a Map and as such is fully dynamic and could produce `color` or `width`.\n *\n * Map case
2\n *\n * ```\n * [style]\n * [style.width.px]\n * [style.color] <<- index\n * ```\n *\n * In the above case adding
`[style.color]` will produce a duplicate because there is already a\n *\n * `[style]` binding which is a Map and as such is
fully dynamic and could produce `color` or\n *\n * `width`.\n *\n * NOTE: Once `[style]` (Map) is added into the
system all things are mapped as duplicates.\n *\n * NOTE: We use `style` as example, but same logic is applied to
`class`es as well.\n *\n * @param tData `TData` where the linked list is stored.\n *\n * @param tStylingKey
`TStylingKeyPrimitive` which contains the value to compare to other keys in\n *\n * the linked list.\n *\n * @param
index Starting location in the linked list to search from\n *\n * @param isPrevDir Direction.\n
* - `true` for previous (lower priority);\n * - `false` for next (higher priority).\n */\n\nfunction
markDuplications(\n  tData: TData, tStylingKey: TStylingKeyPrimitive, index: number, isPrevDir: boolean,\n
isClassBinding: boolean) {\n  const tStylingAtIndex = tData[index + 1] as TStylingRange;\n  const isMap =
tStylingKey === null;\n  let cursor =\n    isPrevDir ? getTStylingRangePrev(tStylingAtIndex) :\n
getTStylingRangeNext(tStylingAtIndex);\n  let foundDuplicate = false;\n  // We keep iterating as long as we have a
cursor\n  // AND either:\n  // - we found what we are looking for, OR\n  // - we are a map in which case we have to
continue searching even after we find what we were\n  // looking for since we are a wild card and everything needs
to be flipped to duplicate.\n  while (cursor !== 0 && (foundDuplicate === false || isMap)) {\n    ngDevMode &&
assertIndexInRange(tData, cursor);\n    const tStylingValueAtCursor = tData[cursor] as TStylingKey;\n
const tStyleRangeAtCursor = tData[cursor + 1] as TStylingRange;\n    if (isStylingMatch(tStylingValueAtCursor,
tStylingKey)) {\n      foundDuplicate = true;\n      tData[cursor + 1] = isPrevDir ?
setTStylingRangeNextDuplicate(tStyleRangeAtCursor) :\n
setTStylingRangePrevDuplicate(tStyleRangeAtCursor);\n    }\n    cursor = isPrevDir ?
getTStylingRangePrev(tStyleRangeAtCursor) :\n
getTStylingRangeNext(tStyleRangeAtCursor);\n  }\n  if (foundDuplicate) {\n    // if we found a duplicate, than mark ourselves.\n
tData[index + 1] = isPrevDir ?
setTStylingRangePrevDuplicate(tStylingAtIndex) :\n

```

```

setTStylingRangeNextDuplicate(tStylingAtIndex);\n })\n\n/**\n * Determines if two `TStylingKey`s are a
match.\n *\n * When computing whether a binding contains a duplicate, we need to compare if the instruction\n *
`TStylingKey` has a match.\n *\n * Here are examples of `TStylingKey`s which match given `tStylingKeyCursor`
is:\n *\n * - `color`\n * - `color` // Match another color\n * - `null` // That means that `tStylingKey` is a
`classMap`/`styleMap` instruction\n * - `[`, `color`, `other`, `true`] // wrapped `color` so match\n * - `[`, `null`,
`other`, `true`] // wrapped `null` so match\n * - `[`, `width`, `color`, `value`] // wrapped static value contains a
match on `color`\n * - `null` // `tStylingKeyCursor` always match as it is `classMap`/`styleMap` instruction\n
*\n * @param tStylingKeyCursor\n * @param tStylingKey\n */\nfunction isStylingMatch(tStylingKeyCursor:
TStylingKey, tStylingKey: TStylingKeyPrimitive) {\n  ngDevMode &&\n    assertNotEqual(\n
Array.isArray(tStylingKey), true, 'Expected that `\\tStylingKey` has been unwrapped');\n  if (\n
tStylingKeyCursor === null || // If the cursor is `null` it means that we have map at that\n //
location so we must assume that we have a match.\n
    tStylingKey == null || // If `tStylingKey` is `null` then it is a map therefor assume that it\n //
contains a match.\n    (Array.isArray(tStylingKeyCursor) ? tStylingKeyCursor[1] : tStylingKeyCursor) ===\n
tStylingKey // If the keys match explicitly than we are a match.\n  ) {\n    return true;\n  } else if
(Array.isArray(tStylingKeyCursor) && typeof tStylingKey === 'string') {\n    // if we did not find a match, but
`tStylingKeyCursor` is `KeyValueArray` that means cursor has\n // statics and we need to check those as well.\n
return keyValueArrayIndexOf(tStylingKeyCursor, tStylingKey) >= 0; // see if we are matching the key\n }
return false;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertEqual, throwError} from './../util/assert';\nimport
{CharCode} from './../util/char_code';\n\n/**\n * Stores the locations of key/value indexes while parsing styling.\n
*\n * In case of `cssText` parsing the indexes are like so:\n *\n * ```\n * "key1: value1; key2: value2; key3: value3"\n
*\n *      ^ ^ ^ ^      ^\n *      | | | |      +-- textEnd\n *      | | | |      | | | | +-----
valueEnd\n *      | | | | +----- value\n *      | | | | +----- keyEnd\n *
+----- key\n *\n * In case of `className` parsing the indexes are like so:\n *\n * ```\n * "key1 key2 key3"\n
*\n *      ^ ^ ^\n *      | | +-- textEnd\n *      | +----- keyEnd\n *
+----- key\n *\n * NOTE: `value` and `valueEnd` are used only for styles, not classes.\n
*/\n\ninterface ParserState {\n  textEnd: number;\n  key: number;\n  keyEnd: number;\n  value:
number;\n  valueEnd: number;\n}\n\n// Global state of the parser. (This makes parser non-reentrant, but that is not an
issue)\nconst parserState: ParserState = {\n  textEnd: 0,\n  key: 0,\n  keyEnd: 0,\n  value: 0,\n  valueEnd:
0,\n};\n\n/**\n * Retrieves the last parsed `key` of style.\n * @param text the text to substring the key from.\n
*/\nexport function getLastParsedKey(text: string): string {\n  return text.substring(parserState.key,
parserState.keyEnd);\n}\n\n/**\n * Retrieves the last parsed `value` of style.\n * @param text the text to substring
the key from.\n */\nexport function getLastParsedValue(text: string): string {\n  return
text.substring(parserState.value, parserState.valueEnd);\n}\n\n/**\n * Initializes `className` string for parsing and
parses the first token.\n *\n * This function is intended to be used in this format:\n *\n * ```\n * for (let i =
parseClassName(text); i >= 0; i = parseClassNameNext(text, i)) {\n *   const key = getLastParsedKey();\n *   ...
*\n * }\n *\n * @param text `className` to parse\n * @returns index where the next invocation of
`parseClassNameNext` should resume.\n */\nexport function parseClassName(text: string): number {\n
resetParserState(text);\n  return parseClassNameNext(text, consumeWhitespace(text, 0,
parserState.textEnd));\n}\n\n/**\n * Parses next `className` token.\n *\n * This function is intended to be used in
this format:\n *\n * ```\n * for (let i = parseClassName(text); i >= 0; i = parseClassNameNext(text, i)) {\n *   const key =
getLastParsedKey();\n *   ...
*\n * }\n *\n * @param text `className` to parse\n * @param index where the
parsing should resume.\n * @returns index where the next invocation of `parseClassNameNext` should resume.\n
*/\nexport function parseClassNameNext(text: string, index: number): number {\n  const end =
parserState.textEnd;\n  if (end === index) {\n    return -1;\n  }\n  index = parserState.keyEnd =
consumeClassToken(text, parserState.key = index, end);\n  return consumeWhitespace(text,

```

```

index, end);}\n\n/**\n * Initializes `cssText` string for parsing and parses the first key/values.\n *\n * This function is intended to be used in this format:\n *\n * for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n *   const key = getLastParsedKey();\n *   const value = getLastParsedValue();\n *   ...}\n *\n * @param text `cssText` to parse\n * @returns index where the next invocation of `parseStyleNext` should resume.\n *\n * @export function parseStyle(text: string): number {\n *   resetParserState(text);\n *   return parseStyleNext(text, consumeWhitespace(text, 0, parserState.textEnd));}\n\n/**\n * Parses the next `cssText` key/values.\n *\n * This function is intended to be used in this format:\n *\n * for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n *   const key = getLastParsedKey();\n *   const value = getLastParsedValue();\n *   ...}\n *\n * @param text `cssText` to parse\n * @param index where the parsing should resume.\n * @returns index where the next invocation of `parseStyleNext` should resume.\n *\n * @export function parseStyleNext(text: string, startIndex: number): number {\n *   const end = parserState.textEnd;\n *   let index = parserState.key = consumeWhitespace(text, startIndex, end);\n *   if (end === index) {\n *     // we reached an end so just quit\n *     return -1;\n *   }\n *   index = parserState.keyEnd = consumeStyleKey(text, index, end);\n *   index = consumeSeparator(text, index, end, CharCode.COLON);\n *   index = parserState.value = consumeWhitespace(text, index, end);\n *   index = parserState.valueEnd = consumeStyleValue(text, index, end);\n *   return consumeSeparator(text, index, end, CharCode.SEMI_COLON);}\n\n/**\n * Reset the global state of the styling parser.\n * @param text The styling text to parse.\n * @export function resetParserState(text: string): void {\n *   parserState.key = 0;\n *   parserState.keyEnd = 0;\n *   parserState.value = 0;\n *   parserState.valueEnd = 0;\n *   parserState.textEnd = text.length;}\n\n/**\n * Returns index of next non-whitespace character.\n *\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index of next non-whitespace character (May be the same as `start` if no whitespace at that location.)\n * @export function consumeWhitespace(text: string, startIndex: number, endIndex: number): number {\n *   while (startIndex < endIndex && text.charCodeAt(startIndex) <= CharCode.SPACE) {\n *     startIndex++;\n *   }\n *   return startIndex;}\n\n/**\n * Returns index of last char in class token.\n *\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index after last char in class token.\n * @export function consumeClassToken(text: string, startIndex: number, endIndex: number): number {\n *   while (startIndex < endIndex && text.charCodeAt(startIndex) < CharCode.SPACE) {\n *     startIndex++;\n *   }\n *   return startIndex;}\n\n/**\n * Consumes all of the characters belonging to style key and token.\n *\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index after last style key character.\n * @export function consumeStyleKey(text: string, startIndex: number, endIndex: number): number {\n *   let ch: number;\n *   while (startIndex < endIndex && ((ch = text.charCodeAt(startIndex)) === CharCode.DASH || ch === CharCode.UNDERSCORE || (ch & CharCode.UPPER_CASE) >= CharCode.A && (ch & CharCode.UPPER_CASE) <= CharCode.Z) || (ch >= CharCode.ZERO && ch <= CharCode.NINE))) {\n *     startIndex++;\n *   }\n *   return startIndex;}\n\n/**\n * Consumes all whitespace and the separator `:` after the style key.\n *\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index after separator and surrounding whitespace.\n * @export function consumeSeparator(\n *   text: string, startIndex: number, endIndex: number, separator: number): number {\n *   startIndex = consumeWhitespace(text, startIndex, endIndex);\n *   if (startIndex < endIndex) {\n *     if (ngDevMode && text.charCodeAt(startIndex) !== separator) {\n *       malformedStyleError(text, String.fromCharCode(separator), startIndex);\n *     }\n *     startIndex++;\n *   }\n *   return startIndex;}\n\n/**\n * Consumes style value honoring `url()` and `\"` text.\n *\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index after last style value character.\n * @export

```

```

function consumeStyleValue(text: string, startIndex: number, endIndex: number): number {
  let ch1 = -1; // 1st previous character
  let ch2 = -1; // 2nd previous character
  let ch3 = -1; // 3rd previous character
  let i = startIndex;
  let lastChIndex = i;
  while (i < endIndex) {
    const ch: number = text.charCodeAt(i++);
    if (ch === CharCode.SEMI_COLON) {
      return lastChIndex;
    } else if (ch === CharCode.DOUBLE_QUOTE || ch === CharCode.SINGLE_QUOTE) {
      lastChIndex = i = consumeQuotedText(text, ch, i, endIndex);
    } else if (
      (ch === CharCode.U_005C || ch === CharCode.U_0026 || ch === CharCode.U_0027 || ch === CharCode.U_0028) ||
      (ch > CharCode.SPACE)
    ) {
      // if we have a non-whitespace character then capture its location
      lastChIndex = i;
      ch3 = ch2;
      ch2 = ch1;
      ch1 = ch & CharCode.UPPER_CASE;
    }
  }
  return lastChIndex;
}

/**
 * Consumes all of the quoted characters.
 * @param text Text to scan
 * @param quoteCharCode CharCode of either `"` or ` ` quote or `)` for `url(...)`
 * @param startIndex Starting index of character where the scan should start.
 * @param endIndex Ending index of character where the scan should end.
 * @returns Index after quoted characters.
 */
export function consumeQuotedText(
  text: string,
  quoteCharCode: number,
  startIndex: number,
  endIndex: number): number {
  let ch1 = -1; // 1st previous character
  let index = startIndex;
  while (index < endIndex) {
    const ch = text.charCodeAt(index++);
    if (ch === quoteCharCode && ch1 !== CharCode.BACK_SLASH) {
      return index;
    }
    if (ch === CharCode.BACK_SLASH && ch1 === CharCode.BACK_SLASH) {
      // two back slashes cancel each other out. For example `\"\\\\\\\\`
      // quotation. (It should not assume that the last `\"` is escaped.)
      ch1 = 0;
    } else {
      ch1 = ch;
    }
  }
  throw ngDevMode ? malformedStyleError(text, String.fromCharCode(quoteCharCode), endIndex) : new Error();
}

function malformedStyleError(text: string, expecting: string, index: number): never {
  ngDevMode && assertEquals(typeof text === 'string', true, 'String expected here');
  throw throwError(`Malformed style at location ${index} in string ` + text.substring(0, index) + `[>>` + text.substring(index, index + 1) + `<<]` + text.slice(index + 1) + `.`. Expecting '${expecting}'.`);
}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at
 * https://angular.io/license
 */
import { SafeValue, unwrapSafeValue } from '../sanitization/bypass';
import {
  KeyValueArray,
  keyValueArrayGet, keyValueArraySet
} from '../util/array_utils';
import {
  assertDefined, assertEquals,
  assertLessThan, assertNotEqual, throwError
} from '../util/assert';
import { EMPTY_ARRAY } from '../util/empty';
import {
  concatStringsWithSpace, stringify
} from '../util/stringify';
import {
  assertFirstUpdatePass
} from '../assert';
import {
  bindingUpdated
} from '../bindings';
import {
  DirectiveDef
} from '../interfaces/definition';
import {
  AttributeMarker, TAttributes, TNode, TNodeFlags, TNodeType
} from '../interfaces/node';
import {
  Renderer
} from '../interfaces/renderer';
import {
  RElement
} from '../interfaces/renderer_dom';
import {
  getTStylingRangeNext, getTStylingRangeNextDuplicate,
  getTStylingRangePrev, getTStylingRangePrevDuplicate, TStylingKey, TStylingRange
} from '../interfaces/styling';
import {
  LView, RENDERER, TData, TView
} from '../interfaces/view';
import {
  applyStyling
} from '../node_manipulation';
import {
  getCurrentDirectiveDef, getLView, getSelectedIndex,
  getTView, incrementBindingIndex
} from '../state';
import {
  insertTStylingBinding
} from '../styling/style_binding_list';
import {
  getLastParsedKey, getLastParsedValue, parseClassName,
  parseClassNameNext, parseStyle, parseStyleNext
} from '../styling/styling_parser';
import { NO_CHANGE } from '../tokens';
import {
  getNativeByIndex
} from '../util/view_utils';
import {
  setDirectiveInputsWhichShadowsStyling
} from '../property';

/**
 * Update a style binding on an element with the provided value.
 * If the style value is falsy then it will be removed from the element
 * (or assigned a different value depending if there are any styles placed
 * on the element with `styleMap` or any static styles that are
 * present from when the element was created with `styling`).
 * Note that the styling element is updated
 */

```

as part of `stylingApply`.  
 @param prop A valid CSS property.  
 @param value New value to write ( `null` or an empty string to remove).  
 @param suffix

Optional suffix. Used with scalar values to add unit such as `px`.  
 Note that this will apply the provided style value to the host element if this function is called within a host binding function.

```

@codeGenApi
export function styleProp(
  prop: string, value: string|number|SafeValue|undefined|null, suffix?:
string|null): typeOf styleProp {
  checkStylingProperty(prop, value, suffix, false);
  return styleProp;
}

```

Update a class binding on an element with the provided value.  
 This instruction is meant to handle the `[class.foo]="exp"` case and, therefore, the class binding itself must already be allocated using `styling` within the creation block.

@param prop A valid CSS class (only one).  
 @param value A true/false value which will turn the class on or off.  
 Note that this will apply the provided class value to the host element if this function is called within a host binding function.

```

@codeGenApi
export function classProp(className: string, value: boolean|undefined|null): typeOf
classProp {
  checkStylingProperty(className, value, null, true);
  return classProp;
}

```

Update style bindings using an object literal on an element.  
 This instruction is meant to apply styling via the `[style]="exp"` template bindings.  
 When styles are applied to the element they will then be updated with respect to any styles/classes set via `styleProp`.  
 If any styles are set to falsy then they will be removed from the element.  
 Note that the styling instruction will not be applied until `stylingApply` is called.

@param styles A key/value style map of the styles that will be applied to the given element.  
 Any missing styles (that have already been applied to the element beforehand) will be removed (unset) from the element's styling.  
 Note that this will apply the provided styleMap value to the host element if this function is called within a host binding function.

```

@codeGenApi
export function styleMap(styles: {[styleName: string]: any}|string|undefined|null): void {
  checkStylingMap(styleKeyValueArraySet, styleStringParser, styles, false);
}

```

Parse text as style and add values to KeyValueArray.  
 This code is pulled out to a separate function so that it can be tree shaken away if it is not needed. It is only referenced from `styleMap`.

@param keyValueArray KeyValueArray to add parsed values to.  
 @param text text to parse.

```

export function styleStringParser(keyValueArray:
KeyValueArray<any>, text: string): void {
  for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {
    styleKeyValueArraySet(keyValueArray, getLastParsedKey(text),
    getLastParsedValue(text));
  }
}

```

Update class bindings using an object literal or class-string on an element.  
 This instruction is meant to apply styling via the `[class]="exp"` template bindings.  
 When classes are applied to the element they will then be updated with respect to any styles/classes set via `classProp`.  
 If any classes are set to falsy then they will be removed from the element.  
 Note that the styling instruction will not be applied until `stylingApply` is called.  
 Note that this will the provided classMap value to the host element if this function is called within a host binding function.

@param classes A key/value map or string of CSS classes that will be added to the given element.  
 Any missing classes (that have already been applied to the element beforehand) will be removed (unset) from the element's list of CSS classes.

```

@codeGenApi
export function classMap(classes: {[className: string]:
boolean|undefined|null}|string|undefined|null): void {
  checkStylingMap(keyValueArraySet,
classStringParser, classes, true);
}

```

Parse text as class and add values to KeyValueArray.  
 This code is pulled out to a separate function so that it can be tree shaken away if it is not needed. It is only referenced from `classMap`.

@param keyValueArray KeyValueArray to add parsed values to.  
 @param text text to parse.

```

export function classStringParser(keyValueArray:
KeyValueArray<any>, text: string): void {
  for (let i = parseClassName(text); i >= 0; i = parseClassNameNext(text, i)) {
    keyValueArraySet(keyValueArray, getLastParsedKey(text), true);
  }
}

```

Common code between `classProp` and `styleProp`.

@param prop property name.  
 @param value binding value.  
 @param suffix suffix for the property (e.g. `em` or `px`).

```

@codeGenApi
export function checkStylingProperty(
  prop: string, value: any|NO_CHANGE, suffix: string|undefined|null,
  isClassBased: boolean): void {
  const IVIEW =

```

```

getLView();\n
  const tView = getTView();\n // Styling instructions use 2 slots per binding.\n // 1. one for the value /
TStylingKey\n // 2. one for the intermittent-value / TStylingRange\n const bindingIndex =
incrementBindingIndex(2);\n if (tView.firstUpdatePass) {\n stylingFirstUpdatePass(tView, prop, bindingIndex,
isClassBased);\n }\n if (value !== NO_CHANGE && bindingUpdated(IView, bindingIndex, value)) {\n const
tNode = tView.data[getSelectedIndex()] as TNode;\n updateStyling(\n tView, tNode, IView,
IView[RENDERER], prop,\n IView[bindingIndex + 1] = normalizeSuffix(value, suffix), isClassBased,
bindingIndex);\n }\n}\n\n/**\n * Common code between `classMap` and `styleMap`.\n *\n * @param
keyValueArraySet (See `keyValueArraySet` in `util/array_utils`) Gets passed in as a\n * function so that
`style` can be processed. This is done for tree shaking purposes.\n *\n * @param stringParser Parser used to parse
`value` if `string`. (Passed in as `style` and `class`\n
* have different parsers.)\n *\n * @param value bound value from application\n *\n * @param isClassBased `true` if
`class` change (`false` if `style`)\n */\n\nexport function checkStylingMap(\n keyValueArraySet: (keyValueArray:
KeyValueArray<any>, key: string, value: any) => void,\n stringParser: (styleKeyValueArray:
KeyValueArray<any>, text: string) => void,\n value: any|NO_CHANGE, isClassBased: boolean): void {\n const
tView = getTView();\n const bindingIndex = incrementBindingIndex(2);\n if (tView.firstUpdatePass) {\n
stylingFirstUpdatePass(tView, null, bindingIndex, isClassBased);\n }\n const IView = getLView();\n if (value !==
NO_CHANGE && bindingUpdated(IView, bindingIndex, value)) {\n // `getSelectedIndex()` should be here
(rather than in instruction) so that it is guarded by the\n // if so as not to read unnecessarily.\n const tNode =
tView.data[getSelectedIndex()] as TNode;\n if (hasStylingInputShadow(tNode, isClassBased) &&
!isInHostBindings(tView,
bindingIndex)) {\n if (ngDevMode) {\n // verify that if we are shadowing then `TData` is appropriately
marked so that we skip\n // processing this binding in styling resolution.\n const tStylingKey =
tView.data[bindingIndex];\n assertEquals(\n Array.isArray(tStylingKey) ? tStylingKey[1] : tStylingKey,
false,\n `Styling linked list shadow input should be marked as \\`false\\``);\n }\n // VE does not
concatenate the static portion like we are doing here.\n // Instead VE just ignores the static completely if dynamic
binding is present.\n // Because of locality we have already set the static portion because we don't know if there\n
// is a dynamic portion until later. If we would ignore the static portion it would look like\n // the binding has
removed it. This would confuse `[ngStyle]`/`[ngClass]` to do the wrong\n // thing as it would think that the static
portion was removed. For this reason we\n
// concatenate it so that `[ngStyle]`/`[ngClass]` can continue to work on changed.\n let staticPrefix =
isClassBased ? tNode.classesWithoutHost : tNode.stylesWithoutHost;\n ngDevMode && isClassBased === false
&& staticPrefix !== null &&\n assertEquals(\n staticPrefix.endsWith(';'), true, `Expecting static portion
to end with \\`;\\``);\n if (staticPrefix !== null) {\n // We want to make sure that falsy values of `value` become
empty strings.\n value = concatStringsWhiteSpace(staticPrefix, value ? value : ``);\n }\n // Given `

` such that `my-dir` has `@Input('style')`.\n // This takes over the `[style]` binding. (Same for
`[class]`)\n setDirectiveInputsWhichShadowsStyling(tView, tNode, IView, value, isClassBased);\n } else {\n
updateStylingMap(\n tView, tNode, IView, IView[RENDERER], IView[bindingIndex + 1],\n
IView[bindingIndex + 1] = toStylingKeyValueArray(keyValueArraySet,
stringParser, value),\n isClassBased, bindingIndex);\n }\n }\n}\n\n/**\n * Determines when the binding is
in `hostBindings` section\n *\n * @param tView Current `TView`\n *\n * @param bindingIndex index of binding
which we would like if it is in `hostBindings`\n */\n\nfunction isInHostBindings(tView: TView, bindingIndex:
number): boolean {\n // All host bindings are placed after the expando section.\n return bindingIndex >=
tView.expandoStartIndex;\n}\n\n/**\n * Collects the necessary information to insert the binding into a linked list of
style bindings\n *\n * using `insertTStylingBinding`.\n *\n * @param tView `TView` where the binding linked list will
be stored.\n *\n * @param tStylingKey Property/key of the binding.\n *\n * @param bindingIndex Index of binding
associated with the `prop`\n *\n * @param isClassBased `true` if `class` change (`false` if `style`)\n */\n\nfunction
stylingFirstUpdatePass(\n tView: TView, tStylingKey: TStylingKey, bindingIndex: number, isClassBased:


```

```

boolean): void {\n  ngDevMode && assertFirstUpdatePass(tView);\n  const tData = tView.data;\n  if\n  (tData[bindingIndex + 1] === null) {\n    // The above check is necessary because we don't clear first update pass\n    until first successful\n    // (no exception) template execution. This prevents the styling instruction from double\n    adding\n    // itself to the list.\n    // `getSelectedIndex()` should be here (rather than in instruction) so that it is\n    guarded by the\n    // if so as not to read unnecessarily.\n    const tNode = tData[getSelectedIndex()] as TNode;\n    ngDevMode && assertDefined(tNode, 'TNode expected');\n    const isHostBindings = isInHostBindings(tView,\n    bindingIndex);\n    if (hasStylingInputShadow(tNode, isClassBased) && tStylingKey === null &&\n    !isHostBindings) {\n      // `tStylingKey === null` implies that we are either `[style]` or `[class]` binding.\n      // If\n      there is a directive which uses `@Input('style')` or `@Input('class')` than\n      // we need to neutralize\n      this binding since that directive is shadowing it.\n      // We turn this into a noop by setting the key to `false`\n      tStylingKey = false;\n    }\n    tStylingKey = wrapInStaticStylingKey(tData, tNode, tStylingKey, isClassBased);\n    insertTStylingBinding(tData, tNode, tStylingKey, bindingIndex, isHostBindings, isClassBased);\n  }\n}\n\n/**\n * Adds static styling information to the binding if applicable.\n * *\n * The linked list of styles not only stores the list\n * and keys, but also stores static styling\n * information on some of the keys. This function determines if the key\n * should contain the styling\n * information and computes it.\n * *\n * See `TStylingStatic` for more details.\n * *\n * @param tData `TData` where the linked list is stored.\n * @param tNode `TNode` for which the styling is being\n * computed.\n * @param stylingKey `TStylingKeyPrimitive` which may need to be wrapped into `TStylingKey`\n * @param isClassBased `true` if `class` (`false` if `style`)\n */\nexport function\nwrapInStaticStylingKey(\n  tData: TData, tNode: TNode, stylingKey: TStylingKey, isClassBased: boolean):\nTStylingKey {\n  const hostDirectiveDef = getCurrentDirectiveDef(tData);\n  let residual = isClassBased ?\ntNode.residualClasses : tNode.residualStyles;\n  if (hostDirectiveDef === null) {\n    // We are in template node.\n    // If template node already had styling instruction then it has already collected the static\n    // styling and there is no\n    need to collect them again. We know that we are the first styling\n    // instruction because the `TNode.*Bindings`\n    points to 0 (nothing has been inserted yet).\n    const isFirstStylingInstructionInTemplate =\n      (isClassBased ?\ntNode.classBindings : tNode.styleBindings) as any as number === 0;\n    if (isFirstStylingInstructionInTemplate)\n    {\n      // It would be nice to be able to get the statics from `mergeAttrs`, however, at this point\n      // they are\n      already merged and it would not be possible to figure which property belongs\n      where\n      // in the priority.\n      stylingKey = collectStylingFromDirectives(null, tData, tNode, stylingKey,\n      isClassBased);\n      stylingKey = collectStylingFromTAttrs(stylingKey, tNode.attrs, isClassBased);\n      // We\n      know that if we have styling binding in template we can't have residual.\n      residual = null;\n    }\n  } else {\n    // We are in host binding node and there was no binding instruction in template node.\n    // This means that we need\n    to compute the residual.\n    const directiveStylingLast = tNode.directiveStylingLast;\n    const\n    isFirstStylingInstructionInHostBinding =\n      directiveStylingLast === -1 || tData[directiveStylingLast] !==\n      hostDirectiveDef;\n    if (isFirstStylingInstructionInHostBinding) {\n      stylingKey =\n      collectStylingFromDirectives(hostDirectiveDef, tData, tNode, stylingKey, isClassBased);\n      if (residual === null)\n      {\n        // - If `null` than either:\n        // - Template styling instruction already ran and\n        it has consumed the static\n        // styling into its `TStylingKey` and so there is no need to update residual.\n        Instead\n        // we need to update the `TStylingKey` associated with the first template node\n        //\n        instruction. OR\n        // - Some other styling instruction ran and determined that there are no residuals\n        let\n        templateStylingKey = getTemplateHeadTStylingKey(tData, tNode, isClassBased);\n        if (templateStylingKey\n        !== undefined && Array.isArray(templateStylingKey)) {\n          // Only recompute if `templateStylingKey` had\n          static values. (If no static value found\n          // then there is nothing to do since this operation can only produce less\n          static keys, not\n          // more.)\n          templateStylingKey = collectStylingFromDirectives(\n          null, tData,\n          tNode, templateStylingKey[1] /* unwrap previous statics */,\n          isClassBased);\n          templateStylingKey\n          =\n          collectStylingFromTAttrs(templateStylingKey,\n          tNode.attrs, isClassBased);\n          setTemplateHeadTStylingKey(tData, tNode, isClassBased,\n          templateStylingKey);\n        }\n      } else {\n        // We only need to recompute residual if it is not `null`.\n        // -\n        If existing residual (implies there was no template styling). This means that some of\n        // the statics may have

```







```

(Array.isArray(unwrappedValue)) {\n  for (let i = 0; i < unwrappedValue.length; i++) {\n
keyValueArraySet(styleKeyValueArray, unwrappedValue[i], true);\n  }\n } else if (typeof unwrappedValue ===
'object') {\n  for (const key in
unwrappedValue) {\n    if (unwrappedValue.hasOwnProperty(key)) {\n
keyValueArraySet(styleKeyValueArray, key, unwrappedValue[key]);\n    }\n  }\n } else if (typeof
unwrappedValue === 'string') {\n  stringParser(styleKeyValueArray, unwrappedValue);\n } else {\n
ngDevMode &&\n    throwError('Unsupported styling type ' + typeof unwrappedValue + ': ' +
unwrappedValue);\n }\n return styleKeyValueArray;\n}\n\n/**\n * Set a `value` for a `key`.\n *\n * See:
`keyValueArraySet` for details\n *\n * @param keyValueArray KeyValueArray to add to.\n *\n * @param key Style
key to add.\n *\n * @param value The value to set.\n */\nexport function styleKeyValueArraySet(keyValueArray:
KeyValueArray<any>, key: string, value: any) {\n  keyValueArraySet(keyValueArray, key,
unwrapSafeValue(value));\n}\n\n/**\n * Update map based styling.\n *\n * Map based styling could be anything
which contains more than one binding. For example `string`,\n * or object literal. Dealing with all of these types
would complicate the logic so\n * instead this function expects that the complex input is first converted into
normalized\n * `KeyValueArray`. The advantage of normalization is that we get the values sorted, which makes it\n
* very cheap to compute deltas between the previous and current value.\n *\n * @param tView Associated
`TView.data` contains the linked list of binding priorities.\n *\n * @param tNode `TNode` where the binding is
located.\n *\n * @param lView `LView` contains the values associated with other styling binding at this `TNode`.\n
*\n * @param renderer Renderer to use if any updates.\n *\n * @param oldKeyValueArray Previous value represented as
`KeyValueArray`\n *\n * @param newKeyValueArray Current value represented as `KeyValueArray`\n *\n * @param
isClassBased `true` if `class` (`false` if `style`)\n *\n * @param bindingIndex Binding index of the binding.\n
*\n * ^function updateStylingMap(\n  tView: TView, tNode: TNode, lView: LView, renderer: Renderer,\n
oldKeyValueArray: KeyValueArray<any>,\n
newKeyValueArray: KeyValueArray<any>,\n
isClassBased: boolean, bindingIndex: number) {\n  if
(oldKeyValueArray as KeyValueArray<any>| NO_CHANGE === NO_CHANGE) {\n    // On first execution the
oldKeyValueArray is NO_CHANGE => treat it as empty KeyValueArray.\n    oldKeyValueArray =
EMPTY_ARRAY as any;\n  }\n  let oldIndex = 0;\n  let newIndex = 0;\n  let oldKey: string|null = 0 <
oldKeyValueArray.length ? oldKeyValueArray[0] : null;\n  let newKey: string|null = 0 < newKeyValueArray.length
? newKeyValueArray[0] : null;\n  while (oldKey !== null || newKey !== null) {\n    ngDevMode &&
assertLessThan(oldIndex, 999, 'Are we stuck in infinite loop?');\n    ngDevMode && assertLessThan(newIndex,
999, 'Are we stuck in infinite loop?');\n    const oldValue =\n      oldIndex < oldKeyValueArray.length ?
oldKeyValueArray[oldIndex + 1] : undefined;\n    const newValue =\n      newIndex < newKeyValueArray.length ?
newKeyValueArray[newIndex + 1] : undefined;\n    let setKey: string|null =
null;\n    let setValue: any = undefined;\n    if (oldKey === newKey) {\n      // UPDATE: Keys are equal => new
value is overwriting old value.\n      oldIndex += 2;\n      newIndex += 2;\n      if (oldValue !== newValue) {\n
setKey = newKey;\n        setValue = newValue;\n      }\n    } else if (newKey === null || oldKey !== null &&
oldKey < newKey!) {\n      // DELETE: oldKey key is missing or we did not find the oldKey in the newValue\n      //
(because the keyValueArray is sorted and `newKey` is found later alphabetically).\n      // `\"background\" <
\"color\"` so we need to delete `\"background\"` because it is not found in the\n      // new array.\n      oldIndex +=
2;\n      setKey = oldKey;\n    } else {\n      // CREATE: newKey's is earlier alphabetically than oldKey's (or no
oldKey) => we have new key.\n      // `\"color\" > \"background\"` so we need to add `color` because it is in new
array but not in\n      // old array.\n      ngDevMode && assertDefined(newKey, 'Expecting
to have a valid key');\n      newIndex += 2;\n      setKey = newKey;\n      setValue = newValue;\n    }\n    if (setKey
!== null) {\n      updateStyling(tView, tNode, lView, renderer, setKey, setValue, isClassBased, bindingIndex);\n
}\n    oldKey = oldIndex < oldKeyValueArray.length ? oldKeyValueArray[oldIndex] : null;\n    newKey =
newIndex < newKeyValueArray.length ? newKeyValueArray[newIndex] : null;\n  }\n}\n\n/**\n * Update a simple
(property name) styling.\n *\n * This function takes `prop` and updates the DOM to that value. The function takes
the binding\n * value as well as binding priority into consideration to determine which value should be written\n * to

```

DOM. (For example it may be determined that there is a higher priority overwrite which blocks the DOM write, or if the value goes to `undefined` a lower priority overwrite may be consulted.)

@param tView Associated `TVIEW.data` contains the linked list of binding priorities.

@param tNode `TNode` where the binding is located.

@param IView `LView` contains the values associated with other styling binding at this `TNode`.

@param renderer Renderer to use if any updates.

@param prop Either style property name or a class name.

@param value Either style value for `prop` or `true`/`false` if `prop` is class.

@param isClassBased `true` if `class` (`false` if `style`)

@param bindingIndex Binding index of the binding.

```

*function updateStyling(tView: TVIEW, tNode: TNode, IView: LView, renderer: Renderer, prop: string, value: string|undefined|null|boolean, isClassBased: boolean, bindingIndex: number) {
  if (!(tNode.type & TNodeType.AnyRNode)) {
    // It is possible to have styling on non-elements (such as ng-container).
    // This is rare, but it does happen. In such a case, just ignore the binding.
    return;
  }
  const tData = tView.data;
  const tRange = tData[bindingIndex + 1] as TStylingRange;
  const higherPriorityValue = getTStylingRangeNextDuplicate(tRange)
  ? findStylingValue(tData, tNode, IView, prop, getTStylingRangeNext(tRange), isClassBased) :
  undefined;
  if (!isStylingValuePresent(higherPriorityValue)) {
    // We don't have a next duplicate, or we did not find a duplicate value.
    if (!isStylingValuePresent(value)) {
      // We should delete current value or restore to lower priority value.
      if (getTStylingRangePrevDuplicate(tRange)) {
        // We have a possible prev duplicate, let's retrieve it.
        value = findStylingValue(tData, null, IView, prop, bindingIndex, isClassBased);
      }
    }
    const rNode = getNativeByIndex(getSelectedIndex(), IView) as RELEMENT;
    applyStyling(renderer, isClassBased, rNode, prop, value);
  }
}

```

Search for styling value with higher priority which is overwriting current value, or a value of lower priority to which we should fall back if the value is `undefined`.

When value is being applied at a location, related values need to be consulted.

- If there is a higher priority binding, we should be using that one instead.

For example `

- If there is a lower priority binding and we are changing to `undefined`

For example `

NOTE: The styling stores two values.

1. The raw value which came from the application is stored at `index + 0` location. (This value is used for dirty checking).
2. The normalized value is stored at `index + 1`.

@param tData `TData` used for traversing the priority.

@param tNode `TNode` to use for resolving static styling. Also controls search direction.

- `TNode` search next and quit as soon as `isStylingValuePresent(value)` is true.

If no value found consult `tNode.residualStyle`/`tNode.residualClass` for default value.

- `null` search prev and go all the way to end. Return last value where `isStylingValuePresent(value)` is true.

@param IView `LView` used for retrieving the actual values.

@param prop Property which we are interested in.

@param index Starting index in the linked list of styling bindings where the search should start.

@param isClassBased `true` if `class` (`false` if `style`)

```

*function findStylingValue(tData: TData, tNode: TNode|null, IView: LView, prop: string, index: number, isClassBased: boolean): any {
  // `TNode` to use for resolving static styling. Also controls search direction.
  // - `TNode` search next and quit as soon as `isStylingValuePresent(value)` is true.
  // If no value found consult `tNode.residualStyle`/`tNode.residualClass` for default value.
  // - `null` search prev and go all the way to end. Return last value where `isStylingValuePresent(value)` is true.
  const isPrevDirection = tNode === null;
  let value: any = undefined;
  while (index > 0) {
    const rawKey = tData[index] as TStylingKey;
    const containsStatics = Array.isArray(rawKey);
    // Unwrap the key if we contain static values.
    const key = containsStatics ? (rawKey as string[])[1] : rawKey;
    const isStylingMap = key === null;
    let valueAtLViewIndex = IView[index + 1];
    if (valueAtLViewIndex === NO_CHANGE) {
      // In firstUpdatePass the styling instructions create a linked list of styling.
      // On subsequent passes it is possible for a styling instruction to try to read a binding
      // which has not yet executed. In that case we will find `NO_CHANGE` and we should assume that
      // we have `undefined` (or empty array in case of styling-

```

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```

map instruction) instead. This\n    // allows the resolution to apply the value
(which may later be overwritten when the\n    // binding actually executes.)\n    valueAtLViewIndex =
isStylingMap ? EMPTY_ARRAY : undefined;\n    }\n    let currentValue = isStylingMap ?
keyValueArrayGet(valueAtLViewIndex, prop) : \n                (key === prop ? valueAtLViewIndex :
undefined);\n    if (containsStatics && !isStylingValuePresent(currentValue)) {\n        currentValue =
keyValueArrayGet(rawKey as KeyValueArray<any>, prop);\n    }\n    if (isStylingValuePresent(currentValue)) {\n
value = currentValue;\n    if (isPrevDirection) {\n        return value;\n    }\n    }\n    const tRange = tData[index +
1] as TStylingRange;\n    index = isPrevDirection ? getTStylingRangePrev(tRange) :
getTStylingRangeNext(tRange);\n    }\n    if (tNode !== null) {\n        // in case where we are going in next direction
AND we did not find anything, we need to\n        // consult residual styling\n        let residual = isClassBased ?
tNode.residualClasses : tNode.residualStyles;\n
        if (residual != null /** OR residual !== undefined */) {\n            value = keyValueArrayGet(residual!, prop);\n        }\n    }\n    return value;\n}\n\n/**\n * Determines if the binding value should be used (or if the value is 'undefined' and
hence priority\n * resolution should be used.)\n * *\n * @param value Binding style value.\n */\nfunction
isStylingValuePresent(value: any): boolean {\n    // Currently only `undefined` value is considered non-binding. That
is `undefined` says I don't\n    // have an opinion as to what this binding should be and you should consult other
bindings by\n    // priority to determine the valid value.\n    // This is extracted into a single function so that we have a
single place to control this.\n    return value !== undefined;\n}\n\n/**\n * Normalizes and/or adds a suffix to the
value.\n * *\n * If value is `null`/`undefined` no suffix is added\n * @param value\n * @param suffix\n */\nfunction
normalizeSuffix(value: any, suffix: string|undefined|null): string|null|undefined|boolean
{\n    if (value == null /** || value === undefined */) {\n        // do nothing\n    } else if (typeof suffix === 'string') {\n
value = value + suffix;\n    } else if (typeof value === 'object') {\n        value = stringify(unwrapSafeValue(value));\n
    }\n    return value;\n}\n\n/**\n * Tests if the `TNode` has input shadow.\n * *\n * An input shadow is when a
directive steals (shadows) the input by using `@Input('style')` or\n * `@Input('class')` as input.\n * *\n * @param
tNode `TNode` which we would like to see if it has shadow.\n * @param isClassBased `true` if `class` (`false` if
`style`)\n */\nfunction hasStylingInputShadow(tNode: TNode, isClassBased: boolean) {\n    return
(tNode.flags & (isClassBased ? TNodeFlags.hasClassInput : TNodeFlags.hasStyleInput)) !== 0;\n}\n\n"/**\n *
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style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertEqual, assertIndexInRange} from '../util/assert';\nimport {TElementNode, TNodeType} from
'../interfaces/node';\nimport {HEADER_OFFSET, RENDERER, T_HOST} from '../interfaces/view';\nimport
{appendChild, createTextNode} from '../node_manipulation';\nimport {getBindingIndex, getLView, getTView,
setCurrentTNode} from '../state';\nimport {getOrCreateTNode} from './shared';\n\n\n/**\n * Create static text
node\n * *\n * @param index Index of the node in the data array\n * @param value Static string value to write.\n *
*\n * @codeGenApi\n */\nfunction text(index: number, value: string = ""): void {\n    const IView = getLView();\n
const tView = getTView();\n    const adjustedIndex = index + HEADER_OFFSET;\n\n    ngDevMode &&\n
assertEqual(\n        getBindingIndex(), tView.bindingStartIndex,\n        `text nodes should be created before any
bindings`);\n    ngDevMode && assertIndexInRange(IView, adjustedIndex);\n\n    const tNode = tView.firstCreatePass
?\n
    getOrCreateTNode(tView, adjustedIndex, TNodeType.Text, value, null) : \n        tView.data[adjustedIndex] as
TElementNode;\n\n    const textNative = IView[adjustedIndex] = createTextNode(IView[RENDERER], value);\n
appendChild(tView, IView, textNative, tNode);\n\n    // Text nodes are self closing.\n    setCurrentTNode(tNode,
false);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {getLView, getSelectedIndex} from '../state';\nimport {NO_CHANGE} from '../tokens';\nimport
{interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7,
interpolation8, interpolationV} from './interpolation';\nimport {textBindingInternal} from './shared';\n\n\n/**\n *
Update text content with a lone bound value\n * *\n * Used when a text node has 1 interpolated value in it, an no

```



that it may be chained.

```

@see textInterpolateV
@codeGenApi
export function textInterpolate6(
  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): typeof textInterpolate6 {
  const IView = getLView();
  const interpolated = interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);
  if (interpolated !== NO_CHANGE) {
    textBindingInternal(IView, getSelectedIndex(), interpolated as string);
  }
  return textInterpolate6;
}

Update text content with 7 bound values surrounded by other text.
Used when a text node has 7 interpolated values in it:
html
<div>prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}suffix</div>
Its compiled representation is:
ts
textInterpolate7(
  prefix, v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');
@returns itself, so that it may be chained.
@see textInterpolateV
@codeGenApi
export function textInterpolate7(
  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): typeof textInterpolate7 {
  const IView = getLView();
  const interpolated = interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);
  if (interpolated !== NO_CHANGE) {
    textBindingInternal(IView, getSelectedIndex(), interpolated as string);
  }
  return textInterpolate7;
}

Update text content with 8 bound values surrounded by other text.
Used when a text node has 8 interpolated values in it:
html
<div>prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}-{v7}suffix</div>
Its compiled representation is:
ts
textInterpolate8(
  prefix, v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');
@returns itself, so that it may be chained.
@see textInterpolateV
@codeGenApi
export function textInterpolate8(
  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, suffix: string): typeof textInterpolate8 {
  const IView = getLView();
  const interpolated = interpolation8(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);
  if (interpolated !== NO_CHANGE) {
    textBindingInternal(IView, getSelectedIndex(), interpolated as string);
  }
  return textInterpolate8;
}

Update text content with 9 or more bound values other surrounded by text.
Used when the number of interpolated values exceeds 8.
html
<div>prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}-{v7}-{v8}-{v9}suffix</div>
Its compiled representation is:
ts
textInterpolateV(
  ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9, 'suffix']);
@param values The collection of values and the strings in between those values, beginning with a string prefix and ending with a string suffix.
(e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)
@returns itself, so that it may be chained.
@codeGenApi
export function textInterpolateV(values: any[]): typeof textInterpolateV {
  const IView = getLView();
  const interpolated = interpolationV(IView, values);
  if (interpolated !== NO_CHANGE) {
    textBindingInternal(IView, getSelectedIndex(), interpolated as string);
  }
  return textInterpolateV;
}

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import {keyValueArraySet} from './util/array_utils';
import {getLView} from './state';
import {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from './interpolation';
import {checkStylingMap, classStringParser} from './styling';

Update an interpolated class on an element with single bound value surrounded by text.
Used when the value passed to a property has 1 interpolated value in it:
html
<div class="prefix{v0}suffix"></div>
Its compiled representation is:
ts
classMapInterpolate1('prefix', v0, 'suffix');
@param prefix Static value used for concatenation only.
@param v0 Value checked for change.
@param suffix Static value used for concatenation only.
@codeGenApi
export function classMapInterpolate1(prefix: string, v0: any, suffix: string): void {
  const IView = getLView();
  const interpolatedValue = interpolation1(IView, prefix, v0, suffix);
  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);
}

Update an interpolated class on an element with 2

```

bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 2 interpolated values in it:\n \* \n \* ``html\n \* <div class="prefix{{v0}}-{{v1}}suffix"></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* classMapInterpolate2('prefix', v0, '-', v1, 'suffix');\n \* ``\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* \nexport function classMapInterpolate2(\n prefix: string, v0: any, i0: string, v1: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n }\n\n/\*\*\n \* \n \* Update an interpolated class on an element with 3 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 3 interpolated values in it:\n \* \n \* ``html\n \* <div class="prefix{{v0}}-{{v1}}-{{v2}}suffix"></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* classMapInterpolate3(\n \* 'prefix', v0, '-', v1, '-', v2, 'suffix');\n \* ``\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* \nexport function classMapInterpolate3(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n }\n\n/\*\*\n \* \n \* Update an interpolated class on an element with 4 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 4 interpolated values in it:\n \* \n \* ``html\n \* <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* classMapInterpolate4(\n \* 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n \* ``\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* \nexport function classMapInterpolate4(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n }\n\n/\*\*\n \* \n \* Update an interpolated class on an element with 5 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 5 interpolated values in it:\n \* \n \* ``html\n \* <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix"></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* classMapInterpolate5(\n \* 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n \* ``\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* \nexport function classMapInterpolate5(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n i3: string, v4: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n }\n\n/\*\*\n \* \n \* Update an interpolated class on an element with 6 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 6 interpolated values in it:\n \* \n \* ``html\n \* <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix"></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* classMapInterpolate6(\n \* 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n \* ``\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for

change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function classMapInterpolate6(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/\*\*\n \* Update an interpolated class on an element with 7 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 7 interpolated values in it:\n \*\n \* ```html\n \* <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix"></div>\n \* ```\n \*\n \* Its compiled representation is:\n \*\n \* ```ts\n \* classMapInterpolate7(\n \* 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n \* ```\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function classMapInterpolate7(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/\*\*\n \* Update an interpolated class on an element with 8 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 8 interpolated values in it:\n \*\n \* ```html\n \* <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n \* ```\n \*\n \* Its compiled representation is:\n \*\n \* ```ts\n \* classMapInterpolate8(\n \* 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n \* ```\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function classMapInterpolate8(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/\*\*\n \* Update an interpolated class on an element with 9 or more bound values surrounded by text.\n \*\n \* Used when the number of interpolated values exceeds 8.\n \*\n \* ```html\n \* <div\n \* class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"></div>\n \* ```\n \*\n \* Its compiled representation is:\n \*\n \* ```ts\n \* classMapInterpolateV(\n \* ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']);\n \* ```\n \*\n \* @param values The collection of values and the strings in-between those values, beginning with\n \* a string prefix and ending with a string suffix.\n \* (e.g. `[ 'prefix',



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value0, '-', value1, '-', value2, ..., value99, 'suffix'])\n * @codeGenApi\n *\nexport function
classMapInterpolateV(values: any[]): void {\n const IView = getLView();\n const interpolatedValue =
interpolationV(IView, values);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue,
true);\n}\n"/>**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {getLView} from './state';\nimport {interpolation1, interpolation2, interpolation3, interpolation4,
interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from './interpolation';\nimport
{styleMap} from './styling';\n\n/**\n *\n * Update an interpolated style on an element with single bound value
surrounded by text.\n *\n * Used when the value passed to a property has 1 interpolated value in it:\n *\n * ```html\n
* <div
* style=\"key: {{v0}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n
* styleMapInterpolate1('key: ', v0, 'suffix');\n * ```\n *\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@codeGenApi\n *\nexport function styleMapInterpolate1(prefix: string, v0: any, suffix: string): void {\n const
IView = getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n
styleMap(interpolatedValue);\n}\n\n/**\n *\n * Update an interpolated style on an element with 2 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 2 interpolated values in it:\n *\n *
```html\n * <div style=\"key: {{v0}}; key1: {{v1}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n
*\n * ```ts\n * styleMapInterpolate2('key: ', v0, '; key1: ', v1, 'suffix');\n * ```\n *\n * @param prefix Static value used
for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @codeGenApi\n *\nexport function styleMapInterpolate2(\n prefix: string, v0: any, i0:
string, v1: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =
interpolation2(IView, prefix, v0, i0, v1, suffix);\n styleMap(interpolatedValue);\n}\n\n/**\n *\n * Update an
interpolated style on an element with 3 bound values surrounded by text.\n *\n * Used when the value passed to a
property has 3 interpolated values in it:\n *\n * ```html\n * <div style=\"key: {{v0}}; key2: {{v1}}; key2:
{{v2}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * styleMapInterpolate3(\n *
'key: ', v0, '; key1: ', v1, '; key2: ', v2, 'suffix');\n * ```\n *\n * @param prefix Static value used for concatenation
only.\n
* @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1
Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n *\nexport function
styleMapInterpolate3(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): void {\n
const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n
styleMap(interpolatedValue);\n}\n\n/**\n *\n * Update an interpolated style on an element with 4 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 4 interpolated values in it:\n *\n *
```html\n * <div style=\"key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}suffix\"></div>\n * ```\n *\n * Its
compiled representation is:\n *\n * ```ts\n * styleMapInterpolate4(\n * 'key: ', v0, '\n * key1: ', v1, '\n * key2: ', v2, '\n * key3: ', v3, 'suffix');\n * ```\n *\n * @param prefix Static value used for concatenation
only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n *
@param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2
Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n *\nexport function
styleMapInterpolate4(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n suffix:
string): void {\n const IView = getLView();\n const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1,
v2, i2, v3, suffix);\n styleMap(interpolatedValue);\n}\n\n/**\n *\n * Update an interpolated style on an element
with 5 bound values surrounded by text.\n *\n * Used when the value passed to a

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property has 5 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate5(\n \* 'key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\n \* export function styleMapInterpolate5(\n \* prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, suffix: string): void {\n \* const IView = getLView();\n \* const interpolatedValue =\n \* interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n \* styleMap(interpolatedValue);\n \* }\n \* }\n \* Update an interpolated style on an element with 6 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 6 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}}suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate6(\n \* 'key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5,\n \* 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\n \* export function styleMapInterpolate6(\n \* prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): void {\n \* const IView = getLView();\n \* const interpolatedValue =\n \* interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n \* styleMap(interpolatedValue);\n \* }\n \* }\n \* Update an interpolated style on an element with 7 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 7 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}}; key6: {{v6}}suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate7(\n \* 'key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5,\n \* ', key6: ', v6, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\n \* export function styleMapInterpolate7(\n \* prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n \* const IView = getLView();\n \* const interpolatedValue =\n \* interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n \* styleMap(interpolatedValue);\n \* }\n \* }\n \* Update an interpolated style on an element with 8 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 8 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}}; key6: {{v6}}; key7: {{v7}}suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate8(\n \* 'key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5,\n \* ', key6: ', v6, ', key7: ', v7, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for

concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolate8(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, i7: string, v8: any, i8: string, v9: any, i9: string, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* Update an interpolated style on an element with 9 or more bound values surrounded by text.\n \* \n \* Used when the number of interpolated values exceeds 8.\n \* \n \* ``html\n \* <div\n \* class="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}};\n \* key6: {{v6}}; key7: {{v7}}; key8: {{v8}}; key9: {{v9}}suffix"\n \* ></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* styleMapInterpolateV(\n \* [key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5,\n \* key6: ', v6, ', key7: ', v7, ', key8: ', v8, ', key9: ', v9, 'suffix']);\n \* ``\n \* \n \* @param values The collection of values and the strings in-between those values, beginning with\n \* a string prefix and ending with a string suffix.\n \* (e.g. `[prefix', value0, ', key2: ', value1, ', key2: ', value2, ..., value99, 'suffix']`)\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolateV(values: any[]): void {\n const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n styleMap(interpolatedValue);\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* \n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \* \n\nimport {getLView,} from './state';\nimport {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from './interpolation';\nimport {checkStylingProperty} from './styling';\n\n\n/\*\*\n \* Update an interpolated style property on an element with single bound value surrounded by text.\n \* \n \* Used when the value passed to a property has 1 interpolated value in it.\n \* \n \* ``html\n \* <div style.color="prefix{{v0}}suffix"\n \* ></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* stylePropInterpolate1(0, 'prefix', v0, 'suffix');\n \* ``\n \* \n \* @param styleIndex Index of style to update. This index value refers to the\n \* index of the style in the style bindings array that was passed into\n \* `styling`.\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* \n \* @codeGenApi\n \* ^\nexport function stylePropInterpolate1(\n prop: string, prefix: string, v0: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate1 {\n const IView = getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate1;\n}\n\n\n/\*\*\n \* Update an interpolated style property on an element with 2 bound values surrounded by text.\n \* \n \* Used when the value passed to a property has 2 interpolated values in it.\n \* \n \* ``html\n \* <div style.color="prefix{{v0}}-{{v1}}suffix"\n \* ></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* stylePropInterpolate2(0, 'prefix', v0, '-', v1, 'suffix');\n \* ``\n \* \n \* @param styleIndex Index of style to update. This index value refers to the\n \* index of the style in the style bindings array that was passed into\n \* `styling`.\n \* \n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* \n \* @codeGenApi\n \* ^\nexport function stylePropInterpolate2(\n prop: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate2 {\n const IView = getLView();\n const interpolatedValue = interpolation2(IView, prefix, v0,

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i0, v1, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return
stylePropInterpolate2;\n}\n\n/**\n *\n * Update an interpolated style property on an element with 3 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 3 interpolated values in it:\n *\n * ```html\n * <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}suffix\"></div>\n * ```\n *\n * Its compiled
representation is:\n *\n * ```ts\n * stylePropInterpolate3(0, 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ```\n *\n * @param
styleIndex Index of style to update. This index value refers to the\n *      index of the style in the style bindings
array that was passed into\n *      `styling`.\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1
Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @param valueSuffix Optional suffix.
Used with scalar values to add unit such as `px`.\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\n\nexport function stylePropInterpolate3(\n  prop: string, prefix: string, v0: any,\n  i0: string, v1: any, i1: string, v2: any, suffix: string,\n  valueSuffix?: string|null): typeof stylePropInterpolate3 {\n\n  const IView = getLView();\n  const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n\n  checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n  return stylePropInterpolate3;\n}\n\n/**\n *\n * Update an interpolated style property on an element with 4 bound values surrounded by text.\n *\n * Used when the
value passed to a property has 4 interpolated values in it:\n *\n * ```html\n * <div style.color=\"prefix{{v0}}-
{{v1}}-{{v2}}-{{v3}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n *
stylePropInterpolate4(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ```\n *\n * @param styleIndex Index of style to
update. This index value refers to the\n *      index of the style in the style bindings array that was passed into\n *
`styling`.\n * @param prefix Static value used for
concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation
only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n *
@param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3
Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param valueSuffix
Optional suffix. Used with scalar values to add unit such as `px`.\n * @returns itself, so that it may be chained.\n *
@param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n * @returns itself, so that it may be
chained.\n * @codeGenApi\n */\n\nexport function stylePropInterpolate4(\n  prop: string, prefix: string, v0: any, i0: string, v1:
any, i1: string, v2: any, i2: string,\n  v3: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate4
{\n\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n\n  checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n  return
stylePropInterpolate4;\n}\n\n/**\n *\n * Update an interpolated style property on an element with 5 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 5 interpolated values in it:\n *\n *
```html\n * <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix\"></div>\n * ```\n *\n * Its
compiled representation is:\n *\n * ```ts\n * stylePropInterpolate5(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4,
'suffix');\n * ```\n *\n * @param styleIndex Index of style to update. This index value refers to the\n *      index of
the style in the style bindings array that was passed into\n *      `styling`.\n * @param prefix Static value used for
concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation
only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n *
@param v2 Value checked for change.\n * @param i2 Static value used for concatenation
only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n *
@param v4 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param
valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n * @returns itself, so that it may be
chained.\n * @codeGenApi\n */\n\nexport function stylePropInterpolate5(\n  prop: string, prefix: string, v0: any, i0:
string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, suffix: string,\n  valueSuffix?:
string|null): typeof stylePropInterpolate5 {\n\n  const IView = getLView();\n  const interpolatedValue =\n  interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n\n  checkStylingProperty(prop,\n  interpolatedValue, valueSuffix, false);\n  return stylePropInterpolate5;\n}\n\n/**\n *\n * Update an interpolated style
property on an element with 6 bound values surrounded by text.\n *\n * Used when the

```

value passed to a property has 6 interpolated values in it:\n \* \n \* ``html\n \* <div style.color=\`prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix\`></div>\n \* ``\n \* \n \* Its compiled representation is:\n \* \n \* ``ts\n \* \n \* stylePropInterpolate6(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n \* ``\n \* \n \* @param styleIndex Index of style to update. This index value refers to the\n \* \n \* index of the style in the style bindings array that was passed into\n \* \n \* `styling`.\n \* \n \* @param prefix Static value used for concatenation only.\n \* \n \* @param v0 Value checked for change.\n \* \n \* @param i0 Static value used for concatenation only.\n \* \n \* @param v1 Value checked for change.\n \* \n \* @param i1 Static value used for concatenation only.\n \* \n \* @param v2 Value checked for change.\n \* \n \* @param i2 Static value used for concatenation only.\n \* \n \* @param v3 Value checked for change.\n \* \n \* @param i3 Static value used for concatenation only.\n \* \n \* @param v4 Value checked for change.\n \* \n \* @param i4 Static value used for concatenation only.\n \* \n \* @param v5 Value checked for change.\n \* \n \* @param suffix Static value used for concatenation only.\n \* \n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* \n \* @returns itself, so that it may be chained.\n \* \n \* @codeGenApi\n \* \n \* /nexport function stylePropInterpolate6(\n \* \n \* prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate6 {\n \* \n \* const IView = getLView();\n \* \n \* const interpolatedValue =\n \* \n \* interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n \* \n \* checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n \* \n \* return stylePropInterpolate6;\n \* \n \* }\n \* \n \* /n\n \* \n \* \n \* \n \* Update an interpolated style property on an element with 7 bound values surrounded by text.\n \* \n \* \n \* \n \* Used when the value passed to a property has 7 interpolated values in it:\n \* \n \* \n \* ``html\n \* \n \* <div style.color=\`prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix\`></div>\n \* \n \* ``\n \* \n \* \n \* \n \* Its compiled representation is:\n \* \n \* \n \* ``ts\n \* \n \* \n \* stylePropInterpolate7(\n \* \n \* 0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n \* \n \* ``\n \* \n \* \n \* \n \* @param styleIndex Index of style to update. This index value refers to the\n \* \n \* \n \* index of the style in the style bindings array that was passed into\n \* \n \* \n \* `styling`.\n \* \n \* \n \* @param prefix Static value used for concatenation only.\n \* \n \* \n \* @param v0 Value checked for change.\n \* \n \* \n \* @param i0 Static value used for concatenation only.\n \* \n \* \n \* @param v1 Value checked for change.\n \* \n \* \n \* @param i1 Static value used for concatenation only.\n \* \n \* \n \* @param v2 Value checked for change.\n \* \n \* \n \* @param i2 Static value used for concatenation only.\n \* \n \* \n \* @param v3 Value checked for change.\n \* \n \* \n \* @param i3 Static value used for concatenation only.\n \* \n \* \n \* @param v4 Value checked for change.\n \* \n \* \n \* @param i4 Static value used for concatenation only.\n \* \n \* \n \* @param v5 Value checked for change.\n \* \n \* \n \* @param i5 Static value used for concatenation only.\n \* \n \* \n \* @param v6 Value checked for change.\n \* \n \* \n \* @param suffix Static value used for concatenation only.\n \* \n \* \n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* \n \* \n \* @returns itself, so that it may be chained.\n \* \n \* \n \* @codeGenApi\n \* \n \* \n \* /nexport function stylePropInterpolate7(\n \* \n \* prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate7 {\n \* \n \* const IView = getLView();\n \* \n \* const interpolatedValue =\n \* \n \* interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n \* \n \* checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n \* \n \* return stylePropInterpolate7;\n \* \n \* }\n \* \n \* /n\n \* \n \* \n \* \n \* Update an interpolated style property on an element with 8 bound values surrounded by text.\n \* \n \* \n \* \n \* Used when the value passed to a property has 8 interpolated values in it:\n \* \n \* \n \* ``html\n \* \n \* <div style.color=\`prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix\`></div>\n \* \n \* ``\n \* \n \* \n \* \n \* \n \* Its compiled representation is:\n \* \n \* \n \* ``ts\n \* \n \* \n \* stylePropInterpolate8(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n \* \n \* ``\n \* \n \* \n \* \n \* \n \* @param styleIndex Index of style to update. This index value refers to the\n \* \n \* \n \* \n \* index of the style in the style bindings array that was passed into\n \* \n \* \n \* \n \* `styling`.\n \* \n \* \n \* @param prefix Static value used for concatenation only.\n \* \n \* \n \* @param v0 Value checked for change.\n \* \n \* \n \* @param i0 Static value used for concatenation only.\n \* \n \* \n \* @param v1 Value checked for change.\n \* \n \* \n \* @param i1 Static value used for concatenation only.\n \* \n \* \n \* @param v2 Value checked for change.\n \* \n \* \n \* @param i2 Static value used for concatenation only.\n \* \n \* \n \* @param v3 Value checked for change.\n \* \n \* \n \* @param i3 Static value used for concatenation only.\n \* \n \* \n \* @param v4 Value checked for change.\n \* \n \* \n \* @param i4 Static value used for concatenation only.\n \* \n \* \n \* @param v5 Value checked for change.\n \* \n \* \n \* @param i5 Static value used for concatenation only.\n \* \n \* \n \* @param v6 Value checked

for change.  
 \* @param i6 Static value used for concatenation only.  
 \* @param v7 Value checked for change.  
 \* @param suffix Static value used for concatenation only.  
 \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.  
 \* @returns itself, so that it may be chained.  
 \* @codeGenApi\n \* ^\nexport function stylePropInterpolate8(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate8 {\n const lView = getLView();\n const interpolatedValue = interpolation8(\n lView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate8;\n}\n\n/\*\*\n \* Update an interpolated style property on an element with 9 or more bound values surrounded by\n \* text.\n \* Used when the number of interpolated values exceeds 8.\n \* ```html\n \* <div\n \* style.color="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix">\n \* </div>\n \* ```\n \* Its compiled representation is:\n \* ```ts\n \* stylePropInterpolateV(\n \* 0, ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']);\n \* ```\n \* @param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.\n \* @param values The collection of values and the strings in-between those values, beginning with a string prefix and ending with a string suffix. (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.  
 \* @returns itself, so that it may be chained.  
 \* @codeGenApi\n \* ^\nexport function stylePropInterpolateV(\n prop: string, values: any[], valueSuffix?: string|null): typeof stylePropInterpolateV {\n const lView = getLView();\n const interpolatedValue = interpolationV(lView, values);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolateV;\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license\n \*/\nimport { bindingUpdated } from './bindings';\nimport { SanitizerFn } from './interfaces/sanitization';\nimport { RENDERER } from './interfaces/view';\nimport { getCurrentDirectiveDef, getLView, getSelectedTNode, getTView, nextBindingIndex } from './state';\nimport { NO\_CHANGE } from './tokens';\nimport { elementPropertyInternal, loadComponentRenderer, storePropertyBindingMetadata } from './shared';\n\n/\*\*\n \* Update a property on a host element. Only applies to native node properties, not inputs.  
 \* Operates on the element selected by index via the {@link select} instruction.  
 \* @param propName Name of property. Because it is going to DOM, this is not subject to renaming as part of minification.  
 \* @param value New value to write.  
 \* @param sanitizer An optional function used to sanitize the value.  
 \* @returns This function returns itself so that it may be chained (e.g. `property('name', ctx.name)(title, ctx.title)`)\n \* @codeGenApi\n \* ^\nexport function hostProperty<T>(\n propName: string, value: T, sanitizer?: SanitizerFn|null): typeof hostProperty {\n const lView = getLView();\n const bindingIndex = nextBindingIndex();\n if (bindingUpdated(lView, bindingIndex, value)) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(tView, tNode, lView, propName, value, lView[RENDERER], sanitizer, true);\n ngDevMode && storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n }\n return hostProperty;\n}\n\n/\*\*\n \* Updates a synthetic host binding (e.g. `[@foo]`) on a component or directive.  
 \* This instruction is for compatibility purposes and is designed to ensure that a synthetic host binding (e.g. `@HostBinding('@foo')`) properly gets rendered in the component's renderer. Normally all host bindings are evaluated with the parent component's renderer, but, in the case of animation @triggers, they need to be evaluated with the sub component's renderer (because that's where the animation triggers are defined).  
 \* Do not use this instruction as a replacement for `elementProperty`. This instruction only exists to ensure compatibility with the ViewEngine's host binding behavior.  
 \* @param index The index of the element to update in the data array.  
 \* @param propName Name of property. Because it is going to DOM, this is not subject to renaming as part of minification.  
 \* @param value New value to write.  
 \* @param sanitizer An optional function used to sanitize the value.  
 \* @codeGenApi\n \* ^\nexport function syntheticHostProperty<T>(\n propName: string, value:

```

T|NO_CHANGE,\n sanitizer?: SanitizerFn|null): typeof syntheticHostProperty {\n const IView = getLView();\n const bindingIndex = nextBindingIndex();\n if (bindingUpdated(IView, bindingIndex, value)) {\n const tView =\n getTView();\n const tNode = getSelectedTNode();\n const currentDef = getCurrentDirectiveDef(tView.data);\n const renderer = loadComponentRenderer(currentDef, tNode, IView);\n elementPropertyInternal(tView,\n tNode, IView, propName, value, renderer, sanitizer, true);\n ngDevMode &&\n storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n }\n return\n syntheticHostProperty;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this\n source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n *\n\nimport {global} from './global';\ndeclare global {\n const ngI18nClosureMode:\n boolean;\n}\n"/**\n * NOTE: changes to the `ngI18nClosureMode` name must be synced with `compiler-\n cli/src/tooling.ts`.\n *\n\nif (typeof ngI18nClosureMode === 'undefined') {\n // These property accesses can be\n ignored because ngI18nClosureMode will be set to false\n // when optimizing code and the whole if statement will\n be dropped.\n // Make sure to refer to ngI18nClosureMode as ['ngI18nClosureMode'] for closure.\n // NOTE: we\n need to have it in IIFE so that the tree-shaker is happy.\n (function()\n {\n // tslint:disable-next-line:no-toplevel-property-access\n global['ngI18nClosureMode'] =\n // TODO(FW-\n 1250): validate that this actually, you know, works.\n // tslint:disable-next-line:no-toplevel-property-access\n typeof goog !== 'undefined' && typeof goog.getMsg === 'function';\n })();\n}\n"/**\n * @license\n * Copyright\n Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n// THIS CODE IS GENERATED - DO NOT\n MODIFY.\nconst u = undefined;\nfunction plural(val: number): number {\nconst n = val, i =\n Math.floor(Math.abs(val)), v = val.toString().replace(/^[^.]*/.?./, "").length;\n\nif (i === 1 && v === 0)\n return\n 1;\nreturn 5;\n}\n\nexport default\n [\"en\", [\"a\", \"p\"], [\"AM\", \"PM\"], u, [\"AM\", \"PM\"], u, u, [\"S\", \"M\", \"T\", \"W\", \"T\", \"F\", \"S\"], [\"Sun\", \"\n Mon\", \"Tue\", \"Wed\", \"Thu\", \"Fri\", \"Sat\", \"Sunday\", \"Monday\", \"Tuesday\", \"Wednesday\", \"Thursday\", \"F\n riday\", \"Saturday\"], [\"Su\", \"Mo\", \"Tu\", \"We\", \"Th\", \"Fr\", \"Sa\"], u, [\"J\", \"F\", \"M\", \"A\", \"M\", \"J\", \"J\", \"\n A\", \"S\", \"O\", \"N\", \"D\"], [\"Jan\", \"Feb\", \"Mar\", \"Apr\", \"May\", \"Jun\", \"Jul\", \"Aug\", \"Sep\", \"Oct\", \"Nov\", \"\n Dec\"], [\"January\", \"February\", \"March\", \"April\", \"May\", \"June\", \"July\", \"August\", \"September\", \"October\" \n , \"November\", \"December\"], u, [\"B\", \"A\"], [\"BC\", \"AD\"], [\"Before\n Christ\", \"Anno Domini\"], 0, [6, 0], [\"M/d/yy\", \"MMM d, y\", \"MMMM d, y\", \"EEEE, MMMM d, y\"], [\"h:mm\n a\", \"h:mm:ss a\", \"h:mm:ss a z\", \"h:mm:ss a zzzz\"], [\"{1}, {0}\", u, \"{1} at {0}\", u, [\".\", \",\", \":\", \"%\", \"+\", \"-\n \", \"E\", \"x\", \"%o\", \"\", \"NaN\", \":\", \"\"], [\"#,##0.###\", \"#,##0%\", \"#\n#,##0.00\", \"#E\", \"USD\", \"$\", \"US\n Dollar\"], {\", \"ltr\", plural};\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this\n source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {RuntimeError, RuntimeErrorCode} from\n './errors';\nimport {global} from './util/global';\nimport localeEn from './locale_en';\n\n/**\n * This const is used\n to store the locale data registered with `registerLocaleData`\n *\n\nlet LOCALE_DATA: {[localeId: string]: any} =\n {};\n\n/**\n * Register locale data to be used internally by Angular. See the\n * [\"I18n guide\"](guide/i18n-\n common-format-data-locale) to know how to import additional locale\n * data.\n *\n * The signature\n `registerLocaleData(data: any, extraData?: any)` is deprecated since v5.1\n *\n\nexport function\n registerLocaleData(data: any, localeId?: string|any, extraData?: any): void {\n if (typeof localeId !== 'string') {\n extraData = localeId;\n localeId = data[LocaleDataIndex.LocaleId];\n }\n\n localeId =\n localeId.toLowerCase().replace(/_/g, '-');\n\n LOCALE_DATA[localeId] = data;\n\n if (extraData) {\n LOCALE_DATA[localeId][LocaleDataIndex.ExtraData]\n = extraData;\n }\n}\n\n/**\n * Finds the locale data for a given locale.\n *\n * @param locale The locale code.\n *\n * @returns The locale data.\n *\n * @see [Internationalization (i18n) Guide](https://angular.io/guide/i18n-overview)\n *\n\nexport function findLocaleData(locale: string): any {\n const normalizedLocale = normalizeLocale(locale);\n\n let match = getLocaleData(normalizedLocale);\n\n if (match) {\n return match;\n }\n\n // let's try to find a parent\n locale\n const parentLocale = normalizedLocale.split('-')[0];\n match = getLocaleData(parentLocale);\n\n if (match)

```







```

I18nCreateOpCode.SHIFT;\n * const text = i18nCreateOpCodes[i];\n * let node: Text|Comment;\n * if (opcode
& I18nCreateOpCode.COMMENT === I18nCreateOpCode.COMMENT) {\n * node = IView[~index] =
document.createComment(text);\n * } else {\n * node = IView[index] = document.createText(text);\n * }\n *
if (opcode & I18nCreateOpCode.APPEND_EAGERLY !== I18nCreateOpCode.APPEND_EAGERLY) {\n *
parentNode.appendChild(node);\n * }\n * }\n * ```\n */\nexport interface I18nCreateOpCodes extends
Array<number|string>,

```

```

I18nDebug {\n __brand__: 'I18nCreateOpCodes';\n}\n\n/**\n * See `I18nCreateOpCodes`\n */\nexport enum
I18nCreateOpCode {\n /**\n * Number of bits to shift index so that it can be combined with the
`APPEND_EAGERLY` and\n * `COMMENT`.\n */\n SHIFT = 2,\n /**\n * Should the node be appended to
parent immediately after creation.\n */\n APPEND_EAGERLY = 0b01,\n /**\n * If set the node should be
comment (rather than a text) node.\n */\n COMMENT = 0b10,\n}\n\n/**\n * Stores DOM operations which
need to be applied to update DOM render tree due to changes in\n * expressions.\n */\n * The basic idea is that
`i18nExp` OpCodes capture expression changes and update a change\n * mask bit. (Bit 1 for expression 1, bit 2 for
expression 2 etc..., bit 32 for expression 32 and\n * higher.) The OpCodes then compare its own change mask
against the expression change mask to\n * determine if the OpCodes should execute.\n */\n * NOTE: 32nd bit is
special as it says 32nd or higher.

```

```

This way if we have more than 32 bindings\n * the code still works, but with lower efficiency. (it is unlikely that a
translation would have\n * more than 32 bindings.)\n */\n * These OpCodes can be used by both the i18n block as
well as ICU sub-block.\n */\n * ## Example\n */\n * Assume\n * ```\n * if (rf & RenderFlags.Update) {\n *
i18nExp(ctx.exp1); // If changed set mask bit 1\n * i18nExp(ctx.exp2); // If changed set mask bit 2\n *
i18nExp(ctx.exp3); // If changed set mask bit 3\n * i18nExp(ctx.exp4); // If changed set mask bit 4\n *
i18nApply(0); // Apply all changes by executing the OpCodes.\n * }\n * ```\n * We can assume that each call
to `i18nExp` sets an internal `changeMask` bit depending on the\n * index of `i18nExp`.\n */\n * ### OpCodes\n *
```\n * <I18nUpdateOpCodes>[\n * // The following OpCodes represent: `<div i18n-
title="pre{ {exp1} }in{ {exp2} }post">\n * // If `changeMask & 0b11`\n * // has changed then execute update
OpCodes.\n * // has NOT changed then skip `8` values and start processing next OpCodes.\n * 0b11, 8,\n *
// Concatenate `newValue = 'pre'+IView[bindIndex-4]+'in'+IView[bindIndex-3]+'post';.\n * 'pre', -4, 'in', -3,
'post',\n * // Update attribute: `elementAttribute(1, 'title', sanitizerFn(newValue));`\n * 1 << SHIFT_REF | Attr,
'title', sanitizerFn,\n * // The following OpCodes represent: `<div i18n>Hello { {exp3} }!`\n * // If
`changeMask & 0b100`\n * // has changed then execute update OpCodes.\n * // has NOT changed then
skip `4` values and start processing next OpCodes.\n * 0b100, 4,\n * // Concatenate `newValue = 'Hello ' +
IView[bindIndex -2] + '!';.\n * 'Hello ', -2, '!',\n * // Update text: `IView[1].textContent = newValue;`\n * 1 <<
SHIFT_REF | Text,\n * // The following OpCodes represent: `<div i18n>{exp4, plural, ... }`\n * // If
`changeMask & 0b1000`\n * // has changed then execute update OpCodes.\n *
// has NOT changed then skip `2` values and start processing next OpCodes.\n * 0b1000, 2,\n * //
Concatenate `newValue = IView[bindIndex -1];`\n * -1,\n * // Switch ICU: `icuSwitchCase(IView[1], 0,
newValue);`\n * 0 << SHIFT_ICU | 1 << SHIFT_REF | IcuSwitch,\n * // Note `changeMask & -1` is always
true, so the IcuUpdate will always execute.\n * -1, 1,\n * // Update ICU: `icuUpdateCase(IView[1], 0);`\n * 0 <<
SHIFT_ICU | 1 << SHIFT_REF | IcuUpdate,\n * }\n * ```\n */\n */\nexport interface I18nUpdateOpCodes
extends Array<string|number|SanitizerFn|null>, I18nDebug {\n __brand__: 'I18nUpdateOpCodes';\n}\n\n/**\n *
Store information for the i18n translation block.\n */\nexport interface TI18n {\n /**\n * A set of OpCodes which
will create the Text Nodes and ICU anchors for the translation blocks.\n */\n * NOTE: The ICU anchors are filled
in with ICU Update OpCode.\n */\n create: I18nCreateOpCodes;\n /**\n * A set of OpCodes which will
be executed on each change detection to determine if any changes to\n * DOM are required.\n */\n update:
I18nUpdateOpCodes;\n}\n\n/**\n * Defines the ICU type of `select` or `plural`\n */\nexport const enum IcuType {\n
select = 0,\n plural = 1,\n}\n\nexport interface TIcu {\n /**\n * Defines the ICU type of `select` or `plural`\n */\n
type: IcuType;\n /**\n * Index in `LView` where the anchor node is stored. `<!-- ICU:0:0 -->`\n */\n
anchorIdx: number;\n /**\n * Currently selected ICU case pointer.\n */\n * `IView[currentCaseLViewIndex]`

```

stores the currently selected case. This is needed to know how to clean up the current case when transitioning to the new case.

If the value stored is `null`: No current case selected.

`<0`: A flag which means that the ICU just switched and that `icuUpdate` must be executed regardless of the `mask`. (After the execution the flag is cleared)

`>=0` A currently selected case

index

currentCaseLViewIndex: number

A list of case values which the current ICU will try to match.

The last value is `other` cases: any[]

A set of OpCodes to apply in order to build up the DOM render tree for the ICU

create: IcuCreateOpCodes[]

A set of OpCodes to apply in order to destroy the DOM render tree for the ICU

remove: I18nRemoveOpCodes[]

A set of OpCodes to apply in order to update the DOM render tree for the ICU bindings

update: I18nUpdateOpCodes[]

Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.

```
export const unusedValueExportToPlacateAjd = 1;
```

```
export interface IcuExpression {
  type: IcuType;
  mainBinding: number;
  cases: string[];
  values: (string|IcuExpression)[][];
}
```

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```
import {DEFAULT_LOCALE_ID} from '../i18n/localization';
import {assertDefined} from '../util/assert';

The locale id that the application is currently using (for translations and ICU expressions). This is the ivy version of `LOCALE_ID` that was defined as an injection token for the view engine but is now defined as a global value.

let LOCALE_ID = DEFAULT_LOCALE_ID;

Sets the locale id that will be used for translations and ICU expressions. This is the ivy version of `LOCALE_ID` that was defined as an injection token for the view engine but is now defined as a global value.

@param localeId
export function setLocaleId(localeId: string) {
  assertDefined(localeId, `Expected localeId to be defined`);
  if (typeof localeId === 'string') {
    LOCALE_ID = localeId.toLowerCase().replace(/_/g, '-');
  }
}
```

Gets the locale id that will be used for translations and ICU expressions. This is the ivy version of `LOCALE\_ID` that was defined as an injection token for the view engine but is now defined as a global value.

```
export function getLocaleId(): string {
  return LOCALE_ID;
}
```

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```
import {assertDomNode, assertIndexInRange} from '../util/assert';
import {TNode, TNodeFlags, TNodeType} from './interfaces/node';
import {Renderer} from './interfaces/renderer';
import {RElement, RNode} from './interfaces/renderer_dom';
import {LView} from './interfaces/view';
import {getInsertInFrontOfRNodeWithNoI18n, nativeInsertBefore} from './node_manipulation';
import {unwrapRNode} from './util/view_utils';

Find a node in front of which `currentTNode` should be inserted (takes i18n into account). This method determines the `RNode` in front of which we should insert the `currentRNode`. This takes `TNode.insertBeforeIndex` into account.

@param parentTNode parent `TNode`
@param currentTNode current `TNode` (The node which we would like to insert into the DOM)
@param IView current `LView`
export function getInsertInFrontOfRNodeWithI18n(
  parentTNode: TNode, currentTNode: TNode, IView: LView): RNode|null {
  const tNodeInsertBeforeIndex = currentTNode.insertBeforeIndex;
  const insertBeforeIndex = Array.isArray(tNodeInsertBeforeIndex) ? tNodeInsertBeforeIndex[0] : tNodeInsertBeforeIndex;
  if (insertBeforeIndex === null) {
    return getInsertInFrontOfRNodeWithNoI18n(parentTNode, currentTNode, IView);
  } else {
    ngDevMode && assertIndexInRange(IView, insertBeforeIndex);
    return unwrapRNode(IView[insertBeforeIndex]);
  }
}
```

Process `TNode.insertBeforeIndex` by adding i18n text nodes. See `TNode.insertBeforeIndex`

```
export function processI18nInsertBefore(
  renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[], parentRElement: RElement|null): void {
  const tNodeInsertBeforeIndex = childTNode.insertBeforeIndex;
  if (Array.isArray(tNodeInsertBeforeIndex)) {
    // An array indicates that there are i18n nodes that need to be added as children of this // `childRNode`. These i18n nodes were created before this `childRNode` was available and
```

```

so\n // only now can be added. The first element of the array is the normal index where we should\n // insert the
`childRNode`. Additional elements are the extra nodes to be added as children of\n // `childRNode`.\n
ngDevMode && assertDomNode(childRNode);\n let i18nParent: RElement|null = childRNode as RElement;\n
let anchorRNode: RNode|null = null;\n if (!(childTNode.type & TNodeType.AnyRNode)) {\n anchorRNode
= i18nParent;\n i18nParent = parentRElement;\n }\n if (i18nParent !== null && (childTNode.flags &
TNodeFlags.isComponentHost) === 0) {\n for (let i = 1; i < tNodeInsertBeforeIndex.length; i++) {\n // No
need to `unwrapRNode` because all of the indexes point to i18n text nodes.\n // see `assertDomNode` below.\n
const i18nChild = IView[tNodeInsertBeforeIndex[i]];\n nativeInsertBefore(renderer, i18nParent, i18nChild,
anchorRNode, false);\n }\n }\n }"}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {assertEqual} from '../util/assert';\nimport {TNode, TNodeType} from
'./interfaces/node';\nimport {setI18nHandling} from './node_manipulation';\nimport
{getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore} from './node_manipulation_i18n';\n\n/*\n * Add
`tNode`
to `previousTNodes` list and update relevant `TNode`s in `previousTNodes` list\n * `tNode.insertBeforeIndex`.\n
*\n * Things to keep in mind:\n * 1. All i18n text nodes are encoded as `TNodeType.Element` and are created
eagerly by the\n * `i18nStart` instruction.\n * 2. All `TNodeType.Placeholder` `TNodes` are elements which will
be created later by\n * `elementStart` instruction.\n * 3. `elementStart` instruction will create `TNode`s in the
ascending `TNode.index` order. (So a\n * smaller index `TNode` is guaranteed to be created before a larger one)\n
*\n * We use the above three invariants to determine `TNode.insertBeforeIndex`.\n *\n * In an ideal world
`TNode.insertBeforeIndex` would always be `TNode.next.index`. However,\n * this will not work because
`TNode.next.index` may be larger than `TNode.index` which means that\n * the next node is not yet created and
therefore we can't insert in front of it.\n *\n * Rule1: `TNode.insertBeforeIndex = null` if `TNode.next
=== null` (Initial condition, as we don't\n * know if there will be further `TNode`s inserted after.)\n * Rule2: If
`previousTNode` is created after the `tNode` being inserted, then\n * `previousTNode.insertBeforeIndex =
tNode.index` (So when a new `tNode` is added we check\n * previous to see if we can update its
`insertBeforeIndex`)\n *\n * See `TNode.insertBeforeIndex` for more context.\n *\n * @param previousTNodes A
list of previous TNodes so that we can easily traverse `TNode`s in\n * reverse order. (If `TNode` would have
`previous` this would not be necessary.)\n * @param newTNode A TNode to add to the `previousTNodes` list.\n
*/\n\nexport function addTNodeAndUpdateInsertBeforeIndex(previousTNodes: TNode[], newTNode: TNode) {\n //
Start with Rule1\n ngDevMode &&\n assertEquals(newTNode.insertBeforeIndex, null, 'We expect that
insertBeforeIndex is not set');\n previousTNodes.push(newTNode);\n if (previousTNodes.length > 1) {\n for
(let i =
previousTNodes.length - 2; i >= 0; i--) {\n const existingTNode = previousTNodes[i];\n // Text nodes are
created eagerly and so they don't need their `indexBeforeIndex` updated.\n // It is safe to ignore them.\n if
(!isI18nText(existingTNode)) {\n if (isNewTNodeCreatedBefore(existingTNode, newTNode) &&\n
getInsertBeforeIndex(existingTNode) === null) {\n // If it was created before us in time, (and it does not yet
have `insertBeforeIndex`)\n // then add the `insertBeforeIndex`.\n setInsertBeforeIndex(existingTNode,
newTNode.index);\n }\n }\n }\n }\n\nfunction isI18nText(tNode: TNode): boolean {\n return
!(tNode.type & TNodeType.Placeholder);\n }\n\nfunction isNewTNodeCreatedBefore(existingTNode: TNode,
newTNode: TNode): boolean {\n return isI18nText(newTNode) || existingTNode.index >
newTNode.index;\n }\n\nfunction getInsertBeforeIndex(tNode: TNode): number|null {\n const index =
tNode.insertBeforeIndex;\n
return Array.isArray(index) ? index[0] : index;\n }\n\nfunction setInsertBeforeIndex(tNode: TNode, value:
number): void {\n const index = tNode.insertBeforeIndex;\n if (Array.isArray(index)) {\n // Array is stored if we
have to insert child nodes. See `TNode.insertBeforeIndex`\n index[0] = value;\n } else {\n
setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);\n tNode.insertBeforeIndex =
value;\n }\n }\n }"}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code

```

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```

import {assertEqual, assertGreaterThan, assertGreaterThanOrEqual, throwError} from '../util/assert';
import {assertTNode, assertTNode} from '../assert';
import {createTNodeAtIndex} from '../instructions/shared';
import {IcuCreateOpCode, TNode} from '../interfaces/i18n';
import {TNodeContainerNode, TNode, TNodeType} from
../interfaces/node;
import {LView, TView} from '../interfaces/view';
import {assertTNodeType} from '../node_assert';
import {setI18nHandling} from '../node_manipulation';
import {getInsertInFrontOfRNodeWithI18n,
processI18nInsertBefore} from '../node_manipulation_i18n';
import {addTNodeAndUpdateInsertBeforeIndex}
from './i18n_insert_before_index';
/**
 * Retrieve `TNode` at a given `index`.
 * The `TNode` can be stored
either directly (if it is nested ICU) OR
 * it is stored inside the `TNodeContainer` if it is top level ICU.
 * The
reason for this is that the top level ICU need a `TNode` so that they are part of the render
 * tree, but nested ICU's
have no TNode, because we don't know ahead of time if the nested ICU is
 * expressed (parent ICU may have
selected a case which does not contain it.)
 * @param tView Current `TView`.
 * @param index Index where
the value should be read from.
 */
export function getTNode(tView: TView, index: number): TNode | null {
  const
value
= tView.data[index] as null | TNode | TNodeContainerNode | string;
  if (value === null || typeof value === 'string')
return null;
  if (ngDevMode && !(value.hasOwnProperty('tViews') ||
value.hasOwnProperty('currentCaseLViewIndex'))) {
    throw Error('We expect to get
    \\null\\|\\TNode\\|\\TNodeContainer\\, but got: ' + value);
  }
  // Here the
`value.hasOwnProperty('currentCaseLViewIndex')` is a polymorphic read as it can be
 // either TNode or
TNodeContainerNode. This is not ideal, but we still think it is OK because it
 // will be just two cases which fits into
the browser inline cache (inline cache can take up to
 // 4)
  const tNode =
value.hasOwnProperty('currentCaseLViewIndex') ? value as TNode :
      (value
as TNodeContainerNode).value;
  ngDevMode && assertTNode(tNode);
  return tNode;
}
/**
 * Store `TNode` at a
give `index`.
 * The `TNode` can be stored either directly (if it is nested ICU)
OR
 * it is stored inside the `TNodeContainer` if it is top level ICU.
 * The reason for this is that the top level
ICU need a `TNode` so that they are part of the render
 * tree, but nested ICU's
have no TNode, because we don't know ahead of time if the nested ICU is
 * expressed (parent ICU may have
selected a case which does not contain it.)
 * @param tView Current `TView`.
 * @param index Index where the value should be stored at in
`TView.data`.
 * @param tNode The TNode to store.
 */
export function setTNode(tView: TView, index: number, tNode:
TNode): void {
  const tNode = tView.data[index] as null | TNodeContainerNode;
  ngDevMode &&
assertEqual(
    tNode === null || tNode.hasOwnProperty('tViews'), true,
    'We expect to get
    \\null\\|\\TNodeContainer\\,');
  if (tNode === null) {
    tView.data[index] = tNode;
  } else {
    ngDevMode &&
assertTNodeType(tNode, TNodeType.Icu);
    tNode.value = tNode;
  }
}
/**
 * Set
`TNode.insertBeforeIndex`
taking the `Array` into account.
 * See `TNode.insertBeforeIndex`.
 */
export function
setTNodeInsertBeforeIndex(tNode: TNode, index: number) {
  ngDevMode && assertTNode(tNode);
  let
insertBeforeIndex = tNode.insertBeforeIndex;
  if (insertBeforeIndex === null) {
    setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);
    insertBeforeIndex =
tNode.insertBeforeIndex =
[null!/* may be updated to number later */, index];
  } else {
    assertEquals(Array.isArray(insertBeforeIndex), true, 'Expecting array here');
    (insertBeforeIndex as
number[]).push(index);
  }
}
/**
 * Create `TNode.type=TNodeType.Placeholder` node.
 * See
`TNodeType.Placeholder` for more information.
 */
export function createTNodePlaceholder(
  tView: TView,
  previousTNodes: TNode[],
  index: number): TNode {
  const tNode = createTNodeAtIndex(tView, index,
TNodeType.Placeholder, null, null);
  addTNodeAndUpdateInsertBeforeIndex(previousTNodes,
tNode);
  return tNode;
}
/**
 * Returns current ICU case.
 * ICU cases are stored as index into the
`TNode.cases`.
 * At times it is necessary to communicate that the ICU case just switched and that next ICU update
 * should update all bindings regardless of the mask. In such a case the we store negative numbers
 * for cases

```

```
which have just been switched. This function removes the negative flag.\n */\nexport function  
getCurrentICUCaseIndex(tIcu: TIcu, IView: LView) {\n  const currentCase: number|null =  
  IView[tIcu.currentCaseLViewIndex];\n  return currentCase === null ? currentCase : (currentCase < 0 ?  
  ~currentCase : currentCase);\n}\n\nexport function getParentFromIcuCreateOpCode(mergedCode: number): number  
{\n  return mergedCode >>> IcuCreateOpCode.SHIFT_PARENT;\n}\n\nexport function  
getRefFromIcuCreateOpCode(mergedCode: number): number {\n  return (mergedCode &  
  IcuCreateOpCode.MASK_REF) >>> IcuCreateOpCode.SHIFT_REF;\n}\n\nexport function  
getInstructionFromIcuCreateOpCode(mergedCode:  
  number): number {\n  return mergedCode & IcuCreateOpCode.MASK_INSTRUCTION;\n}\n\nexport function  
icuParam(opCode: IcuCreateOpCode, parentIdx: number, refIdx: number) {\n  ngDevMode &&  
  assertGreaterThanOrEqual(parentIdx, 0, 'Missing parent index');\n  ngDevMode && assertGreaterThanOrEqual(refIdx, 0,  
  'Missing ref index');\n  return opCode | parentIdx << IcuCreateOpCode.SHIFT_PARENT | refIdx <<  
  IcuCreateOpCode.SHIFT_REF;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at  
https://angular.io/license\n */\nimport { RuntimeError, RuntimeErrorCode } from './errors';\nimport  
{ getPluralCase } from './i18n/localization';\nimport { assertDefined, assertDomNode, assertEqual,  
  assertGreaterThanOrEqual, assertIndexInRange, throwError } from './util/assert';\nimport { assertIndexInExpandableRange,  
  assertTIcu } from './assert';\nimport { attachPatchData } from  
  './context_discovery';\nimport { elementPropertyInternal, setElementAttribute } from './instructions/shared';\nimport  
{ ELEMENT_MARKER, I18nCreateOpCode, I18nCreateOpCodes, I18nUpdateOpCode, I18nUpdateOpCodes,  
  ICU_MARKER, IcuCreateOpCode, IcuCreateOpCodes, IcuType, TI18n, TIcu } from './interfaces/i18n';\nimport  
{ TNode } from './interfaces/node';\nimport { RElement, RNode, RText } from './interfaces/renderer_dom';\nimport  
{ SanitizerFn } from './interfaces/sanitization';\nimport { HEADER_OFFSET, LView, RENDERER, TView } from  
  './interfaces/view';\nimport { createCommentNode, createElementNode, createTextNode, nativeInsertBefore,  
  nativeParentNode, nativeRemoveNode, updateTextNode } from './node_manipulation';\nimport { getBindingIndex }  
  from './state';\nimport { renderStringify } from './util/stringify_utils';\nimport { getNativeByIndex, unwrapRNode }  
  from './util/view_utils';\nimport { getLocaleId } from './i18n_locale_id';\nimport { getCurrentICUCaseIndex,  
  getParentFromIcuCreateOpCode, getRefFromIcuCreateOpCode,  
  getTIcu } from './i18n_util';\n\n/**\n * Keep track of which input bindings in `i18nExp` have changed.\n *\n * This is used to efficiently update expressions in i18n only when the corresponding input has  
  changed.\n *\n * 1) Each bit represents which of the `i18nExp` has changed.\n * 2) There are 32 bits allowed in JS.\n * 3) Bit 32 is special as it is shared for all changes past 32. (In other words if you have more  
  than 32 `i18nExp` then all changes past 32nd `i18nExp` will be mapped to same bit. This means  
  that we may end up changing more than we need to. But i18n expressions with 32 bindings is rare  
  so in practice it should not be an issue.)\n *\n * let changeMask = 0b0;\n *\n * Keeps track of which bit needs to be updated in `changeMask`\n *\n * This value gets incremented on every call to `i18nExp`\n *\n * let changeMaskCounter = 0;\n *\n * Keep track of which input bindings in `i18nExp` have changed.\n *\n * `setMaskBit` gets invoked by each call to `i18nExp`\n *\n * @param hasChange did `i18nExp` detect a change.\n *\n * export function  
setMaskBit(hasChange: boolean) {\n  if (hasChange) {\n    changeMask = changeMask | (1 <<  
      Math.min(changeMaskCounter, 31));\n  }\n  changeMaskCounter++;\n}\n\nexport function applyI18n(tView: TView, IView: LView, index: number) {\n  if (changeMaskCounter > 0) {\n    ngDevMode &&  
    assertDefined(tView, `tView should be defined`);\n    const tI18n = tView.data[index] as TI18n |  
      I18nUpdateOpCodes;\n    // When `index` points to an `i18nAttributes` then we have an array otherwise `TI18n`\n    const updateOpCodes: I18nUpdateOpCodes =\n      Array.isArray(tI18n) ? tI18n as I18nUpdateOpCodes : (tI18n  
      as TI18n).update;\n    const bindingsStartIndex = getBindingIndex() - changeMaskCounter - 1;\n    applyUpdateOpCodes(tView, IView, updateOpCodes, bindingsStartIndex, changeMask);\n  }\n  // Reset  
  changeMask & maskBit to default for the next update cycle\n  changeMask = 0b0;\n  changeMaskCounter
```

```

= 0;\n}\n\n/**\n * Apply `I18nCreateOpCodes` op-codes as stored in `TI18n.create`. \n * \n * Creates text (and
comment) nodes which are internationalized.\n * \n * @param IView Current IView\n * @param createOpCodes Set
of op-codes to apply\n * @param parentRNode Parent node (so that direct children can be added eagerly) or `null` if
it is\n * a root node.\n * @param insertInFrontOf DOM node that should be used as an anchor.\n */\nexport
function applyCreateOpCodes(\n  IView: LView, createOpCodes: I18nCreateOpCodes, parentRNode:
RElement|null,\n  insertInFrontOf: RElement|null): void {\n  const renderer = IView[RENDERER];\n  for (let i =
0; i < createOpCodes.length; i++) {\n    const opCode = createOpCodes[i++] as any;\n    const text =
createOpCodes[i] as string;\n    const isComment = (opCode & I18nCreateOpCode.COMMENT) ===
I18nCreateOpCode.COMMENT;\n    const appendNow =\n      (opCode &
I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY;\n
    const index = opCode >>> I18nCreateOpCode.SHIFT;\n    let rNode = IView[index];\n    if (rNode === null) {\n
      // We only create new DOM nodes if they don't already exist: If ICU switches case back to a\n      // case which
was already instantiated, no need to create new DOM nodes.\n      rNode = IView[index] =\n        isComment ?
renderer.createComment(text) : createTextNode(renderer, text);\n    }\n    if (appendNow && parentRNode !==
null) {\n      nativeInsertBefore(renderer, parentRNode, rNode, insertInFrontOf, false);\n    }\n  }\n}\n\n/**\n *
Apply `I18nMutateOpCodes` OpCodes.\n * \n * @param tView Current `TView`\n * @param mutableOpCodes
Mutable OpCodes to process\n * @param IView Current `LView`\n * @param anchorRNode place where the i18n
node should be inserted.\n */\nexport function applyMutableOpCodes(\n  tView: TView, mutableOpCodes:
IcuCreateOpCodes, IView: LView, anchorRNode: RNode): void {\n  ngDevMode &&
assertDomNode(anchorRNode);\n  const renderer = IView[RENDERER];\n
  // `rootIdx` represents the node into which all inserts happen.\n  let rootIdx: number|null = null;\n  // `rootRNode`
represents the real node into which we insert. This can be different from\n  // `IView[rootIdx]` if we have
projection.\n  // - null we don't have a parent (as can be the case in when we are inserting into a root of\n  //
LView which has no parent.)\n  // - `RElement` The element representing the root after taking projection into
account.\n  let rootRNode!: RElement|null;\n  for (let i = 0; i < mutableOpCodes.length; i++) {\n    const opCode =
mutableOpCodes[i];\n    if (typeof opCode === 'string') {\n      const textNodeIndex = mutableOpCodes[++i] as
number;\n      if (IView[textNodeIndex] === null) {\n        ngDevMode &&
ngDevMode.renderer.createTextNode++;\n        ngDevMode && assertIndexInRange(IView, textNodeIndex);\n
IView[textNodeIndex] = createTextNode(renderer, opCode);\n      }\n    } else if (typeof opCode === 'number') {\n
switch
(opCode & IcuCreateOpCode.MASK_INSTRUCTION) {\n      case IcuCreateOpCode.AppendChild:\n        const parentIdx =
getParentFromIcuCreateOpCode(opCode);\n        if (rootIdx === null) {\n          // The first
operation should save the `rootIdx` because the first operation\n          // must insert into the root. (Only subsequent
operations can insert into a dynamic\n          // parent)\n          rootIdx = parentIdx;\n          rootRNode =
nativeParentNode(renderer, anchorRNode);\n        }\n        let insertInFrontOf: RNode|null;\n        let
parentRNode: RElement|null;\n        if (parentIdx === rootIdx) {\n          insertInFrontOf = anchorRNode;\n
parentRNode = rootRNode;\n        } else {\n          insertInFrontOf = null;\n          parentRNode =
unwrapRNode(IView[parentIdx]) as RElement;\n        }\n        // FIXME(misko): Refactor with
`processI18nText`\n        if (parentRNode !== null) {\n          // This can happen if
the `LView` we are adding to is not attached to a parent `LView`. \n          // In such a case there is no `root` we
can attach to. This is fine, as we still need to\n          // create the elements. When the `LView` gets later added to a
parent these `root` nodes\n          // get picked up and added.\n          ngDevMode &&
assertDomNode(parentRNode);\n          const refIdx = getRefFromIcuCreateOpCode(opCode);\n          ngDevMode &&
assertGreaterThan(refIdx, HEADER_OFFSET, 'Missing ref');\n          // `unwrapRNode` is not
needed here as all of these point to RNodes as part of the i18n\n          // which can't have components.\n          const child = IView[refIdx] as RElement;\n          ngDevMode &&
assertDomNode(child);\n          nativeInsertBefore(renderer, parentRNode, child, insertInFrontOf, false);\n          const tIcu =
getTIcu(tView, refIdx);\n          if (tIcu !== null && typeof tIcu === 'object') {\n            // If we just added a comment

```









```

*/\nextport function i18nCreateOpCodesToString(\n  this: I18nCreateOpCodes|void, opcodes?:
I18nCreateOpCodes): string[] {\n  const createOpCodes: I18nCreateOpCodes = opcodes || (Array.isArray(this) ? this
: [] as any);\n  let lines: string[] = [];\n  for (let i = 0; i < createOpCodes.length; i++) {\n    const opCode =
createOpCodes[i++] as any;\n    const text = createOpCodes[i] as string;\n    const isComment = (opCode &
I18nCreateOpCode.COMMENT) === I18nCreateOpCode.COMMENT;\n    const appendNow = (\n      (opCode &
I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY);\n    const index =
opCode >>> I18nCreateOpCode.SHIFT;\n    lines.push(\n      `parent.appendChild(IView[${index}] = document.${isComment ?
'createComment' : 'createText'}(${JSON.stringify(text)});`);\n    if (appendNow) {\n
lines.push(\n      `parent.appendChild(IView[${index}]);`);\n    }\n  }\n  return lines;\n}\n\n/**\n * Converts
`I18nUpdateOpCodes` array into a human readable format.\n * This function is attached
to the `I18nUpdateOpCodes.debug` property if `ngDevMode` is enabled.\n * This function provides a human
readable view of the opcodes. This is useful when debugging the\n * application as well as writing more readable
tests.\n * @param this `I18nUpdateOpCodes` if attached as a method.\n * @param opcodes
`I18nUpdateOpCodes` if invoked as a function.\n */\nextport function i18nUpdateOpCodesToString(\n  this:
I18nUpdateOpCodes|void, opcodes?: I18nUpdateOpCodes): string[] {\n  const parser = new OpCodeParser(opcodes
|| (Array.isArray(this) ? this : []));\n  let lines: string[] = [];\n\n  function consumeOpCode(value: number): string {\n
const ref = value >>> I18nUpdateOpCode.SHIFT_REF;\n  const opCode = value &
I18nUpdateOpCode.MASK_OPCODE;\n  switch (opCode) {\n    case I18nUpdateOpCode.Text:\n      return
`\n      (IView[${ref}] as Text).textContent = $$$`;\n    case I18nUpdateOpCode.Attr:\n      const attrName =
parser.consumeString();\n      const sanitizationFn =
parser.consumeFunction();\n      const value = sanitizationFn ? `(${sanitizationFn})($$$)` : $$$;\n      return
`\n      (IView[${ref}] as Element).setAttribute('${attrName}', ${value})`;\n    case I18nUpdateOpCode.IcuSwitch:\n
return `icuSwitchCase(${ref}, $$$)`;\n    case I18nUpdateOpCode.IcuUpdate:\n      return
`icuUpdateCase(${ref})`;\n  }\n  throw new Error('unexpected OpCode');\n}\n\nwhile (parser.hasMore()) {\n
let mask = parser.consumeNumber();\n  let size = parser.consumeNumber();\n  const end = parser.i + size;\n
const statements: string[] = [];\n  let statement = "";\n  while (parser.i < end) {\n    let value =
parser.consumeNumberOrString();\n    if (typeof value === 'string') {\n      statement += value;\n    } else if
(value < 0) {\n      // Negative numbers are ref indexes\n      // Here `i` refers to current binding index. It is to
signify that the value is relative,\n      // rather than absolute.\n      statement +=
`${IView[i + value + ]}`;\n    } else {\n      // Positive numbers are operations.\n      const opCodeText =
consumeOpCode(value);\n      statements.push(\n        opCodeText.replace('$$$', '' + statement + '') + `;`);\n
statement = "";\n    }\n  }\n  lines.push(\n    `if (mask & 0b${mask.toString(2)}) { ${statements.join(' ')} }`);\n
}\n  return lines;\n}\n\n/**\n * Converts `I18nCreateOpCodes` array into a human readable format.\n * This function
is attached to the `I18nCreateOpCodes.debug` if `ngDevMode` is enabled. This\n * function provides a human
readable view of the opcodes. This is useful when debugging the\n * application as well as writing more readable
tests.\n * @param this `I18nCreateOpCodes` if attached as a method.\n * @param opcodes
`I18nCreateOpCodes` if invoked as a function.\n */\nextport function icuCreateOpCodesToString(\n  this:
IcuCreateOpCodes|void, opcodes?: IcuCreateOpCodes): string[] {\n  const parser = new OpCodeParser(opcodes ||
(Array.isArray(this) ? this : []));\n  let lines: string[] = [];\n\n  function consumeOpCode(opCode: number): string {\n
const parent = getParentFromIcuCreateOpCode(opCode);\n  const ref = getRefFromIcuCreateOpCode(opCode);\n  switch
(getInstructionFromIcuCreateOpCode(opCode)) {\n    case IcuCreateOpCode.AppendChild:\n      return
`\n      (IView[${parent}] as Element).appendChild(IView[${lastRef}]);`\n    case IcuCreateOpCode.Attr:\n      return
`\n      (IView[${ref}] as Element).setAttribute("${parser.consumeString()}", "${\n
parser.consumeString()}")`;\n  }\n  throw new Error('Unexpected OpCode: ' +
getInstructionFromIcuCreateOpCode(opCode));\n}\n\nlet lastRef = -1;\nwhile (parser.hasMore()) {\n  let value
= parser.consumeNumberStringOrMarker();\n  if (value === ICU_MARKER) {\n    const text =
parser.consumeString();\n    lastRef = parser.consumeNumber();\n    lines.push(\n      `IView[${lastRef}] =

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document.createComment("\${text}\");\n  } else if (value ===
ELEMENT_MARKER) {\n  const text = parser.consumeString();\n  lastRef = parser.consumeNumber();\n
lines.push(`IView[${lastRef}] = document.createElement("\${text}\");\n  } else if (typeof value === 'string') {\n
  lastRef = parser.consumeNumber();\n  lines.push(`IView[${lastRef}] =
document.createTextNode("\${value}\");\n  } else if (typeof value === 'number') {\n  const line =
consumeOpCode(value);\n  line && lines.push(line);\n  } else {\n  throw new Error('Unexpected value');\n
}\n }\n\n return lines;\n}\n\n/**\n * Converts `I18nRemoveOpCodes` array into a human readable format.\n *\n *
This function is attached to the `I18nRemoveOpCodes.debug` if `ngDevMode` is enabled. This\n * function
provides a human readable view of the opcodes. This is useful when debugging the\n * application as well as writing
more readable tests.\n *\n * @param this `I18nRemoveOpCodes` if attached as a method.\n * @param opcodes
`I18nRemoveOpCodes` if invoked as
a function.\n */\nexport function i18nRemoveOpCodesToString(\n  this: I18nRemoveOpCodes|void, opcodes?:
I18nRemoveOpCodes): string[] {\n  const removeCodes = opcodes || (Array.isArray(this) ? this : []);\n  let lines:
string[] = [];\n\n  for (let i = 0; i < removeCodes.length; i++) {\n  const nodeOrIcuIndex = removeCodes[i] as
number;\n  if (nodeOrIcuIndex > 0) {\n  // Positive numbers are `RNode`s.\n
lines.push(`remove(IView[${nodeOrIcuIndex}])`);\n  } else {\n  // Negative numbers are ICUs\n
lines.push(`removeNestedICU(${~nodeOrIcuIndex})`);\n  }\n }\n\n return lines;\n}\n\n\nclass OpCodeParser {\n
i: number = 0;\n codes: any[];\n\n constructor(codes: any[]) {\n  this.codes = codes;\n }\n\n hasMore() {\n
return this.i < this.codes.length;\n }\n\n consumeNumber(): number {\n  let value = this.codes[this.i++];\n
assertNumber(value, 'expecting number in OpCode');\n  return value;\n }\n\n consumeString(): string {\n  let
value = this.codes[this.i++];\n
  assertString(value, 'expecting string in OpCode');\n  return value;\n }\n\n consumeFunction(): Function|null {\n
let value = this.codes[this.i++];\n  if (value === null || typeof value === 'function') {\n  return value;\n }\n
throw new Error('expecting function in OpCode');\n }\n\n consumeNumberOrString(): number|string {\n  let value
= this.codes[this.i++];\n  if (typeof value === 'string') {\n  return value;\n }\n  assertNumber(value, 'expecting
number or string in OpCode');\n  return value;\n }\n\n consumeNumberStringOrMarker():
number|string|ICU_MARKER|ELEMENT_MARKER {\n  let value = this.codes[this.i++];\n  if (typeof value ===
'string' || typeof value === 'number' || value == ICU_MARKER ||\n    value == ELEMENT_MARKER) {\n
return value;\n }\n  assertNumber(value, 'expecting number, string, ICU_MARKER or ELEMENT_MARKER in
OpCode');\n  return value;\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\nimport './../util/ng_dev_mode';\nimport
'./../util/ng_i18n_closure_mode';\nimport {getTemplateContent, URI_ATTRS, VALID_ATTRS,
VALID_ELEMENTS} from './../sanitization/html_sanitizer';\nimport {getInertBodyHelper} from
'./../sanitization/inert_body';\nimport {_sanitizeUrl} from './../sanitization/url_sanitizer';\nimport {assertDefined,
assertEqual, assertGreaterThanOrEqual, assertOneOf, assertString} from './../util/assert';\nimport {CharCode} from
'./../util/char_code';\nimport {loadIcuContainerVisitor} from './instructions/i18n_icu_container_visitor';\nimport
{allocExpando, createTNodeAtIndex} from './instructions/shared';\nimport {getDocument} from
'./interfaces/document';\nimport {ELEMENT_MARKER, I18nCreateOpCode, I18nCreateOpCodes,
I18nRemoveOpCodes, I18nUpdateOpCode, I18nUpdateOpCodes, ICU_MARKER, IcuCreateOpCode,
IcuCreateOpCodes, IcuExpression, IcuType, TI18n, TIcu} from './interfaces/i18n';\nimport {TNode, TNodeType}
from './interfaces/node';\nimport {SanitizerFn} from './interfaces/sanitization';\nimport {HEADER_OFFSET,
LView, TView} from './interfaces/view';\nimport {getCurrentParentTNode, getCurrentTNode, setCurrentTNode}
from './state';\nimport {attachDebugGetter} from './util/debug_utils';\nimport {i18nCreateOpCodesToString,
i18nRemoveOpCodesToString, i18nUpdateOpCodesToString, icuCreateOpCodesToString} from
'./i18n_debug';\nimport {addTNodeAndUpdateInsertBeforeIndex} from './i18n_insert_before_index';\nimport
{ensureIcuContainerVisitorLoaded} from './i18n_tree_shaking';\nimport {createTNodePlaceholder,
icuCreateOpCode, setTIcu, setTNodeInsertBeforeIndex} from './i18n_util';\n\n\nconst BINDING_REGEXP =

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/(\d+):?\d*/gi;\nconst ICU_REGEX = /(\{s*\d+:\d*\s*,\s*\S{6}\s*,[\s\S]*\})/gi;\nconst NESTED_ICU =
/(\d+);/\nconst ICU_BLOCK_REGEX = /^(\s*(\d+:\d*)\s*,\s*(select|plural))\s*,;/\nconst
MARKER = `;\nconst SUBTEMPLATE_REGEX = /\|?(\d+:\d+)/gi;\nconst PH_REGEX =
/(\|?[\#*])\d+:\d*/gi;\n\n**\n * Angular Dart introduced &nbsp; as a placeholder for non-removable space, see:\n
* https://github.com/dart-lang/angular/blob/0bb611387d29d65b5af7f9d2515ab571fd3fbee4/\_tests/test/compiler/preserve\_whitespace\_test.dart#L25-L32\n * In Angular Dart &nbsp; is converted to the 0xE500 PUA (Private Use Areas) unicode character\n * and later on replaced by a space. We are re-implementing the same idea here, since translations\n * might contain this special character.\n *\nconst NGSP_UNICODE_REGEX = /\uE500/g;\nfunction replaceNgsp(value: string): string {\n return value.replace(NGSP_UNICODE_REGEX, ' ');\n}\n\n**\n * Create dynamic nodes from i18n translation block.\n *\n * - Text nodes are created synchronously\n * - TNodes are linked into tree lazily\n *\n * @param tView Current `TVIEW`\n * @parentTNodeIndex index to the parent TNode of this i18n block\n * @param lView Current `LVIEW`\n * @param index Index of `i18nStart` instruction.\n * @param message Message to translate.\n * @param subTemplateIndex Index into the sub template of message translation. (ie in case of\n * `ngIf` (-1 otherwise))\n *\nexport function i18nStartFirstCreatePass(\n tView: TVIEW, parentTNodeIndex: number, lView: LVIEW, index: number, message: string,\n subTemplateIndex: number) {\n const rootTNode = getCurrentParentTNode();\n const createOpCodes: I18nCreateOpCodes = [] as any;\n const updateOpCodes: I18nUpdateOpCodes = [] as any;\n const existingTNodeStack: TNode[][] = [[]];\n if (ngDevMode) {\n attachDebugGetter(createOpCodes, i18nCreateOpCodesToString);\n attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n }\n\n message = getTranslationForTemplate(message, subTemplateIndex);\n const msgParts = replaceNgsp(message).split(PH_REGEX);\n for (let i = 0; i < msgParts.length; i++) {\n let value = msgParts[i];\n if ((i & 1) === 0) {\n // Even indexes are text (including bindings & ICU expressions)\n const parts = i18nParseTextIntoPartsAndICU(value);\n for (let j = 0; j < parts.length; j++) {\n let part = parts[j];\n if ((j & 1) === 0) {\n // `j` is odd therefore `part` is string\n const text = part as string;\n ngDevMode && assertString(text, 'Parsed ICU part should be string');\n if (text !== '') {\n i18nStartFirstCreatePassProcessTextNode(\n tView, rootTNode, existingTNodeStack[0], createOpCodes, updateOpCodes, lView, text);\n } else {\n // `j` is Even therefor `part` is an `ICUExpression`\n const icuExpression: IcuExpression = part as IcuExpression;\n // Verify that ICU expression has the right shape. Translations might contain invalid\n // constructions (while original messages were correct), so ICU parsing at runtime may\n // not succeed (thus `icuExpression` remains a string).\n // Note: we intentionally retain the error here by not using `ngDevMode`, because\n // the value can change based on the locale and users aren't guaranteed to hit\n // an invalid string while they're developing.\n if (typeof icuExpression !== 'object') {\n throw new Error(`Unable to parse ICU expression in "${message}" message.`);\n }\n const icuContainerTNode = createTNodeAndAddOpCode(\n tView, rootTNode, existingTNodeStack[0], lView, createOpCodes,\n ngDevMode ? `ICU ${index}:${icuExpression.mainBinding}` : '', true);\n const icuNodeIndex = icuContainerTNode.index;\n ngDevMode &&\n assertGreaterThanOrEqual(\n icuNodeIndex, HEADER_OFFSET, 'Index must be in absolute LVIEW offset');\n icuStart(tView, lView, updateOpCodes, parentTNodeIndex, icuExpression, icuNodeIndex);\n }\n }\n } else {\n // Odd indexes are placeholders (elements and sub-templates)\n // At this point value is something like: '#1:2' (originally coming from '#1:2')\n const isClosing = value.charCodeAt(0) === CharCode.SLASH;\n const type = value.charCodeAt(isClosing ? 1 : 0);\n ngDevMode && assertOneOf(type, CharCode.STAR, CharCode.HASH);\n const index = HEADER_OFFSET + Number.parseInt(value.substring((isClosing ? 2 : 1))); \n if (isClosing) {\n existingTNodeStack.shift();\n setCurrentTNode(getCurrentParentTNode(), false);\n } else {\n const tNode = createTNodePlaceholder(tView, existingTNodeStack[0], index);\n existingTNodeStack.unshift([]);\n setCurrentTNode(tNode, true);\n }\n }\n }\n tView.data[index] = <TNode>{\n create: createOpCodes,\n

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update: updateOpCodes,\n };\n}\n\n/**\n * Allocate space in i18n Range add create OpCode instruction to create a
text or comment
node.\n *\n * @param tView Current `TView` needed to allocate space in i18n range.\n * @param rootTNode Root
`TNode` of the i18n block. This node determines if the new TNode will be\n * added as part of the `i18nStart`
instruction or as part of the `TNode.insertBeforeIndex`.\n * @param existingTNodes internal state for
`addTNodeAndUpdateInsertBeforeIndex`.\n * @param IView Current `LView` needed to allocate space in i18n
range.\n * @param createOpCodes Array storing `I18nCreateOpCodes` where new opCodes will be added.\n *
@param text Text to be added when the `Text` or `Comment` node will be created.\n * @param isICU true if a
`Comment` node for ICU (instead of `Text`) node should be created.\n */\nfunction createTNodeAndAddOpCode(\n
tView: TView, rootTNode: TNode|null, existingTNodes: TNode[], IView: LView,\n createOpCodes:
I18nCreateOpCodes, text: string|null, isICU: boolean): TNode {\n const i18nNodeIdx = allocExpando(tView,
IView, 1, null);\n let opCode = i18nNodeIdx <<
I18nCreateOpCode.SHIFT;\n let parentTNode = getCurrentParentTNode();\n\n if (rootTNode === parentTNode)
{\n // FIXME(misko): A null `parentTNode` should represent when we fall of the `LView` boundary.\n // (there
is no parent), but in some circumstances (because we are inconsistent about how we set\n //
`previousOrParentTNode`) it could point to `rootTNode` So this is a work around.\n parentTNode = null;\n }\n if
(parentTNode === null) {\n // If we don't have a parent that means that we can eagerly add nodes.\n // If we have
a parent than these nodes can't be added now (as the parent has not been created\n // yet) and instead the
`parentTNode` is responsible for adding it. See\n // `TNode.insertBeforeIndex`\n opCode |=
I18nCreateOpCode.APPEND_EAGERLY;\n }\n if (isICU) {\n opCode |= I18nCreateOpCode.COMMENT;\n
ensureIcuContainerVisitorLoaded(loadIcuContainerVisitor);\n }\n createOpCodes.push(opCode, text === null ? " :
text);\n // We store `{{?}}`
so that when looking at debug `TNodeType.template` we can see where the\n // bindings are.\n const tNode =
createTNodeAtIndex(\n tView, i18nNodeIdx, isICU ? TNodeType.Icu : TNodeType.Text,\n text === null ?
(ngDevMode ? '{{?}}' : "") : text, null);\n addTNodeAndUpdateInsertBeforeIndex(existingTNodes, tNode);\n const
tNodeIdx = tNode.index;\n setCurrentTNode(tNode, false /* Text nodes are self closing */);\n if (parentTNode !==
null && rootTNode !== parentTNode) {\n // We are a child of deeper node (rather than a direct child of
`i18nStart` instruction.)\n // We have to make sure to add ourselves to the parent.\n
setTNodeInsertBeforeIndex(parentTNode, tNodeIdx);\n }\n return tNode;\n}\n\n/**\n * Processes text node in
i18n block.\n *\n * Text nodes can have:\n * - Create instruction in `createOpCodes` for creating the text node.\n * -
Allocate spec for text node in i18n range of `LView`\n * - If contains binding:\n * - bindings => allocate space in
i18n
range of `LView` to store the binding value.\n * - populate `updateOpCodes` with update instructions.\n *\n *
@param tView Current `TView`\n * @param rootTNode Root `TNode` of the i18n block. This node determines if
the new TNode will\n * be added as part of the `i18nStart` instruction or as part of the\n *
`TNode.insertBeforeIndex`.\n * @param existingTNodes internal state for
`addTNodeAndUpdateInsertBeforeIndex`.\n * @param createOpCodes Location where the creation OpCodes will
be stored.\n * @param IView Current `LView`\n * @param text The translated text (which may contain binding)\n
*/\nfunction i18nStartFirstCreatePassProcessTextNode(\n tView: TView, rootTNode: TNode|null,
existingTNodes: TNode[], createOpCodes: I18nCreateOpCodes,\n updateOpCodes: I18nUpdateOpCodes, IView:
LView, text: string): void {\n const hasBinding = text.match(BINDING_REGEX);\n const tNode =
createTNodeAndAddOpCode(\n tView, rootTNode, existingTNodes, IView, createOpCodes, hasBinding
? null : text, false);\n if (hasBinding) {\n generateBindingUpdateOpCodes(updateOpCodes, text, tNode.index,
null, 0, null);\n }\n}\n\n/**\n * See `i18nAttributes` above.\n */\nexport function i18nAttributesFirstPass(tView:
TView, index: number, values: string[]) {\n const previousElement = getCurrentTNode();\n const
previousElementIndex = previousElement.index;\n const updateOpCodes: I18nUpdateOpCodes = [] as any;\n if
(ngDevMode) {\n attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n }\n if
(tView.firstCreatePass && tView.data[index] === null) {\n for (let i = 0; i < values.length; i += 2) {\n const

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SUBTEMPLATE_REGEXP.exec(message)) !== null) {\n  if (!inTemplate) {\n    res += message.substring(index,
match.index
+ match[0].length);\n    tagMatched = match[1];\n    inTemplate = true;\n  } else {\n    if (match[0] ===
`${MARKER}/${tagMatched}${MARKER}`) {\n      index = match.index;\n      inTemplate = false;\n    }\n  }\n}\n\n ngDevMode &&\n  assertEqual(\n    inTemplate, false,\n    `Tag mismatch: unable to find the
end of the sub-template in the translation \"${\n      message}\"`);\n  res += message.slice(index);\n  return
res;\n}\n\n/**\n * Extracts a part of a message and removes the rest.\n *\n * This method is used for extracting a
part of the message associated with a template. A\n * translated message can span multiple templates.\n *\n *
Example:\n * ``\n * <div i18n>Translate <span *ngIf>me</span>!</div>\n * ``\n * @param message The
message to crop\n * @param subTemplateIndex Index of the sub-template to extract. If undefined it returns the\n *
external template and removes all sub-templates.\n */\nexport function getTranslationForTemplate(message:
string, subTemplateIndex: number) {\n  if (isRootTemplateMessage(subTemplateIndex)) {\n    // We want the root
template message, ignore all sub-templates\n    return removeInnerTemplateTranslation(message);\n  } else {\n    //
We want a specific sub-template\n    const start =\n      message.indexOf(`${subTemplateIndex}${MARKER}`) +
2 + subTemplateIndex.toString().length;\n    const end = message.search(new
RegExp(`${MARKER}\\\\\\\\\\\\\\\\*\\\\\\\\\\\\\\\\d+:${subTemplateIndex}${MARKER}`));\n    return
removeInnerTemplateTranslation(message.substring(start, end));\n  }\n}\n\n/**\n * Generate the OpCodes for ICU
expressions.\n *\n * @param icuExpression\n * @param index Index where the anchor is stored and an optional
`TicuContainerNode`\n * - `IView[anchorIdx]` points to a `Comment` node representing the anchor for the ICU.\n *
- `tView.data[anchorIdx]` points to the `TicuContainerNode` if ICU is root ( `null` otherwise)\n */\nexport
function icuStart(\n  tView: TView, IView:
LView, updateOpCodes: I18nUpdateOpCodes, parentIdx: number,\n  icuExpression: IcuExpression, anchorIdx:
number) {\n  ngDevMode && assertDefined(icuExpression, 'ICU expression must be defined');\n  let bindingMask
= 0;\n  const tIcu: TIcu = {\n    type: icuExpression.type,\n    currentCaseLViewIndex: allocExpando(tView, IView,
1, null),\n    anchorIdx,\n    cases: [],\n    create: [],\n    remove: [],\n    update: []\n  };\n  addUpdateIcuSwitch(updateOpCodes, icuExpression, anchorIdx);\n  setTIcu(tView, anchorIdx, tIcu);\n  const
values = icuExpression.values;\n  for (let i = 0; i < values.length; i++) {\n    // Each value is an array of strings &
other ICU expressions\n    const valueArr = values[i];\n    const nestedIcus: IcuExpression[] = [];\n    for (let j = 0; j
< valueArr.length; j++) {\n      const value = valueArr[j];\n      if (typeof value !== 'string') {\n        // It is an nested
ICU expression\n        const icuIndex = nestedIcus.push(value as IcuExpression) - 1;\n
        // Replace nested ICU expression by a comment node\n        valueArr[j] = `<!--${icuIndex}-->`;\n      }\n    }\n  }\n  bindingMask = parseIcuCase(\n
    tView, tIcu, IView, updateOpCodes, parentIdx,
icuExpression.cases[i],\n    valueArr.join(""), nestedIcus) \n    bindingMask;\n  }\n  if (bindingMask)
{\n    addUpdateIcuUpdate(updateOpCodes, bindingMask, anchorIdx);\n  }\n}\n\n/**\n * Parses text containing an
ICU expression and produces a JSON object for it.\n *\n * Original code from closure library, modified for Angular.\n
*\n * @param pattern Text containing an ICU expression that needs to be parsed.\n */\nexport function
parseICUBlock(pattern: string): IcuExpression {\n  const cases = [];\n  const values: (string|IcuExpression)[][] =
[];\n  let icuType = IcuType.plural;\n  let mainBinding = 0;\n  pattern = pattern.replace(ICU_BLOCK_REGEXP,
function(str: string, binding: string, type: string) {\n    if (type === 'select') {\n      icuType
= IcuType.select;\n    } else {\n      icuType = IcuType.plural;\n    }\n    mainBinding = parseInt(binding.slice(1),
10);\n    return ";\n  });\n  const parts = i18nParseTextIntoPartsAndICU(pattern) as string[];\n  // Looking for (key
block)+ sequence. One of the keys has to be "other".\n  for (let pos = 0; pos < parts.length;) {\n    let key =
parts[pos++].trim();\n    if (icuType === IcuType.plural) {\n      // Key can be "=x", we just want "x"\n      key =
key.replace(/\\s*(?:=)?(\\w+)\\s*/, '$1');\n    }\n    if (key.length) {\n      cases.push(key);\n    }\n\n    const blocks =
i18nParseTextIntoPartsAndICU(parts[pos++]) as string[];\n    if (cases.length > values.length) {\n
      values.push(blocks);\n    }\n  }\n  // TODO(ocombe): support ICU expressions in attributes, see #21615\n  return
{type: icuType, mainBinding: mainBinding, cases, values};\n}\n\n/**\n * Breaks pattern into strings and top level
{...} blocks.\n *\n * Can be used to break a message into text and

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ICU expressions, or to break an ICU expression\n * into keys and cases. Original code from closure library,
modified for Angular.\n *\n * @param pattern (sub)Pattern to be broken.\n *\n * @returns An
`Array<string|IcuExpression>` where:\n * - odd positions: `string` => text between ICU expressions\n * - even
positions: `ICUExpression` => ICU expression parsed into `ICUExpression` record.\n */\nexport function
i18nParseTextIntoPartsAndICU(pattern: string): (string|IcuExpression)[] {\n  if (!pattern) {\n    return [];\n  }\n  let
prevPos = 0;\n  const braceStack = [];\n  const results: (string|IcuExpression)[] = [];\n  const braces = /{}/g;\n  //
lastIndex doesn't get set to 0 so we have to.\n  braces.lastIndex = 0;\n  let match;\n  while (match =
braces.exec(pattern)) {\n    const pos = match.index;\n    if (match[0] === '{') {\n      braceStack.pop();\n    } else {\n
if (braceStack.length === 0) {\n      // End of the block.\n      const block = pattern.substring(prevPos, pos);\n
      if (ICU_BLOCK_REGEXP.test(block)) {\n        results.push(parseICUBlock(block));\n      } else {\n
results.push(block);\n      }\n      prevPos = pos + 1;\n    } else {\n      if (braceStack.length === 0) {\n
const substring = pattern.substring(prevPos, pos);\n      results.push(substring);\n      prevPos = pos + 1;\n    }\n
braceStack.push('{');\n  }\n  }\n  const substring = pattern.substring(prevPos);\n  results.push(substring);\n
return results;\n}\n\n/**\n * Parses a node, its children and its siblings, and generates the mutate & update
OpCodes.\n *\n */\nexport function parseIcuCase(\n  tView: TView, tIcu: TIcu, IView: LView, updateOpCodes:
I18nUpdateOpCodes, parentIdx: number,\n  caseName: string, unsafeCaseHtml: string, nestedIcus:
IcuExpression[]): number {\n  const create: IcuCreateOpCodes = [] as any;\n  const remove: I18nRemoveOpCodes
= [] as any;\n  const update: I18nUpdateOpCodes = [] as any;\n  if (ngDevMode)\n    {\n      attachDebugGetter(create, icuCreateOpCodesToString);\n      attachDebugGetter(remove,
i18nRemoveOpCodesToString);\n      attachDebugGetter(update, i18nUpdateOpCodesToString);\n    }\n  tIcu.cases.push(caseName);\n  tIcu.create.push(create);\n  tIcu.remove.push(remove);\n
tIcu.update.push(update);\n  const inertBodyHelper = getInertBodyHelper(getDocument());\n  const
inertBodyElement = inertBodyHelper.getInertBodyElement(unsafeCaseHtml);\n  ngDevMode &&\n  assertDefined(inertBodyElement, 'Unable to generate inert body element');\n  const inertRootNode =
getTemplateContent(inertBodyElement!) as Element || inertBodyElement;\n  if (inertRootNode) {\n    return
walkIcuTree(\n      tView, tIcu, IView, updateOpCodes, create, remove, update, inertRootNode, parentIdx,\n      nestedIcus, 0);\n  } else {\n    return 0;\n  }\n}\n\nfunction walkIcuTree(\n  tView: TView, tIcu: TIcu, IView:
LView, sharedUpdateOpCodes: I18nUpdateOpCodes,\n  create: IcuCreateOpCodes, remove:
I18nRemoveOpCodes,\n  update: I18nUpdateOpCodes,\n  parentNode: Element, parentIdx: number, nestedIcus: IcuExpression[], depth:
number): number {\n  let bindingMask = 0;\n  let currentNode = parentNode.firstChild;\n  while (currentNode) {\n
const newIndex = allocExpando(tView, IView, 1, null);\n  switch (currentNode.nodeType) {\n    case
Node.ELEMENT_NODE:\n      const element = currentNode as Element;\n      const tagName =
element.tagName.toLowerCase();\n      if (VALID_ELEMENTS.hasOwnProperty(tagName)) {\n        addCreateNodeAndAppend(create, ELEMENT_MARKER, tagName, parentIdx, newIndex);\n
tView.data[newIndex] = tagName;\n        const elAttrs = element.attributes;\n        for (let i = 0; i < elAttrs.length;
i++) {\n          const attr = elAttrs.item(i);\n          const lowerAttrName = attr.name.toLowerCase();\n
const hasBinding = !!attr.value.match(BINDING_REGEXP);\n          // we assume the input string is safe, unless
it's using a binding\n          if (hasBinding) {\n            if (VALID_ATTRS.hasOwnProperty(lowerAttrName)) {\n              if
(URI_ATTRS[lowerAttrName]) {\n                generateBindingUpdateOpCodes(\n                  update, attr.value,
newIndex, attr.name, 0, _sanitizeUrl);\n              } else {\n                generateBindingUpdateOpCodes(update,
attr.value, newIndex, attr.name, 0, null);\n              }\n            } else {\n              ngDevMode &&\n
console.warn(\n                `WARNING: ignoring unsafe attribute value ` +\n                `${lowerAttrName}`\n                on element ${tagName} ` +\n                `(see https://g.co/ng/security#xss)`);\n            }\n            } else {\n
addCreateAttribute(create, newIndex, attr);\n            }\n          }\n          // Parse the children of this node (if any)\n
bindingMask = walkIcuTree(\n            tView, tIcu, IView, sharedUpdateOpCodes, create,

```

```

remove, update,\n                currentNode as Element, newIndex, nestedIcus, depth + 1) |\n
bindingMask;\n    addRemoveNode(remove, newIndex, depth);\n    }\n    break;\n    case
Node.TEXT_NODE:\n    const value = currentNode.textContent || ";;\n    const hasBinding =
value.match(BINDING_REGEXP);\n    addCreateNodeAndAppend(create, null, hasBinding ? " : value,
parentIdx, newIndex);\n    addRemoveNode(remove, newIndex, depth);\n    if (hasBinding) {\n
bindingMask =\n        generateBindingUpdateOpCodes(update, value, newIndex, null, 0, null) | bindingMask;\n
    }\n    break;\n    case Node.COMMENT_NODE:\n    // Check if the comment node is a placeholder for a
nested ICU\n    const isNestedIcu = NESTED_ICU.exec(currentNode.textContent || "");\n    if (isNestedIcu) {\n
const nestedIcuIndex = parseInt(isNestedIcu[1], 10);\n    const icuExpression: IcuExpression =
nestedIcus[nestedIcuIndex];\n
    // Create the comment node that will anchor the ICU expression\n    addCreateNodeAndAppend(\n
create, ICU_MARKER, ngDevMode ? `nested ICU ${nestedIcuIndex}` : "", parentIdx,\n        newIndex);\n
icuStart(tView, IView, sharedUpdateOpCodes, parentIdx, icuExpression, newIndex);\n
addRemoveNestedIcu(remove, newIndex, depth);\n    }\n    break;\n    }\n    currentNode =
currentNode.nextSibling;\n    }\n    return bindingMask;\n    }\n\nfunction addRemoveNode(remove:
I18nRemoveOpCodes, index: number, depth: number) {\n    if (depth === 0) {\n    remove.push(index);\n
    }\n}\n\nfunction addRemoveNestedIcu(remove: I18nRemoveOpCodes, index: number, depth: number) {\n    if
(depth === 0) {\n    remove.push(~index); // remove ICU at `index`\n    remove.push(index); // remove ICU
comment at `index`\n    }\n}\n\nfunction addUpdateIcuSwitch(\n    update: I18nUpdateOpCodes, icuExpression:
IcuExpression, index: number) {\n    update.push(\n
toMaskBit(icuExpression.mainBinding), 2, -1 - icuExpression.mainBinding,\n    index <<
I18nUpdateOpCode.SHIFT_REF | I18nUpdateOpCode.IcuSwitch);\n    }\n}\n\nfunction addUpdateIcuUpdate(update:
I18nUpdateOpCodes, bindingMask: number, index: number) {\n    update.push(bindingMask, 1, index <<
I18nUpdateOpCode.SHIFT_REF | I18nUpdateOpCode.IcuUpdate);\n    }\n}\n\nfunction addCreateNodeAndAppend(\n
create: IcuCreateOpCodes, marker: null|ICU_MARKER|ELEMENT_MARKER, text: string,\n
appendToParentIdx: number, createAtIdx: number) {\n    if (marker !== null) {\n    create.push(marker);\n
    }\n    create.push(\n    text, createAtIdx,\n    icuCreateOpCode(IcuCreateOpCode.AppendChild, appendToParentIdx,
createAtIdx));\n    }\n}\n\nfunction addCreateAttribute(create: IcuCreateOpCodes, newIndex: number, attr: Attr) {\n
create.push(newIndex << IcuCreateOpCode.SHIFT_REF | IcuCreateOpCode.Attr, attr.name,
attr.value);\n    }\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n// i18nPostprocess consts\nconst ROOT_TEMPLATE_ID = 0;\nconst
PP_MULTI_VALUE_PLACEHOLDERS_REGEXP = /\[(.+?)\]/;\nconst PP_PLACEHOLDERS_REGEXP =
/\[(.+?)\](\|\/?*\d+:\d+)/g;\nconst PP_ICU_VARS_REGEXP =
/(\{s*(VAR_(PLURAL|SELECT)(_\d+)?)(\s*)/g;\nconst PP_ICU_PLACEHOLDERS_REGEXP = /{([A-Z0-9_+])}/g;\nconst PP_ICUS_REGEXP = /I18N_EXP_(ICU(_\d+)?)/g;\nconst PP_CLOSE_TEMPLATE_REGEXP
= /\|\/?*/g;\nconst PP_TEMPLATE_ID_REGEXP = /\d+:\d+/g;\n\n// Parsed placeholder structure used in
postprocessing (within `i18nPostprocess` function)\n// Contains the following fields: [templateId,
isCloseTemplateTag, placeholder]\ntype PostprocessPlaceholder = [number, boolean, string];\n\n/*\n * Handles
message string post-processing for internationalization.\n * \n * Handles message string post-processing by
transforming it from intermediate\n * format
(that might contain some markers that we need to replace) to the final\n * form, consumable by i18nStart
instruction. Post processing steps include:\n * \n * 1. Resolve all multi-value cases (like [*1:1#2:1|#:1|5])\n * \n * 2.
Replace all ICU vars (like `VAR_PLURAL`)\n * \n * 3. Replace all placeholders used inside ICUs in a form of
{PLACEHOLDER}\n * \n * 4. Replace all ICU references with corresponding values (like ICU_EXP_ICU_1)\n * \n * in
case multiple ICUs have the same placeholder name\n * \n * @param message Raw translation string for post
processing\n * @param replacements Set of replacements that should be applied\n * \n * @returns Transformed
string that can be consumed by i18nStart instruction\n * \n * @codeGenApi\n */\nexport function i18nPostprocess(\n

```

```

message: string, replacements: {[key: string]: (string|string[])} = {}): string {\n /**\n * Step 1: resolve all multi-
value placeholders like [#5|#1:1#2:1#4:1]\n * Note: due to the way we process nested templates
(BFS), multi-value placeholders are typically\n * grouped by templates, for example: [#5|#6|#1:1#3:2] where #5
and #6 belong to root\n * template, #1:1 belong to nested template with index 1 and #1:2 - nested template with
index\n * 3. However in real templates the order might be different: i.e. #1:1 and/or #3:2 may go in\n * front of
#6. The post processing step restores the right order by keeping track of the\n * template id stack and looks for
placeholders that belong to the currently active template.\n */\n let result: string = message;\n if
(PP_MULTI_VALUE_PLACEHOLDERS_REGEXP.test(message)) {\n const matches: {[key: string]:
PostprocessPlaceholder[]} = {};\n const templateIdsStack: number[] = [ROOT_TEMPLATE_ID];\n result =
result.replace(PP_PLACEHOLDERS_REGEXP, (m: any, phs: string, tmp: string): string => {\n const content =
phs || tmp;\n const placeholders: PostprocessPlaceholder[] = matches[content] || [];\n if
(!placeholders.length) {\n content.split('').forEach((placeholder: string) => {\n const match =
placeholder.match(PP_TEMPLATE_ID_REGEXP);\n const templateId = match ? parseInt(match[1], 10) :
ROOT_TEMPLATE_ID;\n const isCloseTemplateTag =
PP_CLOSE_TEMPLATE_REGEXP.test(placeholder);\n placeholders.push([templateId, isCloseTemplateTag,
placeholder]);\n });\n matches[content] = placeholders;\n }\n\n if (!placeholders.length) {\n
throw new Error(`i18n postprocess: unmatched placeholder - ${content}`);\n }\n\n const currentTemplateId =
templateIdsStack[templateIdsStack.length - 1];\n let idx = 0;\n // find placeholder index that matches current
template id\n for (let i = 0; i < placeholders.length; i++) {\n if (placeholders[i][0] === currentTemplateId)
{\n idx = i;\n break;\n }\n }\n // update template id stack based on the current tag extracted\n
const [templateId, isCloseTemplateTag, placeholder] = placeholders[idx];\n if (isCloseTemplateTag) {\n
templateIdsStack.pop();\n } else if (currentTemplateId !== templateId) {\n
templateIdsStack.push(templateId);\n }\n // remove processed tag from the list\n placeholders.splice(idx,
1);\n return placeholder;\n });\n }\n\n // return current result if no replacements specified\n if
(!Object.keys(replacements).length) {\n return result;\n }\n\n /**\n * Step 2: replace all ICU vars (like
`VAR_PLURAL`)\n */\n result = result.replace(PP_ICU_VARS_REGEXP, (match, start, key, _type, _idx, end):
string => {\n return replacements.hasOwnProperty(key) ? `${start}${replacements[key]}${end}` : match;\n
});\n\n /**\n * Step 3: replace all placeholders used inside ICUs in a form of {PLACEHOLDER}\n */\n result =
result.replace(PP_ICU_PLACEHOLDERS_REGEXP, (match, key): string => {\n return
replacements.hasOwnProperty(key) ? replacements[key]
as string : match;\n });\n\n /**\n * Step 4: replace all ICU references with corresponding values (like
ICU_EXP_ICU_1) in case\n * multiple ICUs have the same placeholder name\n */\n result =
result.replace(PP_ICUS_REGEXP, (match, key): string => {\n if (replacements.hasOwnProperty(key)) {\n
const list = replacements[key] as string[];\n if (!list.length) {\n throw new Error(`i18n postprocess:
unmatched ICU - ${match} with key: ${key}`);\n }\n return list.shift()!;\n }\n return match;\n });\n\n
return result;\n }\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport './../util/ng_dev_mode';\nimport './../util/ng_i18n_closure_mode';\nimport {assertDefined} from
'./../util/assert';\nimport {bindingUpdated} from './bindings';\nimport {applyCreateOpCodes, applyI18n,
setMaskBit} from './i18n/i18n_apply';\nimport {i18nAttributesFirstPass, i18nStartFirstCreatePass} from
'./i18n/i18n_parse';\nimport {i18nPostprocess} from './i18n/i18n_postprocess';\nimport {TI18n} from
'./interfaces/i18n';\nimport {TElementNode, TNodeType} from './interfaces/node';\nimport {HEADER_OFFSET,
T_HOST} from './interfaces/view';\nimport {getClosestRElement} from './node_manipulation';\nimport
{getCurrentParentTNode, getLView, getTView, nextBindingIndex, setInI18nBlock} from './state';\nimport
{getConstant} from './util/view_utils';\n\n/**\n * Marks a block of text as translatable.\n */\n * The instructions
`i18nStart` and `i18nEnd` mark the translation block in the template.\n * The translation `message` is the value
which is locale specific. The translation string may\n * contain placeholders which associate inner elements and sub-
templates within the translation.\n */\n * The translation `message` placeholders are: `index`(:{block})`):

```

### \*Binding Placeholder\*:

Marks a location where an expression will be interpolated into. The placeholder ``index`` points to the expression binding index. An optional ``block`` that matches the sub-template in which it was declared.  
``#{index}(:{block})`/`#{index}(:{block})``: \*Element Placeholder\*: Marks the beginning and end of DOM element that were embedded in the original translation block. The placeholder ``index`` points to the element index in the template instructions set. An optional ``block`` that matches the sub-template in which it was declared.  
``*{index}:{block}`/`*{index}:{block}``: \*Sub-template Placeholder\*: Sub-templates must be split up and translated separately in each angular template function. The ``index`` points to the ``template`` instruction index. A ``block`` that matches the sub-template in which it was declared.  
``@param index`` A unique index of the translation in the static block.  
``@param messageIndex`` An index of the translation message from the ``def.consts`` array.  
``@param subTemplateIndex`` Optional sub-template index in the ``message``.

```
@codeGenApi\n\nexport function i18nStart(\n  index: number, messageIndex: number, subTemplateIndex: number = -1): void {\n  const tView = getTView();\n  const IView = getLView();\n  const adjustedIndex = HEADER_OFFSET + index;\n  ngDevMode && assertDefined(tView, `tView should be defined`);\n  const message = getConstant<string>(tView.consts, messageIndex!);\n  const parentTNode = getCurrentParentTNode() as TElementNode | null;\n  if (tView.firstCreatePass) {\n    i18nStartFirstCreatePass(\n      tView, parentTNode === null ? 0 : parentTNode.index, IView, adjustedIndex, message, subTemplateIndex);\n  }\n  const tI18n = tView.data[adjustedIndex] as TI18n;\n  const sameViewParentTNode = parentTNode === IView[T_HOST] ? null : parentTNode;\n  const parentRNode = getClosestRElement(tView, sameViewParentTNode, IView);\n  // If `parentTNode` is an
```

```
  `ElementContainer` than it has <!--ng-container-->.  
  // When we do inserts we have to make sure to insert in front of <!--ng-container-->.  
  const insertInFrontOf = parentTNode && (parentTNode.type & TNodeType.ElementContainer) ?\n    IView[parentTNode.index] : null;\n  applyCreateOpCodes(IView, tI18n.create, parentRNode, insertInFrontOf);\n  setInI18nBlock(true);\n}\n\n/**\n * Translates a translation block marked by `i18nStart` and `i18nEnd`. It inserts the text/ICU nodes into the render tree, moves the placeholder nodes and removes the deleted nodes.  
*\n * @codeGenApi\n */\nexport function i18nEnd(): void {\n  setInI18nBlock(false);\n}\n\n/**\n * Use this instruction to create a translation block that doesn't contain any placeholder.  
*\n * It calls both {@link i18nStart} and {@link i18nEnd} in one instruction.  
*\n * The translation `message` is the value which is locale specific. The translation string may contain placeholders which associate inner
```

elements and sub-templates within the translation.  
The translation ``message`` placeholders are:  
``#{index}(:{block})``: \*Binding Placeholder\*: Marks a location where an expression will be interpolated into. The placeholder ``index`` points to the expression binding index. An optional ``block`` that matches the sub-template in which it was declared.  
``*{index}(:{block})`/`*{index}(:{block})``: \*Element Placeholder\*: Marks the beginning and end of DOM element that were embedded in the original translation block. The placeholder ``index`` points to the element index in the template instructions set. An optional ``block`` that matches the sub-template in which it was declared.  
``*{index}:{block}`/`*{index}:{block}``: \*Sub-template Placeholder\*: Sub-templates must be split up and translated separately in each angular template function. The ``index`` points to the ``template`` instruction index. A ``block`` that matches the sub-template in which it was declared.  
``@param index`` A unique index of the translation in the static block.  
``@param messageIndex`` An index of the translation message from the ``def.consts`` array.  
``@param subTemplateIndex`` Optional sub-template index in the ``message``.

```
@codeGenApi\n\nexport function i18n(index: number, messageIndex: number, subTemplateIndex?: number): void {\n  i18nStart(index, messageIndex, subTemplateIndex);\n  i18nEnd();\n}\n\n/**\n * Marks a list of attributes as translatable.  
*\n * @param index A unique index in the static block  
*\n * @param values\n */\nexport function i18nAttributes(index: number, attrsIndex: number): void {\n  const tView = getTView();\n  ngDevMode && assertDefined(tView, `tView should be defined`);\n  const attrs = getConstant<string[]>(tView.consts, attrsIndex!);\n  i18nAttributesFirstPass(tView, index + HEADER_OFFSET, attrs);\n}\n\n/**\n * Stores the values
```

of the bindings during each update cycle

```
in order to determine if we need to\n * update the translated nodes.\n *\n * @param value The binding's value\n *\n * @returns This function returns itself so that it may be chained\n * (e.g. `i18nExp(ctx.name)(ctx.title)`)\n *\n * @codeGenApi\n * ^\n * export function i18nExp<T>(value: T): typeof i18nExp {\n *   const IView = getLView();\n *   setMaskBit(bindingUpdated(IView, nextBindingIndex(), value));\n *   return i18nExp;\n * }\n *\n * Updates a translation block or an i18n attribute when the bindings have changed.\n *\n * @param index Index of either { @link i18nStart } (translation block) or { @link i18nAttributes } (i18n attribute) on which it should update the content.\n *\n * @codeGenApi\n * ^\n * export function i18nApply(index: number) {\n *   applyI18n(getTView(), getLView(),\n *   index + HEADER_OFFSET);\n * }\n *\n * Handles message string post-processing for internationalization.\n *\n * Handles message string post-processing by transforming it from intermediate\n * format (that might contain some markers that we need to replace) to the final\n * form, consumable by i18nStart instruction. Post processing steps include:\n *\n * 1. Resolve all multi-value cases (like [*:1#2:1|4:1|5])\n *\n * 2. Replace all ICU vars (like `VAR_PLURAL`)\n *\n * 3. Replace all placeholders used inside ICUs in a form of {PLACEHOLDER}\n *\n * 4. Replace all ICU references with corresponding values (like ICU_EXP_ICU_1)\n *\n * in case multiple ICUs have the same placeholder name\n *\n * @param message Raw translation string for post processing\n *\n * @param replacements Set of replacements that should be applied\n *\n * @returns Transformed string that can be consumed by i18nStart instruction\n *\n * @codeGenApi\n * ^\n * export function i18nPostprocess(\n *   message: string,\n *   replacements: {[key: string]: (string|string[])} = {}): string {\n *   return i18nPostprocess(message,\n *   replacements);\n * }\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed
```

by an MIT-style license that can be found in the LICENSE file at <https://angular.io/license>\n \* This file re-exports all symbols contained in this directory.\n \* Why is this file not `index.ts`?\n \* There seems to be an inconsistent path resolution of an `index.ts` file\n \* when only the parent directory is referenced. This could be due to the\n \* node module resolution configuration differing from rollup and/or typescript.\n \* With commit\n \* <https://github.com/angular/angular/commit/d5e3f2c64bd13ce83e7c70788b7fc514ca4a9918>\n \* the `instructions.ts` file was moved to `instructions/instructions.ts` and an\n \* `index.ts` file was used to re-export everything. Having had file names that were\n \* importing from `instructions` directly (not the from the sub file or the `index.ts` file)\n \* caused strange CI issues. `index.ts` had to be renamed to `all.ts` for this\n \* to work.\n \* Jira Issue = FW-1184\n

```
* ^\n * export * from './attribute';\n * export * from './attribute_interpolation';\n * export * from './change_detection';\n * export * from './template';\n * export * from './storage';\n * export * from './di';\n * export * from './di_attr';\n * export * from './element';\n * export * from './element_container';\n * export * from './get_current_view';\n * export * from './listener';\n * export * from './namespace';\n * export * from './next_context';\n * export * from './projection';\n * export * from './property';\n * export * from './property_interpolation';\n * export * from './advance';\n * export * from './styling';\n * export * from './text';\n * export * from './text_interpolation';\n * export * from './class_map_interpolation';\n * export * from './style_map_interpolation';\n * export * from './style_prop_interpolation';\n * export * from './host_property';\n * export * from './i18n';\n * export {getUnknownElementStrictMode, setUnknownElementStrictMode,\n *   getUnknownPropertyStrictMode, setUnknownPropertyStrictMode} from './element_validation';\n * }\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n
```

```
*\n * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at\n * https://angular.io/license\n *\n * import {resolveForwardRef} from './di/forward_ref';\n * import {ClassProvider, Provider} from './di/interface/provider';\n * import {isClassProvider, isTypeProvider} from './di/provider_collection';\n * import {providerToFactory} from './di/r3_injector';\n * import {assertDefined} from './util/assert';\n * import {diPublicInInjector, getNodeInjectable, getOrCreateNodeInjectorForNode} from './di';\n * import {directiveInject} from './instructions/all';\n * import {DirectiveDef} from './interfaces/definition';\n * import {NodeInjectorFactory} from './interfaces/injector';\n * import {TContainerNode, TDirectiveHostNode, TElementContainerNode, TElementNode, TNodeProviderIndexes} from './interfaces/node';\n * import {isComponentDef} from './interfaces/type_checks';\n * import {DestroyHookData, LView,
```





```

the index of item in the array, but only in the begin to end range.\n */\nfunction indexOf(item: any,
arr: any[], begin: number, end: number) {\n for (let i = begin; i < end; i++) {\n if (arr[i] === item) return i;\n }\n return -1;\n}\n\n/**\n * Use this with `multi` providers`.\n */\nfunction multiProvidersFactoryResolver(\n this:
NodeInjectorFactory, _: undefined, tData: TData, lData: LView,\n tNode: TDirectiveHostNode): any[] {\n return
multiResolve(this.multi!, []);\n}\n\n/**\n * Use this with `multi` viewProviders`.\n */\n * This factory knows how to
concatenate itself with the existing `multi` providers`.\n */\nfunction multiViewProvidersFactoryResolver(\n this:
NodeInjectorFactory, _: undefined, tData: TData, lView: LView,\n tNode: TDirectiveHostNode): any[] {\n const
factories = this.multi!;\n let result: any[];\n if (this.providerFactory) {\n const componentCount =
this.providerFactory.componentProviders!;\n const multiProviders =\n getNodeInjectable(lView,
lView[TVIEW], this.providerFactory!.index!, tNode);\n // Copy the section of the
array which contains `multi` providers` from the component\n result = multiProviders.slice(0,
componentCount);\n // Insert the `viewProvider` instances.\n multiResolve(factories, result);\n // Copy the
section of the array which contains `multi` providers` from other directives\n for (let i = componentCount; i <
multiProviders.length; i++) {\n result.push(multiProviders[i]);\n } } else {\n result = [];\n // Insert the
`viewProvider` instances.\n multiResolve(factories, result);\n }\n return result;\n}\n\n/**\n * Maps an array of
factories into an array of values.\n */\nfunction multiResolve(factories: Array<() => any>, result: any[]): any[] {\n
for (let i = 0; i < factories.length; i++) {\n const factory = factories[i]! as () => null;\n result.push(factory());\n
}\n return result;\n}\n\n/**\n * Creates a multi factory.\n */\nfunction multiFactory(\n factoryFn: (\n this:
NodeInjectorFactory, _: undefined, tData: TData, lData: LView,\n
tNode: TDirectiveHostNode) => any,\n index: number, isViewProvider: boolean, isComponent: boolean,\n
f: () => any): NodeInjectorFactory {\n const factory = new NodeInjectorFactory(factoryFn, isViewProvider,
directiveInject);\n factory.multi = [];\n factory.index = index;\n factory.componentProviders = 0;\n
multiFactoryAdd(factory, f, isComponent && !isViewProvider);\n return factory;\n}\n\n", /**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {ProcessProvidersFunction,
Provider} from '../di/interface/provider';\nimport {providersResolver} from '../di_setup';\nimport {DirectiveDef}
from './interfaces/definition';\n\n/**\n * This feature resolves the providers of a directive (or component),\n * and
publish them into the DI system, making it visible to others for injection.\n */\n * For example:\n *
```\n * class ComponentWithProviders {\n * constructor(private greeter: GreeterDE) {\n * static cmp =
defineComponent({\n * type: ComponentWithProviders,\n * selectors: [['component-with-providers']],\n *
factory: () => new ComponentWithProviders(directiveInject(GreeterDE as any)),\n * decls: 1,\n * vars: 1,\n *
template: function(fs: RenderFlags, ctx: ComponentWithProviders) {\n * if (fs & RenderFlags.Create) {\n *
text(0);\n * }\n * if (fs & RenderFlags.Update) {\n * textInterpolate(ctx.greeter.greet());\n * }\n *
},\n * features: [ProvidersFeature([GreeterDE])]\n * });\n * }\n * ```\n */\n * @param definition\n */\n * @codeGenApi\n */\nexport function ProvidersFeature<T>(providers: Provider[], viewProviders: Provider[] = []) {\n
return (definition: DirectiveDef<T>) => {\n definition.providersResolver =\n (def: DirectiveDef<T>,
processProvidersFn?: ProcessProvidersFunction) => {\n return
providersResolver(\n def, //\n processProvidersFn ?
processProvidersFn(providers) : providers, //\n viewProviders);\n };;\n }\n\n", /**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {Injector} from
'../di/injector';\nimport {EnvironmentInjector} from '../di/r3_injector';\nimport {Type} from
'./interface/type';\nimport {ComponentFactoryResolver} from './component_factory_resolver';\n\n/**\n * Represents an instance of an `NgModule` created by an `NgModuleFactory`.\n * Provides access to the `NgModule`
instance and related objects.\n */\n * @publicApi\n */\nexport abstract class NgModuleRef<T> {\n /**\n * The
injector that contains all of the providers of the `NgModule`.\n */\n abstract get injector():
EnvironmentInjector;\n\n /**\n * The resolver that can retrieve component factories in a context of this module.\n
*/\n * Note: since v13, dynamic component creation via\n *

```







```

(!componentDef.standalone) {\n
  return null;\n }\n\n if (!this.cachedInjectors.has(componentDef.id)) {\n  const providers =
internalImportProvidersFrom(false, componentDef.type);\n  const standaloneInjector = providers.length > 0 ?\n  createEnvironmentInjector(\n    [providers], this._injector, `Standalone[${componentDef.type.name}]`)\n  : null;\n  this.cachedInjectors.set(componentDef.id, standaloneInjector);\n }\n\n return
this.cachedInjectors.get(componentDef.id);\n }\n\n ngOnDestroy() {\n  try {\n    for (const injector of
this.cachedInjectors.values()) {\n      if (injector !== null) {\n        injector.destroy();\n      }\n    }\n  } finally
{\n    this.cachedInjectors.clear();\n  }\n }\n\n /** @nocollapse */\n static prov = /** @pureOrBreakMyCode */\n defineInjectable({\n  token: StandaloneService,\n  providedIn: 'environment',\n  factory: () => new
StandaloneService(inject(EnvironmentInjector)),\n });\n }\n\n /**\n * A feature
that acts as a setup code for the {@link StandaloneService}.\n * The most important responsibility of this
feature is to expose the `getStandaloneInjector` function (an entry points to a standalone injector creation) on a
component definition object. We go through the features infrastructure to make sure that the standalone injector
creation logic is tree-shakable and not included in applications that don't use standalone components.\n *
@codeGenApi\n */\n export function StandaloneFeature(definition: ComponentDef<unknown>) {\n
definition.getStandaloneInjector = (parentInjector: EnvironmentInjector) => {\n  return
parentInjector.get(StandaloneService).getOrCreateStandaloneInjector(definition);\n };}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be found in the LICENSE file at https://angular.io/license\n */\n\nimport { ChangeDetectionStrategy}
from '../change_detection/constants';\n\nimport
{Injector} from '../di/injector';\n\nimport {ViewEncapsulation} from '../metadata/view';\n\nimport {assertEqual}
from '../util/assert';\n\nimport {assertLView} from '../assert';\n\nimport {discoverLocalRefs,
getComponentAtIndex, getDirectivesAtIndex, getLContext, readPatchedLView} from
'./context_discovery';\n\nimport {getComponentDef, getDirectiveDef} from './definition';\n\nimport {NodeInjector}
from './di';\n\nimport {buildDebugNode} from './instructions/lview_debug';\n\nimport {DirectiveDef} from
'./interfaces/definition';\n\nimport {TElementNode, TNode, TNodeProviderIndexes} from './interfaces/node';\n\nimport
{isLView} from './interfaces/type_checks';\n\nimport {CLEANUP, CONTEXT, DebugNode, FLAGS, LView,
LViewFlags, T_HOST, TVIEW, TViewType} from './interfaces/view';\n\nimport {getLViewParent,
getRootContext} from './view_traversal_utils';\n\nimport {getTNode, unwrapRNode} from './view_utils';\n\n\n\n**\n
* Retrieves the component instance associated
with a given DOM element.\n * @usageNotes\n * Given the following DOM structure:\n * ``html\n *
<app-root>\n * <div>\n * <child-comp></child-comp>\n * </div>\n * </app-root>\n * ``\n * Calling
`getComponent` on `<child-comp>` will return the instance of `ChildComponent`\n * associated with this DOM
element.\n * Calling the function on `<app-root>` will return the `MyApp` instance.\n * @param element
DOM element from which the component should be retrieved.\n * @returns Component instance associated with the
element or `null` if there is no component associated with it.\n * @publicApi\n * @globalApi ng\n
*/\n\n export function getComponent<T>(element: Element): T|null {\n  ngDevMode &&
assertDomElement(element);\n  const context = getLContext(element);\n  if (context === null) return null;\n  if
(context.component === undefined) {\n    const lView = context.lView;\n    if (lView === null) {\n      return null;\n
    }\n    context.component
= getComponentAtIndex(context.nodeIndex, lView);\n  }\n  return context.component as unknown as
T;\n }\n\n\n /**\n * If inside an embedded view (e.g. `*ngIf` or `*ngFor`), retrieves the context of the embedded
view that the element is part of. Otherwise retrieves the instance of the component whose view owns the element
(in this case, the result is the same as calling `getOwningComponent`).\n * @param element Element for which
to get the surrounding component instance.\n * @returns Instance of the component that is around the element or
null if the element isn't inside any component.\n * @publicApi\n * @globalApi ng\n */\n\n export function
getContext<T extends {}>(element: Element): T|null {\n  assertDomElement(element);\n  const context =
getLContext(element);\n  const lView = context ? context.lView : null;\n  return lView === null ? null :

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IView[CONTEXT] as T;\n\n\n/**\n * Retrieves the component instance whose view contains the DOM element.\n *\n */
For example, if `<child-comp>` is used in the template of `<app-comp>` (i.e. a `ViewChild` of `<app-comp>`),
calling `getOwningComponent` on `<child-comp>` would return `<app-comp>`.
@param elementOrDir DOM element, component or directive instance for which to retrieve the root components.
@returns Component instance whose view owns the DOM element or null if the element is not part of a component
view.
@publicApi
@globalApi ng\n\n\nexport function getOwningComponent<T>(elementOrDir:
Element|{}): T|null {\n  const context = getLContext(elementOrDir!);\n  let IView = context ? context.IView :
null;\n  if (IView === null) return null;\n  let parent: LView|null;\n  while (IView[TVIEW].type ===
TViewType.Embedded && (parent = getLViewParent(IView!)) {\n    IView = parent;\n  }\n  return IView[FLAGS]
& LViewFlags.IsRoot ? null : IView[CONTEXT] as unknown as T;\n\n\n\n/**\n * Retrieves all root components
associated with a DOM element, directive
or component instance.
* Root components are those which have been bootstrapped by Angular.
@param elementOrDir DOM element, component or directive instance for which to retrieve the root components.
@returns Root components associated with the target object.
@publicApi
@globalApi ng\n\n\nexport
function getRootComponents(elementOrDir: Element|{}): {}[] {\n  const IView =
readPatchedLView<{}>(elementOrDir);\n  return IView !== null ? [getRootContext(IView)] : [];\n\n\n\n/**\n *
Retrieves an `Injector` associated with an element, component or directive instance.
@param elementOrDir DOM element, component or directive instance for which to retrieve the injector.
@returns Injector associated with the element, component or directive instance.
@publicApi
@globalApi ng\n\n\nexport
function getInjector(elementOrDir: Element|{}): Injector {\n  const context = getLContext(elementOrDir!);\n  const
IView = context ? context.IView
: null;\n  if (IView === null) return Injector.NULL;\n  const tNode = IView[TVIEW].data[context.nodeIndex] as
TElementNode;\n  return new NodeInjector(tNode, IView);\n\n\n\n\n/**\n * Retrieve a set of injection tokens at a
given DOM node.
@param element Element for which the injection tokens should be retrieved.
\nexport
function getInjectionTokens(element: Element): any[] {\n  const context = getLContext(element!);\n  const IView =
context ? context.IView : null;\n  if (IView === null) return [];\n  const tView = IView[TVIEW];\n  const tNode =
tView.data[context.nodeIndex] as TNode;\n  const providerTokens: any[] = [];\n  const startIndex =
tNode.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n  const endIndex =
tNode.directiveEnd;\n  for (let i = startIndex; i < endIndex; i++) {\n    let value = tView.data[i];\n    if
(isDirectiveDefHack(value)) {\n      // The fact that we sometimes store Type and sometimes DirectiveDef in this
location is a\n      // design
flaw. We should always store same type so that we can be monomorphic. The issue\n      // is that for
Components/Directives we store the def instead the type. The correct behavior\n      // is that we should always be
storing injectable type in this location.\n      value = value.type;\n    }\n    providerTokens.push(value);\n  }\n  return
providerTokens;\n\n\n\n\n/**\n * Retrieves directive instances associated with a given DOM node. Does not include\n
* component instances.
* @usageNotes\n * Given the following DOM structure:\n * ``html\n * <app-root>\n * <button my-button></button>\n * <my-comp></my-comp>\n * </app-root>\n * ``\n * Calling
`getDirectives` on `<button>` will return an array with an instance of the `MyButton` directive that is associated
with the DOM node.\n * Calling `getDirectives` on `<my-comp>` will return an empty array.
@param node DOM node for which to get the directives.
@returns Array of directives associated with the
node.
@publicApi
@globalApi ng\n\n\nexport function getDirectives(node: Node): {}[] {\n  // Skip text
nodes because we can't have directives associated with them.\n  if (node instanceof Text) {\n    return [];\n  }\n  const context = getLContext(node!);\n  const IView = context ? context.IView : null;\n  if (IView === null) {\n
return [];\n  }\n  const tView = IView[TVIEW];\n  const nodeIndex = context.nodeIndex;\n  if
(!tView?.data[nodeIndex]) {\n    return [];\n  }\n  if (context.directives === undefined) {\n    context.directives =
getDirectivesAtNodeIndex(nodeIndex, IView, false);\n  }\n  // The `directives` in this case are a named array
called `LComponentView`. Clone the\n  // result so we don't expose an internal data structure in the user's console.\n

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return context.directives === null ? [] : [...context.directives];\n\n/**\n * Partial metadata for a given directive instance.\n * This information might be useful for debugging purposes or tooling.\n * Currently only `inputs` and `outputs` metadata is available.\n */\n * @publicApi\n */\nexport interface DirectiveDebugMetadata {\n  inputs: Record<string, string>;\n  outputs: Record<string, string>;\n}\n\n/**\n * Partial metadata for a given component instance.\n * This information might be useful for debugging purposes or tooling.\n * Currently the following fields are available:\n * - inputs\n * - outputs\n * - encapsulation\n * - changeDetection\n */\n * @publicApi\n */\nexport interface ComponentDebugMetadata extends DirectiveDebugMetadata {\n  encapsulation: ViewEncapsulation;\n  changeDetection: ChangeDetectionStrategy;\n}\n\n/**\n * Returns the debug (partial) metadata for a particular directive or component instance.\n * The function accepts an instance of a directive or component and returns the corresponding\n * metadata.\n */\n * @param directiveOrComponentInstance Instance of a directive or component\n * @returns metadata of the passed directive or component\n */\n * @publicApi\n * @globalApi\n */\nexport function getDirectiveMetadata(directiveOrComponentInstance: any): ComponentDebugMetadata | DirectiveDebugMetadata | null {\n  const {constructor} = directiveOrComponentInstance;\n  if (!constructor) {\n    throw new Error('Unable to find the instance constructor');\n  }\n  // In case a component inherits from a directive, we may have component and directive metadata\n  // To ensure we don't get the metadata of the directive, we want to call `getComponentDef` first.\n  const componentDef = getComponentDef(constructor);\n  if (componentDef) {\n    return {\n      inputs: componentDef.inputs,\n      outputs: componentDef.outputs,\n      encapsulation: componentDef.encapsulation,\n      changeDetection: componentDef.onPush ? ChangeDetectionStrategy.OnPush : ChangeDetectionStrategy.Default\n    };\n  }\n  const directiveDef = getDirectiveDef(constructor);\n  if (directiveDef) {\n    return {\n      inputs: directiveDef.inputs,\n      outputs: directiveDef.outputs\n    };\n  }\n  return null;\n}\n\n/**\n * Retrieve map of local references.\n * The references are retrieved as a map of local reference name to element or directive instance.\n */\n * @param target DOM element, component or directive instance for which to retrieve\n * the local references.\n */\nexport function getLocalRefs(target: {}): {[key: string]: any} {\n  const context = getLContext(target);\n  if (context === null) {\n    return {};\n  }\n  if (context.localRefs === undefined) {\n    const IView = context.IView;\n    if (IView === null) {\n      return {};\n    }\n    context.localRefs = discoverLocalRefs(IView, context.nodeIndex);\n  }\n  return context.localRefs || {};\n}\n\n/**\n * Retrieves the host element of a component or directive instance.\n * The host element is the DOM element that matched the selector of the directive.\n */\n * @param componentOrDirective Component or directive instance for which the host\n * element should be retrieved.\n * @returns Host element of the target.\n */\n * @publicApi\n * @globalApi\n */\nexport function getHostElement(componentOrDirective: {}): Element {\n  return getLContext(componentOrDirective).native as unknown as Element;\n}\n\n/**\n * Retrieves the rendered text for a given component.\n * This function retrieves the host element of a component and\n * and then returns the `textContent` for that element. This implies\n * that the text returned will include re-projected content of\n * the component as well.\n */\n * @param component The component to return the content text for.\n */\nexport function getRenderedText(component: any): string {\n  const hostElement = getHostElement(component);\n  return hostElement.textContent || '';\n}\n\n/**\n * Event listener configuration returned from `getListeners`.\n */\n * @publicApi\n */\nexport interface Listener {\n  /** Name of the event listener. */\n  name: string;\n  /** Element that the listener is bound to. */\n  element: Element;\n  /** Callback that is invoked when the event is triggered. */\n  callback: (value: any) => any;\n  /** Whether the listener is using event capturing. */\n  useCapture: boolean;\n  /** Type of the listener (e.g. a native DOM event or a custom @Output). */\n  type: 'dom'|'output';\n}\n\n/**\n * Retrieves a list of event listeners associated with a DOM element. The list does include host\n * listeners, but it does not include event listeners defined outside of the Angular context\n * (e.g. through `addEventListener`).\n */\n * @usageNotes\n * Given the following DOM structure:\n * ```html\n * <app-root>\n * <div (click)=\"doSomething()\"></div>\n * </app-root>\n * ```\n * Calling `getListeners` on `<div>` will return an object that looks as follows:\n * ```ts\n * {\n *   name: 'click',\n *   element: <div>,\n *   callback: () => doSomething(),\n *   useCapture: false\n * }\n * ```\n */\n * @param element

```

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Element for which the DOM listeners should be retrieved.\n
 * @returns Array of event listeners on the DOM element.\n * @publicApi\n * @globalApi ng\n * ^\nexport
function getListeners(element: Element): Listener[] {\n  ngDevMode && assertDomElement(element);\n  const
IContext = getLContext(element);\n  const IView = IContext === null ? null : IContext.IView;\n  if (IView === null)
return [];\n  const tView = IView[TVIEW];\n  const tCleanup = IView[CLEANUP];\n  const tCleanup =
tView.cleanup;\n  const listeners: Listener[] = [];\n  if (tCleanup && ICleanup) {\n    for (let i = 0; i <
tCleanup.length;)\n      {\n        const firstParam = tCleanup[i++];\n        const secondParam = tCleanup[i++];\n        if (typeof
firstParam === 'string')\n          {\n            const name: string = firstParam;\n            const listenerElement =
unwrapRNode(IView[secondParam]) as any as Element;\n            const callback: (value: any) => any =
ICleanup[tCleanup[i++]);\n            const useCaptureOrIndx = tCleanup[i++];\n            // if useCaptureOrIndx is boolean
then report it as
is.\n            // if useCaptureOrIndx is positive number then it in unsubscribe method\n            // if useCaptureOrIndx is
negative number then it is a Subscription\n            const type =\n              (typeof useCaptureOrIndx === 'boolean' ||
useCaptureOrIndx >= 0) ? 'dom' : 'output';\n            const useCapture = typeof useCaptureOrIndx === 'boolean' ?
useCaptureOrIndx : false;\n            if (element === listenerElement) {\n              listeners.push({element, name, callback,
useCapture, type});\n            }\n          }\n        }\n      }\n    listeners.sort(sortListeners);\n    return listeners;\n  }\n\nfunction
sortListeners(a: Listener, b: Listener) {\n    if (a.name === b.name) return 0;\n    return a.name < b.name ? -1 :
1;\n  }\n\n/**\n * This function should not exist because it is megamorphic and only mostly correct.\n * See call
site for more info.\n */\nfunction isDirectiveDefHack(obj: any): obj is DirectiveDef<any> {\n    return obj.type !==
undefined && obj.template !== undefined && obj.declaredInputs !==
undefined;\n}\n\n/**\n * Returns the attached `DebugNode` instance for an element in the DOM.\n * @param
element DOM element which is owned by an existing component's view.\n * ^\nexport function
getDebugNode(element: Element): DebugNode|null {\n    if (ngDevMode && !(element instanceof Node)) {\n        throw new
Error('Expecting instance of DOM Element');\n    }\n    const IContext = getLContext(element)!;\n    const
IView = IContext ? IContext.IView : null;\n    if (IView === null) {\n        return null;\n    }\n    const nodeIndex =
IContext.nodeIndex;\n    if (nodeIndex !== -1) {\n        const valueInLView = IView[nodeIndex];\n        // this means that
value in the IView is a component with its own\n        // data. In this situation the TNode is not accessed at the same
spot.\n        const tNode =\n            isLView(valueInLView) ? (valueInLView[T_HOST] as TNode) :\n            getTNode(IView[TVIEW], nodeIndex);\n        ngDevMode &&\n            assertEquals(tNode.index, nodeIndex, 'Expecting
that TNode at index is same as index');\n        return buildDebugNode(tNode, IView);\n    }\n    return null;\n}\n\n/**\n * Retrieve the component `LView` from
component/element.\n * NOTE: `LView` is a private and should not be leaked outside.\n * Don't export this
method to `ng.*` on window.\n * @param target DOM element or component instance for which to retrieve the
LView.\n * ^\nexport function getComponentLView(target: any): LView {\n    const IContext =
getLContext(target)!;\n    const nodeIndx = IContext.nodeIndex;\n    const IView = IContext.IView!;\n    ngDevMode
&& assertLView(IView);\n    const componentLView = IView[nodeIndx];\n    ngDevMode &&
assertLView(componentLView);\n    return componentLView;\n}\n\n/** Asserts that a value is a DOM Element.
*/\nfunction assertDomElement(value: any) {\n    if (typeof Element !== 'undefined' && !(value instanceof Element))\n        {\n            throw new Error('Expecting instance of DOM Element');\n        }\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport {Type} from './interface/type';\nimport {noSideEffects} from './util/closure';\ninterface
TypeWithMetadata extends Type<any> {\n    decorators?: any[];\n    ctorParameters?: () => any[];\n    propDecorators?:
{[field: string]: any};\n}\n\n/**\n * Adds decorator, constructor, and property metadata to a given type via static
metadata fields\n * on the type.\n * These metadata fields can later be read with Angular's
`ReflectionCapabilities` API.\n * Calls to `setClassMetadata` can be guarded by ngDevMode, resulting in the
metadata assignments\n * being tree-shaken away during production builds.\n * ^\nexport function
setClassMetadata(\n    type: Type<any>, decorators: any[]|null, ctorParameters: (() => any[])|null,\n

```



thisArg);\n}\n\n/\*\*\n

\* If the value of any provided exp has changed, calls the pure function to return\n \* an updated value. Or if no values have changed, returns cached value.\n \*\n \* @param slotOffset the offset from binding root to the reserved slot\n \* @param pureFn\n \* @param exp1\n \* @param exp2\n \* @param exp3\n \* @param thisArg Optional calling context of pureFn\n \* @returns Updated or cached value\n \*\n \* @codeGenApi\n \*/\nexport function pureFunction3(\n slotOffset: number, pureFn: (v1: any, v2: any, v3: any) => any, exp1: any, exp2: any, exp3: any,\n thisArg?: any): any {\n return pureFunction3Internal(\n getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, exp3, thisArg);\n}\n\n/\*\*\n \* If the value of any provided exp has changed, calls the pure function to return\n \* an updated value. Or if no values have changed, returns cached value.\n \*\n \* @param slotOffset the offset from binding root to the reserved slot\n \* @param pureFn\n \* @param exp1\n \* @param exp2\n \* @param exp3\n \* @param exp4\n \* @param thisArg Optional calling context of pureFn\n \* @returns Updated or cached value\n \*\n \* @codeGenApi\n \*/\nexport function pureFunction4(\n slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any) => any, exp1: any, exp2: any,\n exp3: any, exp4: any, thisArg?: any): any {\n return pureFunction4Internal(\n getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, exp3, exp4, thisArg);\n}\n\n/\*\*\n \* If the value of any provided exp has changed, calls the pure function to return\n \* an updated value. Or if no values have changed, returns cached value.\n \*\n \* @param slotOffset the offset from binding root to the reserved slot\n \* @param pureFn\n \* @param exp1\n \* @param exp2\n \* @param exp3\n \* @param exp4\n \* @param exp5\n \* @param thisArg Optional calling context of pureFn\n \* @returns Updated or cached value\n \*\n \* @codeGenApi\n \*/\nexport function pureFunction5(\n slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any) => any, exp1: any,\n exp2: any, exp3: any, exp4: any, exp5: any, thisArg?: any): any {\n const bindingIndex = getBindingRoot() + slotOffset;\n const IView = getLView();\n const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n return bindingUpdated(IView, bindingIndex + 4, exp5) || different ?\n updateBinding(\n IView, bindingIndex + 5,\n thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5) :\n pureFn(exp1, exp2, exp3, exp4, exp5)) :\n getBinding(IView, bindingIndex + 5);\n}\n\n/\*\*\n \* If the value of any provided exp has changed, calls the pure function to return\n \* an updated value. Or if no values have changed, returns cached value.\n \*\n \* @param slotOffset the offset from binding root to the reserved slot\n \* @param pureFn\n \* @param exp1\n \* @param exp2\n \* @param exp3\n \* @param exp4\n \* @param exp5\n \* @param exp6\n \* @param thisArg Optional calling context of pureFn\n \* @returns Updated or cached value\n \*\n \* @codeGenApi\n \*/\nexport function pureFunction6(\n slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any, v6: any) => any,\n exp1: any, exp2: any, exp3: any, exp4: any, exp5: any, exp6: any, thisArg?: any): any {\n const bindingIndex = getBindingRoot() + slotOffset;\n const IView = getLView();\n const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n return bindingUpdated2(IView, bindingIndex + 4, exp5, exp6) || different ?\n updateBinding(\n IView, bindingIndex + 6,\n thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6) :\n pureFn(exp1, exp2, exp3, exp4, exp5, exp6)) :\n getBinding(IView, bindingIndex + 6);\n}\n\n/\*\*\n \* If the value of any provided exp has changed, calls the pure function to return\n \* an updated value. Or if no values have changed, returns cached value.\n \*\n \* @param slotOffset the offset from binding root to the reserved slot\n \* @param pureFn\n \* @param exp1\n \* @param exp2\n \* @param exp3\n \* @param exp4\n \* @param exp5\n \* @param exp6\n \* @param exp7\n \* @param thisArg Optional calling context of pureFn\n \* @returns Updated or cached value\n \*\n \* @codeGenApi\n \*/\nexport function pureFunction7(\n slotOffset: number,\n pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any, v6: any, v7: any) => any, exp1: any,\n exp2: any, exp3: any, exp4: any, exp5: any, exp6: any, exp7: any, thisArg?: any): any {\n const bindingIndex = getBindingRoot() + slotOffset;\n const IView = getLView();\n let different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n return bindingUpdated3(IView, bindingIndex + 4, exp5, exp6, exp7) ||\n different ?\n updateBinding(\n IView, bindingIndex + 7,\n thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6, exp7) :\n pureFn(exp1, exp2, exp3, exp4, exp5, exp6, exp7)) :\n



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    getBinding(IView, bindingIndex + 7);\n\n\n\n * If the value of any provided exp has changed, calls the pure
function to return\n * an updated value. Or if no values have changed, returns cached value.\n * \n * @param
slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param
exp2\n * @param exp3\n * @param exp4\n * @param exp5\n * @param exp6\n * @param exp7\n * @param
exp8\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n * \n *
@codeGenApi\n * \nexport function pureFunction8(\n  slotOffset: number,\n  pureFn: (v1: any, v2: any, v3: any,
v4: any, v5: any, v6: any, v7: any, v8: any) => any,\n  exp1: any, exp2: any, exp3: any, exp4: any, exp5: any, exp6:
any, exp7: any, exp8: any,\n  thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const
IView = getLView();\n  const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return
bindingUpdated4(IView,
  bindingIndex + 4, exp5, exp6, exp7, exp8) || different ?\n    updateBinding(\n      IView, bindingIndex + 8,\n
thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6, exp7, exp8) : \n      pureFn(exp1, exp2,
exp3, exp4, exp5, exp6, exp7, exp8)) :\n    getBinding(IView, bindingIndex + 8);\n}\n\n\n\n * pureFunction
instruction that can support any number of bindings.\n * \n * If the value of any provided exp has changed, calls the
pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n * \n * @param
slotOffset the offset from binding root to the reserved slot\n * @param pureFn A pure function that takes binding
values and builds an object or array\n * containing those values.\n * @param exps An array of binding values\n *
@param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n * \n * @codeGenApi\n
*\nexport function pureFunctionV(\n  slotOffset: number,
  pureFn: (...v: any[]) => any, exps: any[], thisArg?: any): any {\n  return pureFunctionVInternal(getLView(),
getBindingRoot(), slotOffset, pureFn, exps, thisArg);\n}\n\n\n\n * Results of a pure function invocation are stored
in LView in a dedicated slot that is initialized\n * to NO_CHANGE. In rare situations a pure pipe might throw an
exception on the very first\n * invocation and not produce any valid results. In this case LView would keep holding
the NO_CHANGE\n * value. The NO_CHANGE is not something that we can use in expressions / bindings thus we
convert\n * it to `undefined`.\n * \nfunction getPureFunctionReturnValue(IView: LView, returnValueIndex:
number) {\n  ngDevMode && assertIndexInRange(IView, returnValueIndex);\n  const lastReturnValue =
IView[returnValueIndex];\n  return lastReturnValue === NO_CHANGE ? undefined : lastReturnValue;\n}\n\n\n\n\n *
* If the value of the provided exp has changed, calls the pure function to return\n * an updated value. Or if the value
has not
changed, returns cached value.\n * \n * @param IView LView in which the function is being executed.\n * @param
bindingRoot Binding root index.\n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn Function that returns an updated value\n * @param exp Updated expression value\n * @param
thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n * \nexport function
pureFunction1Internal(\n  IView: LView, bindingRoot: number, slotOffset: number, pureFn: (v: any) => any, exp:
any,\n  thisArg?: any): any {\n  const bindingIndex = bindingRoot + slotOffset;\n  return bindingUpdated(IView,
bindingIndex, exp) ?\n    updateBinding(IView, bindingIndex + 1, thisArg ? pureFn.call(thisArg, exp) :
pureFn(exp)) :\n    getPureFunctionReturnValue(IView, bindingIndex + 1);\n}\n\n\n\n\n * If the value of any
provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed,
returns cached value.\n
*\n * @param IView LView in which the function is being executed.\n * @param bindingRoot Binding root
index.\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param
exp1\n * @param exp2\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached
value\n * \nexport function pureFunction2Internal(\n  IView: LView, bindingRoot: number, slotOffset: number,
pureFn: (v1: any, v2: any) => any,\n  exp1: any, exp2: any, thisArg?: any): any {\n  const bindingIndex =
bindingRoot + slotOffset;\n  return bindingUpdated2(IView, bindingIndex, exp1, exp2) ?\n    updateBinding(\n
IView, bindingIndex + 2,\n      thisArg ? pureFn.call(thisArg, exp1, exp2) : pureFn(exp1, exp2)) :\n
getPureFunctionReturnValue(IView, bindingIndex + 2);\n}\n\n\n\n\n * If the value of any provided exp has changed,
calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n * \n

```

```

    @param IView LView in which the function is being executed.\n * @param bindingRoot Binding root index.\n *
    @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n *
    @param exp2\n * @param exp3\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or
    cached value\n */\nexport function pureFunction3Internal(\n  IView: LView, bindingRoot: number, slotOffset:
    number,\n  pureFn: (v1: any, v2: any, v3: any) => any, exp1: any, exp2: any, exp3: any,\n  thisArg?: any): any {\n
    const bindingIndex = bindingRoot + slotOffset;\n  return bindingUpdated3(IView, bindingIndex, exp1, exp2, exp3)
    ?\n    updateBinding(\n      IView, bindingIndex + 3,\n      thisArg ? pureFn.call(thisArg, exp1, exp2, exp3) :
    pureFn(exp1, exp2, exp3)) :\n    getPureFunctionReturnValue(IView, bindingIndex + 3);\n}\n\n/**\n * If the
    value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values
    have changed, returns cached value.\n *\n * @param IView LView in which the function is being executed.\n *
    @param bindingRoot Binding root index.\n * @param slotOffset the offset from binding root to the reserved slot\n
    * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param thisArg
    Optional calling context of pureFn\n * @returns Updated or cached value\n *\n */\nexport function
    pureFunction4Internal(\n  IView: LView, bindingRoot: number, slotOffset: number,\n  pureFn: (v1: any, v2: any,
    v3: any, v4: any) => any, exp1: any, exp2: any, exp3: any, exp4: any,\n  thisArg?: any): any {\n  const
    bindingIndex = bindingRoot + slotOffset;\n  return bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4)
    ?\n    updateBinding(\n      IView, bindingIndex + 4,\n      thisArg ? pureFn.call(thisArg, exp1, exp2, exp3,
    exp4) : pureFn(exp1, exp2, exp3, exp4)) :\n    getPureFunctionReturnValue(IView, bindingIndex + 4);\n}\n\n/**\n
    * pureFunction
    instruction that can support any number of bindings.\n *\n * If the value of any provided exp has changed, calls the
    pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param
    IView LView in which the function is being executed.\n * @param bindingRoot Binding root index.\n * @param
    slotOffset the offset from binding root to the reserved slot\n * @param pureFn A pure function that takes binding
    values and builds an object or array\n * containing those values.\n * @param exps An array of binding values\n *
    @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n */\nexport function
    pureFunctionVInternal(\n  IView: LView, bindingRoot: number, slotOffset: number, pureFn: (...v: any[]) => any,\n
    exps: any[], thisArg?: any): any {\n  let bindingIndex = bindingRoot + slotOffset;\n  let different = false;\n  for (let
    i = 0; i < exps.length; i++) {\n    bindingUpdated(IView, bindingIndex++, exps[i])
    && (different = true);\n  }\n  return different ? updateBinding(IView, bindingIndex, pureFn.apply(thisArg, exps))
    :\n    getPureFunctionReturnValue(IView, bindingIndex);\n}\n\n", "/*\n * @license\n * Copyright Google
    LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
    in the LICENSE file at https://angular.io/license\n */\n\nimport {PipeTransform} from
    './change_detection/pipe_transform';\nimport {setInjectImplementation} from './di/inject_switch';\nimport
    {RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from './interface/type';\nimport
    {getFactoryDef} from './definition_factory';\nimport {setIncludeViewProviders} from './di';\nimport {store,
    directiveInject} from './instructions/all';\nimport {isHostComponentStandalone} from
    './instructions/element_validation';\nimport {PipeDef, PipeDefList} from './interfaces/definition';\nimport
    {CONTEXT, DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LView, TVIEW} from './interfaces/view';\nimport
    {pureFunction1Internal, pureFunction2Internal, pureFunction3Internal, pureFunction4Internal, pureFunctionVInternal}
    from './pure_function';\nimport {getBindingRoot, getLView, getTVIEW} from './state';\nimport {load} from
    './util/view_utils';\n\n\n/**\n * Create a pipe.\n *\n * @param index
    Pipe index where the pipe will be stored.\n * @param pipeName The name of the pipe\n * @returns T the instance
    of the pipe.\n *\n * @codeGenApi\n */\nexport function pipe(index: number, pipeName: string): any {\n  const
    tView = getTVIEW();\n  let pipeDef: PipeDef<any>;\n  const adjustedIndex = index + HEADER_OFFSET;\n  if
    (tView.firstCreatePass) {\n    // The `getPipeDef` throws if a pipe with a given name is not found\n    // (so we use
    non-null assertion below).\n    pipeDef = getPipeDef(pipeName, tView.pipeRegistry)!;\n    tView.data[adjustedIndex] = pipeDef;\n    if (pipeDef.onDestroy) {\n      (tView.destroyHooks ||
    (tView.destroyHooks = [])).push(adjustedIndex,

```



```

= load<PipeTransform>(IView, adjustedIndex);\n return isPure(IView, adjustedIndex) ?\n
pureFunction3Internal(\n      IView, getBindingRoot(), slotOffset, pipeInstance.transform, v1, v2, v3,\n
pipeInstance) :\n      pipeInstance.transform(v1, v2, v3);\n}\n\n/**\n * Invokes a pipe with 4 arguments.\n * This\n
instruction acts as a guard to { @link PipeTransform#transform } invoking\n * the pipe only when an input to the\n
pipe changes.\n * @param index Pipe index where the pipe was stored on creation.\n * @param slotOffset the\n
offset in the reserved slot space\n * @param v1 1st argument to { @link PipeTransform#transform }.\n * @param v2\n
2nd argument to { @link PipeTransform#transform }.\n * @param v3 3rd argument to { @link\n
PipeTransform#transform }.\n * @param v4 4th argument to { @link PipeTransform#transform }.\n * @param\n
@codeGenApi\n * ^\nexport function pipeBind4(\n      index: number, slotOffset: number, v1: any, v2: any, v3: any,\n
v4: any): any {\n      const adjustedIndex = index\n
+ HEADER_OFFSET;\n      const IView = getLView();\n      const pipeInstance = load<PipeTransform>(IView,\n
adjustedIndex);\n      return isPure(IView, adjustedIndex) ? pureFunction4Internal(\n\n          IView,\n
getBindingRoot(), slotOffset,\n\n          pipeInstance.transform, v1, v2, v3, v4, pipeInstance) :\n\n          pipeInstance.transform(v1, v2, v3, v4);\n}\n\n/**\n * Invokes a pipe with variable number of\n
arguments.\n * This instruction acts as a guard to { @link PipeTransform#transform } invoking\n * the pipe only\n
when an input to the pipe changes.\n * @param index Pipe index where the pipe was stored on creation.\n * @param\n
slotOffset the offset in the reserved slot space\n * @param values Array of arguments to pass to { @link\n
PipeTransform#transform } method.\n * @codeGenApi\n * ^\nexport function pipeBindV(index: number,\n
slotOffset: number, values: [any, ...any[]]): any {\n      const adjustedIndex\n
= index + HEADER_OFFSET;\n      const IView = getLView();\n      const pipeInstance = load<PipeTransform>(IView,\n
adjustedIndex);\n      return isPure(IView, adjustedIndex) ?\n      pureFunctionVInternal(\n          IView,\n
getBindingRoot(), slotOffset, pipeInstance.transform, values, pipeInstance) :\n\n      pipeInstance.transform.apply(pipeInstance, values);\n}\n\nfunction isPure(IView: LView, index: number): boolean\n
{\n      return (<PipeDef<any>>IView[TVIEW].data[index]).pure;\n}\n\n"/**\n * @license\n * Copyright Google LLC\n
All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in\n
the LICENSE file at https://angular.io/license\n * ^\n\n// <reference types="rxjs" />\nimport { PartialObserver,\n
Subject, Subscription } from 'rxjs';\n\n/**\n * Use in components with the `@Output` directive to emit custom\n
events\n * synchronously or asynchronously, and register handlers for those events\n * by subscribing to an\n
instance.\n * @usageNotes\n
*\n * Extends\n * [RxJS `Subject`](https://rxjs.dev/api/index/class/Subject)\n * for Angular by adding the `emit()`\n
method.\n * In the following example, a component defines two output properties\n * that create event emitters.\n
When the title is clicked, the emitter\n * emits an open or close event to toggle the current visibility state.\n
*\n
```html\n * @Component({\n *   selector: 'zippy',\n *   template: `\n *     <div class="zippy">\n *       <div\n
(click)="toggle()">Toggle</div>\n *       <div [hidden]="!visible">\n *         <ng-content></ng-content>\n *\n
</div>\n *     </div>` })\n * export class Zippy {\n *   visible: boolean = true;\n *   @Output() open:\n
EventEmitter<any> = new EventEmitter();\n *   @Output() close: EventEmitter<any> = new EventEmitter();\n *   toggle()\n
{\n *     this.visible = !this.visible;\n *     if (this.visible) {\n *       this.open.emit(null);\n *     } else {\n *\n
this.close.emit(null);\n *     }\n *   }\n * }\n * ```\n * Access the event\n
object with the `$event` argument passed to the output event\n * handler:\n * ```html\n * <zippy\n
(open)="onOpen($event)" (close)="onClose($event)"></zippy>\n * ```\n * @see [Observables in\n
Angular](guide/observables-in-angular)\n * @publicApi\n * ^\nexport interface EventEmitter<T> extends\n
Subject<T> {\n      /**\n      * @internal\n      * ^\n      __isAsync: boolean;\n      /**\n      * Creates an instance of this class that\n
can\n      * deliver events synchronously or asynchronously.\n      * @param [isAsync=false] When true, deliver\n
events asynchronously.\n      * ^\n      new(isAsync?: boolean): EventEmitter<T>;\n      /**\n      * Emits an event\n
containing a given value.\n      * @param value The value to emit.\n      * ^\n      emit(value?: T): void;\n      /**\n      * Registers handlers for events emitted by this instance.\n      * @param next When supplied, a custom handler for\n
emitted events.\n      * @param error When supplied, a custom handler for an error notification from this emitter.\n      * @param complete\n

```



```

* [Array.map](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/map)\n
*\n map<U>(fn: (item: T, index: number, array: T[]) => U): U[] {\n  return this._results.map(fn);\n }\n\n /**\n
* See\n
* [Array.filter](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/filter)\n
*\n filter(fn: (item: T, index: number, array: T[]) => boolean): T[] {\n  return this._results.filter(fn);\n }\n\n /**\n
* See\n
* [Array.find](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/find)\n
*\n find(fn: (item: T, index: number, array: T[]) => boolean): T|undefined {\n  return this._results.find(fn);\n }\n\n /**\n
* See\n
* [Array.reduce](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/reduce)\n
*\n reduce<U>(fn: (prevValue: U, curValue: T, curIndex: number, array: T[]) => U, init: U): U {\n  return this._results.reduce(fn, init);\n }\n\n /**\n
* See\n
* [Array.forEach](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/forEach)\n
*\n forEach(fn: (item: T, index: number, array: T[]) => void): void {\n  this._results.forEach(fn);\n }\n\n /**\n
* See\n
* [Array.some](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/some)\n
*\n some(fn: (value: T, index: number, array: T[]) => boolean): boolean {\n  return this._results.some(fn);\n }\n\n /**\n
* Returns a copy of the internal results list as an Array.\n
*\n toArray(): T[] {\n  return this._results.slice();\n }\n\n toString(): string {\n  return this._results.toString();\n }\n\n /**\n
* Updates the stored data of the query list, and resets the `dirty` flag to `false`, so that\n
* on change detection, it will not notify of changes to the queries, unless a new change\n
* occurs.\n
* @param resultsTree The query results to store\n
*\n
* @param identityAccessor Optional function for extracting stable object identity from a value\n
* in the array. This function is executed for each element of the query result list while\n
* comparing current query list with the new one (provided as a first argument of the `reset`\n
* function) to detect if the lists are different. If the function is not provided, elements\n
* are compared as is (without any pre-processing).\n
*\n reset(resultsTree: Array<T>|any[], identityAccessor?: (value: T) => unknown): void {\n  // Cast to `QueryListInternal` so that we can mutate fields which are readonly for the usage of\n  // QueryList (but not for QueryList itself.)\n  const self = this as QueryListInternal<T>;\n  (self as {dirty: boolean}).dirty = false;\n  const newResultFlat = flatten(resultsTree);\n  if (this._changesDetected = !arrayEquals(self._results, newResultFlat, identityAccessor))\n  {\n    self._results = newResultFlat;\n    self.length = newResultFlat.length;\n    self.last = newResultFlat[this.length - 1];\n    self.first = newResultFlat[0];\n  }\n\n /**\n
* Triggers a change event by emitting on the `changes` {@link EventEmitter}.\n
*\n notifyOnChanges(): void {\n  if (this._changes && (this._changesDetected || !this._emitDistinctChangesOnly))\n  this._changes.emit(this);\n }\n\n /** internal *\n
*\n setDirty() {\n  (this as {dirty: boolean}).dirty = true;\n }\n\n /** internal *\n
*\n destroy(): void {\n  (this as EventEmitter<any>).complete();\n  (this as EventEmitter<any>).unsubscribe();\n }\n\n // The implementation of `Symbol.iterator` should be declared here, but this would cause\n
// tree-shaking issues with `QueryList`. So instead, it's added in the constructor (see comments\n
// there) and this declaration is left here to ensure that TypeScript considers QueryList to\n
// implement the Iterable interface. This is required for template type-checking of NgFor loops\n
*\n // over QueryLists to work correctly, since QueryList must be assignable to NgIterable.\n
[Symbol.iterator]!: () => Iterator<T>;\n\n\n /**\n
* Internal set of APIs used by the framework. (not to be made public)\n
*\n interface QueryListInternal<T> extends QueryList<T> {\n  reset(a: any[]): void;\n  notifyOnChanges(): void;\n  length: number;\n  last: T;\n  first: T;\n }\n\n\n /**\n
* @license\n
* Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at\n
https://angular.io/license\n
*\n\nimport {Injector} from './di/injector';\nimport {assertLContainer} from './render3/assert';\nimport {createLView, renderView} from './render3/instructions/shared';\nimport {TContainerNode, TNode, TNodeType} from './render3/interfaces/node';\nimport {DECLARATION_LCONTAINER, LView, LViewFlags, QUERIES, TView} from './render3/interfaces/view';\nimport {getCurrentTNode, getLView} from './render3/state';\nimport

```

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{ViewRef as R3_ViewRef} from './render3/view_ref';\nimport {assertDefined} from './util/assert';\n\nimport
{createElementRef, ElementRef} from './element_ref';\nimport {EmbeddedViewRef} from './view_ref';\n\n/**\n *
Represents an embedded template that can be used to instantiate embedded views.\n * To instantiate embedded
views based on a template, use the `ViewContainerRef`\n * method `createEmbeddedView()`.\n *\n * Access a
`TemplateRef` instance by placing a directive on an ``\n * element (or directive prefixed with `*`).
The `TemplateRef` for the embedded view\n * is injected into the constructor of the directive,\n * using the
`TemplateRef` token.\n *\n * You can also use a `Query` to find a `TemplateRef` associated with\n * a component
or a directive.\n *\n * @see `ViewContainerRef`\n * @see [Navigate the Component Tree with
DI](guide/dependency-injection-navtree)\n *\n * @publicApi\n */\nexport abstract class TemplateRef<C> {\n /**\n
 * The anchor element
in the parent view for this embedded view.\n * \n * The data-binding and injection contexts of embedded views
created from this `TemplateRef`\n * inherit from the contexts of this location.\n * \n * Typically new embedded
views are attached to the view container of this location, but in\n * advanced use-cases, the view can be attached to
a different container while keeping the\n * data-binding and injection context from the original location.\n * \n
*\n * \n // TODO(i): rename to anchor or location\n abstract readonly elementRef: ElementRef;\n\n /**\n *
Instantiates an unattached embedded view based on this template.\n * @param context The data-binding context of
the embedded view, as declared\n * in the `` usage.\n * @param injector Injector to be used within
the embedded view.\n * @returns The new embedded view object.\n * \n */\n abstract createEmbeddedView(context:
C, injector?: Injector): EmbeddedViewRef<C>;\n\n /**\n * \n * @internal\n * @nocollapse\n
*\n */\n static __NG_ELEMENT_ID__: () => TemplateRef<any> | null = injectTemplateRef;\n\n\nconst
ViewEngineTemplateRef = TemplateRef;\n\n// TODO(alxhub): combine interface and implementation. Currently
this is challenging since something\n// in g3 depends on them being separate.\nconst R3TemplateRef = class
TemplateRef<T> extends ViewEngineTemplateRef<T> {\n constructor(\n private _declarationLView: LView,\n private
_declarationTContainer: TContainerNode,\n public override elementRef: ElementRef) {\n super();\n
}\n\n override createEmbeddedView(context: T, injector?: Injector): EmbeddedViewRef<T> {\n const
embeddedTView = this._declarationTContainer.tViews as TView;\n const embeddedLView = createLView(\n
this._declarationLView, embeddedTView, context, LViewFlags.CheckAlways, null,\n\n
embeddedTView.declTNode, null, null, null, null, injector || null);\n const declarationLContainer =
this._declarationLView[this._declarationTContainer.index];\n\n
ngDevMode && assertLContainer(declarationLContainer);\n\n
embeddedLView[DECLARATION_LCONTAINER] = declarationLContainer;\n\n const
declarationViewLQueries = this._declarationLView[QUERIES];\n if (declarationViewLQueries !== null) {\n
embeddedLView[QUERIES] = declarationViewLQueries.createEmbeddedView(embeddedTView);\n } \n\n
renderView(embeddedTView, embeddedLView, context);\n\n return new R3_ViewRef<T>(embeddedLView);\n
}\n};\n\n/**\n * Creates a TemplateRef given a node.\n *\n * @returns The TemplateRef instance to use\n
*\n */\nexport function injectTemplateRef<T>(): TemplateRef<T> | null {\n return
createTemplateRef<T>(getCurrentTNode(), getLView());\n}\n\n/**\n * Creates a TemplateRef and stores it on the
injector.\n *\n * @param hostTNode The node on which a TemplateRef is requested\n * @param hostLView The
`LView` to which the node belongs\n * @returns The TemplateRef instance or null if we can't create a TemplateRef
on a given node type\n *\n */\nexport function
createTemplateRef<T>(hostTNode: TNode, hostLView: LView): TemplateRef<T> | null {\n if (hostTNode.type &
TNodeType.Container) {\n ngDevMode && assertDefined(hostTNode.tViews, 'TView must be allocated');\n
return new R3TemplateRef(\n hostLView, hostTNode as TContainerNode, createElementRef(hostTNode,\n
hostLView));\n } \n\n return null;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Injector} from './di/injector';\nimport {EnvironmentInjector} from
'./di/r3_injector';\nimport {isType, Type} from './interface/type';\nimport {assertNodeInjector} from
'./render3/assert';\nimport {ComponentFactory as R3ComponentFactory} from './render3/component_ref';\nimport

```

```

{getComponentDef} from './render3/definition';\nimport {getParentInjectorLocation, NodeInjector} from
'./render3/di';\nimport {addToViewTree,
createLContainer} from './render3/instructions/shared';\nimport {CONTAINER_HEADER_OFFSET, LContainer,
NATIVE, VIEW_REFS} from './render3/interfaces/container';\nimport {NodeInjectorOffset} from
'./render3/interfaces/injector';\nimport {TContainerNode, TDirectiveHostNode, TElementContainerNode,
TElementNode, TNodeType} from './render3/interfaces/node';\nimport {RComment, RElement} from
'./render3/interfaces/renderer_dom';\nimport {isLContainer} from './render3/interfaces/type_checks';\nimport
{LView, PARENT, RENDERER, T_HOST, TVIEW} from './render3/interfaces/view';\nimport
{assertTNodeType} from './render3/node_assert';\nimport {addViewToContainer, destroyLView, detachView,
getBeforeNodeForView, insertView, nativeInsertBefore, nativeNextSibling, nativeParentNode} from
'./render3/node_manipulation';\nimport {getCurrentTNode, getLView} from './render3/state';\nimport
{getParentInjectorIndex, getParentInjectorView, hasParentInjector} from './render3/util/injector_utils';\nimport
{getNativeByTNode, unwrapRNode, viewAttachedToContainer} from './render3/util/view_utils';\nimport
{ViewRef as R3ViewRef} from './render3/view_ref';\nimport {addToArray, removeFromArray} from
'./util/array_utils';\nimport {assertDefined, assertEquals, assertGreaterThan, assertLessThan, throwError} from
'./util/assert';\nimport {ComponentFactory, ComponentRef} from './component_factory';\nimport
{createElementRef, ElementRef} from './element_ref';\nimport {NgModuleRef} from
'./ng_module_factory';\nimport {TemplateRef} from './template_ref';\nimport {EmbeddedViewRef, ViewRef} from
'./view_ref';\n/**\n * Represents a container where one or more views can be attached to a component.\n *\n * Can
contain *host views* (created by instantiating a\n * component with the `createComponent()` method), and
*embedded views*\n * (created by instantiating a `TemplateRef` with the `createEmbeddedView()` method).\n *\n * A
view container instance can contain other view containers,\n * creating
a [view hierarchy](guide/glossary#view-tree).\n *\n * @see `ComponentRef`\n *\n * @see `EmbeddedViewRef`\n *\n
* @publicApi\n */\nexport abstract class ViewContainerRef {\n  /**\n   * Anchor element that specifies the location
of this container in the containing view.\n   *\n   * Each view container can have only one anchor element, and each
anchor element\n   * can have only a single view container.\n   *\n   * Root elements of views attached to this
container become siblings of the anchor element in\n   * the rendered view.\n   *\n   * Access the
`ViewContainerRef` of an element by placing a `Directive` injected\n   * with `ViewContainerRef` on the element,
or use a `ViewChild` query.\n   *\n   * <!-- TODO: rename to anchorElement -->\n   *\n   * abstract get element():
ElementRef;\n   *\n   * /**\n   * The [dependency injector](guide/glossary#injector) for this view container.\n   *\n   * /\n   * abstract get injector(): Injector;\n   *\n   * /**\n   * @deprecated No replacement */\n   * abstract get parentInjector(): Injector;\n   *\n   * /\n   * Destroys all views in this container.\n   *\n   * /\n   * abstract clear(): void;\n   *\n   * /**\n   * Retrieves a view from this
container.\n   * @param index The 0-based index of the view to retrieve.\n   * @returns The `ViewRef` instance, or
null if the index is out of range.\n   * /\n   * abstract get(index: number): ViewRef|null;\n   *\n   * /**\n   * Reports how many
views are currently attached to this container.\n   * @returns The number of views.\n   * /\n   * abstract get length():
number;\n   *\n   * /**\n   * Instantiates an embedded view and inserts it\n   * into this container.\n   * @param
templateRef The HTML template that defines the view.\n   * @param context The data-binding context of the
embedded view, as declared\n   * in the `` usage.\n   * @param options Extra configuration for the
created view. Includes:\n   * * index: The 0-based index at which to insert the new view into this container.\n   *
\n   * If not specified, appends the new view as the last entry.\n   * * injector: Injector to be used within the
embedded view.\n   *\n   * @returns The `ViewRef` instance for the
newly created view.\n   *\n   * /\n   * abstract createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C,
options?: {\n   *   index?: number,\n   *   injector?: Injector\n   * }): EmbeddedViewRef<C>;\n   *\n   * /**\n   * Instantiates an
embedded view and inserts it\n   * into this container.\n   * @param templateRef The HTML template that defines
the view.\n   * @param context The data-binding context of the embedded view, as declared\n   * in the `` usage.\n   * @param index The 0-based index at which to insert the new view into this container.\n   *
\n   * If not specified, appends the new view as the last entry.\n   *\n   * @returns The `ViewRef` instance for the
newly
created view.\n   *\n   * /\n   * abstract createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, index?:

```



```

number):\n    EmbeddedViewRef<C>;\n\n /**\n * Instantiates a single component and inserts its host view into
this container.\n * @param componentType Component Type to use.\n * @param options An object that
contains extra parameters:\n * * index: the index at which to insert the new component's host view into this
container.\n * If not specified, appends the new view as the last entry.\n * * injector: the injector to use as
the parent for the new component.\n * * NgModuleRef: an NgModuleRef of the component's NgModule, you
should almost always provide\n * this to ensure that all expected providers are available for the
component\n * instantiation.\n * * environmentInjector: an EnvironmentInjector which will provide the
component's environment.\n * you should almost always provide this to ensure that all expected
providers\n * are available for the component instantiation. This option is intended to\n *
replace the `NgModuleRef` parameter.\n * * projectableNodes: list
of DOM nodes that should be projected through\n * [](api/core/ng-content) of the new
component instance.\n *\n * @returns The new `ComponentRef` which contains the component instance and the
host view.\n */\n abstract createComponent<C>(componentType: Type<C>, options?: {\n index?: number,\n
injector?: Injector,\n NgModuleRef?: NgModuleRef<unknown>,\n environmentInjector?:
EnvironmentInjector|NgModuleRef<unknown>,\n projectableNodes?: Node[][],\n }): ComponentRef<C>;\n\n
/**\n * Instantiates a single component and inserts its host view into this container.\n *\n * @param
componentFactory Component factory to use.\n * @param index The index at which to insert the new component's
host view into this container.\n * If not specified, appends the new view as the last entry.\n * @param injector
The injector to use as the parent for the new component.\n * @param projectableNodes List of DOM nodes that
should be projected
through\n * [](api/core/ng-content) of the new component instance.\n * @param NgModuleRef
An instance of the NgModuleRef that represent an NgModule.\n * This information is used to retrieve
corresponding NgModule injector.\n *\n * @returns The new `ComponentRef` which contains the component
instance and the host view.\n *\n * @deprecated Angular no longer requires component factories to dynamically
create components.\n * Use different signature of the `createComponent` method, which allows passing\n *
Component class directly.\n */\n abstract createComponent<C>(\n componentFactory: ComponentFactory<C>,\n
index?: number, injector?: Injector,\n projectableNodes?: any[][],\n environmentInjector?:
EnvironmentInjector|NgModuleRef<any>): ComponentRef<C>;\n\n /**\n * Inserts a view into this container.\n
*\n * @param viewRef The view to insert.\n * @param index The 0-based index at which to insert the view.\n * If
not specified,
appends the new view as the last entry.\n * @returns The inserted `ViewRef` instance.\n *\n */\n abstract
insert(viewRef: ViewRef, index?: number): ViewRef;\n\n /**\n * Moves a view to a new location in this
container.\n * @param viewRef The view to move.\n * @param index The 0-based index of the new location.\n
*\n * @returns The moved `ViewRef` instance.\n */\n abstract move(viewRef: ViewRef, currentIndex: number):
ViewRef;\n\n /**\n * Returns the index of a view within the current container.\n * @param viewRef The view to
query.\n * @returns The 0-based index of the view's position in this container,\n * or `-1` if this container doesn't
contain the view.\n */\n abstract indexOf(viewRef: ViewRef): number;\n\n /**\n * Destroys a view attached to
this container\n * @param index The 0-based index of the view to destroy.\n * If not specified, the last view in
the container is removed.\n */\n abstract remove(index?: number): void;\n\n /**\n *
Detaches a view from this container without destroying it.\n * Use along with `insert()` to move a view within the
current container.\n * @param index The 0-based index of the view to detach.\n * If not specified, the last view in
the container is detached.\n */\n abstract detach(index?: number): ViewRef|null;\n\n /**\n * @internal\n *
@nocollapse\n */\n static __NG_ELEMENT_ID__: () => ViewContainerRef =
injectViewContainerRef;\n\n /**\n * Creates a ViewContainerRef and stores it on the injector. Or, if the
ViewContainerRef\n * already exists, retrieves the existing ViewContainerRef.\n *\n * @returns The
ViewContainerRef instance to use\n */\n export function injectViewContainerRef(): ViewContainerRef {\n const
previousTNode = getCurrentTNode() as ElementNode | ElementContainerNode | TContainerNode;\n return
createContainerRef(previousTNode, getLView());\n }\n\n const VE_ViewContainerRef = ViewContainerRef;\n\n//

```

TODO(alxhub): cleaning up this indirection triggers

```
a subtle bug in Closure in g3. Once the fix\n// for that lands, this can be cleaned up.\nconst R3ViewContainerRef =  
class ViewContainerRef extends VE_ViewContainerRef {\n  constructor(\n    private _lContainer: LContainer,\n    private _hostTNode: TElementNode|TContainerNode|TElementContainerNode,\n    private _hostLView: LView)  
  {\n    super();\n  }\n  override get element(): ElementRef {\n    return createElementRef(this._hostTNode,  
    this._hostLView);\n  }\n  override get injector(): Injector {\n    return new NodeInjector(this._hostTNode,  
    this._hostLView);\n  }\n  /** @deprecated No replacement */\n  override get parentInjector(): Injector {\n    const  
    parentLocation = getParentInjectorLocation(this._hostTNode, this._hostLView);\n    if  
    (hasParentInjector(parentLocation)) {\n      const parentView = getParentInjectorView(parentLocation,  
    this._hostLView);\n      const injectorIndex = getParentInjectorIndex(parentLocation);\n      ngDevMode &&  
      assertNodeInjector(parentView,  
    injectorIndex);\n      const parentTNode =\n        parentView[TVIEW].data[injectorIndex +  
    NodeInjectorOffset.TNODE] as TElementNode;\n      return new NodeInjector(parentTNode, parentView);\n    }  
    else {\n      return new NodeInjector(null, this._hostLView);\n    }  
  }\n  override clear(): void {\n    while  
    (this.length > 0) {\n      this.remove(this.length - 1);\n    }  
  }\n  override get(index: number): ViewRef|null {\n    const viewRefs = getViewRefs(this._lContainer);\n    return viewRefs !== null && viewRefs[index] || null;\n  }\n  override get length(): number {\n    return this._lContainer.length - CONTAINER_HEADER_OFFSET;\n  }\n  override createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, options?: {\n    index?: number,\n    injector?: Injector\n  }): EmbeddedViewRef<C>;\n  override createEmbeddedView<C>(templateRef:  
    TemplateRef<C>, context?: C, index?: number):\n    EmbeddedViewRef<C>;\n  override  
    createEmbeddedView<C>(templateRef: TemplateRef<C>,  
    context?: C, indexOrOptions?: number|{\n      index?: number,\n      injector?: Injector\n    }): EmbeddedViewRef<C>  
  {\n    let index: number|undefined;\n    let injector: Injector|undefined;\n    if (typeof indexOrOptions ===  
    'number') {\n      index = indexOrOptions;\n    } else if (indexOrOptions !== null) {\n      index =  
    indexOrOptions.index;\n      injector = indexOrOptions.injector;\n    }  
    const viewRef =  
    templateRef.createEmbeddedView(context || <any> {}, injector);\n    this.insert(viewRef, index);\n    return  
    viewRef;\n  }\n  override createComponent<C>(componentType: Type<C>, options?: {\n    index?: number,\n    injector?: Injector,\n    projectableNodes?: Node[][],\n    ngModuleRef?: NgModuleRef<unknown>,\n  }):  
    ComponentRef<C>;\n  /**\n   * @deprecated Angular no longer requires component factories to dynamically create  
    components.\n   * Use different signature of the `createComponent` method, which allows passing\n   *  
    Component class directly.\n   */\n  override  
    createComponent<C>(\n      componentFactory: ComponentFactory<C>, index?: number|undefined,\n      injector?:  
    Injector|undefined, projectableNodes?: any[][]|undefined,\n      environmentInjector?:  
    EnvironmentInjector|NgModuleRef<any>|undefined): ComponentRef<C>;\n  override createComponent<C>(\n      componentFactoryOrType: ComponentFactory<C>|Type<C>,\n      indexOrOptions?: number|undefined|{\n        index?:  
    number,\n        injector?: Injector,\n        ngModuleRef?: NgModuleRef<unknown>,\n        environmentInjector?:  
    EnvironmentInjector|NgModuleRef<unknown>,\n        projectableNodes?: Node[][],\n      },\n      injector?:  
    Injector|undefined, projectableNodes?: any[][]|undefined,\n      environmentInjector?:  
    EnvironmentInjector|NgModuleRef<any>|undefined): ComponentRef<C> {\n    const isComponentFactory =  
    componentFactoryOrType && !isType(componentFactoryOrType);\n    let index: number|undefined;\n    // This  
    function supports 2 signatures and we need to handle options correctly for  
    both:\n    // 1. When first argument is a Component type. This signature also requires extra\n    // options to be  
    provided as as object (more ergonomic option).\n    // 2. First argument is a Component factory. In this case extra  
    options are represented as\n    // positional arguments. This signature is less ergonomic and will be deprecated.\n    if (isComponentFactory) {\n      if (ngDevMode) {\n        assertEquals(\n          typeof indexOrOptions !== 'object',  
    true,\n          'It looks like Component factory was provided as the first argument ' +\n          'and an options  
    object as the second argument. This combination of arguments ' +\n          'is incompatible. You can either  
    change the first argument to provide Component ' +\n          'type or change the second argument to be a number
```

```

(representing an index at '+\n          'which to insert the new component\'\'s host view into this container');\n
}\n  index = indexOrOptions
  as number | undefined;\n  } else {\n    if (ngDevMode) {\n      assertDefined(\n
getComponentDef(componentFactoryOrType),\n          `Provided Component class doesn't contain Component
definition. ` +\n          `Please check whether provided class has @Component decorator.`);\n      assertEquals(\n
        typeof indexOrOptions !== 'number', true,\n          `It looks like Component type was provided as the first
argument ' +\n          `and a number (representing an index at which to insert the new component\'\'s ' +\n
'host view into this container as the second argument. This combination of arguments ' +\n          `is incompatible.
Please use an object as the second argument instead.`);\n    }\n    const options = (indexOrOptions || {}) as {\n
index?: number,\n    injector?: Injector,\n    ngModuleRef?: NgModuleRef<unknown>,\n
environmentInjector?: EnvironmentInjector | NgModuleRef<unknown>,\n
    projectableNodes?: Node[][],\n    };
    if (ngDevMode && options.environmentInjector &&
options.ngModuleRef) {\n      throwError(\n          `Cannot pass both environmentInjector and ngModuleRef
options to createComponent().`);\n    }\n    index = options.index;\n    injector = options.injector;\n
projectableNodes = options.projectableNodes;\n    environmentInjector = options.environmentInjector ||
options.ngModuleRef;\n  }\n\n  const componentFactory: ComponentFactory<C> = isComponentFactory ?\n
componentFactoryOrType as ComponentFactory<C>:\n    new
R3ComponentFactory(getComponentDef(componentFactoryOrType)!);\n  const contextInjector = injector ||
this.parentInjector;\n\n  // If an `NgModuleRef` is not provided explicitly, try retrieving it from the DI tree.\n  if
(!environmentInjector && (componentFactory as any).ngModule == null) {\n    // For the `ComponentFactory`
case, entering this logic is very unlikely, since we expect that\n
    // an instance of a `ComponentFactory`, resolved via `ComponentFactoryResolver` would have an\n    //
`ngModule` field. This is possible in some test scenarios and potentially in some JIT-based\n    // use-cases. For the
`ComponentFactory` case we preserve backwards-compatibility and try\n    // using a provided injector first, then
fall back to the parent injector of this\n    // `ViewContainerRef` instance.\n    // For the factory-less case,
it's critical to establish a connection with the module\n    // injector tree (by retrieving an instance of an
`NgModuleRef` and accessing its injector),\n    // so that a component can use DI tokens provided in MgModules.
For this reason, we can not\n    // rely on the provided injector, since it might be detached from the DI tree (for
example, if\n    // it was created via `Injector.create` without specifying a parent injector, or if an\n    // injector is
retrieved from an `NgModuleRef` created via `createNgModule`
using an\n    // NgModule outside of a module tree). Instead, we always use `ViewContainerRef`'s parent\n    //
injector, which is normally connected to the DI tree, which includes module injector\n    // subtree.\n    const
_injector = isComponentFactory ? contextInjector : this.parentInjector;\n\n    // DO NOT REFACTOR. The code
here used to have a `injector.get(NgModuleRef, null) ||\n    // undefined` expression which seems to cause internal
google apps to fail. This is documented\n    // in the following internal bug issue: go/b/142967802\n    const result
= _injector.get(EnvironmentInjector, null);\n    if (result) {\n      environmentInjector = result;\n    }\n  }\n\n
const componentRef =\n    componentFactory.create(contextInjector, projectableNodes, undefined,
environmentInjector);\n  this.insert(componentRef.hostView, index);\n  return componentRef;\n  }\n\n  override
insert(viewRef: ViewRef, index?: number): ViewRef {\n    const IView
= (viewRef as R3ViewRef<any>)._IView!;\n    const tView = IView[TVIEW];\n\n    if (ngDevMode &&
viewRef.destroyed) {\n      throw new Error('Cannot insert a destroyed View in a ViewContainer!');\n    }\n\n    if
(viewAttachedToContainer(IView)) {\n      // If view is already attached, detach it first so we clean up references
appropriately.\n\n      const prevIdx = this.indexOf(viewRef);\n\n      // A view might be attached either to this or a
different container. The `prevIdx` for\n      // those cases will be:\n      // equal to -1 for views attached to this
ViewContainerRef\n      // >= 0 for views attached to a different ViewContainerRef\n      if (prevIdx !== -1) {\n
this.detach(prevIdx);\n      } else {\n        const prevLContainer = IView[PARENT] as LContainer;\n
ngDevMode &&\n          assertEquals(\n              isLContainer(prevLContainer), true,\n              `An attached view
should have its PARENT point to a container.`);\n        // We need

```

```

to re-create a R3ViewContainerRef instance since those are not stored on\n    // LView (nor anywhere else).\n
const prevVCREf = new R3ViewContainerRef(\n    prevLContainer, prevLContainer[T_HOST] as
TDirectiveHostNode, prevLContainer[PARENT]);\n    prevVCREf.detach(prevVCREf.indexOf(viewRef));\n
}\n }\n\n // Logical operation of adding `LView` to `LContainer`\n    const adjustedIdx =
this._adjustIndex(index);\n    const lContainer = this._lContainer;\n    insertView(tView, lView, lContainer,
adjustedIdx);\n\n // Physical operation of adding the DOM nodes.\n    const beforeNode =
getBeforeNodeForView(adjustedIdx, lContainer);\n    const renderer = lView[RENDERER];\n    const parentRNode
= nativeParentNode(renderer, lContainer[NATIVE] as RElement | RComment);\n    if (parentRNode !== null) {\n
addViewToContainer(tView, lContainer[T_HOST], renderer, lView, parentRNode, beforeNode);\n    }\n\n
(viewRef as R3ViewRef<any>).attachToViewContainerRef();\n
    addToArray(getOrCreateViewRefs(lContainer), adjustedIdx, viewRef);\n\n    return viewRef;\n }\n\n override
move(viewRef: ViewRef, newIndex: number): ViewRef {\n    if (ngDevMode && viewRef.destroyed) {\n    throw
new Error('Cannot move a destroyed View in a ViewContainer!');\n    }\n    return this.insert(viewRef, newIndex);\n
}\n\n override indexOf(viewRef: ViewRef): number {\n    const viewRefsArr = getViewRefs(this._lContainer);\n
return viewRefsArr !== null ? viewRefsArr.indexOf(viewRef) : -1;\n }\n\n override remove(index?: number): void
{\n    const adjustedIdx = this._adjustIndex(index, -1);\n    const detachedView = detachView(this._lContainer,
adjustedIdx);\n\n    if (detachedView) {\n    // Before destroying the view, remove it from the container's array of
`ViewRef`s.\n    // This ensures the view container length is updated before calling\n    // `destroyLView`, which
could recursively call view container methods that\n    // rely on an accurate
container length.\n    // (e.g. a method on this view container being called by a child directive's OnDestroy\n    //
lifecycle hook)\n    removeFromArray(getOrCreateViewRefs(this._lContainer), adjustedIdx);\n
destroyLView(detachedView[TVIEW], detachedView);\n    }\n }\n\n override detach(index?: number):
ViewRef|null {\n    const adjustedIdx = this._adjustIndex(index, -1);\n    const view = detachView(this._lContainer,
adjustedIdx);\n\n    const wasDetached =\n    view &&
removeFromArray(getOrCreateViewRefs(this._lContainer), adjustedIdx) != null;\n    return wasDetached ? new
R3ViewRef(view!) : null;\n }\n\n private _adjustIndex(index?: number, shift: number = 0) {\n    if (index == null)
{\n    return this.length + shift;\n    }\n    if (ngDevMode) {\n    assertGreaterThan(index, -1, `ViewRef index must
be positive, got ${index}`);\n    // +1 because it's legal to insert at the end.\n    assertLessThan(index, this.length +
1 + shift, 'index');\n    }\n
return index;\n }\n}\n\nfunction getViewRefs(lContainer: LContainer): ViewRef[]|null {\n    return
lContainer[VIEW_REFS] as ViewRef[];\n }\n\nfunction getOrCreateViewRefs(lContainer: LContainer): ViewRef[]
{\n    return (lContainer[VIEW_REFS] || (lContainer[VIEW_REFS] = [])) as ViewRef[];\n }\n\n/**\n * Creates a
ViewContainerRef and stores it on the injector.\n * @param ViewContainerRefToken The ViewContainerRef
type\n * @param ElementRefToken The ElementRef type\n * @param hostTNode The node that is requesting a
ViewContainerRef\n * @param hostLView The view to which the node belongs\n * @returns The
ViewContainerRef instance to use\n */\nexport function createContainerRef(\n    hostTNode:
TElementNode|TContainerNode|TElementContainerNode,\n    hostLView: LView): ViewContainerRef {\n
ngDevMode && assertTNodeType(hostTNode, TNodeType.AnyContainer | TNodeType.AnyRNode);\n\n    let
lContainer: LContainer;\n    const slotValue = hostLView[hostTNode.index];\n    if (isLContainer(slotValue))
{\n    // If the host is a container, we don't need to create a new LContainer\n    lContainer = slotValue;\n    } else {\n
let commentNode: RComment;\n    // If the host is an element container, the native host element is guaranteed to be
a\n    // comment and we can reuse that comment as anchor element for the new LContainer.\n    // The comment
node in question is already part of the DOM structure so we don't need to append\n    // it again.\n    if
(hostTNode.type & TNodeType.ElementContainer) {\n    commentNode = unwrapRNode(slotValue) as
RComment;\n    } else {\n    // If the host is a regular element, we have to insert a comment node manually which
will\n    // be used as an anchor when inserting elements. In this specific case we use low-level DOM\n    //
manipulation to insert it.\n    const renderer = hostLView[RENDERER];\n    ngDevMode &&
ngDevMode.rendererCreateComment++;\n    commentNode = renderer.createComment(ngDevMode ? 'container' :

```

```

");\n\n  const
  hostNative = getNativeByTNode(hostTNode, hostLView!);\n  const parentOfHostNative =
  nativeParentNode(renderer, hostNative);\n  nativeInsertBefore(\n    renderer, parentOfHostNative!,
  commentNode, nativeNextSibling(renderer, hostNative),\n    false);\n  }\n\n  hostLView[hostTNode.index] =
  IContainer =\n    createLContainer(slotValue, hostLView, commentNode, hostTNode);\n\n  addToViewTree(hostLView, IContainer);\n  }\n\n  return new R3ViewContainerRef(IContainer, hostTNode,
  hostLView);\n  }\n\n  "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
  code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
  */\n\n  import {ProcessProvidersFunction} from './../di/interface/provider';\n  import {EnvironmentInjector} from
  './../di/r3_injector';\n  import {Type} from './../interface/type';\n  import {SchemaMetadata} from
  './../metadata/schema';\n  import {ViewEncapsulation} from './../metadata/view';\n  import
  {FactoryFn} from './definition_factory';\n\n  import {TAttributes, TConstantsOrFactory} from './node';\n  import
  {CssSelectorList} from './projection';\n  import {TView} from './view';\n\n  /**\n * Definition of what a template
  rendering function should look like for a component.\n */\n  export type ComponentTemplate<T> = {\n // Note: the
  ctx parameter is typed as T|U, as using only U would prevent a template with\n // e.g. ctx: {} from being assigned to
  ComponentTemplate<any> as TypeScript won't infer U = any\n // in that scenario. By including T this
  incompatibility is resolved.\n <U extends T>(rf: RenderFlags, ctx: T|U): void;\n};\n\n /**\n * Definition of what a
  view queries function should look like.\n */\n  export type ViewQueriesFunction<T> = <U extends T>(rf:
  RenderFlags, ctx: U) => void;\n\n /**\n * Definition of what a content queries function should look like.\n */\n  export
  type ContentQueriesFunction<T> =\n <U extends T>(rf: RenderFlags, ctx: U, directiveIndex:
  number) => void;\n\n /**\n * Flags passed into template functions to determine which blocks (i.e. creation,
  update)\n * should be executed.\n */\n  enum RenderFlags {\n // Whether to run the creation block (e.g. create elements and directives)\n // Create =
  0b01,\n // Whether to run the update block (e.g. refresh bindings)\n // Update = 0b10\n}\n\n /**\n * A subclass
  of `Type` which has a static `cmp` field making it\n * consumable for rendering.\n */\n  export
  interface ComponentType<T> extends Type<T> {\n cmp: unknown;\n}\n\n /**\n * A subclass of `Type` which has
  a static `dir` field making it\n * consumable for rendering.\n */\n  export interface
  DirectiveType<T> extends Type<T> {\n dir: unknown;\n fac: unknown;\n}\n\n /**\n * A subclass of `Type` which
  has a static `pipe` field making it\n * consumable for rendering.\n */\n  export interface PipeType<T>
  extends Type<T> {\n pipe: unknown;\n}\n\n /**\n * Runtime link information for Directives.\n */\n  * This is an
  internal data structure used by the render to link\n * directives into templates.\n */\n  * NOTE: Always use
  `defineDirective` function to create this object,\n * never create the object directly since the shape of this object\n *
  can change between versions.\n */\n  * @param Selector type metadata specifying the selector of the directive or
  component\n */\n  * See: { @link defineDirective}\n */\n  export interface DirectiveDef<T> {\n /**\n * A dictionary
  mapping the inputs' minified property names to their public API names, which\n * are their aliases if any, or their
  original unminified property names\n * (as in `@Input('alias') propertyName: any;`).\n
  */\n // readonly inputs: {[P in keyof T]: string};\n /**\n * @deprecated This is only here because
  `NgOnChanges` incorrectly uses declared name instead of\n * public or minified name.\n */\n // readonly
  declaredInputs: {[P in keyof T]: string};\n /**\n * A dictionary mapping the outputs' minified property names to
  their public API names, which\n * are their aliases if any, or their original unminified property names\n * (as in
  `@Output('alias') propertyName: any;`).\n */\n // readonly outputs: {[P in keyof T]: string};\n /**\n * Function to
  create and refresh content queries associated with a given directive.\n */\n // contentQueries:
  ContentQueriesFunction<T>|null;\n /**\n * Query-related instructions for a directive. Note that while directives
  don't have a\n * view and as such view queries won't necessarily do anything, there might be\n * components that
  extend the directive.\n */\n // viewQuery: ViewQueriesFunction<T>|null;\n /**\n * Refreshes

```

host bindings on the associated directive.

```

    *^ readonly hostBindings: HostBindingsFunction<T>|null;
    /**
     * The number of bindings in this directive `hostBindings` (including pure fn bindings).
     * Used to calculate the length of the component's LView array, so we
     * can pre-fill the array and set the host binding start index.
    */
    *^ readonly hostVars: number;
    /**
     * Assign static attribute values to a host element.
     * This property will assign static attribute values as well as class and style
     * values to a host element. Since attribute values can consist of different types of values, the
     * `hostAttrs` array must include the values in the following format:
    */
    *^ attrs = [
      // static attributes (like `title`, `name`, `id`...)
      attr1, value1, attr2, value,
      // a single namespace value (like `x:id`)
      NAMESPACE_MARKER, namespaceUri1, name1, value1,
      // another single namespace value
      (like `x:name`)
      NAMESPACE_MARKER, namespaceUri2, name2, value2,
      // a series of CSS classes that will be applied to the element (no spaces)
      CLASSES_MARKER, class1, class2, class3,
      // a series of CSS styles (property + value) that will be applied to the element
      STYLES_MARKER, prop1, value1, prop2, value2
    ];
    *^ All non-class and non-style attributes must be defined at the start of the list
    * first before all class and style values are set. When there is a change in value
    * type (like when classes and styles are introduced) a marker must be used to separate
    * the entries. The marker values themselves are set via entries found in the
    * [AttributeMarker] enum.
    *^ readonly hostAttrs: TAttributes|null;
    /** Token representing the directive. Used by DI.
    *^ readonly type: Type<T>;
    /** Function that resolves providers and publishes them into the DI system.
    *^ providersResolver: (<U extends T>(def: DirectiveDef<U>, processProvidersFn?: ProcessProvidersFunction) => void)|null;
    /** The selectors that will be used to match nodes to this directive.
    *^ readonly selectors: CssSelectorList;
    /** Name under which the directive is exported (for use with local references in template)
    *^ readonly exportAs: string[]|null;
    /** Whether this directive (or component) is standalone.
    *^ readonly standalone: boolean;
    /** Factory function used to create a new directive instance. Will be null initially.
    * Populated when the factory is first requested by directive instantiation logic.
    *^ readonly factory: FactoryFn<T>|null;
    /** The features applied to this directive
    *^ readonly features: DirectiveDefFeature[]|null;
    * setInput: (<U extends T>(this: DirectiveDef<U>, instance: U, value: any, publicName: string, privateName: string) => void)|null;
    }
    /** Runtime link information for Components.
    * This is an internal data structure used by the render to link components into templates.
    * NOTE: Always use `defineComponent` function to create this object, never create the object directly since the shape of this object can change between versions.
    * See: { @link defineComponent }
    *^ export interface ComponentDef<T> extends DirectiveDef<T> {
      /** Unique ID for the component. Used in view encapsulation and to keep track of the injector in standalone components.
      *^ readonly id: string;
      /** The View template of the component.
      *^ readonly template: ComponentTemplate<T>;
      /** Constants associated with the component's view.
      *^ readonly consts: TConstantsOrFactory|null;
      /** An array of `ngContent[selector]` values that were found in the template.
      *^ readonly ngContentSelectors?: string[];
      /** A set of styles that the component needs to be present for component to render correctly.
      *^ readonly styles: string[];
      /** The number of nodes, local refs, and pipes in this component template.
      * Used to calculate the length of the component's LView array, so we
      * can pre-fill the array and set the binding start index.
      *^ // TODO(kara): remove queries from this count
      *^ readonly decls: number;
      /** The number of bindings in this component template (including pure fn bindings).
      * Used to calculate the length of the component's LView array, so we
      * can pre-fill the array and set the host binding start index.
      *^ readonly vars: number;
      /** Query-related instructions for a component.
      *^ viewQuery: ViewQueriesFunction<T>|null;
      /** The view encapsulation type, which determines how styles are applied to DOM elements. One of:
      * - `Emulated` (default): Emulate native scoping of styles.
      * - `Native`: Use the native encapsulation mechanism of the renderer.
      * - `ShadowDom`: Use modern [ShadowDOM](https://w3c.github.io/webcomponents/spec/shadow/) and create a ShadowRoot for component's host element.
      * - `None`: Do not provide any template or style encapsulation.
    */
    *^ readonly
  
```

encapsulation: ViewEncapsulation;\n\n /\*\*\n \* Defines arbitrary developer-defined data to be stored on a renderer instance.\n \* This is useful for renderers that delegate to other renderers.\n \*/\n readonly data: {[kind: string]: any};\n\n /\*\* Whether or not this component's ChangeDetectionStrategy is OnPush \*/\n readonly onPush: boolean;\n\n /\*\*\n \* Registry of directives and components that may be found in this view.\n \* The property is either an array of `DirectiveDef`s or a function which returns the array of `DirectiveDef`s. The function is necessary to be able to support forward declarations.\n \*/\n directiveDefs: DirectiveDefListOrFactory|null;\n\n /\*\*\n \* Registry of pipes that may be found in this view.\n \* The property is either an array of `PipeDefs`s or a function which returns the array of `PipeDefs`s. The function is necessary to be able to support forward declarations.\n \*/\n pipeDefs: PipeDefListOrFactory|null;\n\n /\*\*\n \* Unfiltered list of all dependencies of a component, or `null` if none.\n \*/\n dependencies: TypeOrFactory<DependencyTypeList>|null;\n\n /\*\*\n \* The set of schemas that declare elements to be allowed in the component's template.\n \*/\n schemas: SchemaMetadata[]|null;\n\n /\*\*\n \* Ivy runtime uses this place to store the computed tView for the component. This gets filled on the first run of component.\n \*/\n tView: TView|null;\n\n /\*\*\n \* A function added by the {@link StandaloneFeature} and used by the framework to create standalone injectors.\n \*/\n getStandaloneInjector: ((parentInjector: EnvironmentInjector) => EnvironmentInjector | null)|null;\n\n /\*\*\n \* Used to store the result of `noSideEffects` function so that it is not removed by closure compiler. The property should never be read.\n \*/\n readonly \_?: unknown;\n\n /\*\*\n \* Runtime link information for Pipes.\n \* This is an internal data structure used by the renderer to link pipes into templates.\n \* NOTE: Always use `definePipe` function to create this object, never create the object directly since the shape of this object can change between versions.\n \* See: {@link definePipe}\n \*/\n export interface PipeDef<T> {\n /\*\* Token representing the pipe. \*/\n type: Type<T>;\n /\*\*\n \* Pipe name.\n \* Used to resolve pipe in templates.\n \*/\n readonly name: string;\n /\*\*\n \* Factory function used to create a new pipe instance. Will be null initially.\n \* Populated when the factory is first requested by pipe instantiation logic.\n \*/\n factory: FactoryFn<T>|null;\n /\*\*\n \* Whether or not the pipe is pure.\n \* Pure pipes result only depends on the pipe input and not on internal state of the pipe.\n \*/\n readonly pure: boolean;\n /\*\*\n \* Whether this pipe is standalone.\n \*/\n readonly standalone: boolean;\n /\*\*\n \* The following are lifecycle hooks for this pipe\n \*/\n onDestroy: (() => void)|null;\n }\n\n export interface DirectiveDefFeature {\n <T>(directiveDef: DirectiveDef<T>): void;\n /\*\*\n \* Marks a feature as something that {@link InheritDefinitionFeature} will execute during inheritance.\n \* NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers identifying the change as a side effect, and the feature will be included in every bundle.\n \*/\n ngInherit?: true;\n }\n\n export interface ComponentDefFeature {\n <T>(componentDef: ComponentDef<T>): void;\n /\*\*\n \* Marks a feature as something that {@link InheritDefinitionFeature} will execute during inheritance.\n \* NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers identifying the change as a side effect, and the feature will be included in every bundle.\n \*/\n ngInherit?: true;\n }\n\n /\*\*\n \* Type used for directiveDefs on component definition.\n \* The function is necessary to be able to support forward declarations.\n \*/\n export type DirectiveDefListOrFactory = (() => DirectiveDefList)|DirectiveDefList;\n\n export type DirectiveDefList = (DirectiveDef<any>|ComponentDef<any>)[];\n\n export type DirectiveTypesOrFactory = (() => DirectiveTypeList)|DirectiveTypeList;\n\n export type DirectiveTypeList = (DirectiveType<any>|ComponentType<any>|Type<any>)\*\n\n Type<any>/\* Type as workaround for: Microsoft/TypeScript/issues/4881 \*/[];\n\n export type DependencyTypeList = (DirectiveType<any>|ComponentType<any>|PipeType<any>|Type<any>)[];\n\n export type TypeOrFactory<T> = T|(() => T);\n\n export type HostBindingsFunction<T> = <U extends T>(rf: RenderFlags, ctx: U) => void;\n\n /\*\*\n \* Type used for PipeDefs on component definition.\n \*/\n export type PipeDefListOrFactory = (() => PipeDefList)|PipeDefList;\n\n export type PipeDefList = PipeDef<any>[];\n\n export type PipeTypesOrFactory =

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(() => PipeTypeList)|PipeTypeList;\n\nexport type PipeTypeList =\n  (PipeType<any>|Type<any>)* Type as
workaround for: Microsoft/TypeScript/issues/4881 */[];\n\n// Note: This hack is necessary so we don't
erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd =
1;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed
by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\nimport
{ProviderToken} from '../di/provider_token';\nimport {QueryList} from '../linker/query_list';\nimport
{TNode} from './node';\nimport {TView} from './view';\n\n/**\n * An object representing query metadata extracted
from query annotations.\n * \n\nexport interface TQueryMetadata {\n  predicate:
ProviderToken<unknown>|string[];\n  read: any;\n  flags: QueryFlags;\n}\n\n/**\n * A set of flags to be used with
Queries.\n * \n * NOTE: Ensure changes here are reflected in `packages/compiler/src/render3/view/compiler.ts`\n
*\n\nexport const enum QueryFlags {\n  /**\n   * No flags\n   */\n  none = 0b0000,\n  /**\n   * Whether or not the
query should descend into children.\n   */\n  descendants = 0b0001,\n  /**\n   * The query can be computed
statically and hence can be assigned eagerly.\n   */\n  /**\n   * NOTE: Backwards compatibility with ViewEngine.\n   */\n
isStatic = 0b0010,\n  /**\n   * If the `QueryList` should fire change event only if actual change to query was
computed (vs old\n   * behavior where the change was fired whenever the query was recomputed, even if the
recomputed\n   * query resulted in the same list.)\n   */\n  emitDistinctChangesOnly = 0b0100,\n}\n\n/**\n *
TQuery objects represent all
the query-related data that remain the same from one view instance\n * to another and can be determined on the
very first template pass. Most notably TQuery holds all\n * the matches for a given view.\n * \n\nexport interface
TQuery {\n  /**\n   * Query metadata extracted from query annotations.\n   */\n  metadata: TQueryMetadata;\n  /**\n
   * Index of a query in a declaration view in case of queries propagated to an embedded view, -1\n   * for
queries declared in a given view. We are storing this index so we can find a parent query\n   * to clone for an
embedded view (when an embedded view is created).\n   */\n  indexInDeclarationView: number;\n  /**\n   *
Matches collected on the first template pass. Each match is a pair of:\n   * - TNode index;\n   * - match index;\n   * \n
*\n   * A TNode index can be either:\n   * - a positive number (the most common case) to indicate a matching TNode;\n
   * - a negative number to indicate that a given query is crossing a <ng-template> element and\n
   * results from views created based on TemplateRef should be inserted at this place.\n   * \n   * A match index is a
number used to find an actual value (for a given node) when query results\n   * are materialized. This index can have
one of the following values:\n   * - -2 - indicates that we need to read a special token (TemplateRef,
ViewContainerRef etc.); \n   * - -1 - indicates that we need to read a default value based on the node type
(TemplateRef for\n   * ng-template and ElementRef for other elements); \n   * - a positive number - index of an
injectable to be read from the element injector.\n   */\n  matches: number[]|null;\n  /**\n   * A flag indicating if a
given query crosses an <ng-template> element. This flag exists for\n   * performance reasons: we can notice that
queries not crossing any <ng-template> elements will\n   * have matches from a given view only (and adapt
processing accordingly).\n   */\n  crossesNgTemplate: boolean;\n  /**\n   * A method call when a given
query is crossing an element (or element container). This is where a\n   * given TNode is matched against a query
predicate.\n   * @param tView\n   * @param tNode\n   */\n  elementStart(tView: TView, tNode: TNode): void;\n  /**\n
   * A method called when processing the elementEnd instruction - this is mostly useful to determine\n   * if a
given content query should match any nodes past this point.\n   * @param tNode\n   */\n  elementEnd(tNode:
TNode): void;\n  /**\n   * A method called when processing the template instruction. This is where a\n   * given
TContainerNode is matched against a query predicate.\n   * @param tView\n   * @param tNode\n   */\n  template(tView: TView, tNode: TNode): void;\n  /**\n
   * A query-related method called when an embedded
TView is created based on the content of a\n   * <ng-template> element. We call this method to determine if a given
query should be propagated\n   * to the embedded view and if so - return a cloned TQuery for this embedded view.\n
   * @param tNode\n   * @param childQueryIndex\n   */\n  embeddedTView(tNode: TNode, childQueryIndex:
number): TQuery|null;\n}\n\n/**\n * TQueries represent a collection of individual TQuery objects tracked in a given
view. Most of the\n * methods on this interface are simple proxy methods to the corresponding functionality on
TQuery.\n * \n\nexport interface TQueries {\n  /**\n   * Adds a new TQuery to a collection of queries tracked in a

```



given view.\n \* @param tQuery\n \*/\n track(tQuery: TQuery): void;\n \*/\n \* Returns a TQuery instance for at the given index in the queries array.\n \* @param index\n \*/\n getByIndex(index: number): TQuery;\n \*/\n \* Returns the number of queries tracked in a given view.\n \*/\n length: number;\n \*/\n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n \* `elementStart` on each and every TQuery.\n \* @param tView\n \* @param tNode\n \*/\n elementStart(tView: TView, tNode:

TNode): void;\n \*/\n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n \* `elementEnd` on each and every TQuery.\n \* @param tNode\n \*/\n elementEnd(tNode: TNode): void;\n \*/\n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n \* `template` on each and every TQuery.\n \* @param tView\n \* @param tNode\n \*/\n template(tView: TView, tNode: TNode): void;\n \*/\n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n \* `embeddedTView` on each and every TQuery.\n \* @param tNode\n \*/\n embeddedTView(tNode: TNode): TQueries|null;\n \*/\n \* An interface that represents query-related information specific to a view instance. Most notably\n \* it contains:\n \* - materialized query matches;\n \* - a pointer to a QueryList where materialized query results should be reported.\n \*/\nexport interface LQuery<T> {\n \*/\n

\* Materialized query matches for a given view only (!). Results are initialized lazily so the\n \* array of matches is set to `null` initially.\n \*/\n matches: (T|null)[]|null;\n \*/\n \* A QueryList where materialized query results should be reported.\n \*/\n queryList: QueryList<T>;\n \*/\n \* Clones an LQuery for an embedded view. A cloned query shares the same `QueryList` but has a\n \* separate collection of materialized matches.\n \*/\n clone(): LQuery<T>;\n \*/\n \* Called when an embedded view, impacting results of this query, is inserted or removed.\n \*/\n setDirty(): void;\n \*/\n \* LQueries represent a collection of individual LQuery objects tracked in a given view.\n \*/\nexport interface LQueries {\n \*/\n \* A collection of queries tracked in a given view.\n \*/\n queries: LQuery<any>[];\n \*/\n \* A method called when a new embedded view is created. As a result a set of LQueries applicable\n \* for a new embedded view is instantiated

(cloned) from the declaration view.\n \* @param tView\n \*/\n createEmbeddedView(tView: TView): LQueries|null;\n \*/\n \* A method called when an embedded view is inserted into a container. As a result all impacted\n \* `LQuery` objects (and associated `QueryList`) are marked as dirty.\n \* @param tView\n \*/\n insertView(tView: TView): void;\n \*/\n \* A method called when an embedded view is detached from a container. As a result all impacted\n \* `LQuery` objects (and associated `QueryList`) are marked as dirty.\n \* @param tView\n \*/\n detachView(tView: TView): void;\n \*/\n \*/\n // Note: This hack is necessary so we don't erroneously get a circular dependency\n // failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n \*/\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n \*/\n \*/\n // We are temporarily

importing the existing viewEngine\_from core so we can be sure we are\n // correctly implementing its interfaces for backwards compatibility.\nimport { ProviderToken } from '../di/provider\_token';\nimport { createElementRef, ElementRef as ViewEngine\_ElementRef, unwrapElementRef } from './linker/element\_ref';\nimport { QueryList } from './linker/query\_list';\nimport { createTemplateRef, TemplateRef as ViewEngine\_TemplateRef } from './linker/template\_ref';\nimport { createContainerRef, ViewContainerRef } from './linker/view\_container\_ref';\nimport { assertDefined, assertIndexInRange, assertNumber, throwError } from './util/assert';\nimport { stringify } from './util/stringify';\nimport { assertFirstCreatePass, assertLContainer } from './assert';\nimport { getNodeInjectable, locateDirectiveOrProvider } from './di';\nimport { storeCleanupWithContext } from './instructions/shared';\nimport { CONTAINER\_HEADER\_OFFSET, LContainer, MOVED\_VIEWS } from './interfaces/container';\nimport { unusedValueExportToPlacateAjd as unused1 } from './interfaces/definition';\nimport { unusedValueExportToPlacateAjd as unused2 } from './interfaces/injector';\nimport { TContainerNode, TElementContainerNode, TElementNode, TNode, TNodeType, unusedValueExportToPlacateAjd as unused3 } from './interfaces/node';\nimport { LQueries, LQuery, QueryFlags, TQueries, TQuery, TQueryMetadata, unusedValueExportToPlacateAjd as unused4 } from

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./interfaces/query';\nimport {DECLARATION_LCONTAINER, LView, PARENT, QUERIES, TVIEW, TView}
from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {getCurrentQueryIndex,
getCurrentTNode, getLView, getTView, setCurrentQueryIndex} from './state';\nimport {isCreationMode} from
./util/view_utils';\n\nconst unusedValueToPlacateAjd = unused1 + unused2 + unused3 + unused4;\n\nclass
LQuery_<T> implements LQuery<T> {\n matches: (T|null)[]|null = null;\n constructor(public queryList:
QueryList<T>) {} \n clone(): LQuery<T> {\n return new LQuery_(this.queryList);\n } \n
setDirty(): void {\n this.queryList.setDirty();\n } \n}\n\nclass LQueries_ implements LQueries {\n
constructor(public queries: LQuery<any>[] = []) {} \n\n createEmbeddedView(tView: TView): LQueries|null {\n
const tQueries = tView.queries;\n if (tQueries !== null) {\n const noOfInheritedQueries = \n
tView.contentQueries !== null ? tView.contentQueries[0] : tQueries.length;\n const viewLQueries:
LQuery<any>[] = [];\n // An embedded view has queries propagated from a declaration view at the beginning
of the\n // TQueries collection and up until a first content query declared in the embedded view. Only\n //
propagated LQueries are created at this point (LQuery corresponding to declared content\n // queries will be
instantiated from the content query instructions for each directive).\n for (let i = 0; i < noOfInheritedQueries; i++)
{\n const tQuery = tQueries.getByIndex(i);\n const parentLQuery =
this.queries[tQuery.indexInDeclarationView];\n
viewLQueries.push(parentLQuery.clone());\n } \n\n return new LQueries_(viewLQueries);\n } \n\n
return null;\n } \n\n insertView(tView: TView): void {\n this.dirtyQueriesWithMatches(tView);\n } \n\n
detachView(tView: TView): void {\n this.dirtyQueriesWithMatches(tView);\n } \n\n private
dirtyQueriesWithMatches(tView: TView) {\n for (let i = 0; i < this.queries.length; i++) {\n if
(getTQuery(tView, i).matches !== null) {\n this.queries[i].setDirty();\n } \n } \n } \n}\n\nclass
TQueryMetadata_ implements TQueryMetadata {\n constructor(\n public predicate:
ProviderToken<unknown>|string[], public flags: QueryFlags,\n public read: any = null) {} \n}\n\nclass TQueries_
implements TQueries {\n constructor(private queries: TQuery[] = []) {} \n\n elementStart(tView: TView, tNode:
TNode): void {\n ngDevMode &&\n assertFirstCreatePass(\n tView, 'Queries should collect results on
the first template
pass only');\n for (let i = 0; i < this.queries.length; i++) {\n this.queries[i].elementStart(tView, tNode);\n } \n
}\n elementEnd(tNode: TNode): void {\n for (let i = 0; i < this.queries.length; i++) {\n
this.queries[i].elementEnd(tNode);\n } \n } \n\n embeddedTView(tNode: TNode): TQueries|null {\n let
queriesForTemplateRef: TQuery[]|null = null;\n for (let i = 0; i < this.length; i++) {\n const childQueryIndex
= queriesForTemplateRef !== null ? queriesForTemplateRef.length : 0;\n const tqueryClone =
this.getByIndex(i).embeddedTView(tNode, childQueryIndex);\n if (tqueryClone) {\n
tqueryClone.indexInDeclarationView = i;\n if (queriesForTemplateRef !== null) {\n
queriesForTemplateRef.push(tqueryClone);\n } else {\n queriesForTemplateRef = [tqueryClone];\n
}\n } \n } \n\n return queriesForTemplateRef !== null ? new TQueries_(queriesForTemplateRef) : null;\n
}\n\n template(tView: TView,
tNode: TNode): void {\n ngDevMode &&\n assertFirstCreatePass(\n tView, 'Queries should collect
results on the first template pass only');\n for (let i = 0; i < this.queries.length; i++) {\n
this.queries[i].template(tView, tNode);\n } \n } \n\n getByIndex(index: number): TQuery {\n ngDevMode &&
assertIndexInRange(this.queries, index);\n return this.queries[index];\n } \n\n get length(): number {\n return
this.queries.length;\n } \n\n track(tquery: TQuery): void {\n this.queries.push(tquery);\n } \n}\n\nclass TQuery_
implements TQuery {\n matches: number[]|null = null;\n indexInDeclarationView = -1;\n crossesNgTemplate =
false;\n\n /**\n * A node index on which a query was declared (-1 for view queries and ones inherited from the\n
* declaration template). We use this index (alongside with _appliesToNextNode flag) to know\n * when to apply
content queries to elements in a template.\n */\n private _declarationNodeIndex: number;\n\n
/**\n * A flag indicating if a given query still applies to nodes it is crossing. We use this flag\n * (alongside with
_declarationNodeIndex) to know when to stop applying content queries to\n * elements in a template.\n */\n
private _appliesToNextNode = true;\n\n constructor(public metadata: TQueryMetadata, nodeIndex: number = -1)

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{\n  this._declarationNodeIndex = nodeIndex;\n }\n\n elementStart(tView: TView, tNode: TNode): void {\n  if
(this.isApplyingToNode(tNode)) {\n    this.matchTNode(tView, tNode);\n  }\n }\n\n elementEnd(tNode:
TNode): void {\n  if (this._declarationNodeIndex === tNode.index) {\n    this._appliesToNextNode = false;\n
}\n }\n\n template(tView: TView, tNode: TNode): void {\n  this.elementStart(tView, tNode);\n }\n\n
embeddedTView(tNode: TNode, childQueryIndex: number): TQuery|null {\n  if (this.isApplyingToNode(tNode))
{\n    this.crossesNgTemplate = true;\n    // A marker indicating a `` element (a placeholder
for query results from\n    // embedded views created based on this ``).\n    this.addMatch(-
tNode.index, childQueryIndex);\n    return new TQuery_(this.metadata);\n  }\n  return null;\n }\n\n
private
isApplyingToNode(tNode: TNode): boolean {\n  if (this._appliesToNextNode &&\n    (this.metadata.flags &
QueryFlags.descendants) !== QueryFlags.descendants) {\n    const declarationNodeIdx =
this._declarationNodeIndex;\n    let parent = tNode.parent;\n    // Determine if a given TNode is a "direct" child
of a node on which a content query was\n    // declared (only direct children of query's host node can match with
the descendants: false\n    // option). There are 3 main use-case / conditions to consider here:\n    // - <needs-
target><i #target></i></needs-target>: here <i #target> parent node is a query\n    // host node;\n    // - <needs-
target><ng-template [ngIf]="true"><i #target></i></ng-template></needs-target>:\n    //
here <i #target> parent node is null;\n    // - <needs-target><ng-container><i #target></i></ng-container></needs-
target>: here we need\n    // to go past `` to determine <i #target> parent node (but we shouldn't
traverse\n    // up past the query's host node!).\n    while (parent !== null && (parent.type &
TNodeType.ElementContainer) &&\n      parent.index !== declarationNodeIdx) {\n      parent =
parent.parent;\n    }\n    return declarationNodeIdx === (parent !== null ? parent.index : -1);\n  }\n  return
this._appliesToNextNode;\n }\n\n private matchTNode(tView: TView, tNode: TNode): void {\n  const predicate
= this.metadata.predicate;\n  if (Array.isArray(predicate)) {\n    for (let i = 0; i < predicate.length; i++) {\n
const name = predicate[i];\n    this.matchTNodeWithOptions(tView, tNode,
getIdxOfMatchingSelector(tNode, name));\n    // Also try matching the name to a provider since strings can be
used as DI tokens
too.\n    this.matchTNodeWithOptions(\n      tView, tNode, locateDirectiveOrProvider(tNode, tView,
name, false, false));\n    }\n  } else {\n    if ((predicate as any) === ViewEngine_TemplateRef) {\n    if
(tNode.type & TNodeType.Container) {\n      this.matchTNodeWithOptions(tView, tNode, -1);\n    }\n  }
else {\n    this.matchTNodeWithOptions(\n      tView, tNode, locateDirectiveOrProvider(tNode, tView,
predicate, false, false));\n    }\n  }\n }\n\n private matchTNodeWithOptions(tView: TView, tNode: TNode,
nodeMatchIdx: number|null): void {\n  if (nodeMatchIdx !== null) {\n    const read = this.metadata.read;\n    if
(read !== null) {\n      if (read === ViewEngine_ElementRef || read === ViewContainerRef ||\n        read ===
ViewEngine_TemplateRef && (tNode.type & TNodeType.Container)) {\n        this.addMatch(tNode.index, -2);\n
      } else {\n        const directiveOrProviderIdx =\n          locateDirectiveOrProvider(tNode,
tView, read, false, false);\n        if (directiveOrProviderIdx !== null) {\n          this.addMatch(tNode.index,
directiveOrProviderIdx);\n        }\n      } else {\n        this.addMatch(tNode.index, nodeMatchIdx);\n      }\n
}\n }\n\n private addMatch(tNodeIdx: number, matchIdx: number) {\n  if (this.matches === null) {\n
this.matches = [tNodeIdx, matchIdx];\n  } else {\n    this.matches.push(tNodeIdx, matchIdx);\n  }\n }\n
}\n\n/**\n * Iterates over local names for a given node and returns directive index\n * (or -1 if a local name
points to an element).\n * @param tNode static data of a node to check\n * @param selector selector to match\n
* @returns directive index, -1 or null if a selector didn't match any of the local names\n */\nfunction
getIdxOfMatchingSelector(tNode: TNode, selector: string): number|null {\n  const localNames =
tNode.localNames;\n  if (localNames !== null) {\n    for (let i = 0; i < localNames.length;\n    i += 2) {\n    if (localNames[i] === selector) {\n      return localNames[i + 1] as number;\n    }\n  }\n
}\n  return null;\n }\n\nfunction createResultByTNodeType(tNode: TNode, currentView: LView): any {\n  if
(tNode.type & (TNodeType.AnyRNode | TNodeType.ElementContainer)) {\n    return createElementRef(tNode,
currentView);\n  } else if (tNode.type & TNodeType.Container) {\n    return createTemplateRef(tNode,
currentView);\n  }\n  return null;\n }\n\nfunction createResultForNode(IView: LView, tNode: TNode,

```



```
((tQuery.metadata.flags & QueryFlags.isStatic) === QueryFlags.isStatic)) {\n  if (tQuery.matches === null) {\n    queryList.reset([]);\n  } else {\n    const result = tQuery.crossesNgTemplate ?\n      collectQueryResults(tView, IView, queryIndex, []) :\n      materializeViewResults(tView, IView, tQuery, queryIndex);\n    queryList.reset(result, unwrapElementRef);\n    queryList.notifyOnChanges();\n  }\n  return true;\n }\n\n return false;\n }\n\n/**\n * Creates new QueryList, stores the reference in LView and returns QueryList.\n *\n * @param predicate
```

```
The type for which the query will search\n *\n * @param flags Flags associated with the query\n *\n * @param read What to save in the query\n *\n * @codeGenApi\n *\n * ^\n * export function viewQuery<T>(\n  predicate:\n  ProviderToken<unknown>|string[], flags: QueryFlags, read?: any): void {\n  ngDevMode && assertNumber(flags, 'Expecting flags');\n  const tView = getTView();\n  if (tView.firstCreatePass) {\n    createTQuery(tView, new TQueryMetadata_(predicate, flags, read), -1);\n    if ((flags & QueryFlags.isStatic) === QueryFlags.isStatic) {\n      tView.staticViewQueries = true;\n    }\n  }\n  createLQuery<T>(tView, getLView(), flags);\n }\n\n/**\n * Registers a QueryList, associated with a content query, for later refresh (part of a view\n * refresh).\n *\n * @param directiveIndex Current directive index\n *\n * @param predicate The type for which the query will search\n *\n * @param flags Flags associated with the query\n *\n * @param read What to save in the query\n *\n * @returns QueryList<T>\n *\n * @codeGenApi\n *\n * ^\n * export function contentQuery<T>(\n  directiveIndex: number, predicate: ProviderToken<unknown>|string[], flags: QueryFlags,\n  read?: any): void {\n  ngDevMode && assertNumber(flags, 'Expecting flags');\n  const tView = getTView();\n  if (tView.firstCreatePass) {\n    const tNode = getCurrentTNode();\n    createTQuery(tView, new TQueryMetadata_(predicate, flags, read), tNode.index);\n    saveContentQueryAndDirectiveIndex(tView, directiveIndex);\n    if ((flags & QueryFlags.isStatic) === QueryFlags.isStatic) {\n      tView.staticContentQueries = true;\n    }\n  }\n  createLQuery<T>(tView, getLView(), flags);\n }\n\n/**\n * Loads a QueryList corresponding to the current view or content query.\n *\n * @codeGenApi\n *\n * ^\n * export function loadQuery<T>(): QueryList<T> {\n  return loadQueryInternal<T>(getLView(), getCurrentQueryIndex());\n }\n\nfunction loadQueryInternal<T>(IView: LView, queryIndex: number): QueryList<T> {\n  ngDevMode && assertDefined(IView[QUERIES], 'LQueries should be defined when trying to load a query');\n  ngDevMode && assertIndexInRange(IView[QUERIES].queries, queryIndex);\n  return IView[QUERIES].queries[queryIndex].queryList;\n }\n\nfunction createLQuery<T>(tView: TView, IView: LView, flags: QueryFlags) {\n  const queryList = new QueryList<T>(\n    (flags & QueryFlags.emitDistinctChangesOnly) === QueryFlags.emitDistinctChangesOnly);\n  storeCleanupWithContext(tView, IView, queryList, queryList.destroy);\n  if (IView[QUERIES] === null) IView[QUERIES] = new LQueries_();\n  IView[QUERIES].queries.push(new LQuery_(queryList));\n }\n\nfunction createTQuery(tView: TView, metadata: TQueryMetadata, nodeIndex: number): void {\n  if (tView.queries === null) tView.queries = new TQueries_();\n  tView.queries.track(new TQuery_(metadata, nodeIndex));\n }\n\nfunction saveContentQueryAndDirectiveIndex(tView: TView, directiveIndex: number) {\n  const tViewContentQueries = tView.contentQueries || (tView.contentQueries = []);\n  const lastSavedDirectiveIndex =\n    tViewContentQueries.length ? tViewContentQueries[tViewContentQueries.length - 1] : -1;\n  if (directiveIndex !== lastSavedDirectiveIndex) {\n    tViewContentQueries.push(tView.queries!.length - 1, directiveIndex);\n  }\n }\n\nfunction getTQuery(tView: TView, index: number): TQuery {\n  ngDevMode && assertDefined(tView.queries, 'TQueries must be defined to retrieve a TQuery');\n  return tView.queries!.getByIndex(index);\n }\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n *\n */\nimport { createTemplateRef, TemplateRef } from './linker/template_ref';\nimport { TNode } from './interfaces/node';\nimport { LView } from './interfaces/view';\n\n/**\n * Retrieves `TemplateRef` instance from `Injector` when a local reference is placed on the\n * <ng-template> element.\n *\n * @codeGenApi\n *\n * ^\n * export function templateRefExtractor(tNode: TNode, IView: LView): TemplateRef<any>|null {\n  return createTemplateRef(tNode, IView);\n }\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n *\n */
```

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```

import {LifecycleHooksFeature} from './component_ref';
import {defineComponent, defineDirective, defineNgModule, definePipe, setComponentScope, setNgModuleScope} from './definition';
import {CopyDefinitionFeature} from './features/copy_definition_feature';
import {InheritDefinitionFeature} from './features/inherit_definition_feature';
import {NgOnChangesFeature} from './features/ng_onchanges_feature';
import {ProvidersFeature} from './features/providers_feature';
import {StandaloneFeature} from './features/standalone_feature';
import {ComponentDef, ComponentTemplate, ComponentType, DirectiveDef, DirectiveType, PipeDef} from './interfaces/definition';
import {ComponentDeclaration, DirectiveDeclaration, FactoryDeclaration, InjectorDeclaration, NgModuleDeclaration, PipeDeclaration} from './interfaces/public_definitions';
import {ComponentDebugMetadata, DirectiveDebugMetadata, getComponent, getDirectiveMetadata, getDirectives, getHostElement, getRenderedText} from './util/discovery_utils';
export {NgModuleType} from './metadata/ng_module_def';
export {ComponentFactory, ComponentFactoryResolver, ComponentRef, injectComponentFactoryResolver} from './component_ref';
export {getInheritedFactory} from './di';
export {getLocaleId, setLocaleId} from './i18n/i18n_locale_id';
// clang-format off
export {
  detectChanges,
  store,
  advance,
  attribute,
  attributeInterpolate1,
  attributeInterpolate2,
  attributeInterpolate3,
  attributeInterpolate4,
  attributeInterpolate5,
  attributeInterpolate6,
  attributeInterpolate7,
  attributeInterpolate8,
  attributeInterpolateV,
  classMap,
  classMapInterpolate1,
  classMapInterpolate2,
  classMapInterpolate3,
  classMapInterpolate4,
  classMapInterpolate5,
  classMapInterpolate6,
  classMapInterpolate7,
  classMapInterpolate8,
  classMapInterpolateV,
  classProp,
  directiveInject,
  element,
  elementContainer,
  elementContainerEnd,
  elementContainerStart,
  elementEnd,
  elementStart,
  getCurrentView,
  hostProperty,
  injectAttribute,
  invalidFactory,
  listener,
  namespaceHTML,
  namespaceMathML,
  namespaceSVG,
  nextContext,
  projection,
  projectionDef,
  property,
  propertyInterpolate,
  propertyInterpolate1,
  propertyInterpolate2,
  propertyInterpolate3,
  propertyInterpolate4,
  propertyInterpolate5,
  propertyInterpolate6,
  propertyInterpolate7,
  propertyInterpolate8,
  propertyInterpolateV,
  reference,
  styleMap,
  styleMapInterpolate1,
  styleMapInterpolate2,
  styleMapInterpolate3,
  styleMapInterpolate4,
  styleMapInterpolate5,
  styleMapInterpolate6,
  styleMapInterpolate7,
  styleMapInterpolate8,
  styleMapInterpolateV,
  styleProp,
  stylePropInterpolate1,
  stylePropInterpolate2,
  stylePropInterpolate3,
  stylePropInterpolate4,
  stylePropInterpolate5,
  stylePropInterpolate6,
  stylePropInterpolate7,
  stylePropInterpolate8,
  stylePropInterpolateV,
  syntheticHostListener,
  syntheticHostProperty,
  template,
  text,
  textInterpolate,
  textInterpolate1,
  textInterpolate2,
  textInterpolate3,
  textInterpolate4,
  textInterpolate5,
  textInterpolate6,
  textInterpolate7,
  textInterpolate8,
  textInterpolateV,
  getUnknownElementStrictMode,
  setUnknownElementStrictMode,
  getUnknownPropertyStrictMode,
  setUnknownPropertyStrictMode
} from './instructions/all';
export {
  i18n,
  i18nApply,
  i18nAttributes,
  i18nEnd,
  i18nExp,
  i18nPostprocess,
  i18nStart
} from './instructions/i18n';
export {RenderFlags} from './interfaces/definition';
export {AttributeMarker} from './interfaces/node';
export {CssSelectorList, ProjectionSlots} from './interfaces/projection';
export {setClassMetadata} from './metadata';
export {NgModuleFactory, NgModuleRef, createEnvironmentInjector} from './ng_module_ref';
export {
  pipe,
  pipeBind1,
  pipeBind2,
  pipeBind3,
  pipeBind4,
  pipeBindV,
  pureFunction0,
  pureFunction1,
  pureFunction2,
  pureFunction3,
  pureFunction4,
  pureFunction5,
  pureFunction6,
  pureFunction7,
  pureFunction8,
  pureFunctionV,
  contentQuery,
  loadQuery,
  queryRefresh,
  viewQuery
} from './pipe';
export {
  disableBindings,
  enableBindings,
  resetView,
  restoreView,
  NO_CHANGE
} from './state';
export {resolveBody, resolveDocument, resolveWindow} from './tokens';
export {resolveBody, resolveDocument, resolveWindow} from './util/misc_utils';
export {templateRefExtractor} from './view_engine_compatibility_prebound';
// clang-format on
export {
  ComponentDebugMetadata,
  ComponentDef,
  ComponentTemplate,
  ComponentType,

```



```

r3.viewQuery,\n    'loadQuery': r3.loadQuery,\n    'contentQuery': r3.contentQuery,\n    'reference':
r3.reference,\n
    'classMap': r3.classMap,\n    'classMapInterpolate1': r3.classMapInterpolate1,\n    'classMapInterpolate2':
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r3.classMapInterpolate4,\n    'classMapInterpolate5': r3.classMapInterpolate5,\n    'classMapInterpolate6':
r3.classMapInterpolate6,\n    'classMapInterpolate7': r3.classMapInterpolate7,\n    'classMapInterpolate8':
r3.classMapInterpolate8,\n    'classMapInterpolateV': r3.classMapInterpolateV,\n    'styleMap': r3.styleMap,\n
'styleMapInterpolate1': r3.styleMapInterpolate1,\n    'styleMapInterpolate2': r3.styleMapInterpolate2,\n
'styleMapInterpolate3': r3.styleMapInterpolate3,\n    'styleMapInterpolate4': r3.styleMapInterpolate4,\n
'styleMapInterpolate5': r3.styleMapInterpolate5,\n    'styleMapInterpolate6': r3.styleMapInterpolate6,\n
'styleMapInterpolate7': r3.styleMapInterpolate7,\n    'styleMapInterpolate8': r3.styleMapInterpolate8,\n
'styleMapInterpolateV': r3.styleMapInterpolateV,\n    'styleProp': r3.styleProp,\n    'stylePropInterpolate1':
r3.stylePropInterpolate1,\n    'stylePropInterpolate2': r3.stylePropInterpolate2,\n    'stylePropInterpolate3':
r3.stylePropInterpolate3,\n    'stylePropInterpolate4': r3.stylePropInterpolate4,\n    'stylePropInterpolate5':
r3.stylePropInterpolate5,\n    'stylePropInterpolate6': r3.stylePropInterpolate6,\n    'stylePropInterpolate7':
r3.stylePropInterpolate7,\n    'stylePropInterpolate8': r3.stylePropInterpolate8,\n    'stylePropInterpolateV':
r3.stylePropInterpolateV,\n    'classProp': r3.classProp,\n    'advance': r3.advance,\n    'template': r3.template,\n
'text': r3.text,\n    'textInterpolate': r3.textInterpolate,\n    'textInterpolate1':
r3.textInterpolate1,\n    'textInterpolate2': r3.textInterpolate2,\n    'textInterpolate3': r3.textInterpolate3,\n
'textInterpolate4': r3.textInterpolate4,\n    'textInterpolate5': r3.textInterpolate5,\n    'textInterpolate6':
r3.textInterpolate6,\n    'textInterpolate7': r3.textInterpolate7,\n    'textInterpolate8': r3.textInterpolate8,\n
'textInterpolateV': r3.textInterpolateV,\n    'i18n': r3.i18n,\n    'i18nAttributes': r3.i18nAttributes,\n    'i18nExp':
r3.i18nExp,\n    'i18nStart': r3.i18nStart,\n    'i18nEnd': r3.i18nEnd,\n    'i18nApply': r3.i18nApply,\n
'i18nPostprocess': r3.i18nPostprocess,\n    'resolveWindow': r3.resolveWindow,\n    'resolveDocument':
r3.resolveDocument,\n    'resolveBody': r3.resolveBody,\n    'setComponentScope': r3.setComponentScope,\n
'setNgModuleScope': r3.setNgModuleScope,\n    'registerNgModuleType':
registerNgModuleType,\n    'sanitizeHtml': sanitization.sanitizeHtml,\n    'sanitizeStyle':
sanitization.sanitizeStyle,\n    'sanitizeResourceUrl': sanitization.sanitizeResourceUrl,\n    'sanitizeScript':
sanitization.sanitizeScript,\n    'sanitizeUrl': sanitization.sanitizeUrl,\n    'sanitizeUrlOrResourceUrl':
sanitization.sanitizeUrlOrResourceUrl,\n    'trustConstantHtml': sanitization.trustConstantHtml,\n
'trustConstantResourceUrl': sanitization.trustConstantResourceUrl,\n    'validateIframeAttribute':
iframe_attrs_validation.validateIframeAttribute,\n    'forwardRef': forwardRef,\n    'resolveForwardRef':
resolveForwardRef,\n    )));\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {ViewEncapsulation} from '../metadata/view';\n\nexport
interface JitCompilerOptions {\n  defaultEncapsulation?: ViewEncapsulation;\n  preserveWhitespaces?:
boolean;\n}\n\nlet jitOptions: JitCompilerOptions|null = null;\n\nexport function setJitOptions(options:
JitCompilerOptions): void {\n  if (jitOptions !== null) {\n    if (options.defaultEncapsulation !==
jitOptions.defaultEncapsulation) {\n      ngDevMode &&\n        console.error(\n          'Provided value for
`defaultEncapsulation` can not be changed once it has been set.);\n      return;\n    }\n    if
(options.preserveWhitespaces !== jitOptions.preserveWhitespaces) {\n      ngDevMode &&\n        console.error(\n
          'Provided value for `preserveWhitespaces` can not be changed once it has been set.);\n      return;\n    }\n  }\n
jitOptions = options;\n}\n\nexport function getJitOptions(): JitCompilerOptions|null {\n  return
jitOptions;\n}\n\nexport function resetJitOptions(): void {\n  jitOptions = null;\n}\n", "/*\n * @license\n *
Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\nexport function patchModuleCompilation(): void
{\n  // Does nothing, but exists as a target for patching.\n}\n", "/*\n * @license\n * Copyright Google LLC All

```



```

Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n * \n\nimport {ModuleWithProviders} from
'././di/interface/provider';\nimport {Type} from '././interface/type';\nimport {NgModuleDef} from
'././metadata/ng_module_def';\nimport {getNgModuleDef} from './definition';\n\nexport function
isModuleWithProviders(value: any): value is ModuleWithProviders<{}> {\n  return (value as {ngModule?:
any}).ngModule !== undefined;\n}\n\nexport function isNgModule<T>(value: Type<T>): value is
Type<T>&{mod: NgModuleDef<T>} {\n  return !!getNgModuleDef(value);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\nimport
{getCompilerFacade, JitCompilerUsage, R3InjectorMetadataFacade} from '././compiler/compiler_facade';\nimport
{resolveForwardRef} from '././di/forward_ref';\nimport {NG_INJ_DEF} from '././di/interface/defs';\nimport
{ModuleWithProviders} from '././di/interface/provider';\nimport {reflectDependencies} from
'././di/jit/util';\nimport {Type} from '././interface/type';\nimport {registerNgModuleType} from
'././linker/ng_module_registration';\nimport {Component} from '././metadata/directives';\nimport {NgModule}
from '././metadata/ng_module';\nimport {NgModuleDef, NgModuleTransitiveScopes, NgModuleType} from
'././metadata/ng_module_def';\nimport {deepForEach, flatten} from '././util/array_utils';\nimport {assertDefined}
from '././util/assert';\nimport
{EMPTY_ARRAY} from '././util/empty';\nimport {getComponentDef, getDirectiveDef, getNgModuleDef,
getPipeDef, isStandalone} from './definition';\nimport {NG_COMP_DEF, NG_DIR_DEF, NG_FACTORY_DEF,
NG_MOD_DEF, NG_PIPE_DEF} from './fields';\nimport {ComponentDef} from './interfaces/definition';\nimport
{maybeUnwrapFn} from './util/misc_utils';\nimport {stringifyForError} from './util/stringify_utils';\n\nimport
{angularCoreEnv} from './environment';\nimport {patchModuleCompilation} from './module_patch';\nimport
{isModuleWithProviders, isNgModule} from './util';\n\ninterface ModuleQueueItem {\n  moduleType:
Type<any>;\n  ngModule: NgModule;\n}\n\nconst moduleQueue: ModuleQueueItem[] = [];\n\n/**\n * Enqueues
moduleDef to be checked later to see if scope can be set on its\n * component declarations.\n */\nfunction
enqueueModuleForDelayedScoping(moduleType: Type<any>, ngModule: NgModule) {\n
  moduleQueue.push({moduleType, ngModule});\n}\n\nlet flushingModuleQueue = false;\n\n/**\n *
Loops over queued module definitions, if a given module definition has all of its\n * declarations resolved, it
dequeues that module definition and sets the scope on\n * its declarations.\n */\nexport function
flushModuleScopingQueueAsMuchAsPossible() {\n  if (!flushingModuleQueue) {\n    flushingModuleQueue =
true;\n    try {\n      for (let i = moduleQueue.length - 1; i >= 0; i--) {\n        const {moduleType, ngModule} =
moduleQueue[i];\n        if (ngModule.declarations && ngModule.declarations.every(isResolvedDeclaration)) {\n
          // dequeue\n          moduleQueue.splice(i, 1);\n          setScopeOnDeclaredComponents(moduleType,
ngModule);\n        }\n      }\n    } finally {\n      flushingModuleQueue = false;\n    }\n  }\n}\n\n/**\n * Returns truthy
if a declaration has resolved. If the declaration happens to be\n * an array of declarations, it will recurse to check
each declaration in that array\n * (which may also be arrays).\n */\nfunction isResolvedDeclaration(declaration:
any[]|Type<any>): boolean {\n  if (Array.isArray(declaration)) {\n    return
declaration.every(isResolvedDeclaration);\n  }\n  return !!resolveForwardRef(declaration);\n}\n\n/**\n * Compiles a
module in JIT mode.\n * This function automatically gets called when a class has a `@NgModule` decorator.\n
*/\nexport function compileNgModule(moduleType: Type<any>, ngModule: NgModule = {}): void {\n
  patchModuleCompilation();\n  compileNgModuleDefs(moduleType as NgModuleType, ngModule);\n  if
(ngModule.id !== undefined) {\n    registerNgModuleType(moduleType as NgModuleType, ngModule.id);\n  }\n}\n\n// Because we don't know if all declarations have resolved yet at the moment the\n // NgModule decorator is
executing, we're enqueueing the setting of module scope\n // on its declarations to be run at a later time when all
declarations for the module,\n // including forward refs, have resolved.\n\nenqueueModuleForDelayedScoping(moduleType, ngModule);\n}\n\n/**\n * Compiles and adds the
`mod`, `fac` and `inj` properties to the module class.\n * It's possible to compile a module via this API which
will allow duplicate declarations in its\n * root.\n */\nexport function compileNgModuleDefs(\n  moduleType:

```

```

NgModuleType, NgModule: NgModule, \n allowDuplicateDeclarationsInRoot: boolean = false): void {\n
ngDevMode && assertDefined(moduleType, 'Required value moduleType');\n ngDevMode &&
assertDefined NgModule, 'Required value NgModule');\n const declarations: Type<any>[] =
flatten(ngModule.declarations || EMPTY_ARRAY);\n let ngModuleDef: any = null;\n
Object.defineProperty(moduleType, NG_MOD_DEF, {\n configurable: true,\n get: () => {\n if
(ngModuleDef === null) {\n if (ngDevMode && ngModule.imports &&
ngModule.imports.indexOf(moduleType) > -1) {\n // We need to assert this immediately, because allowing it
to continue will cause it to\n // go into an infinite loop before we've reached the point where we throw all the
errors.\n
throw new Error(`${stringifyForError(moduleType)}' module can't import itself`);\n } \n const
compiler = getCompilerFacade(\n {usage: JitCompilerUsage.Decorator, kind: 'NgModule', type:
moduleType});\n ngModuleDef = compiler.compileNgModule(angularCoreEnv,
`ng://${moduleType.name}/mod.js`, {\n type: moduleType,\n bootstrap: flatten(ngModule.bootstrap ||
EMPTY_ARRAY).map(resolveForwardRef),\n declarations: declarations.map(resolveForwardRef),\n
imports: flatten(ngModule.imports || EMPTY_ARRAY)\n .map(resolveForwardRef)\n
.map(expandModuleWithProviders),\n exports: flatten(ngModule.exports || EMPTY_ARRAY)\n
.map(resolveForwardRef)\n .map(expandModuleWithProviders),\n schemas: ngModule.schemas
? flatten(ngModule.schemas) : null,\n id: ngModule.id || null,\n });\n // Set `schemas`
on ngModuleDef to an empty array in JIT mode to indicate that runtime\n // should verify that there are no
unknown elements in a template. In AOT mode, that check\n // happens at compile time and `schemas`
information is not present on Component and Module\n // defs after compilation (so the check doesn't happen
the second time at runtime).\n if (!ngModuleDef.schemas) {\n ngModuleDef.schemas = [];\n } \n
return ngModuleDef;\n } \n });\n\n let ngFactoryDef: any = null;\n Object.defineProperty(moduleType,
NG_FACTORY_DEF, {\n get: () => {\n if (ngFactoryDef === null) {\n const compiler =
getCompilerFacade(\n {usage: JitCompilerUsage.Decorator, kind: 'NgModule', type: moduleType});\n
ngFactoryDef = compiler.compileFactory(angularCoreEnv, `ng://${moduleType.name}/fac.js`, {\n name:
moduleType.name,\n type: moduleType,\n deps: reflectDependencies(moduleType),\n
target: compiler.FactoryTarget.NgModule,\n typeArgumentCount: 0,\n });\n } \n return
ngFactoryDef;\n }, \n // Make the property configurable in dev mode to allow overriding in tests\n
configurable: !!ngDevMode,\n });\n\n let ngInjectorDef: any = null;\n Object.defineProperty(moduleType,
NG_INJ_DEF, {\n get: () => {\n if (ngInjectorDef === null) {\n ngDevMode &&\n
verifySemanticsOfNgModuleDef(\n moduleType as any as NgModuleType,
allowDuplicateDeclarationsInRoot);\n const meta: R3InjectorMetadataFacade = {\n name:
moduleType.name,\n type: moduleType,\n providers: ngModule.providers || EMPTY_ARRAY,\n
imports: [\n (ngModule.imports || EMPTY_ARRAY).map(resolveForwardRef),\n (ngModule.exports ||
EMPTY_ARRAY).map(resolveForwardRef),\n ],\n });\n const compiler = getCompilerFacade(\n
{usage: JitCompilerUsage.Decorator,
kind: 'NgModule', type: moduleType});\n ngInjectorDef =\n compiler.compileInjector(angularCoreEnv,
`ng://${moduleType.name}/inj.js`, meta);\n } \n return ngInjectorDef;\n }, \n // Make the property
configurable in dev mode to allow overriding in tests\n configurable: !!ngDevMode,\n });\n\n\nexport function
generateStandaloneInDeclarationsError(type: Type<any>, location: string) {\n const prefix = `Unexpected
`${stringifyForError(type)}` found in the `declarations` array of the`;\n const suffix =
`${stringifyForError(type)}` is marked as standalone and can't be declared ` +\n `in any NgModule - did you
intend to import it instead (by adding it to the `imports` array)?`; \n return `${prefix} ${location},
${suffix}`;\n }\n\nfunction verifySemanticsOfNgModuleDef(\n moduleType: NgModuleType,
allowDuplicateDeclarationsInRoot: boolean,\n importingModule?: NgModuleType): void {\n if
(verifiedNgModule.get(moduleType)) return;\n\n

```

```

// skip verifications of standalone components, directives, and pipes\n
if (isStandalone(moduleType)) return;\n\n
verifiedNgModule.set(moduleType, true);\n
moduleType = resolveForwardRef(moduleType);\n
let ngModuleDef: NgModuleDef<any>;\n
if (importingModule) {\n
  ngModuleDef = getNgModuleDef(moduleType)!;\n
  if (!ngModuleDef) {\n
    throw new Error(`Unexpected value '${moduleType.name}' imported by the module '${\n
      importingModule.name}'. Please add an @NgModule annotation.`);\n
  }\n
} else {\n
  ngModuleDef = getNgModuleDef(moduleType, true);\n
}\n
const errors: string[] = [];\n
const declarations = maybeUnwrapFn(ngModuleDef.declarations);\n
const imports = maybeUnwrapFn(ngModuleDef.imports);\n
flatten(imports).map(unwrapModuleWithProvidersImports).forEach(modOrStandaloneCmpt => {\n
  verifySemanticsOfNgModuleImport(modOrStandaloneCmpt, moduleType);\n
  verifySemanticsOfNgModuleDef(modOrStandaloneCmpt, false, moduleType);\n
});\n
const exports = maybeUnwrapFn(ngModuleDef.exports);\n
declarations.forEach(verifyDeclarationsHaveDefinitions);\n
declarations.forEach(verifyDirectivesHaveSelector);\n
declarations.forEach((declarationType) => verifyNotStandalone(declarationType, moduleType));\n
const combinedDeclarations: Type<any>[] = [\n
  ...declarations.map(resolveForwardRef),\n
  ...flatten(imports.map(computeCombinedExports)).map(resolveForwardRef),\n
];\n
exports.forEach(verifyExportsAreDeclaredOrReExported);\n
declarations.forEach(decl => verifyDeclarationIsUnique(decl, allowDuplicateDeclarationsInRoot));\n
declarations.forEach(verifyComponentEntryComponentsIsPartOfNgModule);\n\n
const ngModule = getAnnotation<NgModule>(moduleType, 'NgModule');\n
if (ngModule) {\n
  ngModule.imports &&\n
  flatten(ngModule.imports).map(unwrapModuleWithProvidersImports).forEach(mod => {\n
    verifySemanticsOfNgModuleImport(mod, moduleType);\n
    verifySemanticsOfNgModuleDef(mod, false, moduleType);\n
  });\n
  ngModule.bootstrap &&\n
  deepForEach(ngModule.bootstrap, verifyCorrectBootstrapType);\n
  ngModule.bootstrap &&\n
  deepForEach(ngModule.bootstrap, verifyComponentIsPartOfNgModule);\n
  ngModule.entryComponents &&\n
  deepForEach(ngModule.entryComponents, verifyComponentIsPartOfNgModule);\n
}\n\n
// Throw Error if any errors were detected.\n
if (errors.length) {\n
  throw new Error(errors.join("\n"));
}\n\n
////////////////////////////////////////\n
function\n
verifyDeclarationsHaveDefinitions(type: Type<any>): void {\n
  type = resolveForwardRef(type);\n
  const def = getComponentDef(type) || getDirectiveDef(type) || getPipeDef(type);\n
  if (!def) {\n
    errors.push(`Unexpected value '${stringifyForError(type)}' declared by the module '${\n
      stringifyForError(moduleType)}'. Please add a @Pipe/@Directive/@Component annotation.`);\n
  }\n
}\n\n
function verifyDirectivesHaveSelector(type: Type<any>): void {\n
  type = resolveForwardRef(type);\n
  const def = getDirectiveDef(type);\n
  if (!getComponentDef(type) && def && def.selectors.length === 0) {\n
    errors.push(`Directive ${stringifyForError(type)} has no selector, please add it!`);\n
  }\n
}\n\n
function verifyNotStandalone(type: Type<any>, moduleType: NgModuleType): void {\n
  type = resolveForwardRef(type);\n
  const def = getComponentDef(type) || getDirectiveDef(type) || getPipeDef(type);\n
  if (def?.standalone) {\n
    const location = `\"${stringifyForError(moduleType)}\" NgModule`;\n
    errors.push(generateStandaloneInDeclarationsError(type, location));\n
  }\n
}\n\n
function\n
verifyExportsAreDeclaredOrReExported(type: Type<any>) {\n
  type = resolveForwardRef(type);\n
  const kind = getComponentDef(type) && 'component' || getDirectiveDef(type) && 'directive' ||\n
  getPipeDef(type) && 'pipe';\n
  if (kind) {\n
    // only checked if we are declared as Component, Directive, or Pipe\n
    // Modules don't need to be declared or imported.\n
    if (combinedDeclarations.lastIndexOf(type) === -1) {\n
      // We are exporting something which we don't explicitly declare or import.\n
      errors.push(`Can't export ${kind} ${stringifyForError(type)} from ${\n
        stringifyForError(moduleType)} as it was neither declared nor imported!`);\n
    }\n
  }\n
}\n\n
function verifyDeclarationIsUnique(type: Type<any>, suppressErrors: boolean) {\n
  type = resolveForwardRef(type);\n
  const existingModule = ownerNgModule.get(type);\n
  if (existingModule && existingModule !== moduleType) {\n
    if (!suppressErrors) {\n
      const modules =

```

```

[existingModule, moduleType].map(stringifyForError).sort();\n    errors.push(\n        `Type
${stringifyForError(type)} is part of the declarations of 2 modules: ${\n        modules[0]} and ${modules[1]}!`
+\n        `Please consider moving ${stringifyForError(type)} to a higher module that imports ${\n
modules[0]}
and ${modules[1]}.` +\n        `You can also create a new NgModule that exports and includes ${\n
stringifyForError(\n        type)} then import that NgModule in ${modules[0]} and ${modules[1]}.`;\n    }\n
} else {\n    // Mark type as having owner.\n    ownerNgModule.set(type, moduleType);\n    }\n}\n\nfunction
verifyComponentIsPartOfNgModule(type: Type<any>) {\n    type = resolveForwardRef(type);\n    const
existingModule = ownerNgModule.get(type);\n    if (!existingModule && !isStandalone(type)) {\n
errors.push(`Component ${\n    stringifyForError(\n        type)} is not part of any NgModule or the module
has not been imported into your module.`);\n    }\n}\n\nfunction verifyCorrectBootstrapType(type: Type<any>)
{\n    type = resolveForwardRef(type);\n    if (!getComponentDef(type)) {\n
errors.push(`${stringifyForError(type)} cannot be used as an entry component.`);\n    }\n    if (isStandalone(type))
{\n
    // Note: this error should be the same as the\n    // `NGMODULE_BOOTSTRAP_IS_STANDALONE` one in
AOT compiler.\n    errors.push(\n        `The \\`${stringifyForError(type)}\\` class is a standalone component,
which can ` +\n        `not be used in the \\`@NgModule.bootstrap\\` array. Use the \\`bootstrapApplication\\` ` +\n
        `function for bootstrap instead.`);\n    }\n}\n}\n\nfunction
verifyComponentEntryComponentsIsPartOfNgModule(type: Type<any>) {\n    type = resolveForwardRef(type);\n
if (getComponentDef(type)) {\n    // We know we are component\n    const component =
getAnnotation<Component>(type, 'Component');\n    if (component && component.entryComponents) {\n
deepForEach(component.entryComponents, verifyComponentIsPartOfNgModule);\n    }\n}\n}\n\nfunction
verifySemanticsOfNgModuleImport(type: Type<any>, importingModule: Type<any>) {\n    type =
resolveForwardRef(type);\n\n    const directiveDef = getComponentDef(type) || getDirectiveDef(type);\n
    if (directiveDef !== null && !directiveDef.standalone) {\n        throw new Error(`Unexpected directive
'${type.name}' imported by the module '${\n        importingModule.name}'. Please add an @NgModule
annotation.`);\n    }\n\n    const pipeDef = getPipeDef(type);\n    if (pipeDef !== null && !pipeDef.standalone) {\n
throw new Error(`Unexpected pipe '${type.name}' imported by the module '${\n        importingModule.name}'.
Please add an @NgModule annotation.`);\n    }\n}\n}\n\nfunction
unwrapModuleWithProvidersImports(typeOrWithProviders: NgModuleType<any>|\n
{ngModule: NgModuleType<any>}): NgModuleType<any> {\n    typeOrWithProviders =
resolveForwardRef(typeOrWithProviders);\n    return (typeOrWithProviders as any).ngModule ||
typeOrWithProviders;\n}\n\nfunction getAnnotation<T>(type: any, name: string): T|null {\n    let annotation: T|null =
null;\n    collect(type.__annotations__);\n    collect(type.decorators);\n    return annotation;\n}\n
function collect(annotations: any[]|null) {\n    if (annotations) {\n        annotations.forEach(readAnnotation);\n    }\n}\n\nfunction readAnnotation(\n    decorator: {type: {prototype: {ngMetadataName: string}}, args: any[]}, args:
any): void {\n    if (!annotation) {\n        const proto = Object.getPrototypeOf(decorator);\n        if
(proto.ngMetadataName == name) {\n            annotation = decorator as any;\n        } else if (decorator.type) {\n
const proto = Object.getPrototypeOf(decorator.type);\n            if (proto.ngMetadataName == name) {\n
annotation = decorator.args[0];\n            }\n        }\n    }\n}\n}\n\n/**\n * Keep track of compiled components. This is
needed because in tests we often want to compile the\n * same component with more than one NgModule. This
would cause an error unless we reset which\n * NgModule the component belongs to. We keep the list of compiled
components here so that the\n * TestBed can reset it later.\n */\nlet ownerNgModule
= new WeakMap<Type<any>, NgModuleType<any>>();\nlet verifiedNgModule = new
WeakMap<NgModuleType<any>, boolean>();\n\nexport function resetCompiledComponents(): void {\n
ownerNgModule = new WeakMap<Type<any>, NgModuleType<any>>();\n    verifiedNgModule = new
WeakMap<NgModuleType<any>, boolean>();\n    moduleQueue.length = 0;\n}\n\n/**\n * Computes the combined
declarations of explicit declarations, as well as declarations inherited by\n * traversing the exports of imported

```



```

def.transitiveCompileScopes;\n }\n\n const scopes: NgModuleTransitiveScopes = {\n  schemas: def.schemas ||
null,\n  compilation: {\n    directives: new Set<any>(),\n    pipes: new Set<any>(),\n  },\n  exported: {\n
directives: new Set<any>(),\n    pipes: new Set<any>(),\n  },\n };;\n\n
maybeUnwrapFn(def.imports).forEach(<I>(imported: Type<I>) => {\n  // When this module imports another, the
imported module's exported directives and pipes are\n  // added to the compilation scope of this module.\n  const
importedScope = transitiveScopesFor(imported);\n  importedScope.exported.directives.forEach(entry =>
scopes.compilation.directives.add(entry));\n  importedScope.exported.pipes.forEach(entry
=> scopes.compilation.pipes.add(entry));\n });;\n\n maybeUnwrapFn(def.declarations).forEach(declared => {\n
const declaredWithDefs = declared as Type<any>& {\n  pipe?: any;\n };;\n\n if
(getPipeDef(declaredWithDefs)) {\n  scopes.compilation.pipes.add(declared);\n } else {\n  // Either declared
has a cmp or dir, or it's a component which hasn't\n  // had its template compiled yet. In either case, it gets added
to the compilation's\n  // directives.\n  scopes.compilation.directives.add(declared);\n  }\n });;\n\n
maybeUnwrapFn(def.exports).forEach(<E>(exported: Type<E>) => {\n  const exportedType = exported as
Type<E>& {\n  // Components, Directives, NgModules, and Pipes can all be exported.\n  cmp?: any;\n  dir?:
any;\n  mod?: NgModuleDef<E>;\n  pipe?: any;\n };;\n\n  // Either the type is a module, a pipe, or a
component/directive (which may not have a\n  // cmp as it might be
compiled asynchronously).\n  if (isNgModule(exportedType)) {\n  // When this module exports another, the
exported module's exported directives and pipes are\n  // added to both the compilation and exported scopes of
this module.\n  const exportedScope = transitiveScopesFor(exportedType);\n
exportedScope.exported.directives.forEach(entry => {\n  scopes.compilation.directives.add(entry);\n
scopes.exported.directives.add(entry);\n });;\n  exportedScope.exported.pipes.forEach(entry => {\n
scopes.compilation.pipes.add(entry);\n  scopes.exported.pipes.add(entry);\n });;\n } else if
(getPipeDef(exportedType)) {\n  scopes.exported.pipes.add(exportedType);\n } else {\n
scopes.exported.directives.add(exportedType);\n  }\n });;\n\n def.transitiveCompileScopes = scopes;\n return
scopes;\n }\n\nfunction expandModuleWithProviders(value: Type<any>|ModuleWithProviders<{}>): Type<any>
{\n  if (isModuleWithProviders(value)) {\n
return value.ngModule;\n  }\n  return value;\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {getCompilerFacade, JitCompilerUsage,
R3DirectiveMetadataFacade} from '../compiler/compiler_facade';\nimport {R3ComponentMetadataFacade,
R3QueryMetadataFacade} from '../compiler/compiler_facade_interface';\nimport {isForwardRef,
resolveForwardRef} from '../di/forward_ref';\nimport {getReflect, reflectDependencies} from
'../di/jit/util';\nimport {Type} from '../interface/type';\nimport {Query} from '../metadata/di';\nimport
{Component, Directive, Input} from '../metadata/directives';\nimport {componentNeedsResolution,
maybeQueueResolutionOfComponentResources} from '../metadata/resource_loading';\nimport
{ViewEncapsulation} from '../metadata/view';\nimport {flatten} from '../util/array_utils';\nimport
{EMPTY_ARRAY, EMPTY_OBJ} from '../util/empty';\nimport {initNgDevMode} from
'../util/ng_dev_mode';\nimport {getComponentDef, getDirectiveDef, getNgModuleDef, getPipeDef} from
'./definition';\nimport {NG_COMP_DEF, NG_DIR_DEF, NG_FACTORY_DEF} from './fields';\nimport
{ComponentDef, ComponentType, DirectiveDefList, PipeDefList} from './interfaces/definition';\nimport
{stringifyForError} from './util/stringify_utils';\n\nimport {angularCoreEnv} from './environment';\nimport
{getJitOptions} from './jit_options';\nimport {flushModuleScopingQueueAsMuchAsPossible,
patchComponentDefWithScope, transitiveScopesFor} from './module';\nimport {isModuleWithProviders} from
'./util';\n\n/**\n * Keep track of the compilation depth to avoid reentrancy issues during JIT compilation. This\n *
matters in the following scenario:\n * Consider a component 'A' that extends component 'B', both declared in
module 'M'. During\n * the compilation of 'A' the definition of 'B' is requested to
capture the inheritance chain,\n * potentially triggering compilation of 'B'. If this nested compilation were to
trigger\n * `flushModuleScopingQueueAsMuchAsPossible` it may happen that module 'M' is still pending in the\n *

```

queue, resulting in 'A' and 'B' to be patched with the NgModule scope. As the compilation of 'A' is still in progress, this would introduce a circular dependency on its compilation. To avoid this issue, the module scope queue is only flushed for compilations at the depth 0, to ensure all compilations have finished.

```

compileDepth = 0;
Compile an Angular component according to its decorator metadata, and patch the
resulting component def (cmp) onto the component type.
Compilation may be asynchronous (due to the
need to resolve URLs for the component template or other resources, for example). In the event that compilation
is not immediate, `compileComponent` will enqueue resource resolution into a global queue
and will fail to return the `cmp` until the global queue has been resolved with a call to
`resolveComponentResources`.
export function compileComponent(type: Type<any>, metadata: Component):
void {
  // Initialize ngDevMode. This must be the first statement in compileComponent.
  // See the
  `initNgDevMode` docstring for more information.
  (typeof ngDevMode === 'undefined' || ngDevMode) &&
  initNgDevMode();
  let ngComponentDef: ComponentDef<unknown> | null = null;
  // Metadata may have
  resources which need to be resolved.
  maybeQueueResolutionOfComponentResources(type, metadata);
  // Note that we're using the same function as `Directive`, because that's only subset of metadata
  // that we need to
  create the ngFactoryDef. We're avoiding using the component metadata
  // because we'd have to resolve the
  asynchronous templates.
  addDirectiveFactoryDef(type, metadata);
  Object.defineProperty(type,
  NG_COMP_DEF, {
    get: () => {
      if (ngComponentDef
      === null) {
        const compiler =
          getCompilerFacade({usage: JitCompilerUsage.Decorator, kind:
          'component', type: type});
        if (componentNeedsResolution(metadata)) {
          const error = [Component
          `${type.name}` is not resolved:];
          if (metadata.templateUrl) {
            error.push(` - templateUrl:
            ${metadata.templateUrl}`);
          }
          if (metadata.styleUrls && metadata.styleUrls.length) {
            error.push(` - styleUrls: ${JSON.stringify(metadata.styleUrls)}`);
          }
          error.push(`Did you run and wait
          for 'resolveComponentResources()'?`);
          throw new Error(error.join('\n'));
        }
        // This const was
        called `jitOptions` previously but had to be renamed to `options` because
        // of a bug with Terser that caused
        optimized JIT builds to throw a `ReferenceError`.
        // This bug was investigated in
        https://github.com/angular/angular-cli/issues/17264.
        // We should not
        rename it back until https://github.com/terser/terser/issues/615 is fixed.
        const options = getJitOptions();
        let preserveWhitespaces = metadata.preserveWhitespaces;
        if (preserveWhitespaces === undefined) {
          if (options !== null && options.preserveWhitespaces !== undefined) {
            preserveWhitespaces =
            options.preserveWhitespaces;
          } else {
            preserveWhitespaces = false;
          }
        }
        let
        encapsulation = metadata.encapsulation;
        if (encapsulation === undefined) {
          if (options !== null &&
          options.defaultEncapsulation !== undefined) {
            encapsulation = options.defaultEncapsulation;
          } else {
            encapsulation = ViewEncapsulation.Emulated;
          }
        }
        const templateUrl =
        metadata.templateUrl || `ng://${type.name}/template.html`;
        const meta: R3ComponentMetadataFacade = {
          ...directiveMetadata(type, metadata),
          typeSourceSpan: compiler.createParseSourceSpan('Component', type.name, templateUrl),
          template:
          metadata.template || "",
          preserveWhitespaces,
          styles: metadata.styles || EMPTY_ARRAY,
          animations: metadata.animations,
          // JIT components are always compiled against an empty set of
          `declarations`. Instead, the
          // `directiveDefs` and `pipeDefs` are updated at a later point:
          // * for
          NgModule-based components, they're set when the NgModule which declares the
          // component resolves in
          the module scoping queue
          // * for standalone components, they're set just below, after
          `compileComponent`.
          declarations: [],
          changeDetection: metadata.changeDetection,
          encapsulation,
          interpolation: metadata.interpolation,
          viewProviders: metadata.viewProviders || null,
          isStandalone: !!metadata.standalone,
        };
        compilationDepth++;
        try {
          if (meta.usesInheritance) {
            addDirectiveDefToUndecoratedParents(type);
          }
          ngComponentDef =
            compiler.compileComponent(angularCoreEnv, templateUrl, meta) as
            ComponentDef<unknown>;
          if (metadata.standalone) {
            // Patch the component definition for
            standalone components with `directiveDefs` and
            // `pipeDefs` functions which lazily compute the

```

```

directives/pipes available in the      // standalone component. Also set `dependencies` to the lazily resolved list
of imports.\n      const imports: Type<any>[] = flatten(metadata.imports || EMPTY_ARRAY);\n      const
{directiveDefs, pipeDefs} = getStandaloneDefFunctions(type, imports);\n      ngComponentDef.directiveDefs =
directiveDefs;\n      ngComponentDef.pipeDefs = pipeDefs;\n      ngComponentDef.dependencies = () =>
imports.map(resolveForwardRef);\n      } finally {\n      // Ensure
that the compilation depth is decremented even when the compilation failed.\n      compilationDepth--;\n
}\n\n      if (compilationDepth === 0) {\n      // When NgModule decorator executed, we enqueued the module
definition such that\n      // it would only dequeue and add itself as module scope to all of its declarations,\n
// but only if if all of its declarations had resolved. This call runs the check\n      // to see if any modules that are
in the queue can be dequeued and add scope to\n      // their declarations.\n
flushModuleScopingQueueAsMuchAsPossible();\n      }\n\n      // If component compilation is async, then the
@NgModule annotation which declares the\n      // component may execute and set an ngSelectorScope property
on the component type. This\n      // allows the component to patch itself with directiveDefs from the module after
it\n      // finishes compiling.\n      if (hasSelectorScope(type)) {\n
      const scopes = transitiveScopesFor(type.ngSelectorScope);\n
      patchComponentDefWithScope(ngComponentDef, scopes);\n      }\n\n      if (metadata.schemas) {\n      if
(metadata.standalone) {\n      ngComponentDef.schemas = metadata.schemas;\n      } else {\n      throw
new Error(`The 'schemas' was specified for the ${\n      stringifyForError(type)} but is only valid on a
component that is standalone.`);\n      }\n      } else if (metadata.standalone) {\n      ngComponentDef.schemas
= [];\n      }\n      }\n      return ngComponentDef;\n      },\n      // Make the property configurable in dev mode to allow
overriding in tests\n      configurable: !!ngDevMode,\n      });\n\n\n      function getDependencyTypeForError(type:
Type<any>) {\n      if (getComponentDef(type)) return 'component';\n      if (getDirectiveDef(type)) return 'directive';\n      if
(getPipeDef(type)) return 'pipe';\n      return 'type';\n      }\n\n\n      function verifyStandaloneImport(depType: Type<unknown>,
importingType: Type<unknown>) {\n      if (isForwardRef(depType)) {\n      depType =
resolveForwardRef(depType);\n      if (!depType) {\n      throw new Error(`Expected forwardRef function, imported
from \"${\n      stringifyForError(importingType)}\", to return a standalone entity or NgModule but got \"${\n
stringifyForError(depType) || depType}\".`);\n      }\n      }\n\n      if (getNgModuleDef(depType) === null) {\n      const def
= getComponentDef(depType) || getDirectiveDef(depType) || getPipeDef(depType);\n      if (def !== null) {\n      // if a
component, directive or pipe is imported make sure that it is standalone\n      if (!def.standalone) {\n      throw new
Error(`The \"${stringifyForError(depType)}\" ${\n      getDependencyTypeForError(depType)}, imported from
\"${\n      stringifyForError(\n      importingType)}\", is not standalone. Did you forget to add the
standalone: true flag?`);\n      }\n      } else {\n      // it can be either a module with provider
or an unknown (not annotated) type\n      if (isModuleWithProviders(depType)) {\n      throw new Error(`A
module with providers was imported from \"${\n      stringifyForError(\n      importingType)}\". Modules
with providers are not supported in standalone components imports.`);\n      } else {\n      throw new Error(`The
\"${stringifyForError(depType)}\" type, imported from \"${\n      stringifyForError(\n
importingType)}\", must be a standalone component / directive / pipe or an NgModule. Did you forget to add the
required @Component / @Directive / @Pipe or @NgModule annotation?`);\n      }\n      }\n      }\n\n\n      * Build
memoized `directiveDefs` and `pipeDefs` functions for the component definition of a\n      * standalone component,
which process `imports` and filter out directives and pipes. The use of\n      * memoized functions here allows for the
delayed resolution of any `forwardRef`s present in the\n      * component's `imports`.\n      *\n      function
getStandaloneDefFunctions(type: Type<any>, imports: Type<any>[]): {\n      directiveDefs: () => DirectiveDefList,\n
pipeDefs: () => PipeDefList,\n      } {\n      let cachedDirectiveDefs: DirectiveDefList|null = null;\n      let cachedPipeDefs:
PipeDefList|null = null;\n      const directiveDefs = () => {\n      if (cachedDirectiveDefs === null) {\n      // Standalone
components are always able to self-reference, so include the component's own\n      // definition in its
`directiveDefs`.\n      cachedDirectiveDefs = [getComponentDef(type)!];\n      const seen = new
Set<Type<unknown>>();\n      for (const rawDep of imports) {\n      ngDevMode &&
verifyStandaloneImport(rawDep, type);\n      const dep = resolveForwardRef(rawDep);\n      if (seen.has(dep))

```



```

{\n    continue;\n  }\n  seen.add(dep);\n\n  if (!!getNgModuleDef(dep)) {\n    const scope =
transitiveScopesFor(dep);\n    for (const dir of scope.exported.directives) {\n      const def =
getComponentDef(dir)
  || getDirectiveDef(dir);\n      if (def && !seen.has(dir)) {\n        seen.add(dir);\n
cachedDirectiveDefs.push(def);\n      }\n    } else {\n      const def = getComponentDef(dep) ||
getDirectiveDef(dep);\n      if (def) {\n        cachedDirectiveDefs.push(def);\n      }\n    }\n  }\n  return cachedDirectiveDefs;\n};\n\nconst pipeDefs = () => {\n  if (cachedPipeDefs === null) {\n
cachedPipeDefs = [];\n    const seen = new Set<Type<unknown>>();\n\n    for (const rawDep of imports) {\n
const dep = resolveForwardRef(rawDep);\n      if (seen.has(dep)) {\n        continue;\n      }\n
seen.add(dep);\n\n      if (!!getNgModuleDef(dep)) {\n        const scope = transitiveScopesFor(dep);\n        for
(const pipe of scope.exported.pipes) {\n          const def = getPipeDef(pipe);\n          if (def && !seen.has(pipe))
{\n            seen.add(pipe);\n
            cachedPipeDefs.push(def);\n          }\n        } else {\n          const def = getPipeDef(dep);\n          if (def)
{\n            cachedPipeDefs.push(def);\n          }\n        }\n      }\n    }\n    return cachedPipeDefs;\n};\n\nreturn {\n
directiveDefs,\n  pipeDefs,\n};\n\nfunction hasSelectorScope<T>(component: Type<T>): component is
Type<T>&\n  {\n    ngSelectorScope: Type<any> } {\n    return (component as {ngSelectorScope?:
any}).ngSelectorScope !== undefined;\n  }\n\n/**\n * Compile an Angular directive according to its decorator
metadata, and patch the resulting\n * directive def onto the component type.\n * In the event that compilation is
not immediate, `compileDirective` will return a `Promise` which\n * will resolve when compilation completes and
the directive becomes usable.\n */\nexport function compileDirective(type: Type<any>, directive: Directive|null):
void {\n  let ngDirectiveDef: any = null;\n\n  addDirectiveFactoryDef(type, directive ||
  {});\n\n  Object.defineProperty(type, NG_DIR_DEF, {\n    get: () => {\n      if (ngDirectiveDef === null) {\n        //
`directive` can be null in the case of abstract directives as a base class\n        // that use `@Directive()` with no
selector. In that case, pass empty object to the\n        // `directiveMetadata` function instead of null.\n        const meta
= getDirectiveMetadata(type, directive || {});\n        const compiler =\n          getCompilerFacade({usage:
JitCompilerUsage.Decorator, kind: 'directive', type});\n        ngDirectiveDef =\n
compiler.compileDirective(angularCoreEnv, meta.sourceMapUrl, meta.metadata);\n      }\n      return
ngDirectiveDef;\n    },\n    // Make the property configurable in dev mode to allow overriding in tests\n
configurable: !!ngDevMode,\n  });\n\n  function getDirectiveMetadata(type: Type<any>, metadata: Directive) {\n
const name = type && type.name;\n    const sourceMapUrl = `ng:///${name}/dir.js`;\n    const compiler =
getCompilerFacade({usage:
JitCompilerUsage.Decorator, kind: 'directive', type});\n    const facade = directiveMetadata(type as
ComponentType<any>, metadata);\n    facade.typeSourceSpan = compiler.createParseSourceSpan('Directive', name,
sourceMapUrl);\n    if (facade.usesInheritance) {\n      addDirectiveDefToUndecoratedParents(type);\n    }\n    return
{metadata: facade, sourceMapUrl};\n  }\n\n  function addDirectiveFactoryDef(type: Type<any>, metadata:
Directive|Component) {\n    let ngFactoryDef: any = null;\n\n    Object.defineProperty(type, NG_FACTORY_DEF,
{\n      get: () => {\n        if (ngFactoryDef === null) {\n          const meta = getDirectiveMetadata(type, metadata);\n
const compiler =\n            getCompilerFacade({usage: JitCompilerUsage.Decorator, kind: 'directive', type});\n          ngFactoryDef = compiler.compileFactory(angularCoreEnv, `ng:///${type.name}/fac.js`, {\n            name:
meta.metadata.name,\n            type: meta.metadata.type,\n            typeArgumentCount: 0,\n            deps:
reflectDependencies(type),\n
            target: compiler.FactoryTarget.Directive\n          });\n        }\n        return ngFactoryDef;\n      },\n      // Make the
property configurable in dev mode to allow overriding in tests\n      configurable: !!ngDevMode,\n    });\n\n    next export
function extendsDirectlyFromObject(type: Type<any>): boolean {\n    return Object.getPrototypeOf(type.prototype)
=== Object.prototype;\n  }\n\n  /**\n * Extract the `R3DirectiveMetadata` for a particular directive (either a
`Directive` or a\n * `Component`).\n */\n  export function directiveMetadata(type: Type<any>, metadata: Directive):
R3DirectiveMetadataFacade {\n    // Reflect inputs and outputs.\n    const reflect = getReflect();\n    const propMetadata
= reflect.ownPropMetadata(type);\n\n    return {\n      name: type.name,\n      type: type,\n      selector: metadata.selector

```







```

ngAfterContentInit() {\n * // contentChildren is set\n * }\n *\n * ngAfterViewInit() {\n * //
viewChildren is set\n * }\n *}\n *```\n *\n * @Annotation\n */\n queries?: {[key: string]: any};\n\n /**\n
* Maps class properties to host element bindings for properties,\n * attributes, and events, using a set of key-value
pairs.\n *\n * Angular automatically checks host property bindings during change detection.\n * If a binding
changes, Angular updates the directive's host element.\n *\n * When the key is a property of the host element, the
property value is\n * the propagated to the specified DOM property.\n *\n * When the key is a static attribute in
the DOM, the attribute value\n * is propagated to the specified property in the host element.\n *\n * For event
handling:\n * - The key is the DOM event that the directive listens to.\n * To listen to global events, add the target
to the event name.\n * The target can be
`window`, `document` or `body`.\n * - The value is the statement to execute when the event occurs. If the\n *
statement evaluates to `false`, then `preventDefault` is applied on the DOM\n * event. A handler method can refer
to the `$event` local variable.\n *\n */\n host?: {[key: string]: string};\n\n /**\n
* When present, this
directive/component is ignored by the AOT compiler.\n * It remains in distributed code, and the JIT compiler
attempts to compile it\n * at run time, in the browser.\n * To ensure the correct behavior, the app must import
`@angular/compiler`.\n *\n * jit?: true;\n\n /**\n
* Angular directives marked as `standalone` do not need to be
declared in an NgModule. Such\n * directives don't depend on any `intermediate context` of an NgModule (ex.
configured\n * providers).\n *\n * More information about standalone components, directives, and pipes can be
found in [this\n * guide](guide/standalone-components).\n *\n * @developerPreview\n
*\n * standalone?: boolean;\n}\n\n/**\n
* Type of the Directive metadata.\n *\n * @publicApi\n */\nexport const
Directive: DirectiveDecorator = makeDecorator(\n * `Directive`, (dir: Directive = {}) => dir, undefined, undefined,\n
(type: Type<any>, meta: Directive) => compileDirective(type, meta));\n\n/**\n
* Component decorator interface\n
*\n * @publicApi\n */\nexport interface ComponentDecorator {\n * /\n *\n * Decorator that marks a class as an
Angular component and provides configuration\n * metadata that determines how the component should be
processed,\n * instantiated, and used at runtime.\n *\n * Components are the most basic UI building block of an
Angular app.\n * An Angular app contains a tree of Angular components.\n *\n * Angular components are a
subset of directives, always associated with a template.\n * Unlike other directives, only one component can be
instantiated for a given element in a\n * template.\n *\n * A component must belong
to an NgModule in order for it to be available\n * to another component or application. To make it a member of an
NgModule,\n * list it in the `declarations` field of the `NgModule` metadata.\n *\n * Note that, in addition to
these options for configuring a directive,\n * you can control a component's runtime behavior by implementing\n
* life-cycle hooks. For more information, see the\n * [Lifecycle Hooks](guide/lifecycle-hooks) guide.\n *\n *
@usageNotes\n *\n * ### Setting component inputs\n *\n * The following example creates a component with
two data-bound properties,\n * specified by the `inputs` value.\n *\n * <code-example
path=\"core/ts/metadata/directives.ts\" region=\"component-input\"></code-example>\n *\n * ### Setting
component outputs\n *\n * The following example shows two event emitters that emit on an interval. One\n *
emits an output every second, while the other emits every five seconds.\n *\n * {@example
core/ts/metadata/directives.ts
region=\"component-output-interval\"}\n *\n * ### Injecting a class with a view provider\n *\n * The following
simple example injects a class into a component\n * using the view provider specified in component metadata:\n
*\n * ```\n * class Greeter {\n *   greet(name:string) {\n *     return 'Hello ' + name + '!';\n *   }\n * }\n
*\n * @Directive({\n *   selector: 'needs-greeter'\n * })\n * class NeedsGreeter {\n *   greeter:Greeter;\n *\n
* constructor(greeter:Greeter) {\n *   this.greeter = greeter;\n * }\n * }\n *\n * @Component({\n *
selector: 'greet',\n * viewProviders: [\n *   Greeter\n * ],\n * template: `<needs-greeter></needs-
greeter>`\n * })\n * class HelloWorld {\n * }\n *}\n *```\n *\n * ### Preserving whitespace\n *\n *
Removing whitespace can greatly reduce AOT-generated code size and speed up view creation.\n * As of Angular
6, the default for `preserveWhitespaces`
is false (whitespace is removed).\n * To change the default setting for all components in your application, set\n
* the `preserveWhitespaces` option of the AOT compiler.\n *\n * By default, the AOT compiler removes

```

whitespace characters as follows:

- `trim`: Trims all whitespaces at the beginning and the end of a template.
- `removeWhitespace`: Removes whitespace-only text nodes. For example, `<button>Action 1</button><button>Action 2</button>` becomes `<button>Action 1</button><button>Action 2</button>`.
- `collapseWhitespace`: Replaces a series of whitespace characters in text nodes with a single space. For example, `<span>\n some text</span>` becomes `<span> some text </span>`.
- `preserveWhitespace`: Does NOT alter text nodes inside HTML tags such as `<pre>` or `<textarea>`, where whitespace characters are significant. Note that these transformations can influence DOM nodes layout, although impact should be minimal. You can override the default behavior to preserve whitespace characters in certain fragments of a template. For example, you can exclude an entire DOM sub-tree by using the `ngPreserveWhitespaces` attribute: `<div ngPreserveWhitespaces> whitespaces are preserved here <span> and here </span></div>`. You can force a single space to be preserved in a text node by using `&ngsp;`, which is replaced with a space character by Angular's template compiler: `<a>Spaces</a>&ngsp;<a>between</a>&ngsp;<a>links.</a>` `<!-- compiled to be equivalent to: <a>Spaces</a> <a>between</a> <a>links.</a> -->`
- `preserveAllWhitespaces`: Note that sequences of `&ngsp;` are still collapsed to just one space character when the `preserveWhitespaces` option is set to `false`. `<a>before</a>&ngsp;&ngsp;&ngsp;<a>after</a>` `<!-- compiled to be equivalent to: <a>before</a> <a>after</a> -->`
- `preserveAllWhitespaces`: To preserve sequences of whitespace characters, use the `ngPreserveWhitespaces` attribute.

**@Annotation** (obj: Component): TypeDecorator; See the `Component` decorator.

**new**(obj: Component): Component; Supplies configuration metadata for an Angular component.

**@publicApi** `export interface Component extends Directive {`

- `changeDetectionStrategy`: The change-detection strategy to use for this component. When a component is instantiated, Angular creates a change detector, which is responsible for propagating the component's bindings. The strategy is one of:
  - `ChangeDetectionStrategy#OnPush`: sets the strategy to `CheckOnce` (on demand).
  - `ChangeDetectionStrategy#Default`: sets the strategy to `CheckAlways`.
- `ChangeDetectionStrategy`: Defines the set of injectable objects that are visible to its view DOM children. See [example](#injecting-a-class-with-a-view-provider).
- `viewProviders`: Provider[]; The module ID of the module that contains the component. The component must be able to resolve relative URLs for templates and styles. SystemJS exposes the `__moduleName` variable within each module. In CommonJS, this can be set to `module.id`.
- `moduleId`: string; The relative path or absolute URL of a template file for an Angular component. If provided, do not supply an inline template using `template`.
- `templateUrl`: string; An inline template for an Angular component. If provided, do not supply a template file using `templateUrl`.
- `template`: string; One or more relative paths or absolute URLs for files containing CSS stylesheets to use in this component.
- `styleUrls`: string[]; One or more inline CSS stylesheets to use in this component.
- `styles`: string[]; One or more animation `trigger()` calls, containing `[state()](api/animations/state)` and `transition()` definitions. See the [Animations guide](/guide/animations) and animations API documentation.
- `animations`: any[]; An encapsulation policy for the component's styling. Possible values:
  - `ViewEncapsulation.Emulated`: Apply modified component styles in order to emulate a native Shadow DOM CSS encapsulation behavior.
  - `ViewEncapsulation.None`: Apply component styles globally without any sort of encapsulation.
  - `ViewEncapsulation.ShadowDom`: Use the browser's native Shadow DOM API to encapsulate styles. If not supplied, the value is taken from the `CompilerOptions` which defaults to `ViewEncapsulation.Emulated`.
- `linkComponentStyles`: { @link Component#styles styles } nor `{ @link Component#styleUrls styleUrls }`, the policy is automatically switched to `ViewEncapsulation.None`.
- `encapsulation`: ViewEncapsulation; Overrides the default interpolation start and end delimiters

```

({{` and `}}).\n */\n interpolation?: [string, string];\n\n /**\n * A set of components that should be compiled
along with\n * this component. For each component listed here,\n * Angular creates a {@link
ComponentFactory} and stores it in the\n * {@link ComponentFactoryResolver}.\n * @deprecated Since 9.0.0.
With Ivy, this property is no longer necessary.\n */\n entryComponents?: Array<Type<any>|any[]>;\n\n /**\n *
True to preserve or false to remove potentially superfluous whitespace characters\n * from the compiled template.
Whitespace characters are those matching the `\\s`\n * character class in JavaScript regular expressions.
Default is false, unless\n * overridden in compiler options.\n */\n preserveWhitespaces?: boolean;\n\n /**\n *
Angular components marked as `standalone` do not need to be declared in an NgModule. Such\n * components
directly manage their own template dependencies (components, directives, and pipes\n * used in a template) via the
imports property.\n */\n * More information about standalone components, directives, and pipes can be found in
[this\n * guide](guide/standalone-components).\n */\n * @developerPreview\n */\n standalone?: boolean;\n\n
/**\n * The imports property specifies the standalone component's template dependencies — those\n * directives,
components, and pipes that can be used within its template. Standalone components\n * can import other
standalone components, directives, and pipes as well as existing NgModules.\n */\n * This property is only
available for standalone components - specifying it for components\n * declared in an NgModule
generates a compilation error.\n */\n * More information about standalone components, directives, and pipes can
be found in [this\n * guide](guide/standalone-components).\n */\n * @developerPreview\n */\n imports?:
(Type<any>|any[])[];\n\n /**\n * The set of schemas that declare elements to be allowed in a standalone
component. Elements and\n * properties that are neither Angular components nor directives must be declared in a
schema.\n */\n * This property is only available for standalone components - specifying it for components\n *
declared in an NgModule generates a compilation error.\n */\n * More information about standalone components,
directives, and pipes can be found in [this\n * guide](guide/standalone-components).\n */\n schemas?:
SchemaMetadata[];\n\n\n/**\n * Component decorator and metadata.\n */\n * @Annotation\n * @publicApi\n
*/\nexport const Component: ComponentDecorator = makeDecorator(\n  'Component', (c: Component = {}) =>
({changeDetection:
  ChangeDetectionStrategy.Default, ...c}),\n  Directive, undefined, (type: Type<any>, meta: Component) =>
compileComponent(type, meta));\n\n\n/**\n * Type of the Pipe decorator / constructor function.\n */\n * @publicApi\n
*/\nexport interface PipeDecorator {\n\n  /**\n   * Decorator that marks a class as pipe and supplies configuration
metadata.\n   */\n   * A pipe class must implement the `PipeTransform` interface.\n   * For example, if the name is
`myPipe`, use a template binding expression\n   * such as the following:\n   * ``\n   * {{ exp | myPipe }}\n   *
``\n   * The result of the expression is passed to the pipe's `transform()` method.\n   * A pipe must belong
to an NgModule in order for it to be available\n   * to a template. To make it a member of an NgModule,\n   * list it
in the `declarations` field of the `NgModule` metadata.\n   */\n   * @see [Style Guide: Pipe
Names](guide/styleguide#02-09)\n   */\n   (obj: Pipe): TypeDecorator;\n\n   /**\n    * See the `Pipe` decorator.\n    */\n    new(obj: Pipe): Pipe;\n  }\n\n  /**\n   * Type of the Pipe metadata.\n   */\n   * @publicApi\n   */\n  export interface Pipe {\n\n    /**\n     * The pipe name to use in template bindings.\n     * Typically uses
[lowerCamelCase](guide/glossary#case-types)\n     * because the name cannot contain hyphens.\n     */\n     name:
string;\n\n     /**\n      * When true, the pipe is pure, meaning that the\n      * `transform()` method is invoked only when
its input arguments\n      * change. Pipes are pure by default.\n      */\n      * If the pipe has internal state (that is, the
result\n      * depends on state other than its arguments), set `pure` to false.\n      * In this case, the pipe is invoked on
each change-detection cycle,\n      * even if the arguments have not changed.\n      */\n      pure?: boolean;\n\n     /**\n      * Angular pipes marked as `standalone` do not need to be declared in an NgModule. Such\n      * pipes don't depend on
any "intermediate context" of an NgModule (ex. configured providers).\n      */\n      * More information about standalone components, directives, and pipes can be found in [this\n      *
guide](guide/standalone-components).\n      */\n      standalone?: boolean;\n    }\n\n    /**\n     * @Annotation\n     * @publicApi\n     */\n    export const Pipe: PipeDecorator = makeDecorator(\n      'Pipe', (p: Pipe) => ({pure: true, ...p}), undefined,
undefined,\n      (type: Type<any>, meta: Pipe) => compilePipe(type, meta));\n\n    /**\n     * @publicApi\n     */\n    export
interface InputDecorator {\n\n      /**\n       * Decorator that marks a class field as an input property and supplies

```

configuration metadata. The input property is bound to a DOM property in the template. During change detection, Angular automatically updates the data property with the DOM property's value.

`@usageNotes` You can supply an optional name to use in templates when the component is instantiated, that maps to the name of the bound property. By default, the original name of the bound property is used for input binding.

The following example creates a component with two input properties, one of which is given a special binding name.

```

@Component({
  selector: 'bank-account',
  template: `
    Bank Name: {{bankName}}
    Account Id: {{id}}
  `})
class BankAccount {
  // This property is bound using its original name.
  @Input() bankName: string;
  // this property value is bound to a different property name
  // when this component is instantiated in a
  // template.
  @Input('account-id') id: string;
  // this property is not bound, and is not automatically
  // updated by Angular
  normalizedBankName: string;
}

@Component({
  selector: 'app',
  template: `
    <bank-account bankName="RBC" account-id="4747"></bank-account>
  `})
class App {}

```

`@see [Input and Output properties](guide/inputs-outputs)`

`(bindingPropertyName?: string): any;` `new(bindingPropertyName?: string): any;` Type of metadata for an `Input` property.

`@publicApi` `^` `export interface Input` `{}` `/**` The name of the DOM property to which the input property is bound. `bindingPropertyName?: string;` `*/`

`@Annotation` `@publicApi` `^` `export const Input: InputDecorator =` `makePropDecorator('Input', (bindingPropertyName?: string) => ({bindingPropertyName}));` `/**` Type of the Output decorator / constructor function. `@publicApi` `^` `export interface OutputDecorator` `{}` `/**` Decorator that marks a class field as an output property and supplies configuration metadata. The DOM property bound to the output property is automatically updated during change detection. `usageNotes` You can supply an optional name to use in templates when the component is instantiated, that maps to the name of the bound property. By default, the original name of the bound property is used for output binding. See `Input` decorator for an example of providing a binding name. `@see [Input and Output properties](guide/inputs-outputs)`

`(bindingPropertyName?: string): any;` `new(bindingPropertyName?: string): any;` Type of the Output metadata.

`@publicApi` `^` `export interface Output` `{}` `/**` The name of the DOM property to which the output property is bound. `bindingPropertyName?: string;` `*/`

`@Annotation` `@publicApi` `^` `export const Output: OutputDecorator =` `makePropDecorator('Output', (bindingPropertyName?: string) => ({bindingPropertyName}));` `/**` Type of the HostBinding decorator / constructor function. `@publicApi` `^` `export interface HostBindingDecorator` `{}` `/**` Decorator that marks a DOM property as a host-binding property and supplies configuration metadata. Angular automatically checks host property bindings during change detection, and if a binding changes it updates the host element of the directive. `usageNotes` The following example creates a directive that sets the `valid` and `invalid` properties on the DOM element that has an `ngModel` directive on it.

```

@Directive({selector: '[ngModel]'})
class NgModelStatus {
  constructor(public control: NgModel) {}
  @HostBinding('class.valid') get valid() {
    return this.control.valid;
  }
  @HostBinding('class.invalid') get invalid() {
    return this.control.invalid;
  }
}

@Component({
  selector: 'app',
  template: `<input [(ngModel)]="prop">`})
class App {
  prop;
}

```

`(hostPropertyName?: string): any;` `new(hostPropertyName?: string): any;` Type of the HostBinding metadata.

`@publicApi` `^` `export interface HostBinding` `{}` `/**` The DOM property that is bound to a data property. `hostPropertyName?: string;` `*/`

`@Annotation` `@publicApi` `^` `export const HostBinding: HostBindingDecorator =` `makePropDecorator('HostBinding', (hostPropertyName?: string) => ({hostPropertyName}));` `/**` Type of the HostListener decorator / constructor function. `@publicApi` `^` `export interface HostListenerDecorator` `{}` `/**` Decorator that declares a DOM event to listen for, and provides a handler method to run when that event occurs. Angular invokes the



supplied handler method when the host element emits the specified event, and updates the bound element with the result. If the handler method returns false, applies `preventDefault` on the bound element.

(eventName: string, args?: string[]): any; new(eventName: string, args?: string[]): any; Type of the HostListener metadata.

```

    @publicApi
    export interface HostListener {
      /** The DOM event to listen for. */
      eventName?: string;
      /** A set of arguments to pass to the handler method when the event occurs. */
      args?: string[];
    }
  }
  * Decorator that binds a DOM event to a host listener and supplies configuration metadata. Angular invokes the supplied handler method when the host element emits the specified event, and updates the bound element with the result. If the handler method returns false, applies `preventDefault` on the bound element.
  * @usageNotes
  * The following example declares a directive that attaches a click listener to a button and counts clicks.
  * @Directive({selector: 'button[counting]'})
  * class CountClicks {
  *   numberOfClicks = 0;
  *   @HostListener('click', ['$event.target'])
  *   onClick(btn) {
  *     console.log('button', btn, 'number of clicks:', this.numberOfClicks++);
  *   }
  * }
  * @Component({
  *   selector: 'app',
  *   template: '<button counting>Increment</button>',
  * })
  * class App {
  * }
  * The following example registers another DOM event handler that listens for `Enter` key-press events on the global `window`.
  * @Component({
  *   selector: 'app',
  *   template: '<h1>Hello, you have pressed enter {counter} number of times!</h1> Press enter key to increment the counter. <button (click)="resetCounter()">Reset Counter</button>',
  * })
  * class AppComponent {
  *   counter = 0;
  *   @HostListener('window:keydown.enter', ['$event'])
  *   handleKeyDown(event: KeyboardEvent) {
  *     this.counter++;
  *     resetCounter() {
  *       this.counter = 0;
  *     }
  *   }
  * }
  * The list of valid key names for `keydown` and `keyup` events can be found here: https://www.w3.org/TR/DOM-Level-3-Events-key/#named-key-attribute-values
  * Note that keys can also be combined, e.g. `@HostListener('keydown.shift.a')`. The global target names that can be used to prefix an event name are `document:`, `window:` and `body:`.
  * @Annotation
  * @publicApi
  * export const HostListener: HostListenerDecorator = makePropDecorator('HostListener', (eventName?: string, args?: string[]) => ({eventName, args}));
  * Copyright Google LLC All Rights Reserved.
  * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
  * import {ModuleWithProviders, Provider} from './di/interface/provider';
  * import {Type} from './interface/type';
  * import {SchemaMetadata} from './metadata/schema';
  * import {compileNgModule} from './render3/jit/module';
  * import {makeDecorator, TypeDecorator} from './util/decorators';
  * Type of the NgModule decorator / constructor function.
  * @publicApi
  * export interface NgModuleDecorator {
  *   /** Decorator that marks a class as an NgModule and supplies configuration metadata. */
  *   (obj?: NgModule): TypeDecorator;
  *   /** new(obj?: NgModule): NgModule; */
  *   new(obj?: NgModule): NgModule;
  *   /** Type of the NgModule metadata. */
  *   metadata: NgModuleMetadata;
  * }
  * @publicApi
  * export interface NgModule {
  *   /** The set of injectable objects that are available in the injector of this module. */
  *   providers: Provider[];
  *   /** @see [Dependency Injection guide](guide/dependency-injection) */
  *   @see [NgModule guide](guide/providers)
  *   @usageNotes
  *   Dependencies whose providers are listed here become available for injection into any component, directive, pipe or service that is a child of this injector. The NgModule used for bootstrapping uses the root injector, and can provide dependencies to any part of the app. A lazy-loaded module has its own injector, typically a child of the app root injector. Lazy-loaded services are scoped to the lazy-loaded module's injector. If a lazy-loaded module also provides the `UserService`, any component created within that module's context (such as by router navigation) gets the local instance of the service, not the instance in the root injector. Components in external modules continue to receive the instance provided by their injectors.
  *   ### Example
  *   The following example defines a class that is injected in the HelloWorld NgModule.
  *   class Greeter {
  *     greet(name:string) {
  *       return 'Hello ' + name + '!';
  *     }
  *   }
  *   @NgModule({
  *     providers: [
  *       Greeter
  *     ]
  *   })
  *   class HelloWorld {
  *
  
```

```

greeter:Greeter;\n *\n * constructor(greeter:Greeter) {\n *   this.greeter = greeter;\n * }\n * }\n * ```\n
*\n providers?: Provider[];\n\n /**\n * The set of components, directives, and pipes
([declarables](guide/glossary#declarable))\n * that belong to this
module.\n *\n * @usageNotes\n *\n * The set of selectors that are available to a template include those
declared here, and\n * those that are exported from imported NgModules.\n *\n * Declarables must belong to
exactly one module.\n * The compiler emits an error if you try to declare the same class in more than one
module.\n * Be careful not to declare a class that is imported from another module.\n *\n * ### Example\n *\n * The following example allows the CommonModule to use the `NgFor`\n * directive.\n *\n * ```javascript\n * @NgModule({\n *   declarations: [NgFor]\n * })\n * class CommonModule {\n * }\n * ```\n *\n declarations?: Array<Type<any>|any[]>;\n\n /**\n * The set of NgModules whose exported
[declarables](guide/glossary#declarable)\n * are available to templates in this module.\n *\n * @usageNotes\n
*\n * A template can use exported declarables from any\n * imported module, including those from modules that
are imported indirectly\n * and re-exported.\n * For example, `ModuleA` imports `ModuleB`, and also exports\n
* it, which makes the declarables from `ModuleB` available\n * wherever `ModuleA` is imported.\n *\n * ###
Example\n *\n * The following example allows MainModule to use anything exported by\n *
`CommonModule`:\n *\n * ```javascript\n * @NgModule({\n *   imports: [CommonModule]\n * })\n * class
MainModule {\n * }\n * ```\n *\n *\n imports?: Array<Type<any>|ModuleWithProviders<{}>|any[]>;\n\n
/**\n * The set of components, directives, and pipes declared in this\n * NgModule that can be used in the
template of any component that is part of an\n * NgModule that imports this NgModule. Exported declarations are
the module's public API.\n *\n * A declarable belongs to one and only one NgModule.\n * A module can list
another module among its exports, in which case all of that module's\n * public declaration are exported.\n *\n
* @usageNotes\n *\n * Declarations are private by default.\n * If this ModuleA does not export
UserComponent, then only the components within this\n * ModuleA can use UserComponent.\n *\n * ModuleA
can import ModuleB and also export it, making exports from ModuleB\n * available to an NgModule that imports
ModuleA.\n *\n * ### Example\n *\n * The following example exports the `NgFor` directive from
CommonModule.\n *\n * ```javascript\n * @NgModule({\n *   exports: [NgFor]\n * })\n * class
CommonModule {\n * }\n * ```\n *\n *\n exports?: Array<Type<any>|any[]>;\n\n /**\n * The set of components
to compile when this NgModule is defined,\n * so that they can be dynamically loaded into the view.\n *\n * For
each component listed here, Angular creates a `ComponentFactory`\n * and stores it in the
`ComponentFactoryResolver`.\n *\n * Angular automatically adds components in the module's bootstrap\n * and
route definitions into the `entryComponents`
list. Use this\n * option to add components that are bootstrapped\n * using one of the imperative techniques, such
as `ViewContainerRef.createComponent()`.\n *\n * @see [Entry Components](guide/entry-components)\n *
@deprecated\n * Since 9.0.0. With Ivy, this property is no longer necessary.\n * (You may need to keep these if
building a library that will be consumed by a View Engine\n * application.)\n *\n entryComponents?:
Array<Type<any>|any[]>;\n\n /**\n * The set of components that are bootstrapped when\n * this module is
bootstrapped. The components listed here\n * are automatically added to `entryComponents`.\n *\n bootstrap?:
Array<Type<any>|any[]>;\n\n /**\n * The set of schemas that declare elements to be allowed in the NgModule.\n
*\n * Elements and properties that are neither Angular components nor directives\n * must be declared in a schema.\n
*\n *\n * Allowed value are `NO_ERRORS_SCHEMA` and `CUSTOM_ELEMENTS_SCHEMA`.\n *\n
* @security When using one of `NO_ERRORS_SCHEMA` or `CUSTOM_ELEMENTS_SCHEMA`\n * you
must ensure that allowed elements and properties securely escape inputs.\n *\n schemas?:
Array<SchemaMetadata|any[]>;\n\n /**\n * A name or path that uniquely identifies this NgModule in
`getNgModuleById`.\n *\n * If left `undefined`, the NgModule is not registered with `getNgModuleById`.\n *\n id?:
string;\n\n /**\n * When present, this module is ignored by the AOT compiler.\n * It remains in distributed code,
and the JIT compiler attempts to compile it\n * at run time, in the browser.\n * To ensure the correct behavior, the
app must import `@angular/compiler`.\n *\n jit?: true;\n\n\n /**\n * @Annotation\n * @publicApi\n *\n export
const NgModule: NgModuleDecorator = makeDecorator(\n * `NgModule`, (ngModule: NgModule) => ngModule,

```





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Initializer');\n\n/**\n * A token that indicates an opaque platform ID.\n * @publicApi\n * ^\nexport const
PLATFORM_ID = new InjectionToken<Object>('Platform ID', {\n providedIn: 'platform',\n factory: () =>
'unknown', // set a default platform name, when none set explicitly\n});\n\n/**\n * A [DI token](guide/glossary#di-
token \"DI token definition\") that provides a set of callbacks to\n * be called for every component that is
bootstrapped.\n *\n * Each callback must take a `ComponentRef` instance and return nothing.\n *\n *
(componentRef: ComponentRef) => void`\n *\n * @publicApi\n * ^\nexport const APP_BOOTSTRAP_LISTENER
=\n  new InjectionToken<Array<(compRef: ComponentRef<any>) => void>>('appBootstrapListener');\n\n/**\n *
A [DI token](guide/glossary#di-token \"DI token definition\") that indicates the root directory of\n * the
application\n * @publicApi\n * ^\nexport const PACKAGE_ROOT_URL = new
InjectionToken<string>('Application Packages Root URL');\n\n// We keep this
token here, rather than the animations package, so that modules that only care\n// about which animations module is
loaded (e.g. the CDK) can retrieve it without having to\n// include extra dependencies. See #44970 for more
context.\n\n/**\n * A [DI token](guide/glossary#di-token \"DI token definition\") that indicates which animations\n
* module has been loaded.\n * @publicApi\n * ^\nexport const ANIMATION_MODULE_TYPE =\n  new
InjectionToken<'NoopAnimations'|'BrowserAnimations'>('AnimationModuleType');\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport {Injectable} from
'./di';\n\n@Injectable({providedIn: 'platform'})\nexport class Console {\n  log(message: string): void {\n  //
tslint:disable-next-line:no-console\n  console.log(message);\n  }\n  // Note: for reporting errors use
`DOM.logError()` as it is platform
specific\n  warn(message: string): void {\n  // tslint:disable-next-line:no-console\n  console.warn(message);\n
}\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
* ^\n\nimport {InjectionToken} from './di/injection_token';\nimport {inject} from
'./di/injector_compatibility';\nimport {InjectFlags} from './di/interface/injector';\nimport
{DEFAULT_LOCALE_ID, USD_CURRENCY_CODE} from './localization';\n\ndeclare const $localize: {locale?:
string};\n\n/**\n * Work out the locale from the potential global properties.\n *\n * * Closure Compiler: use
`goog.LOCALE`.\n * * Ivy enabled: use `$localize.locale`\n * ^\nexport function getGlobalLocale(): string {\n
if (typeof ngI18nClosureMode !== 'undefined' && ngI18nClosureMode &&\n  typeof goog !== 'undefined' &&
goog.LOCALE !== 'en') {\n  // * The default `goog.LOCALE`
value is `en`, while Angular used `en-US`.\n  // * In order to preserve backwards compatibility, we use Angular
default value over\n  // Closure Compiler's one.\n  return goog.LOCALE;\n } else {\n  // KEEP `typeof
$localize !== 'undefined' && $localize.locale` IN SYNC WITH THE LOCALIZE\n  // COMPILE-TIME
INLINER.\n  //\n  // * During compile time inlining of translations the expression will be replaced\n  // with a
string literal that is the current locale. Other forms of this expression are not\n  // guaranteed to be replaced.\n
//\n  // * During runtime translation evaluation, the developer is required to set `$localize.locale`\n  // if
required, or just to provide their own `LOCALE_ID` provider.\n  return (typeof $localize !== 'undefined' &&
$localize.locale) || DEFAULT_LOCALE_ID;\n  }\n}\n\n/**\n * Provide this token to set the locale of your
application.\n * It is used for i18n extraction, by i18n pipes (DatePipe, I18nPluralPipe, CurrencyPipe,\n
* DecimalPipe and PercentPipe) and by ICU expressions.\n *\n * See the [i18n guide](guide/i18n-common-locale-
id) for more information.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * import { LOCALE_ID }
from '@angular/core';\n * import { platformBrowserDynamic } from '@angular/platform-browser-dynamic';\n *
import { AppModule } from './app/app.module';\n *\n * platformBrowserDynamic().bootstrapModule(AppModule,
{\n *   providers: [{provide: LOCALE_ID, useValue: 'en-US' }]\n * });\n *\n * ```\n *\n * @publicApi\n * ^\nexport
const LOCALE_ID: InjectionToken<string> = new InjectionToken('LocaleId', {\n providedIn: 'root',\n factory: ()
=>\n  inject(LOCALE_ID, InjectFlags.Optional | InjectFlags.SkipSelf) || getGlobalLocale(),\n});\n\n/**\n *
Provide this token to set the default currency code your application uses for\n * CurrencyPipe when there is no
currency code passed into it. This is only used by\n * CurrencyPipe and has no relation to locale currency. Defaults

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additional context.\n */\nexport class ModuleWithComponentFactories<T> {\n  constructor(\n    public\n    ngModuleFactory: NgModuleFactory<T>,\n    public componentFactories: ComponentFactory<any>[])\n  }\n}\n\n/**\n * Low-level service for running the angular compiler during runtime\n * to create\n * {@link ComponentFactory}s, which\n * can later be used to create and render a Component instance.\n *\n * Each\n * `@NgModule` provides an own `Compiler` to its injector,\n * that will use the directives/pipes of the ng module for\n * compilation\n * of components.\n *\n * @publicApi\n *\n * @deprecated\n *\n * Ivy JIT mode doesn't require\n * accessing this symbol.\n * See [JIT API changes due to ViewEngine deprecation](guide/deprecations#jit-api-\n * changes) for\n * additional context.\n *\n * @Injectable({providedIn: 'root'})\n */\nexport class Compiler {\n  /**\n   * Compiles the given NgModule and all of its components. All templates of the components listed\n   * in\n   * `entryComponents` have to be inlined.\n   *\n   * @param moduleType\n   */\n  compileModuleSync<T>(moduleType: Type<T>):\n  NgModuleFactory<T> {\n    return new NgModuleFactoryR3(moduleType);\n  }\n\n  /**\n   * Compiles the given\n   * NgModule and all of its components\n   *\n   * @param moduleType\n   */\n  compileModuleAsync<T>(moduleType: Type<T>):\n  Promise<NgModuleFactory<T>> {\n    return Promise.resolve(this.compileModuleSync(moduleType));\n  }\n\n  /**\n   * Same as {@link #compileModuleSync} but also creates ComponentFactories for all components.\n   *\n   * @param moduleType\n   */\n  compileModuleAndAllComponentsSync<T>(moduleType: Type<T>): ModuleWithComponentFactories<T>\n  {\n    const ngModuleFactory = this.compileModuleSync(moduleType);\n    const moduleDef =\n    getNgModuleDef(moduleType)!;\n    const componentFactories =\n    maybeUnwrapFn(moduleDef.declarations)\n      .reduce((factories: ComponentFactory<any>[], declaration:\n      Type<any>) => {\n        const componentDef = getComponentDef(declaration);\n        componentDef &&\n        factories.push(new ComponentFactoryR3(componentDef));\n        return factories;\n      }, [])\n    as\n    ComponentFactory<any>[];\n    return new ModuleWithComponentFactories(ngModuleFactory,\n    componentFactories);\n  }\n\n  /**\n   * Same as {@link #compileModuleAsync} but also creates\n   * ComponentFactories for all components.\n   *\n   * @param moduleType\n   */\n  compileModuleAndAllComponentsAsync<T>(moduleType:\n  Type<T>):\n  Promise<ModuleWithComponentFactories<T>> {\n    return\n    Promise.resolve(this.compileModuleAndAllComponentsSync(moduleType));\n  }\n\n  /**\n   * Clears all caches.\n   *\n   * @param component\n   */\n  clearCache(): void {\n  }\n\n  /**\n   * Clears the cache for the given component/ngModule.\n   *\n   * @param component\n   */\n  clearCacheFor(type: Type<any>) {\n  }\n\n  /**\n   * Returns the id for a given NgModule, if one is defined and known\n   * to the compiler.\n   *\n   * @param moduleType\n   */\n  getModuleId(moduleType: Type<any>): string | undefined {\n    return undefined;\n  }\n\n  /**\n   * Options for creating a compiler.\n   *\n   * Note: the `useJit` and `missingTranslation` config options\n   * are not used in Ivy, passing them has\n   * no effect. Those config options are deprecated since v13.\n   *\n   * @publicApi\n   *\n   * @deprecated not used at all in Ivy, providing this\n   * config option has no effect.\n   *\n   * @param useJit\n   * @param defaultEncapsulation\n   * @param providers\n   * @param StaticProvider\n   *\n   * @deprecated not used at all in Ivy, providing this config option has no effect.\n   *\n   * @param missingTranslation\n   * @param preserveWhitespaces\n   */\n  constructor(\n    useJit?: boolean,\n    defaultEncapsulation?: ViewEncapsulation,\n    providers?:\n    StaticProvider[],\n    missingTranslation?: MissingTranslationStrategy,\n    preserveWhitespaces?: boolean)\n  {}\n\n  /**\n   * Token to\n   * provide CompilerOptions in the platform injector.\n   *\n   * @publicApi\n   *\n   * @deprecated\n   *\n   * Ivy JIT mode doesn't require accessing this symbol.\n   * See [JIT API changes\n   * due to ViewEngine deprecation](guide/deprecations#jit-api-\n   * changes) for\n   * additional context.\n   *\n   * @Injectable\n   */\n  export abstract class CompilerFactory {\n    abstract createCompiler(options?: CompilerOptions[]): Compiler;\n  }\n\n  /**\n   * Copyright Google LLC All Rights Reserved.\n   * Use of this source code is governed by an MIT-\n   * style license that can be\n   * found in the LICENSE file at https://angular.io/license\n   */\n  import {assertDefined}\n  from\n  './../util/assert';\n  import {getComponentViewByInstance} from './context_discovery';\n  import {detectChanges}\n  from './instructions/change_detection';\n  import {markViewDirty} from './instructions/shared';\n  import\n  {getRootComponents} from './discovery_utils';\n\n  /**\n   * Marks a component for check (in case of OnPush\n   * components) and synchronously\n   * performs change detection on the application this component belongs to.\n   *\n   * @param component\n   * @param Component\n   */\n  markForCheck(component: Component): void {\n    markForCheck(component);\n  }\n}

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@publicApi\n * @globalApi ng\n *^\nexport function applyChanges(component: {}): void {\n  ngDevMode &&
assertDefined(component, 'component');\n  markViewDirty(getComponentViewByInstance(component));\n
getRootComponents(component).forEach(rootComponent => detectChanges(rootComponent));\n}\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *^\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*^\nimport {assertDefined} from './../util/assert';\nimport {global} from './../util/global';\nimport {setProfiler} from
'./profiler';\nimport {applyChanges} from './change_detection_utils';\nimport {getComponent, getContext,
getDirectiveMetadata, getDirectives, getHostElement, getInjector, getListeners, getOwningComponent,
getRootComponents} from './discovery_utils';\n\n\n/**\n * This file introduces series of globally accessible debug
tools\n * to allow for the Angular debugging story to function.\n *^\n * To see this in action run the following
command:\n *^\n * bazel run //packages/core/test/bundling/todo:devserver\n *^\n * Then load `localhost:5432` and
start using the console tools.\n *^\n\n/**\n * This value reflects the property on the window where the dev\n * tools
are patched (window.ng).\n *^\nexport const GLOBAL_PUBLISH_EXPANDO_KEY = 'ng';\n\nlet _published =
false;\n\n/**\n * Publishes a collection of default debug tools onto `window.ng`.\n *^\n
* These functions are available globally when Angular is in development\n * mode and are automatically stripped
away from prod mode is on.\n *^\nexport function publishDefaultGlobalUtils() {\n  if (!_published) {\n    _published
= true;\n\n    /**\n     * Warning: this function is *INTERNAL* and should not be relied upon in application's
code.\n     * The contract of the function might be changed in any release and/or the function can be\n     * removed
completely.\n     *^\n    publishGlobalUtil('setProfiler', setProfiler);\n    publishGlobalUtil('getDirectiveMetadata',
getDirectiveMetadata);\n    publishGlobalUtil('getComponent', getComponent);\n    publishGlobalUtil('getContext',
getContext);\n    publishGlobalUtil('getListeners', getListeners);\n    publishGlobalUtil('getOwningComponent',
getOwningComponent);\n    publishGlobalUtil('getHostElement', getHostElement);\n\n    publishGlobalUtil('getInjector',
getInjector);\n    publishGlobalUtil('getRootComponents', getRootComponents);\n\n    publishGlobalUtil('getDirectives',
getDirectives);\n    publishGlobalUtil('applyChanges', applyChanges);\n\n  }\n}\n\nexport declare type GlobalDevModeContainer = {\n  [GLOBAL_PUBLISH_EXPANDO_KEY]: {\n    [fnName:
string]: Function;\n  }\n};\n\n\n/**\n * Publishes the given function to `window.ng` so that it can be\n * used from the
browser console when an application is not in production.\n *^\nexport function publishGlobalUtil(name: string, fn:
Function): void {\n  if (typeof COMPILED === 'undefined' || !COMPILED) {\n    // Note: we can't export `ng` when
using closure enhanced optimization as:\n    // - closure declares globals itself for minified names, which sometimes
clobber our `ng` global\n    // - we can't declare a closure extern as the namespace `ng` is already used within
Google\n    // for typings for AngularJS (via `goog.provide('ng...')`).\n    const w = global as any as
GlobalDevModeContainer;\n    ngDevMode && assertDefined(fn, 'function not defined');\n    if (w) {\n      let container =
w[GLOBAL_PUBLISH_EXPANDO_KEY];\n      if (!container) {\n        container =
w[GLOBAL_PUBLISH_EXPANDO_KEY] = {};\n      }\n      container[name] = fn;\n    }\n  }\n}\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *^\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *^\n\nconst promise:
Promise<any> = (() => Promise.resolve(0))();\n\nexport function
scheduleMicroTask(fn: Function) {\n  if (typeof Zone === 'undefined') {\n    // use promise to schedule microTask
instead of use Zone\n    promise.then(() => {\n      fn && fn.apply(null, null);\n    });\n  } else {\n    Zone.current.scheduleMicroTask('scheduleMicrotask', fn);\n  }\n}\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *^\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n
*^\nimport {global} from './global';\n\nexport function getNativeRequestAnimationFrame() {\n  let
nativeRequestAnimationFrame: (callback: FrameRequestCallback) => number =\n  global['requestAnimationFrame'];\n  let nativeCancelAnimationFrame: (handle: number) => void =
global['cancelAnimationFrame'];\n  if (typeof Zone !== 'undefined' && nativeRequestAnimationFrame! &&
nativeCancelAnimationFrame!) {\n    // use unpatched version of requestAnimationFrame(native delegate) if
possible\n    // to avoid another Change detection\n    const unpatchedRequestAnimationFrame =\n

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(nativeRequestAnimationFrame as any)[(Zone as any).__symbol__('OriginalDelegate')];\n  if
(unpatchedRequestAnimationFrame) {\n    nativeRequestAnimationFrame = unpatchedRequestAnimationFrame;\n  }\n  const unpatchedCancelAnimationFrame =\n    (nativeCancelAnimationFrame as any)[(Zone as
any).__symbol__('OriginalDelegate')];\n  if (unpatchedCancelAnimationFrame) {\n
nativeCancelAnimationFrame
= unpatchedCancelAnimationFrame;\n  }\n }\n return {nativeRequestAnimationFrame,
nativeCancelAnimationFrame};\n}\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport
{EventEmitter} from './event_emitter';\nimport {global} from './util/global';\nimport {noop} from
 './util/noop';\nimport {getNativeRequestAnimationFrame} from './util/raf';\n\n/**\n * An injectable service for
executing work inside or outside of the Angular zone.\n *\n * The most common use of this service is to optimize
performance when starting a work consisting of\n * one or more asynchronous tasks that don't require UI updates or
error handling to be handled by\n * Angular. Such tasks can be kicked off via { @link #runOutsideAngular } and if
needed, these tasks\n * can reenter the Angular
zone via { @link #run}.\n *\n * <!-- TODO: add/fix links to:\n * - docs explaining zones and the use of zones in
Angular and change-detection\n * - link to runOutsideAngular/run (throughout this file!)\n * -->\n *\n * @usageNotes\n * ### Example\n *\n * ```\n * import {Component, NgZone} from '@angular/core';\n * import
{NgIf} from '@angular/common';\n *\n * @Component({\n *   selector: 'ng-zone-demo',\n *   template: `\n *
<h2>Demo: NgZone</h2>\n *   <p>Progress: {{progress}}%</p>\n *   <p *ngIf="progress >= 100">Done
processing {{label}} of Angular zone!</p>\n *   <button (click)="processWithinAngularZone()">Process
within Angular zone</button>\n *   <button (click)="processOutsideOfAngularZone()">Process outside of
Angular zone</button>\n * `,\n * })\n * export class NgZoneDemo {\n *   progress: number = 0;\n *   label:
string;\n *\n *   constructor(private _ngZone: NgZone) {\n *\n *     // Loop inside the Angular zone\n *     // so the UI
DOES refresh
after each setTimeout cycle\n *     processWithinAngularZone() {\n *       this.label = 'inside';\n *       this.progress =
0;\n *       this._increaseProgress(() => console.log('Inside Done!'));\n *     }\n *\n *     // Loop outside of the Angular
zone\n *     // so the UI DOES NOT refresh after each setTimeout cycle\n *     processOutsideOfAngularZone() {\n *
this.label = 'outside';\n *       this.progress = 0;\n *       this._ngZone.runOutsideAngular(() => {\n *
this._increaseProgress(() => {\n *         // reenter the Angular zone and display done\n *         this._ngZone.run(() =>
{\n *           console.log('Outside Done!');\n *         });\n *       });\n *\n *       _increaseProgress(doneCallback: () => void)
{\n *         this.progress += 1;\n *         console.log(` Current progress: ${this.progress}%`);\n *\n *         if (this.progress <
100) {\n *           window.setTimeout(() => this._increaseProgress(doneCallback), 10);\n *         } else {\n *
doneCallback();\n *       }\n *     }\n *\n *     @publicApi\n *\n *     export class NgZone {\n *       readonly hasPendingMacrotasks: boolean = false;\n *       readonly hasPendingMicrotasks:
boolean = false;\n *\n *       /**\n *        * Whether there are no outstanding microtasks or macrotasks.\n *        *\n *       readonly isStable:
boolean = true;\n *\n *       /**\n *        * Notifies when code enters Angular Zone. This gets fired first on VM Turn.\n *        *\n *       readonly onUnstable: EventEmitter<any> = new EventEmitter(false);\n *\n *       /**\n *        * Notifies when there is no more
microtasks enqueued in the current VM Turn.\n *        *\n *       This is a hint for Angular to do change detection, which may
enqueue more microtasks.\n *        *\n *       For this reason this event can fire multiple times per VM Turn.\n *        *\n *       readonly
onMicrotaskEmpty: EventEmitter<any> = new EventEmitter(false);\n *\n *       /**\n *        * Notifies when the last
`onMicrotaskEmpty` has run and there are no more microtasks, which\n *        * implies we are about to relinquish VM
turn.\n *        *\n *       This event gets called just once.\n *        *\n *       readonly onStable: EventEmitter<any>
= new EventEmitter(false);\n *\n *       /**\n *        * Notifies that an error has been delivered.\n *        *\n *       readonly onError:
EventEmitter<any> = new EventEmitter(false);\n *\n *       constructor({\n *         enableLongStackTrace = false,\n *         shouldCoalesceEventChangeDetection = false,\n *         shouldCoalesceRunChangeDetection = false\n *       }) {\n *         if (typeof
Zone == 'undefined') {\n *           throw new RuntimeError(\n *             RuntimeErrorCode.MISSING_ZONEJS,\n *             ngDevMode && `In this configuration Angular requires Zone.js`);\n *         }\n *\n *         Zone.assertZonePatched();\n *         const

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self = this as any as NgZonePrivate;\n  self._nesting = 0;\n\n  self._outer = self._inner = Zone.current;\n\n  if\n  ((Zone as any)['AsyncStackTaggingZoneSpec']) {\n    const AsyncStackTaggingZoneSpec = (Zone as\n  any)['AsyncStackTaggingZoneSpec'];\n    self._inner = self._inner.fork(new\n  AsyncStackTaggingZoneSpec('Angular'));\n  }\n\n  if ((Zone as any)['TaskTrackingZoneSpec']) {\n    self._inner\n  = self._inner.fork(new ((Zone as\n  any)['TaskTrackingZoneSpec'] as any));\n  }\n\n  if (enableLongStackTrace && (Zone as\n  any)['longStackTraceZoneSpec']) {\n    self._inner = self._inner.fork((Zone as any)['longStackTraceZoneSpec']);\n  }\n  // if shouldCoalesceRunChangeDetection is true, all tasks including event tasks will be\n  // coalesced, so\n  shouldCoalesceEventChangeDetection option is not necessary and can be skipped.\n  self.shouldCoalesceEventChangeDetection =\n    !shouldCoalesceRunChangeDetection &&\n  shouldCoalesceEventChangeDetection;\n  self.shouldCoalesceRunChangeDetection =\n  shouldCoalesceRunChangeDetection;\n  self.lastRequestAnimationFrameId = -1;\n  self.nativeRequestAnimationFrame = getNativeRequestAnimationFrame().nativeRequestAnimationFrame;\n  forkInnerZoneWithAngularBehavior(self);\n  }\n\n  static isInAngularZone(): boolean {\n    // Zone needs to be\n  checked, because this method might be called even when NoopNgZone is used.\n    return typeof Zone !==\n  'undefined' && Zone.current.get('isAngularZone')\n  === true;\n  }\n\n  static assertInAngularZone(): void {\n    if (!NgZone.isInAngularZone()) {\n      throw new\n  RuntimeError(\n    RuntimeErrorCode.UNEXPECTED_ZONE_STATE,\n    ngDevMode && 'Expected to\n  be in Angular Zone, but it is not!');\n    }\n  }\n\n  static assertNotInAngularZone(): void {\n    if\n  (NgZone.isInAngularZone()) {\n      throw new RuntimeError(\n    RuntimeErrorCode.UNEXPECTED_ZONE_STATE,\n    ngDevMode && 'Expected to not be in Angular Zone,\n  but it is!');\n    }\n  }\n\n  /**\n   * Executes the `fn` function synchronously within the Angular zone and returns\n  value returned by\n   * the function.\n   * Running functions via `run` allows you to reenter Angular zone from\n  a task that was executed\n   * outside of the Angular zone (typically started via {@link #runOutsideAngular}).\n   *\n   * Any future tasks or microtasks scheduled from within this function will continue executing from\n   * within\n  the Angular zone.\n\n   * If a synchronous error happens it will be rethrown and not reported via `onError`.\n   *\n   run<T>(fn:\n  (...args: any[]) => T, applyThis?: any, applyArgs?: any[]): T {\n    return (this as any as\n  NgZonePrivate)._inner.run(fn, applyThis, applyArgs);\n  }\n\n  /**\n   * Executes the `fn` function synchronously\n  within the Angular zone as a task and returns value\n   * returned by the function.\n   * Running functions via\n  `run` allows you to reenter Angular zone from a task that was executed\n   * outside of the Angular zone (typically\n  started via {@link #runOutsideAngular}).\n   *\n   * Any future tasks or microtasks scheduled from within this\n  function will continue executing from\n   * within the Angular zone.\n   * If a synchronous error happens it will\n  be rethrown and not reported via `onError`.\n   *\n   runTask<T>(fn: (...args: any[]) => T, applyThis?: any,\n  applyArgs?: any[], name?: string): T {\n    const zone = (this as any as NgZonePrivate)._inner;\n    const task = zone.scheduleEventTask('NgZoneEvent: ' + name, fn, EMPTY_PAYLOAD, noop, noop);\n    try {\n      return zone.runTask(task, applyThis, applyArgs);\n    } finally {\n      zone.cancelTask(task);\n    }\n  }\n\n  /**\n   * Same as `run`, except that synchronous errors are caught and forwarded via `onError` and not\n   * rethrown.\n   *\n   runGuarded<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any[]): T {\n    return (this as any as\n  NgZonePrivate)._inner.runGuarded(fn, applyThis, applyArgs);\n  }\n\n  /**\n   * Executes the `fn` function\n  synchronously in Angular's parent zone and returns value returned by\n   * the function.\n   * Running\n  functions via {@link #runOutsideAngular} allows you to escape Angular's zone and do\n   * work that\n   * doesn't\n  trigger Angular change-detection or is subject to Angular's error handling.\n   *\n   * Any future tasks or microtasks\n  scheduled from within this function will continue executing from\n   * outside of the Angular\n  zone.\n   *\n   * Use {@link #run} to reenter the Angular zone and do work that updates the application model.\n   *\n   runOutsideAngular<T>(fn: (...args: any[]) => T): T {\n    return (this as any as\n  NgZonePrivate)._outer.run(fn);\n  }\n\n  const EMPTY_PAYLOAD = {};\n\n  interface NgZonePrivate extends\n  NgZone {\n    _outer: Zone;\n    _inner: Zone;\n    _nesting: number;\n    _hasPendingMicrotasks: boolean;\n  }

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hasPendingMacrotasks: boolean;\n hasPendingMicrotasks: boolean;\n lastRequestAnimationFrameId: number;\n
/**\n * A flag to indicate if NgZone is currently inside\n * checkStable and to prevent re-entry. The flag is\n *
needed because it is possible to invoke the change\n * detection from within change detection leading to\n *
incorrect behavior.\n *\n * For detail, please refer here,\n * https://github.com/angular/angular/pull/40540\n
*/\n\n isCheckStableRunning: boolean;\n isStable: boolean;\n /**\n * Optionally specify coalescing event change
detections\n\n or not.\n * Consider the following case.\n *\n * <div (click)="doSomething()">\n * <button
(click)="doSomethingElse()"></button>\n * </div>\n *\n * When button is clicked, because of the event
bubbling, both\n * event handlers will be called and 2 change detections will be\n * triggered. We can coalesce
such kind of events to trigger\n * change detection only once.\n *\n * By default, this option will be false. So the
events will not be\n * coalesced and the change detection will be triggered multiple times.\n * And if this option
be set to true, the change detection will be\n * triggered async by scheduling it in an animation frame. So in the
case above,\n * the change detection will only be triggered once.\n *\n shouldCoalesceEventChangeDetection:
boolean;\n /**\n * Optionally specify if `NgZone#run()` method invocations should be coalesced\n * into a single
change detection.\n *\n * Consider the following case.\n *\n * for (let i
= 0; i < 10; i++) {\n *   ngZone.run(() => {\n *     // do something\n *   });\n * }\n *\n * This case triggers
the change detection multiple times.\n * With ngZoneRunCoalescing options, all change detections in an event
loops trigger only once.\n * In addition, the change detection executes in requestAnimationFrame.\n *\n *\n
shouldCoalesceRunChangeDetection: boolean;\n\n nativeRequestAnimationFrame: (callback:
FrameRequestCallback) => number;\n\n // Cache a "fake" top eventTask so you don't need to schedule a new task
every\n // time you run a `checkStable`.\n\n fakeTopEventTask: Task;\n\n\nfunction checkStable(zone:
NgZonePrivate) {\n // TODO: @JiaLiPassion, should check zone.isCheckStableRunning to prevent\n // re-entry.
The case is:\n //\n // @Component(...)\n // export class AppComponent {\n //   constructor(private ngZone:
NgZone) {\n //     this.ngZone.onStable.subscribe(() => {\n //       this.ngZone.run(() => console.log('stable'));
\n //     });\n\n //   }\n // }\n\n // The onStable subscriber run another function inside ngZone\n // which causes `checkStable()` re-
entry.\n // But this fix causes some issues in g3, so this fix will be\n // launched in another PR.\n\n if (zone._nesting
== 0 && !zone.hasPendingMicrotasks && !zone.isStable) {\n   try {\n     zone._nesting++;\n     zone.onMicrotaskEmpty.emit(null);\n   } finally {\n     zone._nesting--;\n     if (!zone.hasPendingMicrotasks) {\n       try {\n         zone.runOutsideAngular(() => zone.onStable.emit(null));\n       } finally {\n         zone.isStable =
true;\n       }\n     }\n   }\n }\n\n\nfunction delayChangeDetectionForEvents(zone: NgZonePrivate) {\n /**\n *
We also need to check _nesting here\n * Consider the following case with shouldCoalesceRunChangeDetection =
true\n *\n * ngZone.run(() => {});\n * ngZone.run(() => {});\n *\n * We want the two `ngZone.run()` only
trigger one change detection\n * when shouldCoalesceRunChangeDetection is
true.\n * And because in this case, change detection run in async way(requestAnimationFrame),\n * so we also
need to check the _nesting here to prevent multiple\n * change detections.\n *\n if (zone.isCheckStableRunning
|| zone.lastRequestAnimationFrameId !== -1) {\n   return;\n }\n\n zone.lastRequestAnimationFrameId =
zone.nativeRequestAnimationFrame.call(global, () => {\n // This is a work around for
https://github.com/angular/angular/issues/36839.\n // The core issue is that when event coalescing is enabled it is
possible for microtasks\n // to get flushed too early (As is the case with `Promise.then`) between the\n //
coalescing eventTasks.\n //\n // To workaround this we schedule a "fake" eventTask before we process the\n //
coalescing eventTasks. The benefit of this is that the "fake" container eventTask\n // will prevent the
microtasks queue from getting drained in between the coalescing\n // eventTask execution.\n\n if
(!zone.fakeTopEventTask)\n\n {\n   zone.fakeTopEventTask = Zone.root.scheduleEventTask('fakeTopEventTask', () => {\n
zone.lastRequestAnimationFrameId = -1;\n   updateMicroTaskStatus(zone);\n   zone.isCheckStableRunning =
true;\n   checkStable(zone);\n   zone.isCheckStableRunning = false;\n }, undefined, () => {}, () => {});\n\n
}\n\n zone.fakeTopEventTask.invoke();\n });\n\n updateMicroTaskStatus(zone);\n }\n\n\nfunction

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forkInnerZoneWithAngularBehavior(zone: NgZonePrivate) {\n  const delayChangeDetectionForEventsDelegate =
() => {\n    delayChangeDetectionForEvents(zone);\n  };\n  zone._inner = zone._inner.fork({\n    name: 'angular',\n    properties: <any>{'isAngularZone': true},\n    onInvokeTask:\n      (delegate: ZoneDelegate, current: Zone, target:
Zone, task: Task, applyThis: any,\n        applyArgs: any): any => {\n        try {\n          onEnter(zone);\n        }\n        return delegate.invokeTask(target, task, applyThis, applyArgs);\n      } finally {\n        if ((zone.shouldCoalesceEventChangeDetection && task.type === 'eventTask') ||\n        zone.shouldCoalesceRunChangeDetection) {\n          delayChangeDetectionForEventsDelegate();\n        }\n        onLeave(zone);\n      }\n    },\n    onInvoke:\n      (delegate: ZoneDelegate, current: Zone, target: Zone,
callback: Function, applyThis: any,\n        applyArgs?: any[], source?: string): any => {\n        try {\n          onEnter(zone);\n        }\n        return delegate.invoke(target, callback, applyThis, applyArgs, source);\n      } finally {\n        if (zone.shouldCoalesceRunChangeDetection) {\n          delayChangeDetectionForEventsDelegate();\n        }\n        onLeave(zone);\n      }\n    },\n    onHasTask:\n      (delegate: ZoneDelegate, current: Zone, target:
Zone, hasTaskState: HasTaskState) => {\n        delegate.hasTask(target, hasTaskState);\n        if (current ===
target) {\n          // We
are only interested in hasTask events which originate from our zone\n          // (A child hasTask event is not
interesting to us)\n          if (hasTaskState.change === 'microTask') {\n            zone._hasPendingMicrotasks =
hasTaskState.microTask;\n            updateMicroTaskStatus(zone);\n            checkStable(zone);\n          } else if
(hasTaskState.change === 'macroTask') {\n            zone.hasPendingMacrotasks = hasTaskState.macroTask;\n          }\n        }\n      },\n    onHandleError: (delegate: ZoneDelegate, current: Zone, target: Zone, error: any): boolean
=> {\n        delegate.handleError(target, error);\n        zone.runOutsideAngular() => zone.onError.emit(error);\n      }\n    return false;\n  } });\n}\n\nfunction updateMicroTaskStatus(zone: NgZonePrivate) {\n  if
(zone._hasPendingMicrotasks ||\n    ((zone.shouldCoalesceEventChangeDetection ||\n    zone.shouldCoalesceRunChangeDetection) &&\n    zone.lastRequestAnimationFrameId !== -1)) {\n    zone.hasPendingMicrotasks
= true;\n  } else {\n    zone.hasPendingMicrotasks = false;\n  }\n}\n\nfunction onEnter(zone: NgZonePrivate) {\n  zone._nesting++;\n  if (zone.isStable) {\n    zone.isStable = false;\n    zone.onUnstable.emit(null);\n  }\n}\n\nfunction onLeave(zone: NgZonePrivate) {\n  zone._nesting--;\n  checkStable(zone);\n}\n\n/**\n * Provides
a noop implementation of `NgZone` which does nothing. This zone requires explicit calls\n * to framework to
perform rendering.\n */\nexport class NoopNgZone implements NgZone {\n  readonly hasPendingMicrotasks:
boolean = false;\n  readonly hasPendingMacrotasks: boolean = false;\n  readonly isStable: boolean = true;\n  readonly onUnstable: EventEmitter<any> = new EventEmitter();\n  readonly onMicrotaskEmpty:
EventEmitter<any> = new EventEmitter();\n  readonly onStable: EventEmitter<any> = new EventEmitter();\n  readonly onError: EventEmitter<any> = new EventEmitter();\n\n  run<T>(fn: (...args: any[]) => T, applyThis?: any,
applyArgs?: any):
T {\n    return fn.apply(applyThis, applyArgs);\n  }\n\n  runGuarded<T>(fn: (...args: any[]) => any, applyThis?:
any, applyArgs?: any): T {\n    return fn.apply(applyThis, applyArgs);\n  }\n\n  runOutsideAngular<T>(fn: (...args:
any[]) => T): T {\n    return fn();\n  }\n\n  runTask<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any,
name?: string): T {\n    return fn.apply(applyThis, applyArgs);\n  }\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\nimport {Inject, Injectable, InjectionToken} from
'./di';\nimport {scheduleMicroTask} from './util/microtask';\nimport {NgZone} from './zone/ng_zone';\n\n/**\n *
Testability API.\n * `declare` keyword causes tsickle to generate externs, so these methods are\n * not renamed
by Closure Compiler.\n * @publicApi\n */\nexport declare interface PublicTestability {\n  isStable(): boolean;\n  whenStable(callback: Function, timeout?: number, updateCallback?: Function): void;\n  findProviders(using: any, provider: string, exactMatch: boolean): any[];\n}\n\n// Angular internal, not intended for
public API.\nexport interface PendingMacrotask {\n  source: string;\n  creationLocation: Error;\n  runCount?:
number;\n  data?: TaskData;\n}\n\nexport interface TaskData {\n  target?: XMLHttpRequest;\n  delay?: number;\n  isPeriodic?: boolean;\n}\n\n// Angular internal, not intended for public API.\nexport type DoneCallback =

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(didWork: boolean, tasks?: PendingMacroTask[]) => void;\nexport type UpdateCallback = (tasks:
PendingMacroTask[]) => boolean;\n\ninterface WaitCallback {\n // Needs to be 'any' - setTimeout returns a number
according to ES6, but\n // on NodeJS it returns a Timer.\n timeoutId: any;\n doneCb: DoneCallback;\n updateCb?:
UpdateCallback;\n}\n\n/**\n * Internal injection token that can be used to access an instance of a Testability class.\n
*\n
* This token acts as a bridge between the core bootstrap code and the `Testability` class. This is\n * needed to
ensure that there are no direct references to the `Testability` class, so it can be\n * tree-shaken away (if not
referenced). For the environments/setups when the `Testability` class\n * should be available, this token is used to
add a provider that references the `Testability`\n * class. Otherwise, only this token is retained in a bundle, but the
`Testability` class is not.\n */\nexport const TESTABILITY = new InjectionToken<Testability>("");\n\n/**\n *
Internal injection token to retrieve Testability getter class instance.\n */\nexport const TESTABILITY_GETTER =
new InjectionToken<GetTestability>("");\n\n/**\n * The Testability service provides testing hooks that can be
accessed from\n * the browser.\n */\n * Angular applications bootstrapped using an NgModule (via
`@NgModule.bootstrap` field) will also\n * instantiate Testability by default (in both development and production
modes).\n */\n * For applications bootstrapped using the `bootstrapApplication` function, Testability is not\n *
included by default. You can include it into your applications by getting the list of necessary\n * providers using the
`provideProtractorTestingSupport` function and adding them into the\n * `options.providers` array. Example:\n */\n
* ``typescript\n * import {provideProtractorTestingSupport} from '@angular/platform-browser';\n * \n * await
bootstrapApplication(RootComponent, providers: [provideProtractorTestingSupport()]);\n * ``\n * \n *
@publicApi\n * \n * @Injectable()\n * \n * export class Testability implements PublicTestability {\n * private
_pendingCount:\n * number = 0;\n * private _isZoneStable: boolean = true;\n * /**\n * Whether any work was done since the last
'whenStable' callback. This is\n * useful to detect if this could have potentially destabilized another\n *
component while it is stabilizing.\n * @internal\n * \n * private _didWork: boolean = false;\n * private
_callbacks: WaitCallback[] = [];\n * private taskTrackingZone: {macroTasks: Task[]|null = null;\n * \n *
constructor(\n * private _ngZone: NgZone, private registry: TestabilityRegistry,\n * \n *
@Inject(TESTABILITY_GETTER) testabilityGetter: GetTestability) {\n * // If there was no Testability logic
registered in the global scope\n * // before, register the current testability getter as a global one.\n * if
(!_testabilityGetter) {\n * setTestabilityGetter(testabilityGetter);\n * testabilityGetter.addToWindow(registry);\n
*\n * this._watchAngularEvents();\n * _ngZone.run(() => {\n * this.taskTrackingZone =\n * typeof Zone ==
'undefined' ? null : Zone.current.get('TaskTrackingZone');\n * });\n * }\n * \n * private _watchAngularEvents(): void {\n
*\n * this._ngZone.onUnstable.subscribe({\n * next: () => {\n * this._didWork = true;\n * this._isZoneStable =
false;\n * });\n * });\n * \n * this._ngZone.runOutsideAngular(() => {\n * this._ngZone.onStable.subscribe({\n
*\n * next: () => {\n * NgZone.assertNotInAngularZone();\n * scheduleMicroTask(() => {\n
*\n * this._isZoneStable = true;\n * this._runCallbacksIfReady();\n * });\n * });\n * });\n * });\n * }\n * \n *
Increases the number of pending request\n * @deprecated pending requests are now tracked with zones.\n * \n *
increasePendingRequestCount(): number {\n * this._pendingCount += 1;\n * this._didWork = true;\n * return
this._pendingCount;\n * }\n * \n * /**\n * Decreases the number of pending request\n * @deprecated pending requests
are now tracked with zones\n * \n * decreasePendingRequestCount(): number {\n * this._pendingCount -= 1;\n * if
(this._pendingCount < 0) {\n * throw new Error('pending async requests below zero');\n * }\n * \n *
this._runCallbacksIfReady();\n * return this._pendingCount;\n * }\n * \n * /**\n * Whether an associated application is
stable\n * \n * isStable(): boolean {\n * return this._isZoneStable
&& this._pendingCount === 0 && !this._ngZone.hasPendingMacroTasks;\n * }\n * \n * private _runCallbacksIfReady():
void {\n * if (this.isStable()) {\n * // Schedules the call backs in a new frame so that it is always async.\n
*\n * scheduleMicroTask(() => {\n * while (this._callbacks.length !== 0) {\n * let cb = this._callbacks.pop();\n
*\n * clearTimeout(cb.timeoutId);\n * cb.doneCb(this._didWork);\n * }\n * this._didWork = false;\n * });\n * }
*\n * else {\n * // Still not stable, send updates.\n * let pending = this.getPendingTasks();\n * this._callbacks =
this._callbacks.filter((cb) => {\n * if (cb.updateCb && cb.updateCb(pending)) {\n
*\n * clearTimeout(cb.timeoutId);\n * return false;\n * }\n * \n * return true;\n * });\n * \n * this._didWork = true;\n *
}

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    }
  }
  private getPendingTasks(): PendingMacroTask[] {
    if (!this.taskTrackingZone) {
      return [];
    }
    // Copy the tasks data so that we don't
    leak tasks.
    return this.taskTrackingZone.macros.map((t: Task) => {
      return {
        source: t.source,
        // From TaskTrackingZone:
        // https://github.com/angular/zone.js/blob/master/lib/zone-spec/task-tracking.ts#L40
        creationLocation: (t as any).creationLocation as Error,
        data: t.data
      };
    });
  }
  private addCallback(cb: DoneCallback, timeout?: number, updateCb?: UpdateCallback) {
    let timeoutId: any = -1;
    if (timeout && timeout > 0) {
      timeoutId = setTimeout(() => {
        this._callbacks = this._callbacks.filter((cb) => cb.timeoutId !== timeoutId);
        cb(this._didWork, this.getPendingTasks());
      }, timeout);
    }
    this._callbacks.push(<WaitCallback>{
      doneCb: cb,
      timeoutId: timeoutId,
      updateCb: updateCb
    });
  }
  /**
   * Wait for the application to be stable with a timeout. If the timeout is reached before
   * that happens, the callback receives a list of the macro tasks that were
   * pending, otherwise null.
   * @param doneCb The callback to invoke when Angular is stable or the timeout
   * expires
   * whichever comes first.
   * @param timeout Optional. The maximum time to wait for Angular to
   * become stable. If not specified, whenStable() will wait forever.
   * @param updateCb Optional. If
   * specified, this callback will be invoked whenever the set of
   * pending macrotasks changes. If this callback
   * returns true doneCb will not be invoked
   * and no further updates will be issued.
   * ^
   * whenStable(doneCb:
   * Function, timeout?: number, updateCb?: Function): void {
    if (updateCb && !this.taskTrackingZone) {
      throw new Error(
        "Task tracking zone is required when passing an update callback to '
        +
        'whenStable(). Is \"zone.js/plugins/task-tracking\" loaded?");
    }
    // These arguments are 'Function' above to
    keep the public API simple.
    this.addCallback(doneCb as DoneCallback, timeout, updateCb as
    UpdateCallback);
    this._runCallbacksIfReady();
  }
  /**
   * Get the number of pending requests
   * @deprecated pending requests are now tracked with zones
   * ^
   * getPendingRequestCount(): number {
    return
    this._pendingCount;
  }
  /**
   * Registers an application with a testability hook so that it can be tracked.
   * @param token token of application, root element
   * @internal
   * ^
   * registerApplication(token: any) {
    this.registry.registerApplication(token, this);
  }
  /**
   * Unregisters an application.
   * @param token token
   * of application, root element
   * @internal
   * ^
   * unregisterApplication(token: any) {
    this.registry.unregisterApplication(token);
  }
  /**
   * Find providers by name
   * @param using The root
   * element to search from
   * @param provider The name of binding variable
   * @param exactMatch Whether
   * using exactMatch
   * ^
   * findProviders(using: any, provider: string, exactMatch: boolean):
   * any[] {
    // TODO(juliemr): implement.
    return [];
  }
  /**
   * A global registry of { @link Testability }
   * instances for specific elements.
   * @publicApi
   * ^
   * @Injectable({providedIn: 'platform'})
   * ^
   * export class
   * TestabilityRegistry {
    /**
     * @internal
     * ^
     * _applications = new Map<any, Testability>();
    /**
     * Registers an
     * application with a testability hook so that it can be tracked
     * @param token token of application, root element
     * @param testability Testability hook
     * ^
     * registerApplication(token: any, testability: Testability) {
    this._applications.set(token, testability);
  }
  /**
   * Unregisters an application.
   * @param token token of
   * application, root element
   * ^
   * unregisterApplication(token: any) {
    this._applications.delete(token);
  }
  /**
   * Unregisters all applications
   * ^
   * unregisterAllApplications() {
    this._applications.clear();
  }
  /**
   * Get a testability hook associated with the application
   * @param elem root element
   * ^
   * getTestability(elem: any): Testability|null {
    return
    this._applications.get(elem) || null;
  }
  /**
   * Get all registered testabilities
   * ^
   * getAllTestabilities():
   * Testability[] {
    return Array.from(this._applications.values());
  }
  /**
   * Get all registered
   * applications(root elements)
   * ^
   * getAllRootElement(): any[] {
    return
    Array.from(this._applications.keys());
  }
  /**
   * Find testability of a node in the Tree
   * @param elem
   * node
   * @param findInAncestors whether finding testability in ancestors if testability was not found in
   * current node
   * ^
   * findTestabilityInTree(elem: Node, findInAncestors: boolean = true): Testability|null {
    return _testabilityGetter?.findTestabilityInTree(this, elem, findInAncestors) ?? null;
  }
  /**
   * Adapter
   * interface for retrieving the `Testability` service associated for a
   * particular context.
   * @publicApi
   * ^
   * ^
   * ^
   * export interface

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GetTestability {\n
  addToWindow(registry: TestabilityRegistry): void;\n
  findTestabilityInTree(registry: TestabilityRegistry, elem: any, findInAncestors: boolean):\n
  Testability|null;\n}\n\n/**\n * Set the {@link GetTestability} implementation used by the Angular testing framework.\n * @publicApi\n */\nexport function setTestabilityGetter(getter: GetTestability): void {\n
  _testabilityGetter = getter;\n}\n\nlet _testabilityGetter: GetTestability|undefined;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport './util/ng_jit_mode';\nimport {merge, Observable, Observer, Subscription} from 'rxjs';\nimport {share} from 'rxjs/operators';\nimport {ApplicationInitStatus} from './application_init';\nimport {APP_BOOTSTRAP_LISTENER, PLATFORM_INITIALIZER} from './application_tokens';\nimport {getCompilerFacade, JitCompilerUsage} from './compiler/compiler_facade';\nimport {Console} from './console';\nimport {Injectable} from './di/injectable';\nimport {InjectionToken} from './di/injection_token';\nimport {Injector} from './di/injector';\nimport {ImportedNgModuleProviders, Provider, StaticProvider} from './di/interface/provider';\nimport {EnvironmentInjector} from './di/r3_injector';\nimport {INJECTOR_SCOPE} from './di/scope';\nimport {ErrorHandler} from './error_handler';\nimport {formatRuntimeError, RuntimeError, RuntimeErrorCode} from './errors';\nimport {DEFAULT_LOCALE_ID} from './i18n/localization';\nimport {LOCALE_ID} from './i18n/tokens';\nimport {Type} from './interface/type';\nimport {COMPILER_OPTIONS, CompilerOptions} from './linker/compiler';\nimport {ComponentFactory, ComponentRef} from './linker/component_factory';\nimport {ComponentFactoryResolver} from './linker/component_factory_resolver';\nimport {InternalNgModuleRef, NgModuleFactory, NgModuleRef} from './linker/ng_module_factory';\nimport {InternalViewRef, ViewRef} from './linker/view_ref';\nimport {isComponentResourceResolutionQueueEmpty, resolveComponentResources} from './metadata/resource_loading';\nimport {assertNgModuleType} from './render3/assert';\nimport {ComponentFactory as R3ComponentFactory} from './render3/component_ref';\nimport {isStandalone} from './render3/definition';\nimport {assertStandaloneComponentType} from './render3/errors';\nimport {setLocaleId} from './render3/i18n/i18n_locale_id';\nimport {setJitOptions} from './render3/jit/jit_options';\nimport {createEnvironmentInjector, NgModuleFactory as R3NgModuleFactory} from './render3/ng_module_ref';\nimport {publishDefaultGlobalUtils as _publishDefaultGlobalUtils} from './render3/util/global_utils';\nimport {TESTABILITY} from './testability/testability';\nimport {isPromise} from './util/lang';\nimport {scheduleMicroTask} from './util/microtask';\nimport {stringify} from './util/stringify';\nimport {NgZone, NoopNgZone} from './zone/ng_zone';\n\nlet\n
  _platformInjector: Injector|null = null;\n\n/**\n * Internal token to indicate whether having multiple bootstrapped platform should be allowed (only\n * one bootstrapped platform is allowed by default). This token helps to support SSR scenarios.\n */\nexport const ALLOW_MULTIPLE_PLATFORMS = new\n
InjectionToken<boolean>('AllowMultipleToken');\n\n/**\n * Internal token that allows to register extra callbacks that should be invoked during the\n * `PlatformRef.destroy` operation. This token is needed to avoid a direct reference to the\n * `PlatformRef` class (i.e. register the callback via `PlatformRef.onDestroy`), thus making the\n * entire class tree-shakeable.\n */\nconst PLATFORM_DESTROY_LISTENERS =\n
new\n
InjectionToken<Set<VoidFunction>>('PlatformDestroyListeners');\n\nconst NG_DEV_MODE =\n
typeof ngDevMode === 'undefined' || ngDevMode;\n\nexport function compileNgModuleFactory<M>(\n
  injector: Injector, options: CompilerOptions,\n
  moduleType: Type<M>): Promise<NgModuleFactory<M>>\n
{\n
  ngDevMode && assertNgModuleType(moduleType);\n
  const moduleFactory = new\n
  R3NgModuleFactory(moduleType);\n
  // All of the logic below is irrelevant for AOT-compiled code.\n
  if (typeof ngJitMode !== 'undefined' && !ngJitMode) {\n
    return Promise.resolve(moduleFactory);\n
  }\n
  const\n
  compilerOptions = injector.get(COMPILER_OPTIONS, []).concat(options);\n
  // Configure the compiler to use the provided options. This call may fail when multiple modules\n
  // are bootstrapped with incompatible options, as a component can only be compiled according to\n
  // a single set of options.\n
  setJitOptions({\n
    defaultEncapsulation: _lastDefined(compilerOptions.map(opts => opts.defaultEncapsulation)),\n
    preserveWhitespaces: _lastDefined(compilerOptions.map(opts => opts.preserveWhitespaces)),\n
  });\n
  if

```

```

(isComponentResourceResolutionQueueEmpty()) {\n  return Promise.resolve(moduleFactory);\n }\n\n const
compilerProviders = _mergeArrays(compilerOptions.map(o => o.providers!));\n\n
  // In case there are no compiler providers, we just return the module factory as\n // there won't be any resource
loader. This can happen with Ivy, because AOT compiled\n // modules can be still passed through
\"bootstrapModule\". In that case we shouldn't\n // unnecessarily require the JIT compiler.\n if
(compilerProviders.length === 0) {\n  return Promise.resolve(moduleFactory);\n }\n\n const compiler =
getCompilerFacade({\n  usage: JitCompilerUsage.Decorator,\n  kind: 'NgModule',\n  type: moduleType,\n });\n\n
const compilerInjector = Injector.create({providers: compilerProviders});\n const resourceLoader =
compilerInjector.get(compiler.ResourceLoader);\n // The resource loader can also return a string while the
\"resolveComponentResources\"\n // always expects a promise. Therefore we need to wrap the returned value in a
promise.\n return resolveComponentResources(url => Promise.resolve(resourceLoader.get(url)))\n .then(() =>
moduleFactory);\n }\n\nexport
function publishDefaultGlobalUtils() {\n  ngDevMode && _publishDefaultGlobalUtils();\n }\n\nexport function
isBoundToModule<C>(cf: ComponentFactory<C>): boolean {\n  return (cf as
R3ComponentFactory<C>).isBoundToModule;\n }\n\n/**\n * A token for third-party components that can register
themselves with NgProbe.\n *\n * @publicApi\n */\nexport class NgProbeToken {\n  constructor(public name:
string, public token: any) {}\n}\n\n/**\n * Creates a platform.\n * Platforms must be created on launch using this
function.\n *\n * @publicApi\n */\nexport function createPlatform(injector: Injector): PlatformRef {\n  if
(!_platformInjector && !_platformInjector.get(ALLOW_MULTIPLE_PLATFORMS, false)) {\n    throw new
RuntimeError(\n      RuntimeErrorCode.MULTIPLE_PLATFORMS,\n      ngDevMode &&\n      'There can
be only one platform. Destroy the previous one to create a new one.);\n  }\n  publishDefaultGlobalUtils();\n
_platformInjector = injector;\n  const platform = injector.get(PlatformRef);\n
  runPlatformInitializers(injector);\n  return platform;\n }\n\n/**\n * The goal of this function is to bootstrap a
platform injector,\n * but avoid referencing `PlatformRef` class.\n * This function is needed for bootstrapping a
Standalone Component.\n */\nexport function createOrReusePlatformInjector(providers: StaticProvider[] = []):
Injector {\n  // If a platform injector already exists, it means that the platform\n // is already bootstrapped and no
additional actions are required.\n  if (_platformInjector) return _platformInjector;\n\n  // Otherwise, setup a new
platform injector and run platform initializers.\n  const injector = createPlatformInjector(providers);\n
_platformInjector = injector;\n  publishDefaultGlobalUtils();\n  runPlatformInitializers(injector);\n  return
injector;\n }\n\nexport function runPlatformInitializers(injector: Injector): void {\n  const inits =
injector.get(PLATFORM_INITIALIZER, null);\n  if (inits) {\n    inits.forEach((init: any) =>
init());\n  }\n}\n\n/**\n * Internal create application API that implements the core application creation logic and
optional\n * bootstrap logic.\n *\n * Platforms (such as `platform-browser`) may require different set of application
and platform\n * providers for an application to function correctly. As a result, platforms may use this function\n *
internally and supply the necessary providers during the bootstrap, while exposing\n * platform-specific APIs as a
part of their public API.\n *\n * @returns A promise that returns an `ApplicationRef` instance once resolved.\n
*/\nexport function internalCreateApplication(config: {\n  rootComponent?: Type<unknown>,\n  appProviders?:
Array<Provider|ImportedNgModuleProviders>,\n  platformProviders?: Provider[],\n }): Promise<ApplicationRef>
{\n  const {rootComponent, appProviders, platformProviders} = config;\n  if (NG_DEV_MODE &&
rootComponent !== undefined) {\n    assertStandaloneComponentType(rootComponent);\n  }\n\n  const
platformInjector
= createOrReusePlatformInjector(platformProviders as StaticProvider[]);\n\n  const ngZone = getNgZone('zone.js',
getNgZoneOptions());\n\n  return ngZone.run(() => {\n    // Create root application injector based on a set of
providers configured at the platform\n // bootstrap level as well as providers passed to the bootstrap call by a
user.\n    const allAppProviders = [\n      {provide: NgZone, useValue: ngZone}, //\n      ...(appProviders || []),
//\n    ];\n\n    const envInjector = createEnvironmentInjector(\n      allAppProviders, platformInjector as
EnvironmentInjector, 'Environment Injector');\n\n    const exceptionHandler: ErrorHandler|null =
envInjector.get(ErrorHandler, null);\n    if (NG_DEV_MODE && !exceptionHandler) {\n      throw new

```





NgZone|zone.js'|noop';\n\n /\*\*\n \* Optionally specify coalescing event change detections or not.\n \* Consider the following case.\n \* \n \* <div (click)="doSomething()">\n \* <button (click)="doSomethingElse()"></button>\n \* </div>\n \* \n \* When button is clicked, because of the event bubbling, both\n \* event handlers will be called and 2 change detections will be\n \* triggered. We can coalesce such kind of events to only trigger\n \* change detection only once.\n \* \n \* By default, this option will be false. So the events will not be\n \* coalesced and the change detection will be triggered multiple times.\n \* And if this option be set to true, the change detection will be\n \* triggered async by scheduling a animation frame. So in the case above,\n \* the change detection will only be triggered once.\n \*/\n ngZoneEventCoalescing?: boolean;\n\n /\*\*\n \* Optionally specify if `NgZone#run()` method invocations should be coalesced\n \* into a single change detection.\n \* \n \* Consider the following case.\n \* \n \* for (let i = 0; i < 10; i++) {\n \* ngZone.run(() => {\n \* // do something\n \* });\n \* }\n \* \n \* This case triggers the change detection multiple times.\n \* With ngZoneRunCoalescing options, all change detections in an event loop trigger only once.\n \* \n \* In addition, the change detection executes in requestAnimationFrame.\n \* \n \*/\n ngZoneRunCoalescing?: boolean;\n}\n\n/\*\*\n \* The Angular platform is the entry point for Angular on a web page.\n \* Each page has exactly one platform. Services (such as reflection) which are common\n \* to every Angular application running on the page are bound in its scope.\n \* A page's platform is initialized implicitly when a platform is created using a platform\n \* factory such as `PlatformBrowser`, or explicitly by calling the `createPlatform()` function.\n \*/\n \* @publicApi\n \* @Injectable({providedIn: 'platform'})\n export class PlatformRef {\n private \_modules: NgModuleRef<any>[] = [];\n private \_destroyListeners: Array<() => void> = [];\n private \_destroyed: boolean = false;\n\n /\*\*\n \* @internal\n \* constructor(private \_injector: Injector) {\n\n /\*\*\n \* Creates an instance of an `@NgModule` for the given platform.\n \* \n \* @deprecated Passing NgModule factories as the `PlatformRef.bootstrapModuleFactory` function\n \* argument is deprecated. Use the `PlatformRef.bootstrapModule` API instead.\n \*/\n bootstrapModuleFactory<M>(moduleFactory: NgModuleFactory<M>, options?: BootstrapOptions):\n Promise<NgModuleRef<M>> {\n // Note: We need to create the NgZone \_before\_ we instantiate the module,\n // as instantiating the module creates some providers eagerly.\n // So we create a mini parent injector that just contains the new NgZone and\n // pass that as parent to the NgModuleFactory.\n const ngZone = getNgZone(options?.ngZone, getNgZoneOptions(options));\n const providers: StaticProvider[] = [{provide: NgZone, useValue: ngZone}];\n // Note: Create ngZoneInjector within ngZone.run so that all of the instantiated services are\n // created within the Angular zone\n // Do not try to replace ngZone.run with ApplicationRef#run because ApplicationRef would then be\n // created outside of the Angular zone.\n return ngZone.run(() => {\n const ngZoneInjector = Injector.create(\n {providers: providers, parent: this.injector, name: moduleFactory.moduleType.name});\n const moduleRef = <InternalNgModuleRef<M>>moduleFactory.create(ngZoneInjector);\n const exceptionHandler: ErrorHandler|null = moduleRef.injector.get(ErrorHandler, null);\n if (!exceptionHandler) {\n throw new RuntimeError(\n RuntimeErrorCode.ERROR\_HANDLER\_NOT\_FOUND,\n ngDevMode && 'No ErrorHandler. Is platform module (BrowserModule) included?');\n }\n ngZone!.runOutsideAngular(() => {\n const subscription = ngZone!.onError.subscribe({\n next: (error: any) => {\n exceptionHandler.handleError(error);\n }\n });\n moduleRef.onDestroy(() => {\n remove(this.\_modules, moduleRef);\n subscription.unsubscribe();\n });\n });\n return \_callAndReportToErrorHandler(exceptionHandler, ngZone!, () => {\n const initStatus: ApplicationInitStatus = moduleRef.injector.get(ApplicationInitStatus);\n initStatus.runInitializers();\n return initStatus.donePromise.then(() => {\n // If the `LOCALE\_ID` provider is defined at bootstrap then we set the value for ivy\n const localeId = moduleRef.injector.get(LOCALE\_ID, DEFAULT\_LOCALE\_ID);\n setLocaleId(localeId || DEFAULT\_LOCALE\_ID);\n this.\_moduleDoBootstrap(moduleRef);\n return moduleRef;\n });\n });\n });\n }\n\n /\*\*\n \* Creates an instance of an `@NgModule` for a given platform.\n \* \n \* @usageNotes\n \* ### Simple Example\n \* \n \* ```typescript\n \* @NgModule({\n \*

```

imports: [BrowserModule]\n * })\n * class MyModule {\n * \n * let moduleRef =
platformBrowser().bootstrapModule(MyModule);\n * ```\n * \n * /\n bootstrapModule<M>(\n moduleType:
Type<M>,\n compilerOptions: (CompilerOptions&BootstrapOptions))\n
Array<CompilerOptions&BootstrapOptions>
= []): Promise<NgModuleRef<M>> {\n const options = optionsReducer({}, compilerOptions);\n return
compileNgModuleFactory(this.injector, options, moduleType)\n .then(moduleFactory =>
this.bootstrapModuleFactory(moduleFactory, options);\n }\n\n private _moduleDoBootstrap(moduleRef:
InternalNgModuleRef<any>): void {\n const appRef = moduleRef.injector.get(ApplicationRef);\n if
(moduleRef._bootstrapComponents.length > 0) {\n moduleRef._bootstrapComponents.forEach(f =>
appRef.bootstrap(f));\n } else if (moduleRef.instance.ngDoBootstrap) {\n
moduleRef.instance.ngDoBootstrap(appRef);\n } else {\n throw new RuntimeError(\n
RuntimeErrorCode.BOOTSTRAP_COMPONENTS_NOT_FOUND,\n ngDevMode &&\n `The
module ${stringify(moduleRef.instance.constructor)} was bootstrapped, ` +\n
`but it does not declare
`"@NgModule.bootstrap" components nor a "ngDoBootstrap" method. ` +\n
`Please define one of
these.`);\n
}\n this._modules.push(moduleRef);\n }\n\n /**\n * Registers a listener to be called when the platform is
destroyed.\n * /\n onDestroy(callback: () => void): void {\n this._destroyListeners.push(callback);\n }\n\n /**\n * Retrieves the platform { @link Injector }, which is the parent injector for\n * every Angular application on the
page and provides singleton providers.\n * /\n get injector(): Injector {\n return this._injector;\n }\n\n /**\n * Destroys the current Angular platform and all Angular applications on the page.\n * Destroys all modules and
listeners registered with the platform.\n * /\n destroy() {\n if (this._destroyed) {\n throw new RuntimeError(\n
RuntimeErrorCode.PLATFORM_ALREADY_DESTROYED,\n ngDevMode && 'The platform has
already been destroyed!');\n }\n this._modules.slice().forEach(module => module.destroy());\n
this._destroyListeners.forEach(listener => listener());\n\n const destroyListeners
= this._injector.get(PLATFORM_DESTROY_LISTENERS, null);\n if (destroyListeners) {\n
destroyListeners.forEach(listener => listener());\n destroyListeners.clear();\n }\n\n this._destroyed = true;\n
}\n\n /**\n * Indicates whether this instance was destroyed.\n * /\n get destroyed() {\n return this._destroyed;\n
}\n}\n\n// Set of options recognized by the NgZone.\ninterface NgZoneOptions {\n enableLongStackTrace:
boolean;\n shouldCoalesceEventChangeDetection: boolean;\n shouldCoalesceRunChangeDetection:
boolean;\n}\n\n// Transforms a set of `BootstrapOptions` (supported by the NgModule-based bootstrap APIs) ->\n//
`NgZoneOptions` that are recognized by the NgZone constructor. Passing no options will result in\n// a set of default
options returned.\nfunction getNgZoneOptions(options?: BootstrapOptions): NgZoneOptions {\n return {\n
enableLongStackTrace: typeof ngDevMode === 'undefined' ? false : !!ngDevMode,\n
shouldCoalesceEventChangeDetection:
!!(options && options.ngZoneEventCoalescing) || false,\n shouldCoalesceRunChangeDetection: !(options &&
options.ngZoneRunCoalescing) || false,\n };\n}\n\nfunction getNgZone(ngZoneToUse:
NgZone|'zone.js'|'noop'|undefined, options: NgZoneOptions): NgZone {\n let ngZone: NgZone;\n\n if
(ngZoneToUse === 'noop') {\n ngZone = new NoopNgZone();\n } else {\n ngZone = (ngZoneToUse ===
'zone.js' ? undefined : ngZoneToUse) || new NgZone(options);\n }\n return ngZone;\n}\n\nfunction
_callAndReportToErrorHandler(\n errorHandler: ErrorHandler, ngZone: NgZone, callback: () => any): any {\n
try {\n const result = callback();\n if (isPromise(result)) {\n return result.catch((e: any) => {\n
ngZone.runOutsideAngular() => errorHandler.handleError(e);\n // rethrow as the exception handler might not
do it\n throw e;\n });\n }\n\n return result;\n } catch (e) {\n ngZone.runOutsideAngular() =>
errorHandler.handleError(e);\n // rethrow
as the exception handler might not do it\n throw e;\n }\n}\n\nfunction optionsReducer<T extends Object>(dst:
any, objs: T[T]): T {\n if (Array.isArray(objs)) {\n dst = objs.reduce(optionsReducer, dst);\n } else {\n dst =
{...dst, ...(objs as any)};\n }\n return dst;\n}\n\n/**\n * A reference to an Angular application running on a page.\n
*\n * @usageNotes\n * \n * { @a is-stable-examples }\n * ### isStable examples and caveats\n * \n * Note two

```

important points about `isStable`, demonstrated in the examples below:

- the application will never be stable if you start any kind of recurrent asynchronous task when the application starts (for example for a polling process, started with a `setInterval`, a `setTimeout` or using RxJS operators like `interval`);
- the `isStable` Observable runs outside of the Angular zone.

Let's imagine that you start a recurrent task (here incrementing a counter, using RxJS `interval`), and at the same time subscribe to `isStable`.

```

constructor(appRef: ApplicationRef) {
  appRef.isStable.pipe(
    filter(stable => stable)
  ).subscribe(() => console.log('App is stable now'));
  interval(1000).subscribe(counter => console.log(counter));
}

```

In this example, `isStable` will never emit `true`, and the trace `"App is stable now"` will never get logged.

If you want to execute something when the app is stable, you have to wait for the application to be stable before starting your polling process.

```

constructor(appRef: ApplicationRef) {
  appRef.isStable.pipe(
    first(stable => stable),
    tap(stable => console.log('App is stable now')),
    switchMap(() => interval(1000))
  ).subscribe(counter => console.log(counter));
}

```

In this example, the trace `"App is stable now"` will be logged and then the counter starts incrementing every second.

Note also that this Observable runs outside of the Angular zone, which means that the code in the subscription to this Observable will not trigger the change detection.

Let's imagine that instead of logging the counter value, you update a field of your component and display it in its template.

```

constructor(appRef: ApplicationRef) {
  appRef.isStable.pipe(
    first(stable => stable),
    switchMap(() => interval(1000))
  ).subscribe(counter => this.value = counter);
}

```

As the `isStable` Observable runs outside the zone, the `value` field will be updated properly, but the template will not be refreshed!

You'll have to manually trigger the change detection to update the template.

```

constructor(appRef: ApplicationRef, cd: ChangeDetectorRef) {
  appRef.isStable.pipe(
    first(stable => stable),
    switchMap(() => interval(1000))
  ).subscribe(counter => {
    this.value = counter;
    cd.detectChanges();
  });
}

```

Or make the subscription callback run inside the zone.

```

constructor(appRef: ApplicationRef, zone: NgZone) {
  appRef.isStable.pipe(
    first(stable => stable),
    switchMap(() => interval(1000))
  ).subscribe(counter => zone.run(() => this.value = counter));
}

```

`@publicApi`

`@Injectable({providedIn: 'root'})`

```

export class ApplicationRef {
  /** @internal */
  private _bootstrapListeners: ((compRef: ComponentRef<any>) => void)[] = [];
  private _views: InternalViewRef[] = [];
  private _runningTick: boolean = false;
  private _stable = true;
  private _onMicrotaskEmptySubscription: Subscription;
  private _destroyed = false;
  private _destroyListeners: Array<() => void> = [];
  /**
   * Indicates whether this instance was destroyed.
   */
  get destroyed(): boolean {
    return this._destroyed;
  }
  /**
   * Get a list of component types registered to this application. This list is populated even before the component is created.
   */
  public readonly componentTypes: Type<any>[] = [];
  /**
   * Get a list of components registered to this application.
   */
  public readonly components: ComponentRef<any>[] = [];
  /**
   * Returns an Observable that indicates when the application is stable or unstable.
   */
  @see [Usage notes](#is-stable-examples) for examples and caveats when using this API.
  /**
   * The `EnvironmentInjector` used to create this application.
   */
  get injector(): EnvironmentInjector {
    return this._injector;
  }
  /** @internal */
  constructor(
    private _zone: NgZone,
    private _injector: EnvironmentInjector,
    private _exceptionHandler: ErrorHandler,
  ) {
    this._onMicrotaskEmptySubscription = this._zone.onMicrotaskEmpty.subscribe({
      next: () => {
        this._zone.run(() => {
          this.tick();
        });
      }
    });
    const isCurrentlyStable = new Observable<boolean>((observer: Observer<boolean>) => {
      this._stable = this._zone.isStable && !this._zone.hasPendingMacrotasks && !this._zone.hasPendingMicrotasks;
      this._zone.runOutsideAngular(() => {
        observer.next(this._stable);
        observer.complete();
      });
    });
    const isStable = new Observable<boolean>((observer: Observer<boolean>) => {
      // Create the subscription to onStable outside the Angular Zone so that the
      // callback is run outside the Angular Zone.
      let stableSub: Subscription;
      this._zone.runOutsideAngular(() => {
        stableSub = this._zone.onStable.subscribe(() => {
          NgZone.assertNotInAngularZone();
        });
      });
    });
  }
}

```



in the `bootstrap` array of `NgModule`, but it requires us to know the component while writing the application code. Imagine a situation where we have to wait for an API call to decide about the component to bootstrap. We can use the `ngDoBootstrap` hook of the `NgModule` and call this method to dynamically bootstrap a component.

```

    { @example core/ts/platform/platform.ts region='componentSelector' }

```

Optionally, a component can be mounted onto a DOM element that does not match the selector of the bootstrapped component. In the following example, we are providing a CSS selector to match the target element.

```

    { @example core/ts/platform/platform.ts region='cssSelector' }

```

While in this example, we are providing reference to a DOM node.

```

    { @example core/ts/platform/platform.ts region='domNode' }

```

```

bootstrap<C>(componentOrFactory: ComponentFactory<C>|Type<C>, rootSelectorOrNode?: string|any):
    ComponentRef<C> {
    NG_DEV_MODE && this.warnIfDestroyed();
    const isComponentFactory =
    componentOrFactory instanceof ComponentFactory;
    const initState =
    this._injector.get(ApplicationInitStatus);
    if (!initState.done) {
    const standalone = !isComponentFactory
    && isStandalone(componentOrFactory);
    const errorMessage =
    'Cannot bootstrap as there are still
    asynchronous initializers running.' +
    (standalone ? ' ' :
    ' Bootstrap components in the
    `ngDoBootstrap` method of the root module. ');
    throw new RuntimeError(
    RuntimeErrorCode.ASYNC_INITIALIZERS_STILL_RUNNING, NG_DEV_MODE && errorMessage);
    }
    let componentFactory: ComponentFactory<C>;
    if (isComponentFactory) {
    componentFactory =
    componentOrFactory;
    } else {
    const resolver = this._injector.get(ComponentFactoryResolver);
    componentFactory = resolver.resolveComponentFactory(componentOrFactory);
    }
    this.componentTypes.push(componentFactory.componentType);
    // Create a factory associated with the
    current module if it's not bound to some other
    const ngModule =
    isBoundToModule(componentFactory) ?
    undefined : this._injector.get(NgModuleRef);
    const selectorOrNode = rootSelectorOrNode ||
    componentFactory.selector;
    const compRef = componentFactory.create(Injector.NULL, [], selectorOrNode,
    ngModule);
    const nativeElement = compRef.location.nativeElement;
    const testability =
    compRef.injector.get(TESTABILITY, null);
    testability?.registerApplication(nativeElement);
    compRef.onDestroy(() => {
    this.detachView(compRef.hostView);
    remove(this.components, compRef);
    testability?.unregisterApplication(nativeElement);
    });
    this._loadComponent(compRef);
    if (typeof
    ngDevMode === 'undefined' || ngDevMode) {
    const _console = this._injector.get(Console);
    _console.log(
    `Angular is
    running in development mode. Call enableProdMode() to enable production mode.`);
    }
    return compRef;
    }
    /**
    * Invoke this method to explicitly process change detection and its side-effects.
    * In
    development mode, `tick()` also performs a second change detection cycle to ensure that no
    * further changes are
    detected. If additional changes are picked up during this second cycle,
    * bindings in the app have side-effects that
    cannot be resolved in a single change detection
    * pass.
    * In this case, Angular throws an error, since an
    Angular application can only have one change
    * detection pass during which all change detection must
    complete.
    */
    tick(): void {
    NG_DEV_MODE && this.warnIfDestroyed();
    if (this._runningTick) {
    throw new RuntimeError(
    RuntimeErrorCode.RECURSIVE_APPLICATION_REF_TICK,
    ngDevMode && 'ApplicationRef.tick is called recursively');
    }
    try {
    this._runningTick = true;
    for (let view of this._views) {
    view.detectChanges();
    }
    if (typeof ngDevMode === 'undefined' ||
    ngDevMode) {
    for (let view of this._views) {
    view.checkNoChanges();
    }
    }
    } catch (e) {
    // Attention: Don't rethrow as it could cancel subscriptions to Observables!
    this._zone.runOutsideAngular(() => this._exceptionHandler.handleError(e));
    }
    finally {
    this._runningTick
    = false;
    }
    }
    /**
    * Attaches a view so that it will be dirty checked.
    * The view will be automatically
    detached when it is destroyed.
    * This will throw if the view is already attached to a ViewContainer.
    */
    attachView(viewRef: ViewRef): void {
    NG_DEV_MODE && this.warnIfDestroyed();
    const view =
    (viewRef as InternalViewRef);
    this._views.push(view);
    view.attachToAppRef(this);
    }
    /**
    * Detaches a view from dirty checking again.
    */
    detachView(viewRef: ViewRef): void

```

```

    {\n  NG_DEV_MODE && this.warnIfDestroyed();\n  const view = (viewRef as InternalViewRef);\n  remove(this._views, view);\n  view.detachFromAppRef();\n }\n\n private _loadComponent(componentRef: ComponentRef<any>): void {\n  this.attachView(componentRef.hostView);\n  this.tick();\n  this.components.push(componentRef);\n  // Get the listeners lazily to prevent DI cycles.\n  const listeners =\n  this._injector.get(APP_BOOTSTRAP_LISTENER, []).concat(this._bootstrapListeners);\n  listeners.forEach((listener) => listener(componentRef));\n }\n\n /** @internal *\n ngOnDestroy() {\n  if (this._destroyed) return;\n  try {\n    // Call all the lifecycle hooks.\n    this._destroyListeners.forEach(listener => listener());\n\n    // Destroy all registered views.\n    this._views.slice().forEach((view) => view.destroy());\n    this._onMicrotaskEmptySubscription.unsubscribe();\n  } finally {\n    // Indicate that this instance is destroyed.\n    this._destroyed = true;\n\n    // Release all references.\n    this._views = [];\n    this._bootstrapListeners = [];\n    this._destroyListeners = [];\n  }\n }\n\n /**\n  * Registers a listener to be called when an instance is destroyed.\n  *\n  * @param callback A callback function to add as a listener.\n  * @returns A function which unregisters a listener.\n  *\n  * @internal\n  *\n  * on Destroy(callback: () => void): VoidFunction {\n  NG_DEV_MODE && this.warnIfDestroyed();\n  this._destroyListeners.push(callback);\n  return () => remove(this._destroyListeners, callback);\n }\n\n /**\n  * Destroys an Angular application represented by this `ApplicationRef`. Calling this function\n  * will destroy the associated environment injectors as well as all the bootstrapped components\n  * with their views.\n  *\n  * destroy(): void {\n  if (this._destroyed) {\n    throw new RuntimeError(\n      RuntimeErrorCode.APPLICATION_REF_ALREADY_DESTROYED,\n      ngDevMode && 'This instance of the `ApplicationRef` has already been destroyed.);\n  }\n\n  // This is a temporary type to represent an instance of an R3Injector, which can be destroyed.\n  // The type will be replaced with a different one once destroyable injector type is available.\n  type DestroyableInjector = Injector & { destroy?: Function, destroyed?: boolean};\n  const injector = this._injector as DestroyableInjector;\n\n  // Check that this injector instance supports destroy operation.\n  if (injector.destroy && !injector.destroyed) {\n    // Destroying an underlying injector will trigger the `ngOnDestroy` lifecycle\n    // hook, which invokes the remaining cleanup actions.\n    injector.destroy();\n  }\n }\n\n /**\n  * Returns the number of attached views.\n  *\n  * get viewCount() {\n  return this._views.length;\n }\n\n private warnIfDestroyed() {\n  if (NG_DEV_MODE && this._destroyed) {\n    console.warn(formatRuntimeError(\n      RuntimeErrorCode.APPLICATION_REF_ALREADY_DESTROYED,\n      'This instance of the `ApplicationRef` has already been destroyed.);\n  }\n }\n\nfunction\nremove<T>(list: T[], el: T): void {\n  const index = list.indexOf(el);\n  if (index > -1) {\n    list.splice(index, 1);\n  }\n }\n\nfunction _lastDefined<T>(args: T[]): T | undefined {\n  for (let i = args.length - 1; i >= 0; i--) {\n    if (args[i] !== undefined) {\n      return args[i];\n    }\n  }\n  return undefined;\n }\n\nfunction _mergeArrays(parts: any[][]): any[] {\n  const result: any[] = [];\n  parts.forEach((part) => part && result.push(...part));\n  return result;\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport { global } from './global';\n\n/**\n * This file is used to control if the default rendering pipeline should be `ViewEngine` or `Ivy`.\n *\n * For more information on how to run and debug tests with either Ivy or View Engine (legacy),\n * please see [BAZEL.md](./docs/BAZEL.md).\n *\nlet _devMode: boolean = true;\nlet _runModeLocked: boolean = false;\n\n/**\n * Returns whether Angular is in development mode. After called once,\n * the value is locked and won't change any more.\n *\n * By default, this is true, unless a user calls `enableProdMode` before calling this.\n *\n * @publicApi\n *\nexport function isDevMode(): boolean {\n  _runModeLocked = true;\n  return _devMode;\n }\n\n/**\n * Disable Angular's development mode, which turns off assertions and other\n * checks within the framework.\n *\n * One important assertion this disables verifies that a change detection pass\n * does not result in additional changes to any bindings (also known as\n * unidirectional data flow).\n *\n * @publicApi\n *\nexport function enableProdMode(): void {\n  if (_runModeLocked) {\n    throw new Error('Cannot enable prod mode after platform

```

```

    setup.);\n }\n\n // The below check is there so when ngDevMode is set via terser\n // `global['ngDevMode'] =
false;` is also dropped.\n if (typeof ngDevMode === 'undefined' || ngDevMode) {\n global['ngDevMode'] =
false;\n }\n\n _devMode = false;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\n// Public API for Zone\nexport {NgZone, NoopNgZone as NoopNgZone} from
'./zone/ng_zone';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n// Public API for render\nexport {Renderer2, RendererFactory2} from './render/api';\nexport
{RendererStyleFlags2, RendererType2} from './render/api_flags';\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport {Type} from './interface/type';\nimport {NgModuleFactory as
R3NgModuleFactory} from './render3/ng_module_ref';\nimport {NgModuleFactory} from
'./ng_module_factory';\nimport {getRegisteredNgModuleType} from './ng_module_registration';\n\n/**\n * Returns
the NgModuleFactory with the given id (specified using [@NgModule.id\n * field](api/core/NgModule#id)), if it
exists and has been loaded. Factories for NgModules that do\n * not specify an `id` cannot be retrieved. Throws if an
NgModule cannot be found.\n * @publicApi\n * @deprecated Use `getNgModuleById` instead.\n */\nexport
function getModuleFactory(id: string): NgModuleFactory<any> {\n const type =
getRegisteredNgModuleType(id);\n if (!type) throw noModuleError(id);\n return new
R3NgModuleFactory(type);\n}\n\n/**\n * Returns the NgModule class with the given id (specified
using [@NgModule.id\n * field](api/core/NgModule#id)), if it exists and has been loaded. Classes for NgModules
that do\n * not specify an `id` cannot be retrieved. Throws if an NgModule cannot be found.\n * @publicApi\n
*/\nexport function getNgModuleById<T>(id: string): Type<T> {\n const type =
getRegisteredNgModuleType(id);\n if (!type) throw noModuleError(id);\n return type;\n}\n\nfunction
noModuleError(\n id: string,\n ): Error {\n return new Error(`No module with ID ${id} loaded`);\n}\n", "/*\n
*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {InjectFlags}
from './di';\nimport {InternalInjectFlags} from './di/interface/injector';\nimport {TNode, TNodeType} from
'./render3/interfaces/node';\nimport {isComponentHost} from './render3/interfaces/type_checks';\nimport
{DECLARATION_COMPONENT_VIEW, LView} from './render3/interfaces/view';\nimport
{getCurrentTNode, getLView} from './render3/state';\nimport {getComponentLViewByIndex} from
'./render3/util/view_utils';\nimport {ViewRef as R3_ViewRef} from './render3/view_ref';\n\n/**\n * Base class that
provides change detection functionality.\n * A change-detection tree collects all views that are to be checked for
changes.\n * Use the methods to add and remove views from the tree, initiate change-detection,\n * and explicitly
mark views as _dirty_, meaning that they have changed and need to be re-rendered.\n *\n * @see [Using change
detection hooks](guide/lifecycle-hooks#using-change-detection-hooks)\n * @see [Defining custom change
detection](guide/lifecycle-hooks#defining-custom-change-detection)\n *\n * @usageNotes\n *\n * The following
examples demonstrate how to modify default change-detection behavior\n * to perform explicit detection when
needed.\n *\n * ### Use markForCheck() with CheckOnce strategy\n *\n * The following example
sets the OnPush change-detection strategy for a component\n * (CheckOnce, rather than the default
CheckAlways), then forces a second check\n * after an interval. See [live
demo](https://plnkr.co/edit/GC512b?p=preview).\n *\n * <code-example path="core/ts/change_detect/change-
detection.ts"\n * region="mark-for-check"></code-example>\n *\n * ### Detach change detector to limit how
often check occurs\n *\n * The following example defines a component with a large list of read-only data\n * that is
expected to change constantly, many times per second.\n * To improve performance, we want to check and update
the list\n * less often than the changes actually occur. To do that, we detach\n * the component's change detector and
perform an explicit local check every five seconds.\n *\n * <code-example path="core/ts/change_detect/change-
detection.ts"\n * region="detach"></code-example>\n *\n * ### Reattaching a detached component\n *\n * The

```



following example creates a component displaying

```
live data.\n * The component detaches its change detector from the main change detector tree\n * when the `live`  
property is set to false, and reattaches it when the property\n * becomes true.\n *\n * <code-example  
path=\"core/ts/change_detect/change-detection.ts\" region=\"reattach\"></code-example>\n *\n * @publicApi\n *\n * \nexport abstract class ChangeDetectorRef {\n /**\n * When a view uses the {@link  
ChangeDetectionStrategy#OnPush OnPush} (checkOnce)\n * change detection strategy, explicitly marks the view  
as changed so that\n * it can be checked again.\n *\n * Components are normally marked as dirty (in need of  
rendering) when inputs\n * have changed or events have fired in the view. Call this method to ensure that\n * a  
component is checked even if these triggers have not occurred.\n *\n * <!-- TODO: Add a link to a chapter on  
OnPush components -->\n *\n * \n abstract markForCheck(): void;\n /**\n * Detaches this view from the  
change-detection  
tree.\n * A detached view is not checked until it is reattached.\n * Use in combination with `detectChanges()`  
to implement local change detection checks.\n *\n * Detached views are not checked during change detection runs  
until they are\n * re-attached, even if they are marked as dirty.\n *\n * <!-- TODO: Add a link to a chapter on  
detach/reattach/local digest -->\n *\n * <!-- TODO: Add a live demo once ref.detectChanges is merged into master --  
>\n *\n * \n abstract detach(): void;\n /**\n * Checks this view and its children. Use in combination with  
{@link ChangeDetectorRef#detach\n * detach}\n * to implement local change detection checks.\n *\n * <!--  
TODO: Add a link to a chapter on detach/reattach/local digest -->\n *\n * <!-- TODO: Add a live demo once  
ref.detectChanges is merged into master -->\n *\n * \n abstract detectChanges(): void;\n /**\n * Checks the  
change detector and its children, and throws if any changes are detected.\n *\n * Use in development mode to verify that running change detection doesn't introduce\n * other changes. Calling it  
in production mode is a noop.\n *\n * \n abstract checkNoChanges(): void;\n /**\n * Re-attaches the previously  
detached view to the change detection tree.\n * Views are attached to the tree by default.\n *\n * <!-- TODO:  
Add a link to a chapter on detach/reattach/local digest -->\n *\n * \n abstract reattach(): void;\n /**\n *  
@internal\n * @nocollapse\n * \n static __NG_ELEMENT_ID__: (flags: InjectFlags) => ChangeDetectorRef =  
injectChangeDetectorRef;\n }\n /**\n * Returns a ChangeDetectorRef (a.k.a. a ViewRef)\n * \nexport function  
injectChangeDetectorRef(flags: InjectFlags): ChangeDetectorRef {\n return createViewRef(\n  
getCurrentTNode()!, getLView(),\n (flags & InternalInjectFlags.ForPipe) ===  
InternalInjectFlags.ForPipe);\n }\n /**\n * Creates a ViewRef and stores it on the injector as ChangeDetectorRef  
(public alias).\n *\n * @param  
tNode The node that is requesting a ChangeDetectorRef\n * @param IView The view to which the node belongs\n * @param isPipe Whether the view is being injected into a pipe.\n * @returns The ChangeDetectorRef to use\n * \nfunction createViewRef(tNode: TNode, IView: LView, isPipe: boolean): ChangeDetectorRef {\n if  
(isComponentHost(tNode) && !isPipe) {\n // The LView represents the location where the component is  
declared.\n // Instead we want the LView for the component View and so we need to look it up.\n const  
componentView = getComponentLViewByIndex(tNode.index, IView); // look down\n return new  
R3_ViewRef(componentView, componentView);\n } else if (tNode.type & (TNodeType.AnyRNode |  
TNodeType.AnyContainer | TNodeType.Icu)) {\n // The LView represents the location where the injection is  
requested from.\n // We need to locate the containing LView (in case where the `IView` is an embedded view)\n const hostComponentView = IView[DECLARATION_COMPONENT_VIEW]; //  
look up\n return new R3_ViewRef(hostComponentView, IView);\n }\n return null;\n }\n /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license  
that can be\n * found in the LICENSE file at https://angular.io/license\n * \nimport { ChangeDetectorRef } from  
\"./change_detection/change_detector_ref\";\n /**\n * Represents an Angular [view](guide/glossary#view  
\"Definition\").\n *\n * @see {@link ChangeDetectorRef#usage-notes Change detection usage}\n *\n * @publicApi\n * \nexport abstract class ViewRef extends ChangeDetectorRef {\n /**\n * Destroys this view and  
all of the data structures associated with it.\n *\n * \n abstract destroy(): void;\n /**\n * Reports whether this view  
has been destroyed.\n * @returns True after the `destroy()` method has been called, false otherwise.\n * \n
```

```

abstract get destroyed(): boolean;

/**
 * A lifecycle hook that provides additional developer-defined
 * cleanup
 *
 * functionality for views.
 * @param callback A handler function that cleans up developer-defined data
 * associated with a view. Called when the `destroy()` method is invoked.
 */
abstract onDestroy(callback:
Function): any;

/**
 * Represents an Angular [view](guide/glossary#view) in a view
 * container. An [embedded view](guide/glossary#view-tree) can be referenced from a component
 * other than the hosting component whose template defines it, or it can be defined
 * independently by a `TemplateRef`.
 *
 * Properties of elements in a view can change, but the structure (number and order) of elements in
 * a view cannot. Change the structure of elements by inserting, moving, or
 * removing nested views in a view container.
 *
 * @see `ViewContainerRef`
 *
 * @usageNotes
 * The following template breaks down into two separate
 * `TemplateRef` instances,
 * an outer one and an inner one.
 *
 * Count: {{ items.length }}
 *
 * <ul>
 * <li *ngFor="let item of items">{{ item }}</li>
 * </ul>
 *
 * This is the outer
 * `TemplateRef`:
 *
 * Count: {{ items.length }}
 *
 * <ng-template ngFor let-item
 * [ngForOf]="items"></ng-template>
 *
 * This is the inner `TemplateRef`:
 *
 * <li>{{ item }}</li>
 *
 * The outer and inner `TemplateRef` instances are assembled into views as
 * follows:
 *
 * <!-- ViewRef: outer-0 -->
 * Count: 2
 *
 * <ng-template view-container-ref></ng-
 * template>
 *
 * <!-- ViewRef: inner-1 --><li>first</li><!-- /ViewRef: inner-1 -->
 *
 * <!-- ViewRef: inner-2 --
 * ><li>second</li><!-- /ViewRef: inner-2 -->
 *
 * <!-- /ViewRef: outer-0 -->
 *
 * @publicApi
 */
export abstract class EmbeddedViewRef<C> extends ViewRef {
  /**
   * The context for this view, inherited
   * from the anchor element.
   */
  abstract context: C;

  /**
   * The root nodes for this embedded view.
   */
  abstract get
  rootNodes(): any[];
}

export interface InternalViewRef extends ViewRef {
  detachFromAppRef(): void;
  attachToAppRef(appRef: ViewRefTracker): void;
}

/**
 * Interface for tracking root `ViewRef`s in
 * `ApplicationRef`.
 *
 * NOTE: Importing `ApplicationRef` here directly creates circular dependency, which is
 * why we have
 * a subset of the `ApplicationRef` interface `ViewRefTracker` here.
 */
export interface
ViewRefTracker {
  detachView(viewRef: ViewRef): void;
}

/**
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 *
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 * found in
 * the LICENSE file at https://angular.io/license
 */
// Public API for compiler
export { Compiler,
COMPILER_OPTIONS,
CompilerFactory,
CompilerOptions,
ModuleWithComponentFactories } from
'./linker/compiler';
export { ComponentFactory, ComponentRef } from './linker/component_factory';
export
{ ComponentFactoryResolver } from './linker/component_factory_resolver';
export
{ ElementRef } from './linker/element_ref';
export { NgModuleFactory, NgModuleRef } from
'./linker/ng_module_factory';
export { getModuleFactory, getNgModuleById } from
'./linker/ng_module_factory_loader';
export { QueryList } from './linker/query_list';
export { TemplateRef } from
'./linker/template_ref';
export { ViewContainerRef } from './linker/view_container_ref';
export
{ EmbeddedViewRef, ViewRef } from './linker/view_ref';

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 * Rights Reserved.
 *
 * Use of this source code is governed by an MIT-style license that can be
 * found in
 * the LICENSE file at https://angular.io/license
 */
// This file exists for easily patching NgModuleFactoryLoader in
g3
export default {};

/**
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 * Rights Reserved.
 *
 * Use of this
 * source code is governed by an MIT-style license that can be
 * found in
 * the LICENSE file at
 * https://angular.io/license
 */
import { Injector } from './di/injector';
import
{ assertTNodeForLView } from './render3/assert';
import { getLContext } from
'./render3/context_discovery';
import { CONTAINER_HEADER_OFFSET, LContainer, NATIVE } from
'./render3/interfaces/container';
import { TElementNode, TNode, TNodeFlags, TNodeType } from
'./render3/interfaces/node';
import { isComponentHost, isLContainer } from
'./render3/interfaces/type_checks';
import { DECLARATION_COMPONENT_VIEW, LView, PARENT,
T_HOST, TData, TVIEW } from './render3/interfaces/view';
import { getComponent, getContext,
getInjectionTokens, getInjector, getListeners, getLocalRefs, getOwningComponent } from

```



```

map of attribute names to attribute values for an element.\n *^n get attributes(): {[key: string]: string|null} {\n
const attributes: {[key: string]: string|null} = {};\n const element = this.nativeElement;\n\n if (!element) {\n
return attributes;\n }\n\n const context = getLContext(element)!;\n const IView = context ? context.IView :
null;\n\n if (IView === null) {\n
return {};\n }\n\n const tNodeAttrs = (IView[TVIEW].data[context.nodeIndex] as TNode).attrs;\n const
lowercaseTNodeAttrs: string[] = [];\n\n // For debug nodes we take the element's attribute directly from the DOM
since it allows us\n // to account for ones that weren't set via bindings (e.g. ViewEngine keeps track of the ones\n
// that are set through `Renderer2`). The problem is that the browser will lowercase all names,\n // however since
we have the attributes already on the TNode, we can preserve the case by going\n // through them once, adding
them to the `attributes` map and putting their lower-cased name\n // into an array. Afterwards when we're going
through the native DOM attributes, we can check\n // whether we haven't run into an attribute already through the
TNode.\n if (tNodeAttrs) {\n let i = 0;\n while (i < tNodeAttrs.length) {\n const attrName =
tNodeAttrs[i];\n\n // Stop as soon as we hit a marker. We only care
about the regular attributes. Everything\n // else will be handled below when we read the final attributes off the
DOM.\n if (typeof attrName !== 'string') break;\n\n const attrValue = tNodeAttrs[i + 1];\n
attributes[attrName] = attrValue as string;\n lowercaseTNodeAttrs.push(attrName.toLowerCase());\n\n i +=
2;\n }\n }\n\n const eAttrs = element.attributes;\n for (let i = 0; i < eAttrs.length; i++) {\n const attr =
eAttrs[i];\n const lowercaseName = attr.name.toLowerCase();\n\n // Make sure that we don't assign the same
attribute both in its\n // case-sensitive form and the lower-cased one from the browser.\n if
(lowercaseTNodeAttrs.indexOf(lowercaseName) === -1) {\n // Save the lowercase name to align the behavior
between browsers.\n // IE preserves the case, while all other browser convert it to lower case.\n
attributes[lowercaseName] = attr.value;\n }\n }\n\n return attributes;\n
}\n\n /**\n * The inline styles of the DOM element.\n * Will be `null` if there is no `style` property on the
underlying DOM element.\n * @see [ElementCSSInlineStyle](https://developer.mozilla.org/en-
US/docs/Web/API/ElementCSSInlineStyle/style)\n *^n get styles(): {[key: string]: string|null} {\n if
(this.nativeElement && (this.nativeElement as HTMLInputElement).style) {\n return (this.nativeElement as
HTMLInputElement).style as {[key: string]: any};\n }\n return {};\n }\n\n /**\n * A map containing the class
names on the element as keys.\n * This map is derived from the `className` property of the DOM element.\n
*\n * Note: The values of this object will always be `true`. The class key will not appear in the KV\n * object if it
does not exist on the element.\n * @see [Element.className](https://developer.mozilla.org/en-
US/docs/Web/API/Element/className)\n *^n get classes(): {[key: string]: boolean} {\n const result:
{[key: string]: boolean} = {};\n const element = this.nativeElement as HTMLInputElement | SVGElement;\n\n //
SVG elements return an `SVGAnimatedString` instead of a plain string for the `className`.\n const className =
element.className as string | SVGAnimatedString;\n const classes =\n\n typeof className !== 'string' ?
className.baseVal.split(' ') : className.split(' ');\n\n classes.forEach((value: string) => result[value] = true);\n
return result;\n }\n\n /**\n * The `childNodes` of the DOM element as a `DebugNode` array.\n * @see
[Node.childNodes](https://developer.mozilla.org/en-US/docs/Web/API/Node/childNodes)\n *^n get childNodes():
DebugNode[] {\n const childNodes = this.nativeNode.childNodes;\n const children: DebugNode[] = [];\n for
(let i = 0; i < childNodes.length; i++) {\n const element = childNodes[i];\n
children.push(getDebugNode(element)!);\n }\n return children;\n }\n\n /**\n * The immediate
`DebugElement`\n children. Walk the tree by descending through `children`.\n *^n get children(): DebugElement[] {\n const
nativeElement = this.nativeElement;\n if (!nativeElement) return [];\n const childNodes =
nativeElement.children;\n const children: DebugElement[] = [];\n for (let i = 0; i < childNodes.length; i++) {\n
const element = childNodes[i];\n children.push(getDebugNode(element) as DebugElement);\n }\n return
children;\n }\n\n /**\n * @returns the first `DebugElement` that matches the predicate at any depth in the
subtree.\n *^n query(predicate: Predicate<DebugElement>): DebugElement {\n const results =
this.queryAll(predicate);\n return results[0] || null;\n }\n\n /**\n * @returns All `DebugElement` matches for the

```

```

predicate at any depth in the subtree.\n */\n queryAll(predicate: Predicate<DebugElement>): DebugElement[] {\n
const matches: DebugElement[] = [];\n _queryAll(this, predicate, matches, true);\n return matches;\n
}\n\n /**\n * @returns All `DebugNode` matches for the predicate at any depth in the subtree.\n */\n
queryAllNodes(predicate: Predicate<DebugNode>): DebugNode[] {\n const matches: DebugNode[] = [];\n
_queryAll(this, predicate, matches, false);\n return matches;\n }\n\n /**\n * Triggers the event by its name if
there is a corresponding listener in the element's\n * `listeners` collection.\n *\n * If the event lacks a listener or
there's some other problem, consider\n * calling `nativeElement.dispatchEvent(eventObject)`.\n *\n * @param
eventName The name of the event to trigger\n * @param eventObj The _event object_ expected by the handler\n
*\n * @see [Testing components scenarios](guide/testing-components-scenarios#trigger-event-handler)\n */\n
triggerEventHandler(eventName: string, eventObj?: any): void {\n const node = this.nativeNode as any;\n const
invokedListeners: Function[] = [];\n\n this.listeners.forEach(listener => {\n
if (listener.name === eventName) {\n const callback = listener.callback;\n callback.call(node, eventObj);\n
invokedListeners.push(callback);\n }\n });\n\n // We need to check whether `eventListeners` exists,
because it's something\n // that Zone.js only adds to `EventTarget` in browser environments.\n if (typeof
node.eventListeners === 'function') {\n // Note that in Ivy we wrap event listeners with a call to
`event.preventDefault` in some\n // cases. We use `__ngUnwrap__` as a special token that gives us access to the
actual event\n // listener.\n node.eventListeners(eventName).forEach((listener: Function) => {\n // In
order to ensure that we can detect the special __ngUnwrap__ token described above, we\n // use `toString` on
the listener and see if it contains the token. We use this approach to\n // ensure that it still worked with compiled
code since it cannot remove or rename string\n // literals.\n
We also considered using a special function name (i.e. if(listener.name ===\n // special)) but that was more
cumbersome and we were also concerned the compiled code could\n // strip the name, turning the condition in
to (\"" === \"\") and always returning true.\n if (listener.toString().indexOf('__ngUnwrap__') !== -1) {\n
const unwrappedListener = listener('__ngUnwrap__');\n return invokedListeners.indexOf(unwrappedListener)
=== -1 &&\n unwrappedListener.call(node, eventObj);\n }\n });\n }\n }\n\nfunction
copyDomProperties(element: Element|null, properties: {[name: string]: string}): void {\n if (element) {\n // Skip
own properties (as those are patched)\n let obj = Object.getPrototypeOf(element);\n const NodePrototype: any =
Node.prototype;\n while (obj !== null && obj !== NodePrototype) {\n const descriptors =
Object.getOwnPropertyDescriptors(obj);\n for (let key in descriptors) {\n
if (!key.startsWith('__') && !key.startsWith('on')) {\n // don't include properties starting with `__` and `on`.\n
// `__` are patched values which should not be included.\n // `on` are listeners which also should not be
included.\n const value = (element as any)[key];\n if (isPrimitiveValue(value)) {\n properties[key]
= value;\n }\n }\n }\n obj = Object.getPrototypeOf(obj);\n }\n }\n\nfunction
isPrimitiveValue(value: any): boolean {\n return typeof value === 'string' || typeof value === 'boolean' || typeof
value === 'number' ||\n value === null;\n}\n\n/**\n * Walk the TNode tree to find matches for the predicate.\n
*\n * @param parentElement the element from which the walk is started\n * @param predicate the predicate to
match\n * @param matches the list of positive matches\n * @param elementsOnly whether only elements should be
searched\n */\nfunction _queryAll(\n parentElement: DebugElement,\n
predicate: Predicate<DebugElement>, matches: DebugElement[],\n elementsOnly: true): void;\nfunction
_queryAll(\n parentElement: DebugElement, predicate: Predicate<DebugNode>, matches: DebugNode[],\n
elementsOnly: false): void;\nfunction _queryAll(\n parentElement: DebugElement, predicate:\n
Predicate<DebugElement>|Predicate<DebugNode>,\n matches: DebugElement[]|DebugNode[], elementsOnly:\n
boolean) {\n const context = getLContext(parentElement.nativeNode!);\n const IView = context ? context.IView :
null;\n if (IView !== null) {\n const parentTNode = IView[TVIEW].data[context.nodeIndex] as TNode;\n
_queryNodeChildren(\n parentTNode, IView, predicate, matches, elementsOnly, parentElement.nativeNode);\n
} else {\n // If the context is null, then `parentElement` was either created with Renderer2 or native DOM\n //
APIs.\n _queryNativeNodeDescendants(parentElement.nativeNode, predicate, matches, elementsOnly);\n
}\n}\n\n/**\n * Recursively match

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the current TNode against the predicate, and goes on with the next ones.\n *\n * @param tNode the current
TNode\n * @param IView the LView of this TNode\n * @param predicate the predicate to match\n * @param
matches the list of positive matches\n * @param elementsOnly whether only elements should be searched\n *
@param rootNativeNode the root native node on which predicate should not be matched\n */\nfunction
_queryNodeChildren(\n  tNode: TNode, IView: LView, predicate:
Predicate<DebugElement>|Predicate<DebugNode>,\n  matches: DebugElement[]|DebugNode[], elementsOnly:
boolean, rootNativeNode: any) {\n  ngDevMode && assertTNodeForLView(tNode, IView);\n  const nativeNode =
getNativeByTNodeOrNull(tNode, IView);\n  // For each type of TNode, specific logic is executed.\n  if (tNode.type
& (TNodeType.AnyRNode | TNodeType.ElementContainer)) {\n    // Case 1: the TNode is an element\n    // The
native node has to be checked.\n    _addQueryMatch(nativeNode, predicate, matches, elementsOnly,
rootNativeNode);\n    if (isComponentHost(tNode)) {\n      // If the element is the host of a component, then all
nodes in its view have to be processed.\n      // Note: the component's content (tNode.child) will be processed from
the insertion points.\n      const componentView = getComponentLViewByIndex(tNode.index, IView);\n      if
(componentView && componentView[TVIEW].firstChild) {\n        _queryNodeChildren(\n
componentView[TVIEW].firstChild!, componentView, predicate, matches, elementsOnly,\n
rootNativeNode);\n      }\n    } else {\n      if (tNode.child) {\n        // Otherwise, its children have to be processed.\n
_queryNodeChildren(tNode.child, IView, predicate, matches, elementsOnly, rootNativeNode);\n      }\n    }\n    //
We also have to query the DOM directly in order to catch elements inserted through\n    // Renderer2. Note that this
is __not__ optimal, because we're walking similar trees multiple\n    // times. ViewEngine could do it more
efficiently, because all the insertions go through\n    // Renderer2, however that's not the case in Ivy. This approach
is being used because:\n    // 1. Matching the ViewEngine behavior would mean potentially introducing a
dependency\n    // from `Renderer2` to Ivy which could bring Ivy code into ViewEngine.\n    // 2. It allows us to
capture nodes that were inserted directly via the DOM.\n    nativeNode &&
_queryNativeNodeDescendants(nativeNode, predicate, matches, elementsOnly);\n  }\n  // In all cases, if a
dynamic container exists for this node, each view inside it has to be\n  // processed.\n  const nodeOrContainer =
IView[tNode.index];\n  if (isLContainer(nodeOrContainer)) {\n    _queryNodeChildrenInContainer(\n
nodeOrContainer, predicate, matches, elementsOnly, rootNativeNode);\n  } } else if (tNode.type &
TNodeType.Container) {\n    // Case 2: the TNode is a container\n    // The native node has to be checked.\n    const
IContainer =
IView[tNode.index];\n    _addQueryMatch(IContainer[NATIVE], predicate, matches, elementsOnly,
rootNativeNode);\n    // Each view inside the container has to be processed.\n
_queryNodeChildrenInContainer(IContainer, predicate, matches, elementsOnly, rootNativeNode);\n  } } else if
(tNode.type & TNodeType.Projection) {\n    // Case 3: the TNode is a projection insertion point (i.e. a <ng-
content>).\n    // The nodes projected at this location all need to be processed.\n    const componentView =
IView![DECLARATION_COMPONENT_VIEW];\n    const componentHost = componentView[T_HOST] as
TElementNode;\n    const head: TNode|null =\n      (componentHost.projection as (TNode |
null))?[tNode.projection as number];\n    if (Array.isArray(head)) {\n      for (let nativeNode of head) {\n
_addQueryMatch(nativeNode, predicate, matches, elementsOnly, rootNativeNode);\n      }\n    } else if (head) {\n
const nextLView = componentView[PARENT]! as LView;\n    const nextTNode =
nextLView[TVIEW].data[head.index]
as TNode;\n    _queryNodeChildren(nextTNode, nextLView, predicate, matches, elementsOnly,
rootNativeNode);\n  } } } else if (tNode.child) {\n    // Case 4: the TNode is a view.\n
_queryNodeChildren(tNode.child, IView, predicate, matches, elementsOnly, rootNativeNode);\n  }\n}\n\n// We don't
want to go to the next sibling of the root node.\nif (rootNativeNode !== nativeNode) {\n  // To determine the next
node to be processed, we need to use the next or the projectionNext\n  // link, depending on whether the current
node has been projected.\n  const nextTNode = (tNode.flags & TNodeFlags.isProjected) ? tNode.projectionNext :
tNode.next;\n  if (nextTNode) {\n    _queryNodeChildren(nextTNode, IView, predicate, matches, elementsOnly,
rootNativeNode);\n  } }\n}\n\n/**\n * Process all TNodes in a given container.\n *\n * @param IContainer the

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container to be processed\n * @param predicate the predicate to match\n * @param matches the list of positive
  matches\n * @param elementsOnly whether only elements should be searched\n * @param rootNativeNode the
  root native node on which predicate should not be matched\n */\nfunction _queryNodeChildrenInContainer(\n
  IContainer: LContainer, predicate: Predicate<DebugElement>|Predicate<DebugNode>,\n  matches:
  DebugElement[]|DebugNode[], elementsOnly: boolean, rootNativeNode: any) {\n  for (let i =
  CONTAINER_HEADER_OFFSET; i < IContainer.length; i++) {\n    const childView = IContainer[i] as LView;\n
    const firstChild = childView[TVIEW].firstChild;\n    if (firstChild) {\n      _queryNodeChildren(firstChild,
      childView, predicate, matches, elementsOnly, rootNativeNode);\n    }\n  }\n}\n\n/**\n * Match the current native
  node against the predicate.\n */\n * @param nativeNode the current native node\n * @param predicate the predicate
  to match\n * @param matches the list of positive matches\n * @param elementsOnly whether only elements should
  be searched\n * @param rootNativeNode the root
  native node on which predicate should not be matched\n */\nfunction _addQueryMatch(\n  nativeNode: any,
  predicate: Predicate<DebugElement>|Predicate<DebugNode>,\n  matches: DebugElement[]|DebugNode[],
  elementsOnly: boolean, rootNativeNode: any) {\n  if (rootNativeNode !== nativeNode) {\n    const debugNode =
    getDebugNode(nativeNode);\n    if (!debugNode) {\n      return;\n    }\n    // Type of the \"predicate and \"matches\"
    array are set based on the value of\n    // the \"elementsOnly\" parameter. TypeScript is not able to properly infer
    these\n    // types with generics, so we manually cast the parameters accordingly.\n    if (elementsOnly &&
    (debugNode instanceof DebugElement) && predicate(debugNode) &&\n      matches.indexOf(debugNode) === -
    1) {\n      matches.push(debugNode);\n    } else if (\n      !elementsOnly && (predicate as
    Predicate<DebugNode>)(debugNode) &&\n      (matches as DebugNode[]).indexOf(debugNode) === -1) {\n
    (matches as DebugNode[]).push(debugNode);\n
  }\n}\n}\n}\n\n/**\n * Match all the descendants of a DOM node against a predicate.\n */\n * @param nativeNode
  the current native node\n * @param predicate the predicate to match\n * @param matches the list where matches are
  stored\n * @param elementsOnly whether only elements should be searched\n */\nfunction
_queryNativeNodeDescendants(\n  parentNode: any, predicate:
  Predicate<DebugElement>|Predicate<DebugNode>,\n  matches: DebugElement[]|DebugNode[], elementsOnly:
  boolean) {\n  const nodes = parentNode.childNodes;\n  const length = nodes.length;\n  for (let i = 0; i < length;
  i++) {\n    const node = nodes[i];\n    const debugNode = getDebugNode(node);\n    if (debugNode) {\n      if
    (elementsOnly && (debugNode instanceof DebugElement) && predicate(debugNode) &&\n      matches.indexOf(debugNode) === -1) {\n      matches.push(debugNode);\n    } else if (\n      !elementsOnly
    && (predicate as Predicate<DebugNode>)(debugNode) &&\n      (matches as
    DebugNode[]).indexOf(debugNode)
    === -1) {\n      (matches as DebugNode[]).push(debugNode);\n    }\n  }\n  _queryNativeNodeDescendants(node,
  predicate, matches, elementsOnly);\n}\n}\n}\n\n/**\n * Iterates through the property bindings for a given node
  and generates\n * a map of property names to values. This map only contains property bindings\n * defined in
  templates, not in host bindings.\n */\nfunction collectPropertyBindings(\n  properties: {[key: string]: string},
  tNode: TNode, lView: LView, tData: TData): void {\n  let bindingIndexes = tNode.propertyBindings;\n  if
  (bindingIndexes !== null) {\n    for (let i = 0; i < bindingIndexes.length; i++) {\n      const bindingIndex =
      bindingIndexes[i];\n      const propMetadata = tData[bindingIndex] as string;\n      const metadataParts =
      propMetadata.split(INTERPOLATION_DELIMITER);\n      const propertyName = metadataParts[0];\n      if
      (metadataParts.length > 1) {\n        let value = metadataParts[1];\n        for (let j = 1; j
        < metadataParts.length - 1; j++) {\n          value += renderStringify(lView[bindingIndex + j - 1]) + metadataParts[j
        + 1];\n        }\n        properties[propertyName] = value;\n      } else {\n        properties[propertyName] =
        lView[bindingIndex];\n      }\n    }\n  }\n}\n\n// Need to keep the nodes in a global Map so that multiple angular
  apps are supported.\nconst _nativeNodeToDebugNode = new Map<any, DebugNode>();\nconst
  NG_DEBUG_PROPERTY = '__ng_debug__';\n\n/**\n * @publicApi\n */\nexport function
  getDebugNode(nativeNode: any): DebugNode|null {\n  if (nativeNode instanceof Node) {\n    if
    (!(nativeNode.hasOwnProperty(NG_DEBUG_PROPERTY))) {\n      (nativeNode as

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any)[NG_DEBUG_PROPERTY] = nativeNode.nodeType === Node.ELEMENT_NODE ?\n      new
DebugElement(nativeNode as Element) :\n      new DebugNode(nativeNode);\n  }\n  return (nativeNode as
any)[NG_DEBUG_PROPERTY];\n  }\n  return null;\n}\n\n// TODO: cleanup all references to this function and
remove it.\n\nexport
function getDebugNodeR2(_nativeNode: any): DebugNode|null {\n  return null;\n}\n\nexport function
getAllDebugNodes(): DebugNode[] {\n  return Array.from(_nativeNodeToDebugNode.values());\n}\n\nexport
function indexDebugNode(node: DebugNode) {\n  _nativeNodeToDebugNode.set(node.nativeNode,
node);\n}\n\nexport function removeDebugNodeFromIndex(node: DebugNode) {\n
_nativeNodeToDebugNode.delete(node.nativeNode);\n}\n\n/**\n * A boolean-valued function over a value,
possibly including context information\n * regarding that value's position in an array.\n * *\n * @publicApi\n
*/\n\nexport interface Predicate<T> {\n  (value: T): boolean;\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {RuntimeError, RuntimeErrorCode} from
'./../errors';\nimport {isListLikeIterable, iterateListLike} from './../util/iterable';\nimport {stringify}
from './../util/stringify';\nimport {IterableChangeRecord, IterableChanges, IterableDiffer, IterableDifferFactory,
NgIterable, TrackByFunction} from './iterable_differs';\n\nexport class DefaultIterableDifferFactory implements
IterableDifferFactory {\n  constructor() {}\n  supports(obj: Object|null|undefined): boolean {\n    return
isListLikeIterable(obj);\n  }\n  create<V>(trackByFn?: TrackByFunction<V>): DefaultIterableDiffer<V> {\n
return new DefaultIterableDiffer<V>(trackByFn);\n  }\n  const trackByIdentity = (index: number, item: any) =>
item;\n\n/**\n * @deprecated v4.0.0 - Should not be part of public API.\n * @publicApi\n */\n\nexport class
DefaultIterableDiffer<V> implements IterableDiffer<V>, IterableChanges<V> {\n  public readonly length: number
= 0;\n  // TODO(issue/24571): remove '!'.\n  public readonly collection!: V[]|Iterable<V>|null;\n  // Keeps track of
the used records at any point in time (during & across `check()` calls)\n  private _linkedRecords:
_DuplicateMap<V>|null = null;\n  // Keeps track of the removed records at any point in time during `check()`
calls.\n  private _unlinkedRecords: _DuplicateMap<V>|null = null;\n  private _previousItHead:
IterableChangeRecord<V>|null = null;\n  private _itHead: IterableChangeRecord<V>|null = null;\n  private
_itTail: IterableChangeRecord<V>|null = null;\n  private _additionsHead: IterableChangeRecord<V>|null =
null;\n  private _additionsTail: IterableChangeRecord<V>|null = null;\n  private _movesHead:
IterableChangeRecord<V>|null = null;\n  private _movesTail: IterableChangeRecord<V>|null = null;\n  private
_removalsHead: IterableChangeRecord<V>|null = null;\n  private _removalsTail: IterableChangeRecord<V>|null
= null;\n  // Keeps track of records where custom track by is the same, but item identity has changed\n  private
_identityChangesHead: IterableChangeRecord<V>|null = null;\n  private _identityChangesTail:
IterableChangeRecord<V>|null = null;\n  private _trackByFn:
TrackByFunction<V>;\n  constructor(trackByFn?: TrackByFunction<V>) {\n    this._trackByFn = trackByFn ||
trackByIdentity;\n  }\n  forEachItem(fn: (record: IterableChangeRecord<V>) => void) {\n    let record:
IterableChangeRecord<V>|null;\n    for (record = this._itHead; record !== null; record = record._next) {\n
fn(record);\n    }\n  }\n  forEachOperation(\n    fn: (item: IterableChangeRecord<V>, previousIndex:
number|null, currentIndex: number|null) => void) {\n    let nextIt = this._itHead;\n    let nextRemove =
this._removalsHead;\n    let addRemoveOffset = 0;\n    let moveOffsets: number[]|null = null;\n    while (nextIt ||
nextRemove) {\n      // Figure out which is the next record to process\n      // Order: remove, add, move\n      const
record: IterableChangeRecord<V> = !nextRemove ||\n        nextIt &&\n        nextIt.currentIndex! <\n
getPreviousIndex(nextRemove, addRemoveOffset, moveOffsets) ?\n        nextIt!\n      :\n        nextRemove;\n      const adjPreviousIndex = getPreviousIndex(record, addRemoveOffset, moveOffsets);\n
const currentIndex = record.currentIndex;\n      // consume the item, and adjust the addRemoveOffset and update
moveDistance if necessary\n      if (record === nextRemove) {\n        addRemoveOffset--;\n        nextRemove =
nextRemove._nextRemoved;\n      } else {\n        nextIt = nextIt!._next;\n        if (record.previousIndex === null) {\n
addRemoveOffset++;\n        } else {\n          // INVARIANT: currentIndex < previousIndex\n          if
(!moveOffsets) moveOffsets = [];\n          const localMovePreviousIndex = adjPreviousIndex - addRemoveOffset;\n

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record._next) {\n    record._nextPrevious = record._next;\n
    }\n\n    for (record = this._additionsHead; record !== null; record = record._nextAdded) {\n
record.previousIndex = record.currentIndex;\n    }\n    this._additionsHead = this._additionsTail = null;\n\n    for
(record = this._movesHead; record !== null; record = record._nextMoved) {\n    record.previousIndex =
record.currentIndex;\n    }\n    this._movesHead = this._movesTail = null;\n    this._removalsHead =
this._removalsTail = null;\n    this._identityChangesHead = this._identityChangesTail = null;\n\n    //
TODO(vicb): when assert gets supported\n    // assert(!this.isDirty);\n    }\n    }\n\n    /**\n     * This is the core
function which handles differences between collections.\n     *\n     * - `record` is the record which we saw at this
position last time. If null then it is a new\n     * item.\n     * - `item` is the current item in the collection\n     * - `index`
is the position of the item in the collection\n     * \n     * @internal\n     */\n    _mismatch(record:
IterableChangeRecord_<V>|null, item: V, itemTrackBy: any, index: number):\n    IterableChangeRecord_<V> {\n
    // The previous record after which we will append the current one.\n    let previousRecord:
IterableChangeRecord_<V>|null;\n\n    if (record === null) {\n    previousRecord = this._itTail;\n    } else {\n
previousRecord = record._prev;\n    // Remove the record from the collection since we know it does not match the
item.\n    this._remove(record);\n    }\n\n    // See if we have evicted the item, which used to be at some anterior
position of _itHead list.\n    record = this._unlinkedRecords === null ? null :
this._unlinkedRecords.get(itemTrackBy, null);\n    if (record !== null) {\n    // It is an item which we have evicted
earlier: reinsert it back into the list.\n    // But first we need to check if identity changed, so we can update in view if
necessary.\n    if (!Object.is(record.item, item)) this._addIdentityChange(record, item);\n\n    this._reinsertAfter(record,
previousRecord, index);\n    } else {\n    // Attempt to see if the item is at some posterior position of _itHead list.\n
record = this._linkedRecords === null ? null : this._linkedRecords.get(itemTrackBy, index);\n    if (record !==
null) {\n    // We have the item in _itHead at/after `index` position. We need to move it forward in the\n    //
collection.\n    // But first we need to check if identity changed, so we can update in view if necessary.\n    if
(!Object.is(record.item, item)) this._addIdentityChange(record, item);\n\n    this._moveAfter(record,
previousRecord, index);\n    } else {\n    // It is a new item: add it.\n    record =\n    this._addAfter(new
IterableChangeRecord_<V>(item, itemTrackBy), previousRecord, index);\n    }\n    }\n    return record;\n    }\n\n    /**\n     * This check is only needed if an array contains duplicates. (Short circuit of nothing dirty)\n     *\n     * Use
case: `[a, a] => [b,
a, a]`\n     *\n     * If we did not have this check then the insertion of `b` would:\n     * 1) evict first `a`\n     * 2) insert
`b` at `0` index.\n     * 3) leave `a` at index `1` as is. <-- this is wrong!\n     * 3) reinsert `a` at index 2. <-- this is
wrong!\n     *\n     * The correct behavior is:\n     * 1) evict first `a`\n     * 2) insert `b` at `0` index.\n     * 3) reinsert `a`
at index 1.\n     * 3) move `a` at from `1` to `2`.\n     *\n     * Double check that we have not evicted a duplicate
item. We need to check if the item type may\n     * have already been removed.\n     * The insertion of b will evict the
first 'a'. If we don't reinsert it now it will be reinserted\n     * at the end. Which will show up as the two 'a's switching
position. This is incorrect, since a\n     * better way to think of it is as insert of 'b' rather than switch 'a' with 'b' and
then add 'a'\n     * at the end.\n     * \n     * @internal\n     */\n    _verifyReinsertion(record: IterableChangeRecord_<V>,
item: V, itemTrackBy:
any, index: number):\n    IterableChangeRecord_<V> {\n    let reinsertRecord: IterableChangeRecord_<V>|null
=\n    this._unlinkedRecords === null ? null : this._unlinkedRecords.get(itemTrackBy, null);\n    if
(reinsertRecord !== null) {\n    record = this._reinsertAfter(reinsertRecord, record._prev!, index);\n    } else if
(record.currentIndex !== index) {\n    record.currentIndex = index;\n    this._addToMoves(record, index);\n    }\n    return record;\n    }\n\n    /**\n     * Get rid of any excess {@link IterableChangeRecord_}s from the previous
collection\n     * \n     * - `record` The first excess {@link IterableChangeRecord_}.\n     * \n     * @internal\n     */\n    _truncate(record: IterableChangeRecord_<V>|null) {\n    // Anything after that needs to be removed;\n    while
(record !== null) {\n    const nextRecord: IterableChangeRecord_<V>|null = record._next;\n
this._addToRemovals(this._unlink(record));\n    record = nextRecord;\n    }\n    if (this._unlinkedRecords

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!== null) {\n  this._unlinkedRecords.clear();\n  }\n  if (this._additionsTail !== null) {\n
this._additionsTail._nextAdded = null;\n  }\n  if (this._movesTail !== null) {\n  this._movesTail._nextMoved =
null;\n  }\n  if (this._itTail !== null) {\n  this._itTail._next = null;\n  }\n  if (this._removalsTail !== null) {\n
  this._removalsTail._nextRemoved = null;\n  }\n  if (this._identityChangesTail !== null) {\n
this._identityChangesTail._nextIdentityChange = null;\n  }\n  }\n  /** @internal *\n  _reinsertAfter(\n  record:
IterableChangeRecord_<V>, prevRecord: IterableChangeRecord_<V>|null, \n  index: number):
IterableChangeRecord_<V> {\n  if (this._unlinkedRecords !== null) {\n
this._unlinkedRecords.remove(record);\n  }\n  const prev = record._prevRemoved;\n  const next =
record._nextRemoved;\n  if (prev === null) {\n  this._removalsHead = next;\n  } else {\n
prev._nextRemoved = next;\n  }\n  if
(next === null) {\n  this._removalsTail = prev;\n  } else {\n  next._prevRemoved = prev;\n  }\n  }\n
this._insertAfter(record, prevRecord, index);\n  this._addToMoves(record, index);\n  return record;\n  }\n  /**
@internal *\n  _moveAfter(\n  record: IterableChangeRecord_<V>, prevRecord:
IterableChangeRecord_<V>|null, \n  index: number): IterableChangeRecord_<V> {\n  this._unlink(record);\n
this._insertAfter(record, prevRecord, index);\n  this._addToMoves(record, index);\n  return record;\n  }\n  /**
@internal *\n  _addAfter(\n  record: IterableChangeRecord_<V>, prevRecord:
IterableChangeRecord_<V>|null, \n  index: number): IterableChangeRecord_<V> {\n  this._insertAfter(record,
prevRecord, index);\n  if (this._additionsTail === null) {\n  // TODO(vicb):\n  // assert(this._additionsHead
=== null);\n  this._additionsTail = this._additionsHead = record;\n  } else {\n  // TODO(vicb):\n  //
assert(_additionsTail._nextAdded
=== null);\n  // assert(record._nextAdded === null);\n  this._additionsTail = this._additionsTail._nextAdded =
record;\n  }\n  return record;\n  }\n  /** @internal *\n  _insertAfter(\n  record: IterableChangeRecord_<V>,
prevRecord: IterableChangeRecord_<V>|null, \n  index: number): IterableChangeRecord_<V> {\n  //
TODO(vicb):\n  // assert(record !== prevRecord);\n  // assert(record._next === null);\n  // assert(record._prev ===
null);\n  const next: IterableChangeRecord_<V>|null = \n  prevRecord === null ? this._itHead :
prevRecord._next;\n  // TODO(vicb):\n  // assert(next !== record);\n  // assert(prevRecord !== record);\n
record._next = next;\n  record._prev = prevRecord;\n  if (next === null) {\n  this._itTail = record;\n  } else {\n
  next._prev = record;\n  }\n  if (prevRecord === null) {\n  this._itHead = record;\n  } else {\n
prevRecord._next = record;\n  }\n  if (this._linkedRecords === null)
{\n  this._linkedRecords = new _DuplicateMap<V>();\n  }\n  this._linkedRecords.put(record);\n  }\n
record.currentIndex = index;\n  return record;\n  }\n  /** @internal *\n  _remove(record:
IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n  return
this._addToRemovals(this._unlink(record));\n  }\n  /** @internal *\n  _unlink(record:
IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n  if (this._linkedRecords !== null) {\n
this._linkedRecords.remove(record);\n  }\n  const prev = record._prev;\n  const next = record._next;\n  //
TODO(vicb):\n  // assert((record._prev = null) === null);\n  // assert((record._next = null) === null);\n  if (prev
=== null) {\n  this._itHead = next;\n  } else {\n  prev._next = next;\n  }\n  if (next === null) {\n
this._itTail = prev;\n  } else {\n  next._prev = prev;\n  }\n  }\n  return record;\n  }\n  /** @internal *\n
_addToMoves(record: IterableChangeRecord_<V>, toIndex: number):
IterableChangeRecord_<V> {\n  // TODO(vicb):\n  // assert(record._nextMoved === null);\n  if
(record.previousIndex === toIndex) {\n  return record;\n  }\n  if (this._movesTail === null) {\n  //
TODO(vicb):\n  // assert(_movesHead === null);\n  this._movesTail = this._movesHead = record;\n  } else
{\n  // TODO(vicb):\n  // assert(_movesTail._nextMoved === null);\n  this._movesTail =
this._movesTail._nextMoved = record;\n  }\n  }\n  return record;\n  }\n  private _addToRemovals(record:
IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n  if (this._unlinkedRecords === null) {\n
this._unlinkedRecords = new _DuplicateMap<V>();\n  }\n  this._unlinkedRecords.put(record);\n  }\n
record.currentIndex = null;\n  record._nextRemoved = null;\n  if (this._removalsTail === null) {\n  //
TODO(vicb):\n  // assert(_removalsHead === null);\n  this._removalsTail = this._removalsHead = record;\n

```

```

record._prevRemoved =
  null;\n } else {\n // TODO(vicb);\n // assert(_removalsTail._nextRemoved === null);\n //
assert(record._nextRemoved === null);\n record._prevRemoved = this._removalsTail;\n this._removalsTail =
this._removalsTail._nextRemoved = record;\n }\n return record;\n }\n\n /** @internal */\n
_addIdentityChange(record: IterableChangeRecord_<V>, item: V) {\n record.item = item;\n if
(this._identityChangesTail === null) {\n this._identityChangesTail = this._identityChangesHead = record;\n }
else {\n this._identityChangesTail = this._identityChangesTail._nextIdentityChange = record;\n }\n return
record;\n }\n}\n\nexport class IterableChangeRecord_<V> implements IterableChangeRecord<V> {\n
currentIndex: number|null = null;\n previousIndex: number|null = null;\n\n /** @internal */\n _nextPrevious:
IterableChangeRecord_<V>|null = null;\n /** @internal */\n _prev: IterableChangeRecord_<V>|null = null;\n /**
@internal */\n _next: IterableChangeRecord_<V>|null
= null;\n /** @internal */\n _prevDup: IterableChangeRecord_<V>|null = null;\n /** @internal */\n _nextDup:
IterableChangeRecord_<V>|null = null;\n /** @internal */\n _prevRemoved: IterableChangeRecord_<V>|null =
null;\n /** @internal */\n _nextRemoved: IterableChangeRecord_<V>|null = null;\n /** @internal */\n
_nextAdded: IterableChangeRecord_<V>|null = null;\n /** @internal */\n _nextMoved:
IterableChangeRecord_<V>|null = null;\n /** @internal */\n _nextIdentityChange:
IterableChangeRecord_<V>|null = null;\n\n\n constructor(public item: V, public trackById: any) {} }\n\n// A
linked list of IterableChangeRecords with the same IterableChangeRecord_item\nclass
_DuplicateItemRecordList<V> {\n /** @internal */\n _head: IterableChangeRecord_<V>|null = null;\n /**
@internal */\n _tail: IterableChangeRecord_<V>|null = null;\n\n /**\n * Append the record to the list of
duplicates.\n *\n * Note: by design all records in the list of duplicates
hold the same value in record.item.\n */\n add(record: IterableChangeRecord_<V>): void {\n if (this._head ===
null) {\n this._head = this._tail = record;\n record._nextDup = null;\n record._prevDup = null;\n } else
{\n // TODO(vicb);\n // assert(record.item === _head.item ||\n // record.item is num &&
record.item.isNaN && _head.item is num && _head.item.isNaN);\n this._tail!._nextDup = record;\n
record._prevDup = this._tail;\n record._nextDup = null;\n this._tail = record;\n }\n }\n\n // Returns a
IterableChangeRecord_ having IterableChangeRecord_trackById == trackById and\n //
IterableChangeRecord_currentIndex >= atOrAfterIndex\n get(trackById: any, atOrAfterIndex: number|null):
IterableChangeRecord_<V>|null {\n let record: IterableChangeRecord_<V>|null;\n for (record = this._head;
record !== null; record = record._nextDup) {\n if ((atOrAfterIndex === null || atOrAfterIndex <=
record.currentIndex!)
&&\n Object.is(record.trackById, trackById)) {\n return record;\n }\n }\n return null;\n }\n\n
/**\n * Remove one { @link IterableChangeRecord_ } from the list of duplicates.\n *\n * Returns whether the list
of duplicates is empty.\n */\n remove(record: IterableChangeRecord_<V>): boolean {\n // TODO(vicb);\n //
assert(() {\n // // verify that the record being removed is in the list.\n // for (IterableChangeRecord_ cursor =
_head; cursor != null; cursor = cursor._nextDup) {\n // if (identical(cursor, record)) return true;\n // }\n //
return false;\n //});\n\n const prev: IterableChangeRecord_<V>|null = record._prevDup;\n const next:
IterableChangeRecord_<V>|null = record._nextDup;\n if (prev === null) {\n this._head = next;\n } else {\n
prev._nextDup = next;\n }\n if (next === null) {\n this._tail = prev;\n } else {\n next._prevDup = prev;\n
}\n return this._head === null;\n
}\n}\n\nclass _DuplicateMap<V> {\n map = new Map<any, _DuplicateItemRecordList<V>>();\n\n put(record:
IterableChangeRecord_<V>) {\n const key = record.trackById;\n\n let duplicates = this.map.get(key);\n if
(!duplicates) {\n duplicates = new _DuplicateItemRecordList<V>();\n this.map.set(key, duplicates);\n }\n
duplicates.add(record);\n }\n\n /**\n * Retrieve the `value` using key. Because the IterableChangeRecord_ value
may be one which we\n * have already iterated over, we use the `atOrAfterIndex` to pretend it is not there.\n *\n
* Use case: `[a, b, c, a, a]` if we are at index `3` which is the second `a` then asking if we\n * have any more `a`s
needs to return the second `a`.\n */\n get(trackById: any, atOrAfterIndex: number|null):
IterableChangeRecord_<V>|null {\n const key = trackById;\n const recordList = this.map.get(key);\n return

```

```

recordList ? recordList.get(trackById, atOrAfterIndex) : null;\n } \n\n /**\n  * Removes a
  { @link IterableChangeRecord_ } from the list of duplicates.\n  *\n  * The list of duplicates also is removed from
  the map if it gets empty.\n  *\n  remove(record: IterableChangeRecord_<V>): IterableChangeRecord_<V> {\n
  const key = record.trackById;\n  const recordList: _DuplicateItemRecordList<V> = this.map.get(key)!;\n  //
  Remove the list of duplicates when it gets empty\n  if (recordList.remove(record)) {\n    this.map.delete(key);\n
  }\n  return record;\n } \n\n get isEmpty(): boolean {\n  return this.map.size === 0;\n } \n\n clear() {\n
  this.map.clear();\n } \n\n\nfunction getPreviousIndex(item: any, addRemoveOffset: number, moveOffsets:
  number[]|null): number {\n  const previousIndex = item.previousIndex;\n  if (previousIndex === null) return
  previousIndex;\n  let moveOffset = 0;\n  if (moveOffsets && previousIndex < moveOffsets.length) {\n
  moveOffset = moveOffsets[previousIndex];\n } \n  return previousIndex + addRemoveOffset +
  moveOffset;\n } \n\n", "/**\n
  * @license\n  * Copyright Google LLC All Rights Reserved.\n  *\n  * Use of this source code is governed by an
  MIT-style license that can be\n  * found in the LICENSE file at https://angular.io/license\n  *\n\nimport
  { RuntimeError, RuntimeErrorCode } from '../errors';\nimport { isJsonObject } from '../util/iterable';\nimport
  { stringify } from '../util/stringify';\n\nimport { KeyValueChangeRecord, KeyValueChanges, KeyValueDiffer,
  KeyValueDifferFactory } from './keyvalue_differs';\n\n\nexport class DefaultKeyValueDifferFactory<K, V>
  implements KeyValueDifferFactory {\n  constructor() {} \n  supports(obj: any): boolean {\n    return obj instanceof
  Map || isJsonObject(obj);\n } \n\n  create<K, V>(): KeyValueDiffer<K, V> {\n    return new
  DefaultKeyValueDiffer<K, V>();\n } \n\n\nexport class DefaultKeyValueDiffer<K, V> implements
  KeyValueDiffer<K, V>, KeyValueChanges<K, V> {\n  private _records = new Map<K,
  KeyValueChangeRecord_<K, V>>();\n  private _mapHead: KeyValueChangeRecord_<K, V>|null =
  null;\n  // _appendAfter is used in the check loop\n  private _appendAfter: KeyValueChangeRecord_<K, V>|null =
  null;\n  private _previousMapHead: KeyValueChangeRecord_<K, V>|null = null;\n  private _changesHead:
  KeyValueChangeRecord_<K, V>|null = null;\n  private _changesTail: KeyValueChangeRecord_<K, V>|null =
  null;\n  private _additionsHead: KeyValueChangeRecord_<K, V>|null = null;\n  private _additionsTail:
  KeyValueChangeRecord_<K, V>|null = null;\n  private _removalsHead: KeyValueChangeRecord_<K, V>|null =
  null;\n  private _removalsTail: KeyValueChangeRecord_<K, V>|null = null;\n\n  get isDirty(): boolean {\n    return
  this._additionsHead !== null || this._changesHead !== null ||\n    this._removalsHead !== null;\n } \n\n
  forEachItem(fn: (r: KeyValueChangeRecord<K, V>) => void) {\n    let record: KeyValueChangeRecord_<K,
  V>|null;\n    for (record = this._mapHead; record !== null; record = record._next) {\n      fn(record);\n    } \n
  } \n\n  forEachPreviousItem(fn: (r: KeyValueChangeRecord<K,
  V>) => void) {\n    let record: KeyValueChangeRecord_<K, V>|null;\n    for (record = this._previousMapHead;
  record !== null; record = record._nextPrevious) {\n      fn(record);\n    } \n\n  } \n\n  forEachChangedItem(fn: (r:
  KeyValueChangeRecord<K, V>) => void) {\n    let record: KeyValueChangeRecord_<K, V>|null;\n    for (record =
  this._changesHead; record !== null; record = record._nextChanged) {\n      fn(record);\n    } \n\n  } \n\n
  forEachAddedItem(fn: (r: KeyValueChangeRecord<K, V>) => void) {\n    let record: KeyValueChangeRecord_<K,
  V>|null;\n    for (record = this._additionsHead; record !== null; record = record._nextAdded) {\n      fn(record);\n
  } \n\n  } \n\n  forEachRemovedItem(fn: (r: KeyValueChangeRecord<K, V>) => void) {\n    let record:
  KeyValueChangeRecord_<K, V>|null;\n    for (record = this._removalsHead; record !== null; record =
  record._nextRemoved) {\n      fn(record);\n    } \n\n  } \n\n  diff(map?: Map<any, any>|{[k: string]: any}|null): any {\n
  if (!map)\n    {\n      map = new Map();\n    } \n  else if (!(map instanceof Map || isJsonObject(map))) {\n    throw new
  RuntimeError(\n      RuntimeErrorCode.INVALID_DIFFER_INPUT,\n      ngDevMode &&\n      `Error
  trying to diff '${stringify(map)}'. Only maps and objects are allowed`);\n    } \n\n  return this.check(map) ? this :
  null;\n } \n\n  onDestroy() {} \n\n /**\n  * Check the current state of the map vs the previous.\n  * The algorithm is
  optimised for when the keys do no change.\n  *\n  check(map: Map<any, any>|{[k: string]: any}): boolean {\n
  this._reset();\n\n  let insertBefore = this._mapHead;\n  this._appendAfter = null;\n\n  this._forEach(map, (value:
  any, key: any) => {\n    if (insertBefore && insertBefore.key === key) {\n

```

```

this._maybeAddToChanges(insertBefore, value);\n    this._appendAfter = insertBefore;\n    insertBefore =
insertBefore._next;\n    } else {\n    const record = this._getOrCreateRecordForKey(key, value);\n    insertBefore
= this._insertBeforeOrAppend(insertBefore, record);\n    }\n    }\n    // Items remaining at the end of the list
have been deleted\n    if (insertBefore) {\n    if (insertBefore._prev) {\n    insertBefore._prev._next = null;\n
}\n\n    this._removalsHead = insertBefore;\n\n    for (let record: KeyValueChangeRecord_<K, V>|null =
insertBefore; record !== null;\n    record = record._nextRemoved) {\n    if (record === this._mapHead) {\n
this._mapHead = null;\n    }\n    this._records.delete(record.key);\n    record._nextRemoved =
record._next;\n    record.previousValue = record.currentValue;\n    record.currentValue = null;\n
record._prev = null;\n    record._next = null;\n    }\n    }\n\n    // Make sure tails have no next records from
previous runs\n    if (this._changesTail) this._changesTail._nextChanged = null;\n    if (this._additionsTail)
this._additionsTail._nextAdded = null;\n\n    return this.isDirty;\n\n    }\n\n    /**\n    * Inserts a record before `before` or append at the end of the list when `before` is null.\n    *\n    *
Notes:\n    * - This method appends at `this._appendAfter`,\n    * - This method updates `this._appendAfter`,\n    * -
The return value is the new value for the insertion pointer.\n    */\n    private _insertBeforeOrAppend(\n    before:
KeyValueChangeRecord_<K, V>|null,\n    record: KeyValueChangeRecord_<K, V>):
KeyValueChangeRecord_<K, V>|null {\n    if (before) {\n    const prev = before._prev;\n    record._next =
before;\n    record._prev = prev;\n    before._prev = record;\n    if (prev) {\n    prev._next = record;\n
}\n\n    if (before === this._mapHead) {\n    this._mapHead = record;\n    }\n\n    this._appendAfter = before;\n
return before;\n    }\n\n    if (this._appendAfter) {\n    this._appendAfter._next = record;\n    record._prev =
this._appendAfter;\n    } else {\n    this._mapHead = record;\n    }\n\n    this._appendAfter
= record;\n    return null;\n    }\n\n    private _getOrCreateRecordForKey(key: K, value: V):
KeyValueChangeRecord_<K, V> {\n    if (this._records.has(key)) {\n    const record = this._records.get(key)!;\n
this._maybeAddToChanges(record, value);\n    const prev = record._prev;\n    const next = record._next;\n    if
(prev) {\n    prev._next = next;\n    }\n    if (next) {\n    next._prev = prev;\n    }\n    record._next = null;\n
record._prev = null;\n    return record;\n    }\n\n    const record = new KeyValueChangeRecord_<K, V>(key);\n
this._records.set(key, record);\n    record.currentValue = value;\n    this._addToAdditions(record);\n    return
record;\n    }\n\n    /** @internal */\n    _reset() {\n    if (this.isDirty) {\n    let record: KeyValueChangeRecord_<K,
V>|null;\n    // let `_previousMapHead` contain the state of the map before the changes\n
this._previousMapHead = this._mapHead;\n    for (record = this._previousMapHead;\n    record !== null; record = record._next) {\n    record._nextPrevious = record._next;\n    }\n\n    // Update
`record.previousValue` with the value of the item before the changes\n    // We need to update all changed items
(that's those which have been added and changed)\n    for (record = this._changesHead; record !== null; record =
record._nextChanged) {\n    record.previousValue = record.currentValue;\n    }\n    for (record =
this._additionsHead; record != null; record = record._nextAdded) {\n    record.previousValue =
record.currentValue;\n    }\n\n    this._changesHead = this._changesTail = null;\n    this._additionsHead =
this._additionsTail = null;\n    this._removalsHead = null;\n    }\n    }\n\n    // Add the record or a given key to the list
of changes only when the value has actually changed\n    private _maybeAddToChanges(record:
KeyValueChangeRecord_<K, V>, newValue: any): void {\n    if (!Object.is(newValue, record.currentValue)) {\n
record.previousValue
= record.currentValue;\n    record.currentValue = newValue;\n    this._addToChanges(record);\n    }\n    }\n\n    private _addToAdditions(record: KeyValueChangeRecord_<K, V>)\n    {\n    if (this._additionsHead === null) {\n
this._additionsHead = this._additionsTail = record;\n    } else {\n    this._additionsTail!._nextAdded = record;\n
this._additionsTail = record;\n    }\n    }\n\n    private _addToChanges(record: KeyValueChangeRecord_<K, V>)\n    {\n
if (this._changesHead === null) {\n    this._changesHead = this._changesTail = record;\n    } else {\n
this._changesTail!._nextChanged = record;\n    this._changesTail = record;\n    }\n    }\n\n    /** @internal */\n    private _forEach<K, V>(obj: Map<K, V>|{[k: string]: V}, fn: (v: V, k: any) => void)\n    {\n    if (obj instanceof Map)\n    {\n    obj.forEach(fn);\n    } else {\n    Object.keys(obj).forEach(k => fn(obj[k], k));\n    }\n    }\n    }\n\n    class

```

```

KeyValueChangeRecord_<K, V> implements KeyValueChangeRecord<K, V> {
  previousValue: V|null = null;
  currentValue: V|null = null;
  /** @internal */ _nextPrevious:
  KeyValueChangeRecord_<K, V>|null = null;
  /** @internal */ _next: KeyValueChangeRecord_<K, V>|null =
  null;
  /** @internal */ _prev: KeyValueChangeRecord_<K, V>|null = null;
  /** @internal */ _nextAdded:
  KeyValueChangeRecord_<K, V>|null = null;
  /** @internal */ _nextRemoved: KeyValueChangeRecord_<K,
  V>|null = null;
  /** @internal */ _nextChanged: KeyValueChangeRecord_<K, V>|null = null;
  constructor(public key: K) {}
}
/**
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import {defineInjectable} from '../di/interface/defs';
import {StaticProvider}
from '../di/interface/provider';
import {Optional, SkipSelf} from '../di/metadata';
import {RuntimeError,
  RuntimeErrorCode} from '../errors';
import
  {DefaultIterableDifferFactory} from '../differs/default_iterable_differ';
/**
 * A type describing supported
 * iterable types.
 */
export type NgIterable<T> = Array<T>|Iterable<T>;
/**
 * A strategy
 * for tracking changes over time to an iterable. Used by {@link NgForOf} to
 * respond to changes in an iterable by
 * effecting equivalent changes in the DOM.
 */
export interface IterableDiffer<V> {
  /**
   * Compute a difference between the previous state and the new `object` state.
   * @param object containing the
   * new value.
   * @returns an object describing the difference. The return value is only valid until the next
   * `diff()` invocation.
   */
  diff(object: NgIterable<V>|undefined|null): IterableChanges<V>|null;
}
/**
 * An
 * object describing the changes in the `Iterable` collection since last time
 * `IterableDiffer#diff()` was invoked.
 */
export interface IterableChanges<V> {
  /**
   * Iterate over all changes. `IterableChangeRecord` will contain information about changes
   * to each
   * item.
   */
  forEachItem(fn: (record: IterableChangeRecord<V>) => void): void;
  /**
   * Iterate over a set of
   * operations which when applied to the original `Iterable` will produce the
   * new `Iterable`.
   * NOTE:
   * These are not necessarily the actual operations which were applied to the original
   * `Iterable`, rather these are a
   * set of computed operations which may not be the same as the ones applied.
   */
  @param record A change
  which needs to be applied
  @param previousIndex The `IterableChangeRecord#previousIndex` of the `record`
  refers to the
  original `Iterable` location, where as `previousIndex` refers to the transient location
  of the item, after applying the operations up to this point.
  @param currentIndex The
  `IterableChangeRecord#currentIndex` of the `record` refers to the
  original
  `Iterable` location, where as `currentIndex` refers to the transient location
  of the item, after applying the
  operations up to this point.
  */
  forEachOperation(fn: (record: IterableChangeRecord<V>,
    previousIndex: number|null,
    currentIndex: number|null) => void): void;
  /**
   * Iterate over changes in
   * the order of original `Iterable` showing where the original items
   * have moved.
   */
  forEachPreviousItem(fn:
    (record: IterableChangeRecord<V>) => void): void;
  /**
   * Iterate over all added items.
   */
  forEachAddedItem(fn: (record: IterableChangeRecord<V>) => void): void;
  /**
   * Iterate over all moved items.
   */
  forEachMovedItem(fn: (record: IterableChangeRecord<V>) => void): void;
  /**
   * Iterate over all removed
   * items.
   */
  forEachRemovedItem(fn: (record: IterableChangeRecord<V>) => void): void;
  /**
   * Iterate over
   * all items which had their identity (as computed by the `TrackByFunction`)
   * changed.
   */
  forEachIdentityChange(fn: (record: IterableChangeRecord<V>) => void): void;
}
/**
 * Record
 * representing the item change information.
 */
export interface IterableChangeRecord<V> {
  /**
   * Current index of the item in `Iterable` or null if removed.
   */
  readonly currentIndex: number|null;
  /**
   * Previous index of the item in `Iterable` or null if added.
   */
  readonly previousIndex: number|null;
  /**
   * The
   * item.
   */
  readonly item: V;
  /**
   * Track by identity as computed by the `TrackByFunction`.
   */
  readonly
  trackById: any;
}
/**
 * A function optionally passed into the `NgForOf` directive to customize how
 * `NgForOf` uniquely
 * identifies items in an iterable.
 * `NgForOf` needs to uniquely identify items in the
 * iterable to correctly perform DOM updates
 * when items in the iterable are reordered, new items are added, or
 * existing items are removed.
 * In all of these scenarios it is usually desirable to only update the

```

DOM elements associated with the items affected by the change. This behavior is important to preserve any DOM-specific UI state (like cursor position, focus, text selection) when the iterable is modified

- enable animation of item addition, removal, and iterable reordering
- preserve the value of the `<select>` element when nested `<option>` elements are dynamically populated using `NgForOf` and the bound iterable is updated

A common use for custom `trackBy` functions is when the model that `NgForOf` iterates over contains a property with a unique identifier. For example, given a model:

```
class User {
  id: number;
  name: string;
  ...
}
```

a custom `trackBy` function could look like the following:

```
function userTrackBy(index, user) {
  return user.id;
}
```

A custom `trackBy` function must have several properties:

- be [idempotent](https://en.wikipedia.org/wiki/Idempotence) (be without side effects, and always return the same value for a given input)
- return unique value for all unique inputs
- be fast

@see [NgForOf#ngForTrackBy](api/common/NgForOf#ngForTrackBy)

```
@publicApi
export interface TrackByFunction<T> {
  // Note: the type parameter `U` enables more accurate
  // template type checking in case a trackBy function is declared using a base type of the iterated type. The `U`
  // type gives TypeScript additional freedom to infer a narrower type for the `item` parameter type, instead of
  // imposing the trackBy's declared item type as the inferred type for `T`.
  // See https://github.com/angular/angular/issues/40125
  @param index The index of the item within the iterable.
  @param item The item in the iterable.
  <U extends T>(index: number, item: T&U):
  any;
}
```

```
export interface IterableDifferFactory {
  supports(objects: any): boolean;
  create<V>(trackByFn?: TrackByFunction<V>):
  IterableDiffer<V>;
}
```

```
export function defaultIterableDifferFactory() {
  return new IterableDifferers([new DefaultIterableDifferFactory()]);
}
```

A repository of different iterable diffing strategies used by `NgFor`, `NgClass`, and others.

```
@publicApi
export class IterableDifferers {
  /** @nocollapse */
  static prov = /** @pureOrBreakMyCode */ defineInjectable(
    { token: IterableDifferers, providedIn: 'root', factory:
    defaultIterableDifferFactory });
  /** @deprecated v4.0.0 - Should be private */
  factories:
  IterableDifferFactory[];
  constructor(factories: IterableDifferFactory[]) {
    this.factories = factories;
  }
  static create(factories: IterableDifferFactory[], parent?: IterableDifferers): IterableDifferers {
    if (parent != null) {
      const copied = parent.factories.slice();
      factories = factories.concat(copied);
    }
    return new IterableDifferers(factories);
  }
  /** Takes an array of {@link IterableDifferFactory} and returns a provider used to extend the inherited {@link IterableDifferers} instance with the provided factories and return a new {@link IterableDifferers} instance.
  @usageNotes
  ### Example
  The following example shows how to extend an existing list of factories, which will only be applied to the injector for this component and its children. This step is all that's required to make a new {@link IterableDiffer} available.
  @Component({
    viewProviders: [
      IterableDifferers.extend([
        new ImmutableListDiffer()
      ])
    ]
  })
  static extend(factories: IterableDifferFactory[]):
  StaticProvider {
    return {
      provide: IterableDifferers,
      useFactory: (parent: IterableDifferers|null) => {
        // if parent is null, it means that we are in the root injector and we have
        // just overridden the default injection mechanism for IterableDifferers, in such a case just assume
        // defaultIterableDifferFactory.
        return IterableDifferers.create(factories, parent ||
        defaultIterableDifferFactory());
      },
      // Dependency technically isn't optional, but we can provide a better
      // error message this way.
      deps: [[IterableDifferers, new SkipSelf(), new Optional()]]
    };
  }
  find(iterable:
  any): IterableDifferFactory {
    const factory = this.factories.find(f => f.supports(iterable));
    if (factory != null) {
      return factory;
    } else {
      throw new RuntimeError(
        RuntimeErrorCode.NO_SUPPORTING_DIFFER_FACTORY,
        ngDevMode && `Cannot find a
        differ supporting object '${iterable}' of type '${
          getTypeNameForDebugging(iterable)}'`);
    }
  }
}
```

```
export function getTypeNameForDebugging(type: any): string {
  return type['name'] || typeof
  type;
}
```



```

* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {Optional,
SkipSelf, StaticProvider, defineInjectable} from '././di';\nimport {RuntimeError, RuntimeErrorCode} from
'././errors';\n\nimport {DefaultKeyValueDifferFactory} from './default_keyvalue_differ';\n\n\n/**\n * A differ that
tracks changes made to an object over time.\n *\n * @publicApi\n *\nexport interface KeyValueDiffer<K, V> {\n
/**\n * Compute a difference between the previous state and the new `object` state.\n *\n * @param object
containing the new value.\n * @returns an object describing the difference. The return value is only valid until the
next\n * `diff()` invocation.\n *\n diff(object: Map<K, V>): KeyValueChanges<K, V>|null;\n\n /**\n *
Compute a difference between the previous state and the new `object` state.\n *\n * @param
object containing the new value.\n * @returns an object describing the difference. The return value is only valid
until the next\n * `diff()` invocation.\n *\n diff(object: {[key: string]: V}): KeyValueChanges<string, V>|null;\n
// TODO(TS2.1): diff<KP extends string>(this: KeyValueDiffer<KP, V>, object: Record<KP, V>):\n //
KeyValueDiffer<KP, V>;\n}\n\n/**\n * An object describing the changes in the `Map` or `{[k:string]: string}` since
last time\n * `KeyValueDiffer#diff()` was invoked.\n *\n * @publicApi\n *\nexport interface
KeyValueChanges<K, V> {\n /**\n * Iterate over all changes. `KeyValueChangeRecord` will contain information
about changes\n * to each item.\n * ^\n forEachItem(fn: (r: KeyValueChangeRecord<K, V>) => void): void;\n\n
/**\n * Iterate over changes in the order of original Map showing where the original items\n * have moved.\n
*\n forEachPreviousItem(fn: (r: KeyValueChangeRecord<K, V>) => void): void;\n\n /**\n * Iterate over all keys
for which values have changed.\n * ^\n forEachChangedItem(fn: (r: KeyValueChangeRecord<K, V>) => void):
void;\n\n /**\n * Iterate over all added items.\n * ^\n forEachAddedItem(fn: (r: KeyValueChangeRecord<K, V>)
=> void): void;\n\n /**\n * Iterate over all removed items.\n * ^\n forEachRemovedItem(fn: (r:
KeyValueChangeRecord<K, V>) => void): void;\n}\n\n\n/**\n * Record representing the item change information.\n
*\n * @publicApi\n *\nexport interface KeyValueChangeRecord<K, V> {\n /**\n * Current key in the Map.\n
*\n readonly key: K;\n\n /**\n * Current value for the key or `null` if removed.\n * ^\n readonly currentValue:
V|null;\n\n /**\n * Previous value for the key or `null` if added.\n * ^\n readonly previousValue:
V|null;\n}\n\n\n/**\n * Provides a factory for {@link KeyValueDiffer}.\n *\n * @publicApi\n *\nexport interface
KeyValueDifferFactory {\n /**\n * Test to see if the differ knows how to diff this kind of object.\n * ^\n
supports(objects:
any): boolean;\n\n /**\n * Create a `KeyValueDiffer`.\n * ^\n create<K, V>(): KeyValueDiffer<K,
V>;\n}\n\n\nexport function defaultKeyValueDifferFactory() {\n return new KeyValueDifferFactory(new
DefaultKeyValueDifferFactory());\n}\n\n\n/**\n * A repository of different Map diffing strategies used by NgClass,
NgStyle, and others.\n *\n * @publicApi\n *\nexport class KeyValueDifferFactory {\n /** @nocollapse\n *\n
static prov = /** @pureOrBreakMyCode */ defineInjectable(\n {token: KeyValueDifferFactory, providedIn: 'root', factory:
defaultKeyValueDifferFactory});\n\n /**\n * @deprecated v4.0.0 - Should be private.\n * ^\n factories:
KeyValueDifferFactory[];\n\n constructor(factories: KeyValueDifferFactory[]) {\n this.factories = factories;\n
}\n\n static create<S>(factories: KeyValueDifferFactory[], parent?: KeyValueDifferFactory): KeyValueDifferFactory {\n
if (parent) {\n const copied = parent.factories.slice();\n factories = factories.concat(copied);\n }\n return
new KeyValueDifferFactory(factories);\n }\n\n /**\n * Takes an array of {@link KeyValueDifferFactory} and returns a
provider used to extend the\n * inherited {@link KeyValueDifferFactory} instance with the provided factories and return
a new\n * {@link KeyValueDifferFactory} instance.\n *\n * @usageNotes\n * ### Example\n *\n * The following
example shows how to extend an existing list of factories,\n * which will only be applied to the injector for this
component and its children.\n * This step is all that's required to make a new {@link KeyValueDifferFactory} available.\n
*\n * ```\n * @Component({\n * viewProviders: [\n * KeyValueDifferFactory.extend([new
ImmutableMapDifferFactory()]\n * ]\n * })\n * ```\n * ^\n *\n static extend<S>(factories: KeyValueDifferFactory[]):
StaticProvider {\n return {\n provide: KeyValueDifferFactory,\n useFactory: (parent: KeyValueDifferFactory) => {\n
// if parent is null, it means that we are in the root injector and we have just overridden\n
// the default injection mechanism for KeyValueDifferFactory, in such a case just assume\n //
`defaultKeyValueDifferFactory`.\n return KeyValueDifferFactory.create(factories, parent ||

```

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defaultKeyValueDiffersFactory());\n    },\n    // Dependency technically isn't optional, but we can provide a better
error message this way.\n    deps: [[KeyValueDiffers, new SkipSelf(), new Optional()]]\n    });\n\n    find(kv:
any): KeyValueDifferFactory {\n    const factory = this.factories.find(f => f.supports(kv));\n    if (factory) {\n
return factory;\n    }\n    throw new RuntimeError(\n
RuntimeErrorCode.NO_SUPPORTING_DIFFER_FACTORY,\n    ngDevMode && `Cannot find a differ
supporting object '${kv}'`);\n    }\n\n    ,"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {DefaultIterableDifferFactory}
from './differs/default_iterable_differ';\nimport {DefaultKeyValueDifferFactory} from
 './differs/default_keyvalue_differ';\nimport {IterableDifferFactory, IterableDiffers} from
 './differs/iterable_differs';\nimport {KeyValueDifferFactory, KeyValueDiffers} from
 './differs/keyvalue_differs';\n\nexport {SimpleChange, SimpleChanges} from './interface/simple_change';\nexport
{devModeEqual} from './util/comparison';\nexport {ChangeDetectorRef} from './change_detector_ref';\nexport
{ChangeDetectionStrategy, ChangeDetectorStatus, isDefaultChangeDetectionStrategy} from './constants';\nexport
{DefaultIterableDiffer, DefaultIterableDifferFactory} from './differs/default_iterable_differ';\nexport
{DefaultKeyValueDifferFactory} from './differs/default_keyvalue_differ';\nexport {IterableChangeRecord,
IterableChanges, IterableDiffer, IterableDifferFactory, IterableDiffers, NgIterable, TrackByFunction} from
 './differs/iterable_differs';\nexport {KeyValueChangeRecord, KeyValueChanges, KeyValueDiffer,
KeyValueDifferFactory, KeyValueDiffers} from './differs/keyvalue_differs';\nexport {PipeTransform} from
 './pipe_transform';\n\n\n/**\n * Structural diffing for `Object`s and `Map`s.\n */\nconst keyValDiff:
KeyValueDifferFactory[] = [new DefaultKeyValueDifferFactory()];\n\n/**\n * Structural diffing for `Iterable` types
such as `Array`s.\n */\nconst iterableDiff: IterableDifferFactory[] = [new DefaultIterableDifferFactory()];\n\nexport
const defaultIterableDiffers = new IterableDiffers(iterableDiff);\n\nexport const defaultKeyValueDiffers = new
KeyValueDiffers(keyValDiff);\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n * @module\n * @description\n * Change detection enables data binding in
Angular.\n */\nexport {ChangeDetectionStrategy, ChangeDetectorRef, DefaultIterableDiffer,
IterableChangeRecord, IterableChanges,
IterableDiffer, IterableDifferFactory, IterableDiffers, KeyValueChangeRecord, KeyValueChanges,
KeyValueDiffer, KeyValueDifferFactory, KeyValueDiffers, NgIterable, PipeTransform, SimpleChange,
SimpleChanges, TrackByFunction} from './change_detection/change_detection';\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {createPlatformFactory, PlatformRef} from
 './application_ref';\nimport {StaticProvider} from './di';\n\n/**\n * This platform has to be included in any other
platform\n */\n * @publicApi\n */\nexport const platformCore: (extraProviders?: StaticProvider[]|undefined) =>
PlatformRef =\n    createPlatformFactory(null, 'core', []);\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file
at https://angular.io/license\n */\n\nimport {ApplicationRef} from './application_ref';\nimport {NgModule} from
 './metadata';\n\n/**\n * Re-exported by `BrowserModule`, which is included automatically in the root\n *
`AppModule` when you create a new app with the CLI `new` command. Eagerly injects\n * `ApplicationRef` to
instantiate it.\n */\n * @publicApi\n */\n@NgModule()\nexport class ApplicationModule {\n // Inject
ApplicationRef to make it eager...\n    constructor(appRef: ApplicationRef) {\n    }\n\n    ,"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * Coerces a value (typically a string) to a
boolean.\n */\nexport function coerceToBoolean(value: unknown): boolean {\n    return typeof value === 'boolean' ?
value : (value !== null && value !== 'false');\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n */\n

```

```

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* found in the LICENSE file at
https://angular.io/license
export {ALLOW_MULTIPLE_PLATFORMS as
ALLOW_MULTIPLE_PLATFORMS, internalCreateApplication as internalCreateApplication} from
'./application_ref';
export {APP_ID_RANDOM_PROVIDER as APP_ID_RANDOM_PROVIDER} from
'./application_tokens';
export {defaultIterableDiffers as defaultIterableDiffers, defaultKeyValueDiffers as
defaultKeyValueDiffers} from './change_detection/change_detection';
export {ChangeDetectorStatus as
ChangeDetectorStatus, isDefaultChangeDetectionStrategy as isDefaultChangeDetectionStrategy} from
'./change_detection/constants';
export {Console as Console} from './console';
export {getDebugNodeR2 as
getDebugNodeR2} from './debug/debug_node';
export {setCurrentInjector as setCurrentInjector} from
'./di/injector_compatibility';
export {getInjectableDef as getInjectableDef, InjectableDeclaration, InjectorDef} from
'./di/interface/defs';
export
{INJECTOR_SCOPE as INJECTOR_SCOPE} from './di/scope';
export {formatRuntimeError as
formatRuntimeError, RuntimeError as RuntimeError} from './errors';
export {CurrencyIndex as CurrencyIndex,
ExtraLocaleDataIndex as ExtraLocaleDataIndex, findLocaleData as findLocaleData,
getLocaleCurrencyCode as getLocaleCurrencyCode, getLocalePluralCase as getLocalePluralCase,
LocaleDataIndex as LocaleDataIndex,
registerLocaleData as registerLocaleData, unregisterAllLocaleData as unregisterLocaleData} from
'./i18n/locale_data_api';
export {DEFAULT_LOCALE_ID as DEFAULT_LOCALE_ID} from
'./i18n/localization';
export {ComponentFactory as ComponentFactory} from './linker/component_factory';
export
{clearResolutionOfComponentResourcesQueue as clearResolutionOfComponentResourcesQueue,
resolveComponentResources as resolveComponentResources} from './metadata/resource_loading';
export
{ReflectionCapabilities as ReflectionCapabilities} from './reflection/reflection_capabilities';
export
{allowSanitizationBypassAndThrow as allowSanitizationBypassAndThrow, BypassType as BypassType,
getSanitizationBypassType as getSanitizationBypassType, SafeHtml as SafeHtml, SafeResourceUrl as
SafeResourceUrl, SafeScript as SafeScript, SafeStyle as SafeStyle, SafeUrl as SafeUrl, SafeValue as SafeValue,
unwrapSafeValue as unwrapSafeValue} from './sanitization/bypass';
export {_sanitizeHtml as _sanitizeHtml} from
'./sanitization/html_sanitizer';
export {_sanitizeUrl as _sanitizeUrl} from './sanitization/url_sanitizer';
export
{TESTABILITY as TESTABILITY, TESTABILITY_GETTER as TESTABILITY_GETTER} from
'./testability/testability';
export {coerceToBoolean as coerceToBoolean} from './util/coercion';
export
{devModeEqual as devModeEqual} from './util/comparison';
export {makeDecorator as makeDecorator} from
'./util/decorators';
export {global as global} from './util/global';
export {isListLikeIterable as isListLikeIterable}
from './util/iterable';
export
{isObservable as isObservable, isPromise as isPromise, isSubscribable as isSubscribable} from './util/lang';
export
{stringify as stringify} from './util/stringify';
export {NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR as
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR} from './view/provider_flags';
// TODO(alxhub):
allows tests to compile, can be removed when tests have been updated.
export const ivyEnabled = true;
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-
 * style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import {FactoryTarget,
getCompilerFacade, JitCompilerUsage, R3DeclareComponentFacade, R3DeclareDirectiveFacade,
R3DeclareFactoryFacade, R3DeclareInjectableFacade, R3DeclareInjectorFacade, R3DeclareNgModuleFacade,
R3DeclarePipeFacade} from './../compiler/compiler_facade';
import {Type} from './../interface/type';
import
{setClassMetadata} from './../metadata';
import
{angularCoreEnv} from './environment';
/**
 * Compiles a partial directive declaration object into a full
directive definition object.
 * @codeGenApi
 */
export function ngDeclareDirective(decl:
R3DeclareDirectiveFacade): unknown {
  const compiler = getCompilerFacade({usage:
JitCompilerUsage.PartialDeclaration, kind: 'directive', type: decl.type});
  return
  compiler.compileDirectiveDeclaration(angularCoreEnv, `ng:///${decl.type.name}/fac.js`, decl);
}
/**
 * Evaluates the class metadata declaration.
 * @codeGenApi
 */
export function
ngDeclareClassMetadata(decl: {type: Type<any>; decorators: any[]; ctorParameters?: () => any[]};

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propDecorators?: {[field: string]: any};\n}): void {\n  setClassMetadata(\n    decl.type, decl.decorators,\n    decl.ctorParameters ?? null, decl.propDecorators ?? null);\n}\n\n/**\n * Compiles a partial component declaration\n object into a full component definition object.\n *\n * @codeGenApi\n */\nexport function ngDeclareComponent(decl: R3DeclareComponentFacade): unknown {\n  const compiler =\n    getCompilerFacade(\n      {usage: JitCompilerUsage.PartialDeclaration, kind: 'component', type: decl.type});\n  return compiler.compileComponentDeclaration(\n    angularCoreEnv, `ng://${decl.type.name}/cmp.js`,\n    decl);\n}\n\n/**\n * Compiles a partial pipe declaration object into a full pipe definition object.\n *\n * @codeGenApi\n */\nexport function ngDeclareFactory(decl: R3DeclareFactoryFacade): unknown {\n  const\n    compiler = getCompilerFacade({\n      usage: JitCompilerUsage.PartialDeclaration,\n      kind:\n        getFactoryKind(decl.target),\n      type: decl.type\n    });\n  return compiler.compileFactoryDeclaration(\n    angularCoreEnv, `ng://${decl.type.name}/fac.js`, decl);\n}\n\nfunction getFactoryKind(target: FactoryTarget) {\n  switch (target) {\n    case FactoryTarget.Directive:\n      return 'directive';\n    case FactoryTarget.Component:\n      return 'component';\n    case\n      FactoryTarget.Injectable:\n      return 'injectable';\n    case FactoryTarget.Pipe:\n      return 'pipe';\n    case\n      FactoryTarget.NgModule:\n      return 'NgModule';\n  }\n}\n\n/**\n * Compiles a partial injectable declaration\n object into a full injectable definition object.\n *\n * @codeGenApi\n */\nexport function ngDeclareInjectable(decl:\n  R3DeclareInjectableFacade): unknown {\n  const compiler = getCompilerFacade(\n    {usage:\n      JitCompilerUsage.PartialDeclaration, kind: 'injectable', type: decl.type});\n  return\n    compiler.compileInjectableDeclaration(\n      angularCoreEnv, `ng://${decl.type.name}/prov.js`, decl);\n}\n\n/**\n * These enums are used in the partial factory declaration calls.\n */\nexport {FactoryTarget} from\n  './../compiler/compiler_facade';\n\n/**\n * Compiles a partial injector declaration object into a full injector\n definition object.\n *\n * @codeGenApi\n */\nexport function ngDeclareInjector(decl: R3DeclareInjectorFacade):\n  unknown {\n  const compiler = getCompilerFacade(\n    {\n      usage: JitCompilerUsage.PartialDeclaration, kind: 'NgModule', type: decl.type\n    });\n  return\n    compiler.compileInjectorDeclaration(\n      angularCoreEnv, `ng://${decl.type.name}/inj.js`, decl);\n}\n\n/**\n * Compiles a partial NgModule declaration object into a full NgModule definition object.\n *\n * @codeGenApi\n */\nexport function ngDeclareNgModule(decl: R3DeclareNgModuleFacade): unknown {\n  const compiler =\n    getCompilerFacade(\n      {usage: JitCompilerUsage.PartialDeclaration, kind: 'NgModule', type: decl.type});\n  return compiler.compileNgModuleDeclaration(\n    angularCoreEnv, `ng://${decl.type.name}/mod.js`,\n    decl);\n}\n\n/**\n * Compiles a partial pipe declaration object into a full pipe definition object.\n *\n * @codeGenApi\n */\nexport function ngDeclarePipe(decl: R3DeclarePipeFacade): unknown {\n  const compiler =\n    getCompilerFacade(\n      {usage: JitCompilerUsage.PartialDeclaration, kind: 'pipe', type: decl.type});\n  return\n    compiler.compilePipeDeclaration(angularCoreEnv,\n      `ng://${decl.type.name}/pipe.js`, decl);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n */\n\n// clang-format off\n// we reexport these symbols just so that they are retained\n during the dead code elimination\n// performed by rollup while it's creating fesm files.\n// no code actually\n imports these symbols from the @angular/core entry point\nexport {\n  compileNgModuleFactory as\n    compileNgModuleFactory,\n  isBoundToModule as isBoundToModule\n} from './application_ref';\nexport {\n  injectChangeDetectorRef as injectChangeDetectorRef,\n} from './change_detection/change_detector_ref';\nexport {\n  getDebugNode as getDebugNode,\n} from './debug/debug_node';\nexport {\n  NG_INJ_DEF as\n    NG_INJ_DEF,\n  NG_PROV_DEF as\n    NG_PROV_DEF,\n  isInjectable as isInjectable,\n} from\n  './di/interface/defs';\nexport\n  {createInjector as createInjector} from './di/create_injector';\nexport {\n  registerNgModuleType as\n    registerNgModuleType,\n  setAllowDuplicateNgModuleIdsForTest as\n    setAllowDuplicateNgModuleIdsForTest,\n} from './linker/ng_module_registration';\nexport {\n  NgModuleDef as\n    NgModuleDef,\n  NgModuleTransitiveScopes\n    as NgModuleTransitiveScopes,\n} from './metadata/ng_module_def';\nexport {\n  getLContext as\n    getLContext\n} from './render3/context_discovery';\nexport {\n  NG_COMP_DEF as\n    NG_COMP_DEF,\n  NG_DIR_DEF as

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NG_DIR_DEF,\n NG_ELEMENT_ID as NG_ELEMENT_ID,\n NG_MOD_DEF as NG_MOD_DEF,\n
NG_PIPE_DEF as NG_PIPE_DEF,\n} from './render3/fields';\nexport {\n AttributeMarker as AttributeMarker,\n ComponentDef as ComponentDef,\n ComponentFactory as Render3ComponentFactory,\n ComponentRef as
Render3ComponentRef,\n ComponentType as ComponentType,\n CssSelectorList as CssSelectorList,\n
detectChanges as detectChanges,\n DirectiveDef as DirectiveDef,\n DirectiveType
as DirectiveType,\n getDirectives as getDirectives,\n getHostElement as getHostElement,\n
LifecycleHooksFeature as LifecycleHooksFeature,\n NgModuleFactory as NgModuleFactory,\n NgModuleRef as
Render3NgModuleRef,\n NgModuleType as NgModuleType,\n NO_CHANGE as NO_CHANGE,\n PipeDef as
PipeDef,\n RenderFlags as RenderFlags,\n setClassMetadata as setClassMetadata,\n setLocaleId as setLocaleId,\n
store as store,\n advance,\n attribute,\n attributeInterpolate1,\n attributeInterpolate2,\n attributeInterpolate3,\n
attributeInterpolate4,\n attributeInterpolate5,\n attributeInterpolate6,\n attributeInterpolate7,\n
attributeInterpolate8,\n attributeInterpolateV,\n classMap,\n classMapInterpolate1,\n classMapInterpolate2,\n
classMapInterpolate3,\n classMapInterpolate4,\n classMapInterpolate5,\n classMapInterpolate6,\n
classMapInterpolate7,\n classMapInterpolate8,\n classMapInterpolateV,\n classProp,\n
ComponentDeclaration,\n contentQuery,\n CopyDefinitionFeature,\n defineComponent,\n defineDirective,\n
defineNgModule,\n definePipe,\n DirectiveDeclaration,\n directiveInject,\n disableBindings,\n element,\n
elementContainer,\n elementContainerEnd,\n elementContainerStart,\n elementEnd,\n elementStart,\n
enableBindings,\n FactoryDeclaration,\n getCurrentView,\n getInheritedFactory,\n hostProperty,\n i18n,\n
i18nApply,\n i18nAttributes,\n i18nEnd,\n i18nExp,\n i18nPostprocess,\n i18nStart,\n
InheritDefinitionFeature,\n injectAttribute,\n InjectorDeclaration,\n invalidFactory,\n listener,\n loadQuery,\n
namespaceHTML,\n namespaceMathML,\n namespaceSVG,\n nextContext,\n NgModuleDeclaration,\n
NgOnChangesFeature,\n pipe,\n pipeBind1,\n pipeBind2,\n pipeBind3,\n pipeBind4,\n pipeBindV,\n
PipeDeclaration,\n projection,\n projectionDef,\n property,\n
propertyInterpolate,\n propertyInterpolate1,\n propertyInterpolate2,\n propertyInterpolate3,\n
propertyInterpolate4,\n propertyInterpolate5,\n propertyInterpolate6,\n propertyInterpolate7,\n
propertyInterpolate8,\n propertyInterpolateV,\n ProvidersFeature,\n pureFunction0,\n pureFunction1,\n
pureFunction2,\n pureFunction3,\n pureFunction4,\n pureFunction5,\n pureFunction6,\n pureFunction7,\n
pureFunction8,\n pureFunctionV,\n queryRefresh,\n reference,\n resetView,\n resolveBody,\n
resolveDocument,\n resolveWindow,\n restoreView,\n\n setComponentScope,\n setNgModuleScope,\n
StandaloneFeature,\n styleMap,\n styleMapInterpolate1,\n styleMapInterpolate2,\n styleMapInterpolate3,\n
styleMapInterpolate4,\n styleMapInterpolate5,\n styleMapInterpolate6,\n styleMapInterpolate7,\n
styleMapInterpolate8,\n styleMapInterpolateV,\n styleProp,\n stylePropInterpolate1,\n
stylePropInterpolate2,\n stylePropInterpolate3,\n stylePropInterpolate4,\n stylePropInterpolate5,\n
stylePropInterpolate6,\n stylePropInterpolate7,\n stylePropInterpolate8,\n stylePropInterpolateV,\n
syntheticHostListener,\n syntheticHostProperty,\n template,\n templateRefExtractor,\n text,\n textInterpolate,\n
textInterpolate1,\n textInterpolate2,\n textInterpolate3,\n textInterpolate4,\n textInterpolate5,\n
textInterpolate6,\n textInterpolate7,\n textInterpolate8,\n textInterpolateV,\n viewQuery,\n
getUnknownElementStrictMode,\n setUnknownElementStrictMode,\n getUnknownPropertyStrictMode,\n
setUnknownPropertyStrictMode\n} from
 './render3/index';\nexport {\n LContext as LContext,\n} from './render3/interfaces/context';\nexport {\n
setDocument as setDocument\n} from './render3/interfaces/document';\nexport {\n compileComponent as
compileComponent,\n compileDirective as compileDirective,\n}
from './render3/jit/directive';\nexport {\n resetJitOptions as resetJitOptions,\n} from
 './render3/jit/jit_options';\nexport {\n compileNgModule as compileNgModule,\n compileNgModuleDefs as
compileNgModuleDefs,\n flushModuleScopingQueueAsMuchAsPossible as
flushModuleScopingQueueAsMuchAsPossible,\n patchComponentDefWithScope as
patchComponentDefWithScope,\n resetCompiledComponents as resetCompiledComponents,\n
transitiveScopesFor as transitiveScopesFor,\n} from './render3/jit/module';\nexport {\n FactoryTarget as
FactoryTarget,\n ngDeclareClassMetadata,\n ngDeclareComponent,\n ngDeclareDirective,\n ngDeclareFactory,\n}

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ngDeclareInjectable,\n ngDeclareInjector,\n ngDeclareNgModule,\n ngDeclarePipe,\n} from
'./render3/jit/partial';\nexport {\n compilePipe as compilePipe,\n} from './render3/jit/pipe';\nexport { isStandalone as
isStandalone } from './render3/definition';\nexport { Profiler as Profiler, ProfilerEvent as ProfilerEvent } from
'./render3/profiler';\nexport
{\n publishDefaultGlobalUtils as publishDefaultGlobalUtils,\n\n publishGlobalUtil as publishGlobalUtil } from
'./render3/util/global_utils';\nexport { ViewRef as ViewRef } from './render3/view_ref';\nexport {\n
bypassSanitizationTrustHtml as bypassSanitizationTrustHtml,\n\n bypassSanitizationTrustResourceUrl as
bypassSanitizationTrustResourceUrl,\n\n bypassSanitizationTrustScript as bypassSanitizationTrustScript,\n\n
bypassSanitizationTrustStyle as bypassSanitizationTrustStyle,\n\n bypassSanitizationTrustUrl as
bypassSanitizationTrustUrl,\n} from './sanitization/bypass';\nexport {\n sanitizeHtml,\n\n sanitizeResourceUrl,\n\n
sanitizeScript,\n\n sanitizeStyle,\n\n sanitizeUrl,\n\n sanitizeUrlOrResourceUrl,\n\n trustConstantHtml,\n\n
trustConstantResourceUrl,\n} from './sanitization/sanitization';\nexport {\n validateIframeAttribute,\n} from
'./sanitization/iframe_attrs_validation';\nexport {\n noSideEffects as noSideEffects,\n} from './util/closure';\n\n//
clang-format on\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport { Injector } from './di/injector';\nimport { EnvironmentInjector, getNullInjector } from
'./di/r3_injector';\nimport { Type } from './interface/type';\nimport { ComponentRef } from
'./linker/component_factory';\nimport { ComponentFactory } from './component_ref';\nimport { GetComponentDef }
from './definition';\nimport { assertComponentDef } from './errors';\n\n/**\n * Creates a `ComponentRef` instance
based on provided component type and a set of options.\n * \n * @usageNotes\n * \n * The example below
demonstrates how the `createComponent` function can be used\n * to create an instance of a ComponentRef
dynamically and attach it to an ApplicationRef,\n * so that it gets included into change detection cycles.\n * \n *
Note: the example uses standalone
components, but the function can also be used for\n * non-standalone components (declared in an NgModule) as
well.\n * \n * ```typescript\n * @Component({\n *   standalone: true,\n *   template: `Hello {{ name }}`!\n * })\n *
class HelloComponent {\n *   name = 'Angular';\n * }\n * \n * @Component({\n *   standalone: true,\n *   template:
`<div id="hello-component-host"></div>\n * `)\n * class RootComponent {\n *   // Bootstrap an application.\n *
const applicationRef = await bootstrapApplication(RootComponent);\n *   // Locate a DOM node that would be
used as a host.\n *   const host = document.getElementById('hello-component-host');\n *   // Get an
`EnvironmentInjector` instance from the `ApplicationRef`.\n *   const environmentInjector =
applicationRef.injector;\n *   // We can now create a `ComponentRef` instance.\n *   const componentRef =
createComponent(HelloComponent, {host, environmentInjector});\n *   // Last step is to register the newly
created ref using the `ApplicationRef`
instance\n * // to include the component view into change detection cycles.\n *
applicationRef.attachView(componentRef.hostView);\n * ```\n * \n * @param component Component class
reference.\n * @param options Set of options to use:\n * * `environmentInjector`: An `EnvironmentInjector`
instance to be used for the component, see\n * additional info about it at https://angular.io/guide/standalone-
components#environment-injectors.\n * * `hostElement` (optional): A DOM node that should act as a host node for
the component. If not\n * provided, Angular creates one based on the tag name used in the component selector (and
falls\n * back to using `div` if selector doesn't have tag name info).\n * * `elementInjector` (optional): An
`ElementInjector` instance, see additional info about it at\n * https://angular.io/guide/hierarchical-dependency-
injection#elementinjector.\n * * `projectableNodes` (optional): A list of DOM nodes that should be projected
through\n *
[<ng-content>](api/core/ng-content) of the new component instance.\n * @returns ComponentRef instance that
represents a given Component.\n * \n * @publicApi\n */\nexport function createComponent<C>(component:
Type<C>, options: {\n environmentInjector: EnvironmentInjector,\n\n hostElement?: Element,\n\n elementInjector?:
Injector,\n\n projectableNodes?: Node[][],\n}): ComponentRef<C> {\n\n ngDevMode &&\n\n assertComponentDef(component);\n\n const componentDef = GetComponentDef(component)!;\n\n const

```



```

DEFAULT_CURRENCY_CODE, MissingTranslationStrategy} from './i18n/tokens';\nextport {ApplicationModule}
from './application_module';\nextport {AbstractType, Type} from './interface/type';\nextport {EventEmitter} from
 './event_emitter';\nextport {ErrorHandler} from './error_handler';\nextport * from './core_private_export';\nextport *
from './core_render3_private_export';\nextport {SecurityContext} from './sanitization/security';\nextport {Sanitizer}
from './sanitization/sanitizer';\nextport {createNgModule, createNgModuleRef, createEnvironmentInjector} from
 './render3/ng_module_ref';\nextport {createComponent, reflectComponentType, ComponentMirror} from
 './render3/component';\n\nimport {global}

```

```

from './util/global';\nif (typeof ngDevMode !== 'undefined' && ngDevMode) {\n // This helper is to give a
reasonable error message to people upgrading to v9 that have not yet\n // installed `@angular/localize` in their
app.\n // tslint:disable-next-line: no-toplevel-property-access\n global.$localize = global.$localize || function() {\n
throw new Error(\n    'It looks like your application or one of its dependencies is using i18n.\n' +\n    'Angular 9
introduced a global `$localize()` function that needs to be loaded.\n' +\n    'Please run `ng add @angular/localize`
from the Angular CLI.\n' +\n    '(For non-CLI projects, add `import `@angular/localize/init`;` to your
`polyfills.ts` file.\n' +\n    'For server-side rendering applications add the import to your `main.server.ts` file.);
};\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found

```

```

in the LICENSE file at https://angular.io/license\n *^/\n/**\n * @module\n * @description\n * Entry point for all
public APIs of this package.\n *^/\nextport * from './src/core';\n\n// This file only reexports content of the `src` folder.
Keep it that way.\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*^/\n/* This file is not used to build this module. It is only used during editing\n * by the TypeScript language
service and during build for verification. `ngc`\n * replaces this file with production index.ts when it rewrites private
symbol\n * names.\n *^/\nextport * from './public_api';\n"/**\n * Generated bundle index. Do not edit.\n
*^/\nextport * from

```

```

 './index';\n"], "names": ["ViewEncapsulation", "global", "getPipeDef", "unusedValueExportToPlacateAjd", "INJECTO
R", "getNamespace", "unusedValueToPlacateAjd", "unused1", "unused2", "unused3", "unused4", "unused5", "policy", "g
etPolicy", "inject", "USE_VALUE", "NULL_INJECTOR", "ComponentRef", "ComponentFactory", "getComponent", "
ComponentFactoryResolver", "ViewRef", "AbstractComponentFactoryResolver", "AbstractComponentFactory", "Abs
tractComponentRef", "LOCALE_ID", "NgModuleRef", "NgModuleFactory", "viewEngine_NgModuleRef", "viewEngi
ne_ComponentFactoryResolver", "viewEngine_NgModuleFactory", "defineInjectable", "getDirectiveMetadata", "getD
ebugNode", "R3_ViewRef", "R3ComponentFactory", "R3ViewRef", "ViewEngine_TemplateRef", "ViewEngine_Elem
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```



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No license file was found, but licenses were detected in source scan.

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Found in path(s):

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*/  
 * @license  
 * Copyright Google LLC All Rights Reserved.  
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 * Wraps a test function in an asynchronous test zone. The test will automatically complete when all asynchronous calls within this zone are done. Can be used to wrap an {@link inject} call.  
 * Example:  
 * ```  
 * it('...', waitForAsync(inject([AClass], (object) => {  
 *   object.doSomething.then(() => {  
 *     expect(...);  
 *   }  
 * }));  
 * @publicApi  
 * ^nexport function waitForAsync(fn: Function): (done: any) => any {  
 *   const _Zone: any = typeof Zone !== 'undefined' ? Zone : null;  
 *   if (!_Zone) {  
 *     return function() {  
 *       return Promise.reject('Zone is needed for the waitForAsync() test helper but could not be found. ' +  
 *       'Please make sure that your environment includes zone.js');  
 *     };  
 *   }  
 *   const asyncTest = _Zone && _Zone[_Zone.__symbol__('asyncTest')];  
 *   if (typeof asyncTest === 'function') {  
 *     return asyncTest(fn);  
 *   }  
 *   return function() {  
 *     return Promise.reject('zone-testing.js is needed for the async() test helper but could not be found. ' +  
 *     'Please make sure that your environment includes zone.js/testing');  
 *   };  
 * }  
 * @deprecated use `waitForAsync`, (expected removal in v12)  
 * @see {@link waitForAsync}  
 * @publicApi  
 * ^nexport function async(fn: Function): (done: any) => any {  
 *   return waitForAsync(fn);  
 * }  
 * @license  
 * Copyright Google LLC All Rights Reserved.  
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license  
 * ^nimport {ChangeDetectorRef, ComponentRef, DebugElement, ElementRef, getDebugNode, NgZone, RendererFactory2} from '@angular/core';  
 * ^n * Fixture for debugging and testing a component.  
 * ^n * @publicApi  
 * ^nexport class ComponentFixture<T> {  
 *   /**  
 *    * The DebugElement associated with the root element of this component.  
 *    * ^n debugElement: DebugElement;  
 *    * ^n * The instance of the root component class.  
 *    * ^n componentInstance: T;  
 *    * ^n * The native element at the root of the component.  
 *    * ^n nativeElement: any;  
 *    * ^n * The ElementRef for the element at the root of the component.  
 *    * ^n elementRef: ElementRef;  
 *    * ^n * The ChangeDetectorRef for the component.  
 *    * ^n changeDetectorRef: ChangeDetectorRef;  
 *    * ^n private _renderer: RendererFactory2|null|undefined;  
 *    * ^n private _isStable: boolean = true;  
 *    * ^n private _isDestroyed: boolean = false;  
 *    * ^n private _resolve: ((result: any) => void)|null = null;  
 *    * ^n private _promise: Promise<any>|null = null;  
 *    * ^n private _onUnstableSubscription: any /** TODO #9100 */ = null;  
 *    * ^n private _onStableSubscription: any /** TODO #9100 */ = null;  
 *    * ^n private _onMicrotaskEmptySubscription: any /** TODO #9100 */ = null;  
 *    * ^n private _onErrorSubscription: any /** TODO #9100 */ = null;  
 *    * ^n constructor(  
 *     public componentRef: ComponentRef<T>, public ngZone: NgZone|null, private _autoDetect: boolean) {  
 *       this.changeDetectorRef = componentRef.changeDetectorRef;  
 *       this.elementRef = componentRef.location;  
 *       this.debugElement = <DebugElement>getDebugNode(this.elementRef.nativeElement);  
 *       this.componentInstance = componentRef.instance;  
 *       this.nativeElement = this.elementRef.nativeElement;  
 *       this.componentRef = componentRef;  
 *       this.ngZone = ngZone;  
 *       if (ngZone) {  
 *         // Create subscriptions outside the NgZone so that the callbacks run outside  
 *         // of NgZone.  
 *         ngZone.runOutsideAngular(() => {  
 *           this._onUnstableSubscription = ngZone.onUnstable.subscribe({  
 *             next: () => {  
 *               this._isStable = false;  
 *             }  
 *           });  
 *           this._onMicrotaskEmptySubscription = ngZone.onMicrotaskEmpty.subscribe({  
 *             next: () => {  
 *               if (this._autoDetect) {  
 *                 // Do a change detection run with checkNoChanges set to true to check  
 *                 // there are no changes on the second run.  
 *                 this.detectChanges(true);  
 *               }  
 *             }  
 *           });  
 *           this._onStableSubscription = ngZone.onStable.subscribe({  
 *             next: () => {  
 *               this._isStable = true;  
 *               // Check whether there is a pending whenStable() completer to resolve.  
 *               if
```

```

(this._promise !== null) {\n          // If so check whether there are no pending macrotasks before resolving.\n          // Do this check in the next tick so that ngZone gets a chance to update the state of\n          // pending macrotasks.\n          scheduleMicroTask() => {\n            if (!ngZone.hasPendingMacrotasks) {\n              if (this._promise !== null) {\n                this._resolve!(true);\n                this._resolve = null;\n                this._promise = null;\n              }\n            }\n          });\n          this._onErrorSubscription = ngZone.onError.subscribe({\n            next: (error: any) => {\n              throw error;\n            }\n          });\n          private _tick(checkNoChanges: boolean) {\n            this.changeDetectorRef.detectChanges();\n            if (checkNoChanges) {\n              this.checkNoChanges();\n            }\n            /**\n             * Trigger a change detection cycle for the component.\n             */\n            detectChanges(checkNoChanges: boolean = true): void {\n              if (this.ngZone !== null) {\n                // Run the change detection inside the NgZone so that any async tasks as part of the change\n                // detection are captured by the zone and can be waited for in isStable.\n                this.ngZone.run(() => {\n                  this._tick(checkNoChanges);\n                });\n              } else {\n                // Running without zone. Just do the change detection.\n                this._tick(checkNoChanges);\n              }\n            }\n            /**\n             * Do a change detection run to make sure there were no changes.\n             */\n            checkNoChanges(): void {\n              this.changeDetectorRef.checkNoChanges();\n            }\n            /**\n             * Set whether the fixture should autodetect changes.\n             */\n            * Also runs detectChanges once so that any existing change is detected.\n            */\n            autoDetectChanges(autoDetect: boolean = true) {\n              if (this.ngZone === null) {\n                throw new Error('Cannot call autoDetectChanges when ComponentFixtureNoNgZone is set');\n              }\n              this._autoDetect = autoDetect;\n            }\n            detectChanges();\n          }\n          /**\n             * Return whether the fixture is currently stable or has async tasks that have not been completed\n             * yet.\n             */\n            isStable(): boolean {\n              return this._isStable && !this.ngZone!.hasPendingMacrotasks;\n            }\n            /**\n             * Get a promise that resolves when the fixture is stable.\n             */\n            * This can be used to resume testing after events have triggered asynchronous activity or\n            * asynchronous change detection.\n            */\n            whenStable(): Promise<any> {\n              if (this.isStable()) {\n                return Promise.resolve(false);\n              } else if (this._promise !== null) {\n                return this._promise;\n              } else {\n                this._promise = new Promise(res => {\n                  this._resolve = res;\n                });\n                return this._promise;\n              }\n            }\n            private _getRenderer() {\n              if (this._renderer === undefined) {\n                this._renderer = this.componentRef.injector.get(RendererFactory2, null);\n              }\n              return this._renderer as RendererFactory2 | null;\n            }\n            /**\n             * Get a promise that resolves when the ui state is stable following animations.\n             */\n            whenRenderingDone(): Promise<any> {\n              const renderer = this._getRenderer();\n              if (renderer && renderer.whenRenderingDone) {\n                return renderer.whenRenderingDone();\n              }\n              return this.whenStable();\n            }\n            /**\n             * Trigger component destruction.\n             */\n            destroy(): void {\n              if (!this._isDestroyed) {\n                this.componentRef.destroy();\n              }\n              if (this._onUnstableSubscription !== null) {\n                this._onUnstableSubscription.unsubscribe();\n                this._onUnstableSubscription = null;\n              }\n              if (this._onStableSubscription !== null) {\n                this._onStableSubscription.unsubscribe();\n                this._onStableSubscription = null;\n              }\n              if (this._onMicrotaskEmptySubscription !== null) {\n                this._onMicrotaskEmptySubscription.unsubscribe();\n                this._onMicrotaskEmptySubscription = null;\n              }\n              if (this._onErrorSubscription !== null) {\n                this._onErrorSubscription.unsubscribe();\n                this._onErrorSubscription = null;\n              }\n              this._isDestroyed = true;\n            }\n          }\n        }\n      }\n    }\n  }\n}\n\nfunction scheduleMicroTask(fn: Function) {\n  Zone.current.scheduleMicroTask('scheduleMicrotask', fn);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nconst _Zone: any = typeof Zone !== 'undefined' ? Zone : null;\nconst fakeAsyncTestModule = _Zone && _Zone[_Zone.__symbol__('fakeAsyncTest')];\nconst fakeAsyncTestModuleNotLoadedErrorMessage = `zone-testing.js is needed for the fakeAsync() test helper but could not be found. Please make sure that your environment includes zone.js/testing`;\n\n/**\n * Clears out the shared fake async zone for a test.\n * To be called in a global `beforeEach`.\n */\n * @publicApi\n */\nexport function resetFakeAsyncZone(): void {\n  if (fakeAsyncTestModule) {\n    return fakeAsyncTestModule.resetFakeAsyncZone();\n  }\n  throw new

```

```

Error(fakeAsyncTestModuleNotLoadedErrorMessage);\n}\n\n/**\n * Wraps a function to be executed in the
`fakeAsync` zone.\n * - Microtasks are manually executed by calling `flushMicrotasks()`. \n * - Timers are
synchronous; `tick()` simulates the asynchronous passage of time.\n *\n * If there are any pending timers at the end
of the function,
an exception is thrown.\n *\n * Can be used to wrap `inject()` calls.\n *\n * @param fn The function that you want
to wrap in the `fakeAsync` zone.\n *\n * @usageNotes\n * ### Example\n *\n * { @example
core/testing/ts/fake_async.ts region='basic'}\n *\n * @returns The function wrapped to be executed in the
`fakeAsync` zone.\n * Any arguments passed when calling this returned function will be passed through to the `fn`\n
* function in the parameters when it is called.\n *\n * @publicApi\n */\nexport function fakeAsync(fn: Function):
(...args: any[]) => any {\n if (fakeAsyncTestModule) {\n return fakeAsyncTestModule.fakeAsync(fn);\n }\n
throw new Error(fakeAsyncTestModuleNotLoadedErrorMessage);\n}\n\n/**\n * Simulates the asynchronous
passage of time for the timers in the `fakeAsync` zone.\n *\n * The microtasks queue is drained at the very start of
this function and after any timer callback\n * has been executed.\n *\n * @param millis The number of milliseconds
to advance the
virtual timer.\n * @param tickOptions The options to pass to the `tick()` function.\n *\n * @usageNotes\n *\n * The
`tick()` option is a flag called `processNewMacroTasksSynchronously`,\n * which determines whether or not to
invoke new macroTasks.\n *\n * If you provide a `tickOptions` object, but do not specify a\n *
`processNewMacroTasksSynchronously` property (`tick(100, {})`),\n * then
`processNewMacroTasksSynchronously` defaults to true.\n *\n * If you omit the `tickOptions` parameter
(`tick(100)`), then\n * `tickOptions` defaults to `{processNewMacroTasksSynchronously: true}`.\n *\n * ###
Example\n *\n * { @example core/testing/ts/fake_async.ts region='basic'}\n *\n * The following example includes a
nested timeout (new macroTask), and\n * the `tickOptions` parameter is allowed to default. In this case,\n *
`processNewMacroTasksSynchronously` defaults to true, and the nested\n * function is executed on each tick.\n *\n
* ```\n * it ('test with nested setTimeout', fakeAsync()
=> {\n * let nestedTimeoutInvoked = false;\n * function funcWithNestedTimeout() {\n * setTimeout(() => {\n
* nestedTimeoutInvoked = true;\n * });\n * });\n * setTimeout(funcWithNestedTimeout);\n * tick();\n *
expect(nestedTimeoutInvoked).toBe(true);\n * });\n * ```\n *\n * In the following case,
`processNewMacroTasksSynchronously` is explicitly\n * set to false, so the nested timeout function is not
invoked.\n *\n * ```\n * it ('test with nested setTimeout', fakeAsync() => {\n * let nestedTimeoutInvoked = false;\n
* function funcWithNestedTimeout() {\n * setTimeout(() => {\n * nestedTimeoutInvoked = true;\n * });\n *
});\n * setTimeout(funcWithNestedTimeout);\n * tick(0, {processNewMacroTasksSynchronously: false});\n *
expect(nestedTimeoutInvoked).toBe(false);\n * });\n * ```\n *\n * @publicApi\n */\nexport function tick(\n
millis: number = 0, tickOptions: {processNewMacroTasksSynchronously: boolean} = {\n
processNewMacroTasksSynchronously:
true\n }): void {\n if (fakeAsyncTestModule) {\n return fakeAsyncTestModule.tick(millis, tickOptions);\n }\n
throw new Error(fakeAsyncTestModuleNotLoadedErrorMessage);\n}\n\n/**\n * Flushes any pending microtasks
and simulates the asynchronous passage of time for the timers in\n * the `fakeAsync` zone by\n * draining the
macrotask queue until it is empty.\n *\n * @param maxTurns The maximum number of times the scheduler attempts
to clear its queue before\n * throwing an error.\n * @returns The simulated time elapsed, in milliseconds.\n *\n *
@publicApi\n */\nexport function flush(maxTurns?: number): number {\n if (fakeAsyncTestModule) {\n return
fakeAsyncTestModule.flush(maxTurns);\n }\n throw new
Error(fakeAsyncTestModuleNotLoadedErrorMessage);\n}\n\n/**\n * Discard all remaining periodic tasks.\n *\n *
@publicApi\n */\nexport function discardPeriodicTasks(): void {\n if (fakeAsyncTestModule) {\n return
fakeAsyncTestModule.discardPeriodicTasks();\n
}\n throw new Error(fakeAsyncTestModuleNotLoadedErrorMessage);\n}\n\n/**\n * Flush any pending
microtasks.\n *\n * @publicApi\n */\nexport function flushMicrotasks(): void {\n if (fakeAsyncTestModule) {\n
return fakeAsyncTestModule.flushMicrotasks();\n }\n throw new
Error(fakeAsyncTestModuleNotLoadedErrorMessage);\n}\n\n", /**\n * @license\n * Copyright Google LLC All

```

```

Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {InjectionToken, SchemaMetadata} from
'@angular/core';\n\n\n/** Whether test modules should be torn down by default. */\nexport const
TEARDOWN_TESTING_MODULE_ON_DESTROY_DEFAULT = true;\n\n\n/** Whether unknown elements in
templates should throw by default. */\nexport const THROW_ON_UNKNOWN_ELEMENTS_DEFAULT =
false;\n\n\n/** Whether unknown properties in templates should throw by default. */\nexport const
THROW_ON_UNKNOWN_PROPERTIES_DEFAULT = false;\n\n\n\n * An abstract class for inserting the root test component element in a platform independent way.\n *\n *
@publicApi\n *\nexport class TestComponentRenderer {\n  insertRootElement(rootElementId: string) {}\n
  removeAllRootElements() {} }\n\n\n\n * @publicApi\n *\nexport const ComponentFixtureAutoDetect =\n
new InjectionToken<boolean[]>('ComponentFixtureAutoDetect');\n\n\n\n * @publicApi\n *\nexport const
ComponentFixtureNoNgZone = new InjectionToken<boolean[]>('ComponentFixtureNoNgZone');\n\n\n\n\n *
@publicApi\n *\nexport interface TestModuleMetadata {\n  providers?: any[];\n  declarations?: any[];\n  imports?:
any[];\n  schemas?: Array<SchemaMetadata|any[]>;\n  teardown?: ModuleTeardownOptions;\n  /**\n * Whether
NG0304 runtime errors should be thrown when unknown elements are present in component's\n * template.
Defaults to `false`, where the error is simply logged. If set to `true`, the error is\n * thrown.\n * @see
https://angular.io/errors/NG8001 for
the description of the problem and how to fix it\n * \n errorOnUnknownElements?: boolean;\n /**\n * Whether
errors should be thrown when unknown properties are present in component's template.\n * Defaults to `false`,
where the error is simply logged.\n * If set to `true`, the error is thrown.\n * @see
https://angular.io/errors/NG8002 for the description of the error and how to fix it\n * \n
errorOnUnknownProperties?: boolean;\n }\n\n\n\n * @publicApi\n *\nexport interface TestEnvironmentOptions
{\n /**\n * Configures the test module teardown behavior in `TestBed`.\n * \n teardown?:
ModuleTeardownOptions;\n /**\n * Whether errors should be thrown when unknown elements are present in
component's template.\n * Defaults to `false`, where the error is simply logged.\n * If set to `true`, the error is
thrown.\n * @see https://angular.io/errors/NG8001 for the description of the error and how to fix it\n * \n
errorOnUnknownElements?: boolean;\n /**\n * Whether
errors should be thrown when unknown properties are present in component's template.\n * Defaults to `false`,
where the error is simply logged.\n * If set to `true`, the error is thrown.\n * @see
https://angular.io/errors/NG8002 for the description of the error and how to fix it\n * \n
errorOnUnknownProperties?: boolean;\n }\n\n\n\n * Configures the test module teardown behavior in `TestBed`.\n
\n * @publicApi\n *\nexport interface ModuleTeardownOptions {\n /** Whether the test module should be destroyed
after every test. Defaults to `true`. */\n  destroyAfterEach: boolean;\n\n /** Whether errors during test module
destruction should be re-thrown. Defaults to `true`. */\n  rethrowErrors?: boolean;\n }\n\n\n\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n\nimport {Type} from
'./interface/type';\n\nimport {Component}
from './directives';\n\n\n\n * Used to resolve resource URLs on `@Component` when used with JIT
compilation.\n *\n * Example:\n *\n * ``\n * @Component({\n *   selector: 'my-comp',\n *   templateUrl: 'my-
comp.html', // This requires asynchronous resolution\n * })\n * class MyComponent{\n *   }\n *\n * // Calling
`renderComponent` will fail because `renderComponent` is a synchronous process\n * // and `MyComponent`'s
`@Component.templateUrl` needs to be resolved asynchronously.\n *\n * // Calling `resolveComponentResources`\n
will resolve `@Component.templateUrl` into\n * // `@Component.template`, which allows `renderComponent` to
proceed in a synchronous manner.\n *\n * // Use browser's `fetch()` function as the default resource resolution
strategy.\n *\n * resolveComponentResources(fetch).then(() => {\n *   // After resolution all URLs have been converted
into `template` strings.\n *   renderComponent(MyComponent);\n * });\n *\n * ``\n *\n * NOTE: In AOT the
resolution happens during compilation,

```

and so there should be no need to call this method outside JIT mode.

```

    * @param resourceResolver a
    function which is responsible for returning a `Promise` to the contents of the resolved URL. Browser's `fetch()`
    method is a good default implementation.
    \n export function resolveComponentResources(\n resourceResolver:
    (url: string) => (Promise<string|{text(): Promise<string>}>)): Promise<void> {\n // Store all promises which are
    fetching the resources.\n const componentResolved: Promise<void>[] = [];\n // Cache so that we don't fetch the
    same resource more than once.\n const urlMap = new Map<string, Promise<string>>();\n function
    cachedResourceResolve(url: string): Promise<string> {\n let promise = urlMap.get(url);\n if (!promise) {\n
    const resp = resourceResolver(url);\n urlMap.set(url, promise = resp.then(unwrapResponse));\n }\n return
    promise;\n }\n componentResourceResolutionQueue.forEach((component: Component, type: Type<any>)
    => {\n const promises: Promise<void>[] = [];\n if (component.templateUrl) {\n
    promises.push(cachedResourceResolve(component.templateUrl).then((template) => {\n component.template =
    template;\n }));\n }\n const styleUrls = component.styleUrls;\n const styles = component.styles ||
    (component.styles = []);\n const styleOffset = component.styles.length;\n styleUrls &&
    styleUrls.forEach((styleUrl, index) => {\n styles.push(""); // pre-allocate array.\n
    promises.push(cachedResourceResolve(styleUrl).then((style) => {\n styles[styleOffset + index] = style;\n
    styleUrls.splice(styleUrls.indexOf(styleUrl), 1);\n if (styleUrls.length == 0) {\n component.styleUrls =
    undefined;\n }\n }));\n });\n const fullyResolved = Promise.all(promises).then(() =>
    componentDefResolved(type));\n componentResolved.push(fullyResolved);\n });\n
    clearResolutionOfComponentResourcesQueue();\n return Promise.all(componentResolved).then(()
    => undefined);\n }\n\nlet componentResourceResolutionQueue = new Map<Type<any>, Component>();\n\n// Track
    when existing cmp for a Type is waiting on resources.\nconst componentDefPendingResolution = new
    Set<Type<any>>();\n\nexport function maybeQueueResolutionOfComponentResources(type: Type<any>,
    metadata: Component) {\n if (componentNeedsResolution(metadata)) {\n
    componentResourceResolutionQueue.set(type, metadata);\n componentDefPendingResolution.add(type);\n
    }\n}\n\nexport function isComponentDefPendingResolution(type: Type<any>): boolean {\n return
    componentDefPendingResolution.has(type);\n}\n\nexport function componentNeedsResolution(component:
    Component): boolean {\n return !!(\n component.templateUrl && !component.hasOwnProperty('template')) ||\n
    component.styleUrls && component.styleUrls.length);\n}\n\nexport function
    clearResolutionOfComponentResourcesQueue(): Map<Type<any>, Component> {\n const old =
    componentResourceResolutionQueue;\n
    componentResourceResolutionQueue = new Map();\n return old;\n}\n\nexport function
    restoreComponentResolutionQueue(queue: Map<Type<any>, Component>): void {\n
    componentDefPendingResolution.clear();\n queue.forEach( (_, type) =>
    componentDefPendingResolution.add(type));\n componentResourceResolutionQueue = queue;\n}\n\nexport
    function isComponentResourceResolutionQueueEmpty() {\n return componentResourceResolutionQueue.size ===
    0;\n}\n\nfunction unwrapResponse(response: string|{text(): Promise<string>}): string|Promise<string> {\n return
    typeof response == 'string' ? response : response.text();\n}\n\nfunction componentDefResolved(type: Type<any>):
    void {\n componentDefPendingResolution.delete(type);\n}\n\n/**\n * @license\n * Copyright Google LLC All
    Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be found in the
    LICENSE file at https://angular.io/license\n *\n\n// TODO(jteplitz602): Load WorkerGlobalScope from
    lib.webworker.d.ts
    file #3492\n\ndeclare var WorkerGlobalScope: any /** TODO #9100 */;\n\n// CommonJS / Node have global context
    exposed as "global" variable.\n// We don't want to include the whole node.d.ts this this compilation unit so we'll
    just fake\n// the global "global" var for now.\ndeclare var global: any /** TODO #9100 */;\n\n// Always use
    __globalThis if available, which is the spec-defined global variable across all\n// environments, then fallback to
    __global first, because in Node tests both __global and\n// __window may be defined and __global should be
    __global in that case. Note: Typeof/Instanceof\n// checks are considered side-effects in Terser. We explicitly mark
    this as side-effect free:\n// https://github.com/terser/terser/issues/250.\nconst __global: any = (/* @__PURE__ */ (\n
  
```



```

() => (typeof globalThis !== 'undefined' && globalThis) || (typeof global !== 'undefined' && global) || (typeof
window !== 'undefined' && window) || (typeof self !== 'undefined' && self) || (typeof WorkerGlobalScope !== 'undefined' &&
WorkerGlobalScope) || self instanceof WorkerGlobalScope && self));\n\n/**\n *
Attention: whenever providing a new value, be sure to add an\n * entry into the corresponding `...externs.js` file,\n *
so that closure won't use that global for its purposes.\n */\nexport { _global as global};\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * A set of interfaces which are
shared between `@angular/core` and `@angular/compiler` to allow\n * for late binding of `@angular/compiler` for
JIT purposes.\n */\n * This file has two copies. Please ensure that they are in sync:\n * -
packages/compiler/src/compiler_facade_interface.ts (main)\n * -
packages/core/src/compiler/compiler_facade_interface.ts (replica)\n */\n * Please ensure that the two files are in
sync using this command:\n * ``\n
* cp packages/compiler/src/compiler_facade_interface.ts \\n *
packages/core/src/compiler/compiler_facade_interface.ts\n */\n\nexport interface ExportedCompilerFacade
{\n  compilerFacade: CompilerFacade;\n}\n\nexport interface CompilerFacade {\n  compilePipe(angularCoreEnv:
CoreEnvironment, sourceMapUrl: string, meta: R3PipeMetadataFacade):\n  any;\n  compilePipeDeclaration(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string, declaration: R3DeclarePipeFacade): any;\n
  compileInjectable(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3InjectableMetadataFacade): any;\n  compileInjectableDeclaration(\n  angularCoreEnv: CoreEnvironment,
sourceMapUrl: string, meta: R3DeclareInjectableFacade): any;\n  compileInjector(\n  angularCoreEnv:
CoreEnvironment, sourceMapUrl: string, meta: R3InjectorMetadataFacade): any;\n  compileInjectorDeclaration(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string,\n  declaration: R3DeclareInjectorFacade):
any;\n  compileNgModule(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3NgModuleMetadataFacade): any;\n  compileNgModuleDeclaration(\n  angularCoreEnv: CoreEnvironment,
sourceMapUrl: string,\n  declaration: R3DeclareNgModuleFacade): any;\n  compileDirective(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3DirectiveMetadataFacade): any;\n
  compileDirectiveDeclaration(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string,\n  declaration:
R3DeclareDirectiveFacade): any;\n  compileComponent(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl:
string, meta: R3ComponentMetadataFacade): any;\n  compileComponentDeclaration(\n  angularCoreEnv:
CoreEnvironment, sourceMapUrl: string,\n  declaration: R3DeclareComponentFacade): any;\n  compileFactory(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3FactoryDefMetadataFacade): any;\n
  compileFactoryDeclaration(\n  angularCoreEnv: CoreEnvironment,
sourceMapUrl: string, meta: R3DeclareFactoryFacade): any;\n\n  createParseSourceSpan(kind: string, typeName:
string, sourceUrl: string): ParseSourceSpan;\n\n  FactoryTarget: typeof FactoryTarget;\n // Note that we do not use
`new(): ResourceLoader` here because\n // the resource loader class is abstract and not constructable.\n
ResourceLoader: Function & { prototype: ResourceLoader};\n}\n\nexport interface CoreEnvironment {\n  [name:
string]: Function;\n}\n\nexport type ResourceLoader = {\n  get(url: string): Promise<string>|string;\n};\n\nexport
type StringMap = {\n  [key: string]: string;\n};\n\nexport type StringMapWithRename = {\n  [key: string]:
string|[string, string];\n};\n\nexport type Provider = unknown;\n\nexport type Type = Function;\n\nexport type
OpaqueValue = unknown;\n\nexport enum FactoryTarget {\n  Directive = 0,\n  Component = 1,\n  Injectable = 2,\n  Pipe = 3,\n  NgModule = 4,\n}\n\nexport interface R3DependencyMetadataFacade {\n  token: OpaqueValue;\n
attribute:
string|null;\n  host: boolean;\n  optional: boolean;\n  self: boolean;\n  skipSelf: boolean;\n}\n\nexport interface
R3DeclareDependencyMetadataFacade {\n  token: OpaqueValue;\n  attribute?: boolean;\n  host?: boolean;\n
optional?: boolean;\n  self?: boolean;\n  skipSelf?: boolean;\n}\n\nexport interface R3PipeMetadataFacade {\n
name: string;\n  type: Type;\n  pipeName: string;\n  pure: boolean;\n  isStandalone: boolean;\n}\n\nexport interface
R3InjectableMetadataFacade {\n  name: string;\n  type: Type;\n  typeArgumentCount: number;\n  providedIn?:
Type|'root'|'platform'|'any'|null;\n  useClass?: OpaqueValue;\n  useFactory?: OpaqueValue;\n  useExisting?:

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OpaqueValue;\n useValue?: OpaqueValue;\n deps?: R3DependencyMetadataFacade[];\n}\n\nexport interface
R3NgModuleMetadataFacade {\n type: Type;\n bootstrap: Function[];\n declarations: Function[];\n imports:
Function[];\n exports: Function[];\n schemas: {name: string}[]|null;\n id: string|null;\n}\n\nexport interface
R3InjectorMetadataFacade
{\n name: string;\n type: Type;\n providers: Provider[];\n imports: OpaqueValue[];\n}\n\nexport interface
R3DirectiveMetadataFacade {\n name: string;\n type: Type;\n typeSourceSpan: ParseSourceSpan;\n selector:
string|null;\n queries: R3QueryMetadataFacade[];\n host: {[key: string]: string};\n propMetadata: {[key: string]:
OpaqueValue[]};\n lifecycle: {usesOnChanges: boolean};\n inputs: string[];\n outputs: string[];\n
usesInheritance: boolean;\n exportAs: string[]|null;\n providers: Provider[]|null;\n viewQueries:
R3QueryMetadataFacade[];\n isStandalone: boolean;\n}\n\nexport interface R3ComponentMetadataFacade extends
R3DirectiveMetadataFacade {\n template: string;\n preserveWhitespaces: boolean;\n animations:
OpaqueValue[]|undefined;\n declarations: R3TemplateDependencyFacade[];\n styles: string[];\n encapsulation:
ViewEncapsulation;\n viewProviders: Provider[]|null;\n interpolation?: [string, string];\n changeDetection?:
ChangeDetectionStrategy;\n}\n\nexport
interface R3DeclareDirectiveFacade {\n selector?: string;\n type: Type;\n inputs?: {[classPropertyName: string]:
string|[string, string]};\n outputs?: {[classPropertyName: string]: string};\n host?: {\n attributes?: {[key: string]:
OpaqueValue};\n listeners?: {[key: string]: string};\n properties?: {[key: string]: string};\n classAttribute?:
string;\n styleAttribute?: string;\n }; \n queries?: R3DeclareQueryMetadataFacade[];\n viewQueries?:
R3DeclareQueryMetadataFacade[];\n providers?: OpaqueValue;\n exportAs?: string[];\n usesInheritance?:
boolean;\n usesOnChanges?: boolean;\n isStandalone?: boolean;\n}\n\nexport interface
R3DeclareComponentFacade extends R3DeclareDirectiveFacade {\n template: string;\n isInline?: boolean;\n
styles?: string[];\n\n // Post-standalone libraries use a unified dependencies field.\n dependencies?:
R3DeclareTemplateDependencyFacade[];\n\n // Pre-standalone libraries have separate component/directive/pipe
fields:\n components?: R3DeclareDirectiveDependencyFacade[];\n directives?:
R3DeclareDirectiveDependencyFacade[];\n pipes?: {[pipeName: string]: OpaqueValue|(( =>
OpaqueValue))};\n\n\n viewProviders?: OpaqueValue;\n animations?: OpaqueValue;\n changeDetection?:
ChangeDetectionStrategy;\n encapsulation?: ViewEncapsulation;\n interpolation?: [string, string];\n
preserveWhitespaces?: boolean;\n}\n\nexport type R3DeclareTemplateDependencyFacade = {\n kind:
string\n}&(R3DeclareDirectiveDependencyFacade|R3DeclarePipeDependencyFacade|\n
R3DeclareNgModuleDependencyFacade);\n\nexport interface R3DeclareDirectiveDependencyFacade {\n kind?:
'directive'|'component';\n selector: string;\n type: OpaqueValue|(( => OpaqueValue));\n inputs?: string[];\n
outputs?: string[];\n exportAs?: string[];\n}\n\nexport interface R3DeclarePipeDependencyFacade {\n kind?:
'pipe';\n name: string;\n type: OpaqueValue|(( => OpaqueValue));\n}\n\nexport interface
R3DeclareNgModuleDependencyFacade
{\n kind: 'ngmodule';\n type: OpaqueValue|(( => OpaqueValue));\n}\n\nexport enum
R3TemplateDependencyKind {\n Directive = 0,\n Pipe = 1,\n NgModule = 2,\n}\n\nexport interface
R3TemplateDependencyFacade {\n kind: R3TemplateDependencyKind;\n type: OpaqueValue|(( =>
OpaqueValue));\n}\n\nexport interface R3FactoryDefMetadataFacade {\n name: string;\n type: Type;\n
typeArgumentCount: number;\n deps: R3DependencyMetadataFacade[]|null;\n target: FactoryTarget;\n}\n\nexport
interface R3DeclareFactoryFacade {\n type: Type;\n deps: R3DeclareDependencyMetadataFacade[]|'invalid'|null;\n
target: FactoryTarget;\n}\n\nexport interface R3DeclareInjectableFacade {\n type: Type;\n providedIn?:
Type|'root'|'platform'|'any'|null;\n useClass?: OpaqueValue;\n useFactory?: OpaqueValue;\n useExisting?:
OpaqueValue;\n useValue?: OpaqueValue;\n deps?: R3DeclareDependencyMetadataFacade[];\n}\n\nexport enum
ViewEncapsulation {\n Emulated = 0,\n\n // Historically the 1 value was for `Native`
encapsulation which has been removed as of v11.\n None = 2,\n ShadowDom = 3\n}\n\nexport type
ChangeDetectionStrategy = number;\n\nexport interface R3QueryMetadataFacade {\n propertyName: string;\n
first: boolean;\n predicate: OpaqueValue|string[];\n descendants: boolean;\n emitDistinctChangesOnly: boolean;\n
read: OpaqueValue|null;\n static: boolean;\n}\n\nexport interface R3DeclareQueryMetadataFacade {\n

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propertyName: string;\n first?: boolean;\n predicate: OpaqueValue|string[];\n descendants?: boolean;\n read?:
OpaqueValue;\n static?: boolean;\n emitDistinctChangesOnly?: boolean;\n}\n\nexport interface
R3DeclareInjectorFacade {\n type: Type;\n imports?: OpaqueValue[];\n providers?: OpaqueValue[];\n}\n\nexport
interface R3DeclareNgModuleFacade {\n type: Type;\n bootstrap?: OpaqueValue[]((() => OpaqueValue[]));\n
declarations?: OpaqueValue[]((() => OpaqueValue[]);\n imports?: OpaqueValue[]((() => OpaqueValue[]);\n
exports?: OpaqueValue[]((() => OpaqueValue[]));\n
  schemas?: OpaqueValue[];\n id?: OpaqueValue;\n}\n\nexport interface R3DeclarePipeFacade {\n type: Type;\n
name: string;\n pure?: boolean;\n isStandalone?: boolean;\n}\n\nexport interface ParseSourceSpan {\n start: any;\n
end: any;\n details: any;\n fullStart: any;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {global} from './util/global';\nimport {CompilerFacade,
ExportedCompilerFacade, Type} from './compiler_facade_interface';\nexport * from
'./compiler_facade_interface';\n\nexport const enum JitCompilerUsage {\n Decorator,\n
PartialDeclaration,\n}\n\ninterface JitCompilerUsageRequest {\n usage: JitCompilerUsage;\n kind:
'directive'|'component'|'pipe'|'injectable'|'NgModule';\n type: Type;\n}\n\nexport function
getCompilerFacade(request: JitCompilerUsageRequest): CompilerFacade {\n const
  globalNg: ExportedCompilerFacade = global['ng'];\n  if (globalNg && globalNg.compilerFacade) {\n    return
    globalNg.compilerFacade;\n  }\n  if (typeof ngDevMode === 'undefined' || ngDevMode) {\n    // Log the type as
    an error so that a developer can easily navigate to the type from the\n    // console.\n    console.error(`JIT
    compilation failed for ${request.kind}`, request.type);\n    let message = `The ${request.kind} '${\n      request.\n      type.name}' needs to be compiled using the JIT compiler, but '@angular/compiler' is not available.\n\n`;
    if (request.usage === JitCompilerUsage.PartialDeclaration) {\n      message += `The ${request.kind} is part of a
    library that has been partially compiled.\n`;
      message +=\n        `However, the Angular Linker has not
      processed the library such that JIT compilation is used as fallback.\n`;
      message += "\n";
      message +=\n        `Ideally, the library is processed using the Angular Linker to become
      fully AOT compiled.\n`;
    } else {\n      message +=\n        `JIT compilation is discouraged for production use-
      cases! Consider using AOT mode instead.\n`;
    }
    message +=\n      `Alternatively, the JIT compiler should
    be loaded by bootstrapping using '@angular/platform-browser-dynamic' or '@angular/platform-server',\n`;
    message +=\n      `or manually provide the compiler with 'import "@angular/compiler";' before bootstrapping.`;\n
    throw new Error(message);\n  } else {\n    throw new Error('JIT compiler unavailable');\n  }\n}\n\n",/**\n *
  @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
  style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nexport function
getClosureSafeProperty<T>(objWithPropertyToExtract: T): string {\n for (let key in objWithPropertyToExtract)
  {\n    if (objWithPropertyToExtract[key] === getClosureSafeProperty as any) {\n      return key;\n    }\n  }\n  throw Error('Could not find renamed property on target object.);\n}\n\n",/**\n * Sets properties on a target
  object from a source object, but only if\n * the property doesn't already exist on the target object.\n * @param target
  The target to set properties on\n * @param source The source of the property keys and values to set\n */\nexport
function fillProperties(target: {[key: string]: string}, source: {[key: string]: string}) {\n for (const key in source) {\n
  if (source.hasOwnProperty(key) && !target.hasOwnProperty(key)) {\n    target[key] = source[key];\n  }\n}\n}\n\n",/**\n *
  @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
  governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n
export function stringify(token: any): string {\n if (typeof token === 'string') {\n return token;\n }\n\n if
(Array.isArray(token)) {\n return '[' + token.map(stringify).join('
  ') + ']';\n }\n\n if (token == null) {\n return " + token;\n }\n\n if (token.overriddenName) {\n return
`${token.overriddenName}`;\n }\n\n if (token.name) {\n return `${token.name}`;\n }\n\n const res =
token.toString();\n\n if (res == null) {\n return " + res;\n }\n\n const newLineIndex = res.indexOf("\n");\n return
newLineIndex === -1 ? res : res.substring(0, newLineIndex);\n}\n\n",/**\n * Concatenates two strings with separator,
  allocating new strings only when necessary.\n *\n * @param before before string.\n * @param separator separator

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string.\n * @param after after string.\n * @returns concatenated string.\n * ^\nexport function
concatStringsWithSpace(before: string|null, after: string|null): string {\n return (before == null || before === ") ?\n
(after === null ? " : after) :\n ((after == null || after === ") ? before : before + ' ' + after);\n}\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport {Type} from './interface/type';\nimport {getClosureSafeProperty} from './util/property';\nimport
{stringify} from './util/stringify';\n\n\n/**\n * An interface that a function passed into {@link forwardRef} has to
implement.\n *\n * @usageNotes\n * ### Example\n *\n * {@example core/di/ts/forward_ref/forward_ref_spec.ts
region='forward_ref_fn'}\n * @publicApi\n */\nexport interface ForwardRefFn {\n (): any;\n}\n\nconst
__forward_ref__ = getClosureSafeProperty({__forward_ref__: getClosureSafeProperty});\n\n\n/**\n * Allows to
refer to references which are not yet defined.\n *\n * For instance, `forwardRef` is used when the `token` which we
need to refer to for the purposes of\n * DI is declared, but not yet defined. It is also used when the `token` which we
use when creating\n * a query is not yet defined.\n *\n * @usageNotes\n * ### Example\n * {\n * @example
core/di/ts/forward_ref/forward_ref_spec.ts region='forward_ref'}\n * @publicApi\n */\nexport function
forwardRef(forwardRefFn: ForwardRefFn): Type<any> {\n (<any>forwardRefFn).__forward_ref__ =
forwardRef;\n (<any>forwardRefFn).toString = function() {\n return stringify(this());\n };
\n return
(<Type<any>><any>forwardRefFn);\n}\n\n\n/**\n * Lazily retrieves the reference value from a forwardRef.\n *\n * Acts as the identity function when given a non-forward-ref value.\n *\n * @usageNotes\n * ### Example\n *\n *
{@example core/di/ts/forward_ref/forward_ref_spec.ts region='resolve_forward_ref'}\n *\n * @see `forwardRef`\n
*\n * @publicApi\n */\nexport function resolveForwardRef<T>(type: T): T {\n return isForwardRef(type) ? type() :
type;\n}\n\n\n/**\n * Checks whether a function is wrapped by a `forwardRef`. *\nexport function isForwardRef(fn:
any): fn is() => any {\n return typeof fn === 'function' && fn.hasOwnProperty(__forward_ref__) &&\n
fn.__forward_ref__ === forwardRef;\n}\n"/**\n
*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {Type} from
'././interface/type';\nimport {getClosureSafeProperty} from '././util/property';\nimport {ClassProvider,
ConstructorProvider, ExistingProvider, FactoryProvider, StaticClassProvider, ValueProvider} from
'./provider';\n\n\n\n/**\n * Information about how a type or `InjectionToken` interfaces with the DI system.\n *\n *
At a minimum, this includes a `factory` which defines how to create the given type `T`, possibly\n * requesting
injection of other types if necessary.\n *\n * Optionally, a `providedIn` parameter specifies that the given type
belongs to a particular\n * `Injector`, `NgModule`, or a special scope (e.g. `root`). A value of `null` indicates\n *
that the injectable does not belong to any scope.\n *\n * @codeGenApi\n * @publicApi\n */\nexport interface InjectableDeclaration<T> {\n /**\n * Specifies that the given type belongs to a
particular injector:\n * - `InjectorType` such as `NgModule`,\n * - `root` the root injector\n * - `any` all
injectors.\n * - `null`, does not belong to any injector. Must be explicitly listed in the injector\n * `providers`.\n
*\n * providedIn: InjectorType<any>|'root'|'platform'|'any'|'environment'|null;\n *\n * The token to which this
definition belongs.\n *\n * Note that this may not be the same as the type that the `factory` will create.\n *\n
token: unknown;\n *\n * Factory method to execute to create an instance of the injectable.\n *\n factory: (t?:
Type<any>) => T;\n *\n * In a case of no explicit injector, a location where the instance of the injectable is
stored.\n *\n value: T|undefined;\n }\n\n\n\n/**\n * Information about the providers to be included in an `Injector` as well as how the given type\n * which carries the
information should be created by the DI system.\n *\n * An `InjectorDef` can import other types which have
`InjectorDefs`, forming a deep nested\n * structure of providers with a defined priority (identically to how
`NgModule`s also have\n * an import/dependency structure).\n *\n * NOTE: This is a private type and should not be
exported\n *\n * @codeGenApi\n */\nexport interface InjectorDef<T> {\n // TODO(alxhub): Narrow down the type
here once decorators properly change the return type of the\n // class they are decorating (to add the prov property
for example).\n providers: (Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|\n

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    StaticClassProvider|ClassProvider|any[]|];\n\n imports:
(InjectorType<any>|InjectorTypeWithProviders<any>|)];\n\n\n/**\n * A `Type` which has a `prov:
InjectableDeclaration` static
    field.\n *\n * `InjectableType`s contain their own Dependency Injection metadata and are usable in an\n *
`InjectorDef`-based `StaticInjector`.\n *\n * @publicApi\n */\n\nexport interface InjectableType<T> extends
Type<T> {\n /**\n * Opaque type whose structure is highly version dependent. Do not rely on any properties.\n
*/\n prov: unknown;\n}\n\n\n/**\n * A type which has an `InjectorDef` static field.\n *\n * `InjectorTypes` can be
used to configure a `StaticInjector`.\n *\n * This is an opaque type whose structure is highly version dependent. Do
not rely on any\n * properties.\n *\n * @publicApi\n */\n\nexport interface InjectorType<T> extends Type<T> {\n
fact?: unknown;\n inj: unknown;\n}\n\n\n/**\n * Describes the `InjectorDef` equivalent of a `ModuleWithProviders`,
an `InjectorType` with an\n * associated array of providers.\n *\n * Objects of this type can be listed in the imports
section of an `InjectorDef`.\n *\n * NOTE: This is a private type and should not be exported\n */\n\nexport
interface InjectorTypeWithProviders<T> {\n ngModule: InjectorType<T>;\n providers?:
(Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|\n
StaticClassProvider|ClassProvider|any[]|)];\n\n\n\n/**\n * Construct an injectable definition which defines how a
token will be constructed by the DI\n * system, and in which injectors (if any) it will be available.\n *\n * This
should be assigned to a static `prov` field on a type, which will then be an\n * `InjectableType`.\n *\n * Options:\n *
* `providedIn` determines which injectors will include the injectable, by either associating it\n * with an
`@NgModule` or other `InjectorType`, or by specifying that this injectable should be\n * provided in the `root`
injector, which will be the application-level injector in most apps.\n * * `factory` gives the zero argument function
which will create an instance of the injectable.\n * The factory can call `inject` to access the `Injector` and
request injection of dependencies.\n *\n * @codeGenApi\n * @publicApi This instruction has been emitted by
ViewEngine for some time and is deployed to npm.\n */\n\nexport function defineInjectable<T>(opts: {\n token:
unknown,\n providedIn?: Type<any>|'root'|'platform'|'any'|'environment'|null, factory: () => T,\n}): unknown {\n
return {\n token: opts.token,\n providedIn: opts.providedIn as any || null,\n factory: opts.factory,\n value:
undefined,\n } as InjectableDeclaration<T>;\n}\n\n\n/**\n * @deprecated in v8, delete after v10. This API should be
used only by generated code, and that\n * code should now use defineInjectable instead.\n *\n * @publicApi\n
*/\n\nexport const defineInjectable = defineInjectable;\n\n\n\n/**\n * Construct an `InjectorDef` which configures an
injector.\n *\n * This should be assigned to a static injector def (`inj`) field on a type, which will then be an\n *
`InjectorType`.\n *\n * Options:\n * * `providers`: an optional array of providers to
add to the injector. Each provider must\n * either have a factory or point to a type which has a `prov` static
property (the\n * type must be an `InjectableType`).\n * * `imports`: an optional array of imports of other
`InjectorType`s or `InjectorTypeWithModule`s\n * whose providers will also be added to the injector. Locally
provided types will override\n * providers from imports.\n *\n * @codeGenApi\n */\n\nexport function
defineInjector(options: {providers?: any[], imports?: any[]}): unknown {\n return {providers: options.providers || [],
imports: options.imports || []};\n}\n\n\n\n/**\n * Read the injectable def (`prov`) for `type` in a way which is immune to
accidentally reading\n * inherited value.\n *\n * @param type A type which may have its own (non-inherited)
`prov`.\n */\n\nexport function getInjectableDef<T>(type: any): InjectableDeclaration<T>|null {\n return
getOwnDefinition(type, NG_PROV_DEF) || getOwnDefinition(type, NG_INJECTABLE_DEF);\n}\n\n\nexport
function isInjectable(type:
any): boolean {\n return getInjectableDef(type) !== null;\n}\n\n\n\n/**\n * Return definition only if it is defined
directly on `type` and is not inherited from a base\n * class of `type`.\n */\n\nfunction getOwnDefinition<T>(type:
any, field: string): InjectableDeclaration<T>|null {\n return type.hasOwnProperty(field) ? type[field] :
null;\n}\n\n\n\n/**\n * Read the injectable def (`prov`) for `type` or read the `prov` from one of its ancestors.\n *\n *
@param type A type which may have `prov`, via inheritance.\n *\n * @deprecated Will be removed in a future
version of Angular, where an error will occur in the\n * scenario if we find the `prov` on an ancestor only.\n
*/\n\nexport function getInheritedInjectableDef<T>(type: any): InjectableDeclaration<T>|null {\n const def = type
&& (type[NG_PROV_DEF] || type[NG_INJECTABLE_DEF]);\n\n if (def) {\n const typeName =

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getTypeName(type);\n // TODO(FW-1307): Re-add ngDevMode when closure can handle it\n // ngDevMode
&&\n console.warn(\n `DEPRECATED: DI is instantiating a token \"${\n     typeName}\" that inherits
its @Injectable decorator but does not provide one itself.\n` +\n `This will become an error in a future version
of Angular. Please add @Injectable() to the \"${\n     typeName}\" class.`);\n return def;\n } else {\n return
null;\n }\n}\n\n/** Gets the name of a type, accounting for some cross-browser differences. */\nfunction
getTypeName(type: any): string {\n // `Function.prototype.name` behaves differently between IE and other
browsers. In most browsers\n // it'll always return the name of the function itself, no matter how many other
functions it\n // inherits from. On IE the function doesn't have its own `name` property, but it takes it from\n // the
lowest level in the prototype chain. E.g. if we have `class Foo extends Parent` most\n // browsers will evaluate
`Foo.name` to `Foo` while IE will return `Parent`. We work around\n // the
issue by converting the function to a string and parsing its name out that way via a regex.\n if
(type.hasOwnProperty('name')) {\n return type.name;\n }\n\n const match = (" +
type).match(/^function\s*([\s(]+)/);\n return match === null ? " : match[1];\n}\n\n/**\n * Read the injector def
type in a way which is immune to accidentally reading inherited value.\n *\n * @param type type which may have
an injector def (^ inj)\n *\n * @export function getInjectorDef<T>(type: any): InjectorDef<T>|null {\n return type &&
(type.hasOwnProperty(NG_INJ_DEF) || type.hasOwnProperty(NG_INJECTOR_DEF)) ?\n (type as
any)[NG_INJ_DEF] :\n null;\n}\n\nexport const NG_PROV_DEF = getClosureSafeProperty({prov:
getClosureSafeProperty});\nexport const NG_INJ_DEF = getClosureSafeProperty({inj:
getClosureSafeProperty});\n\n// We need to keep these around so we can read off old defs if new defs are
unavailable\nexport const NG_INJECTABLE_DEF = getClosureSafeProperty({ngInjectableDef:
getClosureSafeProperty});\nexport
const NG_INJECTOR_DEF = getClosureSafeProperty({ngInjectorDef: getClosureSafeProperty});\n\n", "/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n * Base URL for the
error details page.\n *\n * Keep the files below in full sync:\n * - packages/compiler-
cli/src/ngtsc/diagnostics/src/error_details_base_url.ts\n * - packages/core/src/error_details_base_url.ts\n *\nexport
const ERROR_DETAILS_PAGE_BASE_URL = 'https://angular.io/errors';\n\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {ERROR_DETAILS_PAGE_BASE_URL}
from './error_details_base_url';\n\n/**\n * The list of error codes used in runtime code of the `core` package.\n *
Reserved error code range: 100-999.\n *\n * Note: the minus sign denotes the fact that a particular code has a
detailed guide on\n * angular.io. This extra annotation is needed to avoid introducing a separate set to store\n * error
codes which have guides, which might leak into runtime code.\n *\n * Full list of available error guides can be found
at https://angular.io/errors.\n *\nexport const enum RuntimeErrorCode {\n // Change Detection Errors\n
EXPRESSION_CHANGED_AFTER_CHECKED = -100,\n RECURSIVE_APPLICATION_REF_TICK =
101,\n\n // Dependency Injection Errors\n
CYCLIC_DI_DEPENDENCY = -200,\n PROVIDER_NOT_FOUND =
-201,\n INVALID_FACTORY_DEPENDENCY = 202,\n MISSING_INJECTION_CONTEXT = -203,\n
INVALID_INJECTION_TOKEN = 204,\n INJECTOR_ALREADY_DESTROYED = 205,\n
PROVIDER_IN_WRONG_CONTEXT = 207,\n MISSING_INJECTION_TOKEN = 208,\n
INVALID_MULTI_PROVIDER = 209,\n\n // Template Errors\n
MULTIPLE_COMPONENTS_MATCH = -
300,\n EXPORT_NOT_FOUND = -301,\n PIPE_NOT_FOUND = -302,\n
UNKNOWN_BINDING = 303,\n UNKNOWN_ELEMENT = 304,\n TEMPLATE_STRUCTURE_ERROR =
305,\n INVALID_EVENT_BINDING = 306,\n\n // Bootstrap Errors\n
MULTIPLE_PLATFORMS = 400,\n
PLATFORM_NOT_FOUND = 401,\n ERROR_HANDLER_NOT_FOUND = 402,\n
BOOTSTRAP_COMPONENTS_NOT_FOUND = 403,\n PLATFORM_ALREADY_DESTROYED = 404,\n
ASYNC_INITIALIZERS_STILL_RUNNING = 405,\n APPLICATION_REF_ALREADY_DESTROYED =
406,\n RENDERER_NOT_FOUND = 407,\n\n // Styling Errors\n\n // Declarations Errors\n\n // i18n Errors\n
INVALID_I18N_STRUCTURE = 700,\n MISSING_LOCALE_DATA = 701,\n\n // standalone errors\n

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IMPORT_PROVIDERS_FROM_STANDALONE = 800,\n\n // JIT Compilation Errors\n // Other\n
INVALID_DIFFER_INPUT = 900,\n NO_SUPPORTING_DIFFER_FACTORY = 901,\n
VIEW_ALREADY_ATTACHED = 902,\n INVALID_INHERITANCE = 903,\n
UNSAFE_VALUE_IN_RESOURCE_URL = 904,\n UNSAFE_VALUE_IN_SCRIPT = 905,\n
MISSING_GENERATED_DEF = 906,\n TYPE_IS_NOT_STANDALONE = 907,\n MISSING_ZONEJS = 908,\n
UNEXPECTED_ZONE_STATE = 909,\n

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UNSAFE_IFRAME_ATTRS = -910,\n}\n\n/**\n * Class that represents a runtime error.\n * Formats and outputs
the error message in a consistent way.\n *\n * Example:\n * ```\n * throw new RuntimeError(\n *
RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,\n *   ngDevMode && 'Injector has already been
destroyed.);\n * ```\n *\n * Note: the `message` argument contains a descriptive error message as a string in
development\n * mode (when the `ngDevMode` is defined). In production mode (after tree-shaking pass), the\n *
`message` argument becomes `false`, thus we account for it in the typings and the runtime logic.\n */\nexport class
RuntimeError<T extends number = RuntimeErrorCode> extends Error {\n  constructor(public code: T, message:
null|false|string) {\n    super(formatRuntimeError<T>(code, message));\n  }\n}\n\n/**\n * Called to format a runtime
error.\n * See additional info on the `message` argument type in the `RuntimeError` class description.\n */\nexport
function formatRuntimeError<T

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extends number = RuntimeErrorCode>(\n  code: T, message: null|false|string): string {\n  // Error code might be a
negative number, which is a special marker that instructs the logic to\n  // generate a link to the error details page on
angular.io.\n  const fullCode = `NG0${Math.abs(code)}`; \n\n  let errorMessage = `${fullCode}${message ? ': ' +
message.trim() : ''}`;\n\n  if (ngDevMode && code < 0) {\n    const addPeriodSeparator =
!errorMessage.match(/[,;!]?$/);\n    const separator = addPeriodSeparator ? '!' : ' '; \n    errorMessage = \n
`${errorMessage}${separator} Find more at ${ERROR_DETAILS_PAGE_BASE_URL}/${fullCode}`;\n  }\n\n  return errorMessage;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n/**\n * @description\n *\n * Represents a type that a Component or other object is
instances of.\n *\n *

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An example of a `Type` is `MyCustomComponent` class, which in JavaScript is represented by\n * the
`MyCustomComponent` constructor function.\n *\n * @publicApi\n */\nexport const Type = Function;\n\nexport
function isType(v: any): v is Type<any> {\n  return typeof v === 'function';\n}\n\n/**\n * @description\n *\n * Represents an abstract class `T`, if applied to a concrete class it would stop being\n * instantiable.\n *\n *
@publicApi\n */\nexport interface AbstractType<T> extends Function {\n  prototype: T;\n}\n\nexport interface
Type<T> extends Function {\n  new(...args: any[]): T;\n}\n\nexport type Mutable<T> extends {\n [x: string]: any }, K
extends string> = {\n  [P in K]: T[P];\n};\n\n/**\n * Returns a writable type version of type.\n *\n * USAGE:\n *
Given:\n * ```\n * interface Person {\n  readonly name: string;\n * }\n *\n * We would like to get a read/write version
of `Person`.\n * ```\n * const WritablePerson = Writable<Person>;\n *\n * The result is that you can do:\n * ```\n *
const readonlyPerson: Person = {\n  name: 'Marry';\n * }\n * readonlyPerson.name = 'John'; // TypeError\n *
(readonlyPerson as WritablePerson).name = 'John'; // OK\n *\n * // Error: Correctly detects that `Person` did not
have `age` property.\n * (readonlyPerson as WritablePerson).age = 30;\n * ```\n */\nexport type Writable<T> = {\n
-readonly[K in keyof T]: T[K];\n};\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n// The functions in this file verify that the assumptions we are making\n// about
state in an instruction are correct before implementing any logic.\n// They are meant only to be called in dev mode
as sanity checks.\n\nimport {stringify} from './stringify';\n\nexport function assertNumber(actual: any, msg: string):
asserts actual is number {\n  if (!(typeof actual === 'number')) {\n    throw Error(msg, typeof
actual, 'number', '===');\n  }\n}\n\nexport function assertNumberInRange(\n  actual: any, minInclusive: number,
maxInclusive: number): asserts actual is number {\n  assertNumber(actual, 'Expected a number');\n  assertLessThanOrEqual(actual, maxInclusive, 'Expected number to be less than or equal to');\n  assertGreaterThanOrEqual(actual, minInclusive, 'Expected number to be greater than or equal to');\n}\n\nexport

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function assertString(actual: any, msg: string): asserts actual is string {\n if (!(typeof actual === 'string')) {\n
throwError(msg, actual === null ? 'null' : typeof actual, 'string', '===');\n }}\n\nexport function
assertFunction(actual: any, msg: string): asserts actual is Function {\n if (!(typeof actual === 'function')) {\n
throwError(msg, actual === null ? 'null' : typeof actual, 'function', '===');\n }}\n\nexport function
assertEqual<T>(actual: T, expected: T, msg: string) {\n if (!(actual == expected)) {\n throwError(msg, actual,
expected, '==');\n
}}\n\nexport function assertNotEqual<T>(actual: T, expected: T, msg: string): asserts actual is T {\n if (!(actual
!= expected)) {\n throwError(msg, actual, expected, '!=');\n }}\n\nexport function assertSame<T>(actual: T,
expected: T, msg: string): asserts actual is T {\n if (!(actual === expected)) {\n throwError(msg, actual, expected,
'===');\n }}\n\nexport function assertNotSame<T>(actual: T, expected: T, msg: string) {\n if (!(actual !==
expected)) {\n throwError(msg, actual, expected, '!==');\n }}\n\nexport function assertLessThan<T>(actual: T,
expected: T, msg: string): asserts actual is T {\n if (!(actual < expected)) {\n throwError(msg, actual, expected,
'<');\n }}\n\nexport function assertLessThanOrEqual<T>(actual: T, expected: T, msg: string): asserts actual is T
{\n if (!(actual <= expected)) {\n throwError(msg, actual, expected, '<=');\n }}\n\nexport function
assertGreaterThan<T>(actual: T, expected: T, msg: string): asserts actual is
T {\n if (!(actual > expected)) {\n throwError(msg, actual, expected, '>');\n }}\n\nexport function
assertGreaterThanOrEqual<T>(actual: T, expected: T, msg: string): asserts actual is T {\n if (!(actual >=
expected)) {\n throwError(msg, actual, expected, '>=');\n }}\n\nexport function assertNotDefined<T>(actual: T,
msg: string) {\n if (actual != null) {\n throwError(msg, actual, null, '!=');\n }}\n\nexport function
assertDefined<T>(actual: T|null|undefined, msg: string): asserts actual is T {\n if (actual == null) {\n
throwError(msg, actual, null, '!=');\n }}\n\nexport function throwError(msg: string): never;\nexport function
throwError(msg: string, actual: any, expected: any, comparison: string): never;\nexport function throwError(msg:
string, actual?: any, expected?: any, comparison?: string): never {\n throw new Error(\n `ASSERTION ERROR:
${msg}` +\n (comparison == null ? " : ` [Expected=> ${expected} ${comparison} ${actual}
<=Actual]`));\n }\n\nexport
function assertDomNode(node: any): asserts node is Node {\n // If we're in a worker, `Node` will not be defined.\n
if (!(typeof Node !== 'undefined' && node instanceof Node) && !(typeof node === 'object' && node != null
&& node.constructor.name === 'WebWorkerRenderNode')) {\n throwError(`The provided value must be an
instance of a DOM Node but got ${stringify(node)}`);\n }}\n\nexport function assertIndexInRange(arr: any[],
index: number) {\n assertDefined(arr, 'Array must be defined.);\n const maxLen = arr.length;\n if (index < 0 ||
index >= maxLen) {\n throwError(`Index expected to be less than ${maxLen} but got ${index}`);\n
}}\n\nexport function assertOneOf(value: any, ...validValues: any[]) {\n if (validValues.indexOf(value) !== -1)
return true;\n throwError(`Expected value to be one of ${JSON.stringify(validValues)} but was ${\n
JSON.stringify(value)}.`);\n }\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport {assertEqual, assertLessThanOrEqual} from './assert';\n\n/**\n * Equivalent
to ES6 spread, add each item to an array.\n *\n * @param items The items to add\n * @param arr The array to
which you want to add the items\n *\nexport function addAllToArray(items: any[], arr: any[]) {\n for (let i = 0; i <
items.length; i++) {\n arr.push(items[i]);\n }}\n\n\n/**\n * Determines if the contents of two arrays is identical\n
*\n * @param a first array\n * @param b second array\n * @param identityAccessor Optional function for
extracting stable object identity from a value in\n * the array.\n *\nexport function arrayEquals<T>(a: T[], b: T[],
identityAccessor?: (value: T) => unknown): boolean {\n if (a.length !== b.length) return false;\n for (let i = 0; i <
a.length; i++) {\n let valueA = a[i];\n let valueB = b[i];\n if
(identityAccessor) {\n valueA = identityAccessor(valueA) as any;\n valueB = identityAccessor(valueB) as
any;\n }}\n if (valueB !== valueA) {\n return false;\n }}\n return true;\n }\n\n\n/**\n * Flattens an
array.\n *\nexport function flatten(list: any[], dst?: any[]): any[] {\n if (dst === undefined) dst = list;\n for (let i =
0; i < list.length; i++) {\n let item = list[i];\n if (Array.isArray(item)) {\n // we need to inline it.\n if (dst
=== list) {\n // Our assumption that the list was already flat was wrong and\n // we need to clone flat since

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we need to write to it.\n    dst = list.slice(0, i);\n    }\n    flatten(item, dst);\n  } else if (dst !== list) {\n
dst.push(item);\n  }\n }\n return dst;\n}\n\nexport function deepForEach<T>(input: (T|any[])[], fn: (value: T) =>
void): void {\n  input.forEach(value => Array.isArray(value) ? deepForEach(value, fn) : fn(value));\n}\n\nexport
function addToArray(arr:
  any[], index: number, value: any): void {\n  // perf: array.push is faster than array.splice!\n  if (index >= arr.length)
{\n    arr.push(value);\n  } else {\n    arr.splice(index, 0, value);\n  }\n}\n\nexport function removeFromArray(arr:
  any[], index: number): any {\n  // perf: array.pop is faster than array.splice!\n  if (index >= arr.length - 1) {\n    return
arr.pop();\n  } else {\n    return arr.splice(index, 1)[0];\n  }\n}\n\nexport function newArray<T = any>(size:
  number): T[];\nexport function newArray<T>(size: number, value: T): T[];\nexport function newArray<T>(size:
  number, value?: T): T[] {\n  const list: T[] = [];\n  for (let i = 0; i < size; i++) {\n    list.push(value!);\n  }\n  return
list;\n}\n\n/**\n * Remove item from array (Same as `Array.splice()` but faster.)\n *\n * `Array.splice()` is not as
fast because it has to allocate an array for the elements which were\n * removed. This causes memory pressure and
slows down code when most of the time we don't\n * care
  about the deleted items array.\n *\n * https://jperf.com/fast-array-splice (About 20x faster)\n *\n * @param array
Array to splice\n *\n * @param index Index of element in array to remove.\n *\n * @param count Number of items to
remove.\n */\nexport function arraySplice(array: any[], index: number, count: number): void {\n  const length =
array.length - count;\n  while (index < length) {\n    array[index] = array[index + count];\n    index++;\n  }\n  while
(count--)\n    array.pop(); // shrink the array\n  }\n}\n\n/**\n * Same as `Array.splice(index, 0, value)` but faster.\n *\n * `Array.splice()` is not fast because it has to allocate an array for the elements which were\n * removed. This
causes memory pressure and slows down code when most of the time we don't\n * care about the deleted items
array.\n *\n * @param array Array to splice.\n *\n * @param index Index in array where the `value` should be added.\n *\n * @param value Value to add to array.\n */\nexport function arrayInsert(array: any[],
  index: number, value: any): void {\n  ngDevMode && assertLessThanOrEqual(index, array.length, 'Can\\'t insert
past array end.);\n  let end = array.length;\n  while (end > index) {\n    const previousEnd = end - 1;\n    array[end] =
array[previousEnd];\n    end = previousEnd;\n  }\n  array[index] = value;\n}\n\n/**\n * Same as
`Array.splice2(index, 0, value1, value2)` but faster.\n *\n * `Array.splice()` is not fast because it has to allocate an
array for the elements which were\n * removed. This causes memory pressure and slows down code when most of
the time we don't\n * care about the deleted items array.\n *\n * @param array Array to splice.\n *\n * @param index
Index in array where the `value` should be added.\n *\n * @param value1 Value to add to array.\n *\n * @param value2
Value to add to array.\n */\nexport function arrayInsert2(array: any[], index: number, value1: any, value2: any): void
{\n  ngDevMode && assertLessThanOrEqual(index, array.length, 'Can\\'t insert past array end.);\n
  let end = array.length;\n  if (end === index) {\n    // inserting at the end.\n    array.push(value1, value2);\n  } else if
(end === 1) {\n    // corner case when we have less items in array than we have items to insert.\n
    array.push(value2, array[0]);\n    array[0] = value1;\n  } else {\n    end--;\n    array.push(array[end - 1],
array[end]);\n    while (end > index) {\n      const previousEnd = end - 2;\n      array[end] = array[previousEnd];\n
      end--;\n    }\n    array[index] = value1;\n    array[index + 1] = value2;\n  }\n}\n\n/**\n * Insert a `value` into an
`array` so that the array remains sorted.\n *\n * NOTE:\n * - Duplicates are not allowed, and are ignored.\n * - This
uses binary search algorithm for fast inserts.\n *\n * @param array A sorted array to insert into.\n *\n * @param value
The value to insert.\n *\n * @returns index of the inserted value.\n */\nexport function arrayInsertSorted(array: string[],
  value: string): number {\n  let index = arrayIndexOfSorted(array, value);\n
  if (index < 0) {\n    // if we did not find it insert it.\n    index = ~index;\n    arrayInsert(array, index, value);\n  }\n
  return index;\n}\n\n/**\n * Remove `value` from a sorted `array`.\n *\n * NOTE:\n * - This uses binary search
algorithm for fast removals.\n *\n * @param array A sorted array to remove from.\n *\n * @param value The value to
remove.\n *\n * @returns index of the removed value.\n * - positive index if value found and removed.\n * - negative
index if value not found. (~index` to get the value where it should have been\n * inserted)\n */\nexport function
arrayRemoveSorted(array: string[], value: string): number {\n  const index = arrayIndexOfSorted(array, value);\n  if
(index >= 0) {\n    arraySplice(array, index, 1);\n  }\n  return index;\n}\n\n/**\n * Get an index of an `value` in a
sorted `array`.\n *\n * NOTE:\n * - This uses binary search algorithm for fast removals.\n *\n * @param array A

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sorted array to binary search.\n * @param value The value to
look for.\n * @returns index of the value.\n * - positive index if value found.\n * - negative index if value not
found. (^~index` to get the value where it should have been\n * located)\n */\nexport function
arrayIndexOfSorted(array: string[], value: string): number {\n  return _arrayIndexOfSorted(array, value,
0);\n}\n\n/**\n * `KeyValueArray` is an array where even positions contain keys and odd positions contain
values.\n *\n * `KeyValueArray` provides a very efficient way of iterating over its contents. For small\n * sets (~10)
the cost of binary searching an `KeyValueArray` has about the same performance\n * characteristics that of a `Map`
with significantly better memory footprint.\n *\n * If used as a `Map` the keys are stored in alphabetical order so that
they can be binary searched\n * for retrieval.\n *\n * See: `keyValueArraySet`, `keyValueArrayGet`,
`keyValueArrayIndexOf`, `keyValueArrayDelete`.\n */\nexport interface KeyValueArray<VALUE> extends
Array<VALUE|string>
{\n  __brand__: 'array-map';\n}\n\n/**\n * Set a `value` for a `key`.\n *\n * @param keyValueArray to modify.\n *
@param key The key to locate or create.\n * @param value The value to set for a `key`.\n * @returns index (always
even) of where the value was set.\n */\nexport function keyValueArraySet<V>(\n  keyValueArray:
KeyValueArray<V>, key: string, value: V): number {\n  let index = keyValueArrayIndexOf(keyValueArray, key);\n
if (index >= 0) {\n    // if we found it set it.\n    keyValueArray[index | 1] = value;\n  } else {\n    index = ~index;\n
arrayInsert2(keyValueArray, index, key, value);\n  }\n  return index;\n}\n\n/**\n * Retrieve a `value` for a `key` (on
`undefined` if not found.)\n *\n * @param keyValueArray to search.\n * @param key The key to locate.\n *
@return The `value` stored at the `key` location or `undefined` if not found.\n */\nexport function
keyValueArrayGet<V>(\n  keyValueArray: KeyValueArray<V>, key: string): V|undefined {\n  const index =
keyValueArrayIndexOf(keyValueArray,\n  key);\n  if (index >= 0) {\n    // if we found it retrieve it.\n    return keyValueArray[index | 1] as V;\n  }\n  return
undefined;\n}\n\n/**\n * Retrieve a `key` index value in the array or `-1` if not found.\n *\n * @param
keyValueArray to search.\n * @param key The key to locate.\n * @returns index of where the key is (or should
have been.)\n * - positive (even) index if key found.\n * - negative index if key not found. (^~index` (even) to get
the index where it should have\n * been inserted.)\n */\nexport function
keyValueArrayIndexOf<V>(\n  keyValueArray: KeyValueArray<V>, key: string): number {\n  return
_arrayIndexOfSorted(keyValueArray as string[], key, 1);\n}\n\n/**\n * Delete a `key` (and `value`) from the
`KeyValueArray`.\n *\n * @param keyValueArray to modify.\n * @param key The key to locate or delete (if
exist).\n * @returns index of where the key was (or should have been.)\n * - positive (even) index if key found and
deleted.\n * - negative
index if key not found. (^~index` (even) to get the index where it should have\n * been.)\n */\nexport function
keyValueArrayDelete<V>(\n  keyValueArray: KeyValueArray<V>, key: string): number {\n  const index =
keyValueArrayIndexOf(keyValueArray, key);\n  if (index >= 0) {\n    // if we found it remove it.\n
arraySplice(keyValueArray, index, 2);\n  }\n  return index;\n}\n\n\n/**\n * INTERNAL: Get an index of an `value`
in a sorted `array` by grouping search by `shift`.\n *\n * NOTE:\n * - This uses binary search algorithm for fast
removals.\n *\n * @param array A sorted array to binary search.\n * @param value The value to look for.\n *
@param shift grouping shift.\n * - `0` means look at every location\n * - `1` means only look at every other
(even) location (the odd locations are to be ignored as\n * they are values.)\n * @returns index of the value.\n *
- positive index if value found.\n * - negative index if value not found. (^~index` to get the value where it
should have been\n * inserted)\n */\nfunction _arrayIndexOfSorted(array: string[], value: string, shift: number):
number {\n  ngDevMode && assertEqual(Array.isArray(array), true, 'Expecting an array');\n  let start = 0;\n  let end
= array.length >> shift;\n  while (end !== start) {\n    const middle = start + ((end - start) >> 1); // find the middle.\n
const current = array[middle << shift];\n    if (value === current) {\n      return (middle << shift);\n    } else if
(current > value) {\n      end = middle;\n    } else {\n      start = middle + 1; // We already searched middle so make
it non-inclusive by adding 1\n    }\n  }\n  return ~(end << shift);\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\n\n/**\n * Convince closure compiler that the wrapped function

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has no side-effects.\n *\n * Closure compiler always assumes
that `toString` has no side-effects. We use this quirk to\n * allow us to execute a function but have closure compiler
mark the call as no-side-effects.\n * It is important that the return value for the `noSideEffects` function be
assigned\n * to something which is retained otherwise the call to `noSideEffects` will be removed by closure\n *
compiler.\n *\nexport function noSideEffects<T>(fn: () => T): T {\n  return {toString: fn}.toString() as unknown as
T;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {Type} from './interface/type';\n\nimport {noSideEffects} from './closure';\n\n\n/**\n * An interface
implemented by all Angular type decorators, which allows them to be used as\n * decorators as well as Angular
syntax.\n *\n * @ng.Component(...)\n * class MyClass {...}\n * ``\n *\n * @publicApi\n
*\nexport interface TypeDecorator {\n  /**\n   * Invoke as decorator.\n   *\n   * <T extends Type<any>>(type: T):
T;\n\n   * // Make TypeDecorator assignable to built-in ParameterDecorator type.\n   * // ParameterDecorator is declared
in lib.d.ts as a `declare type`\n   * // so we cannot declare this interface as a subtype.\n   * // see
https://github.com/angular/angular/issues/3379#issuecomment-126169417\n   * (target: Object, propertyKey?:
string|symbol, parameterIndex?: number): void;\n\n}\n\nexport const ANNOTATIONS = '__annotations__';\nexport
const PARAMETERS = '__parameters__';\nexport const PROP_METADATA = '__prop_metadata__';\n\n/**\n *
@suppress {globalThis}\n *\nexport function makeDecorator<T>(\n  name: string, props?: (...args: any[]) => any,
parentClass?: any,\n  additionalProcessing?: (type: Type<T>) => void,\n  typeFn?: (type: Type<T>, ...args: any[])
=> void):\n  {new (...args: any[]): any; (...args: any[]): any; (...args: any[]): (cls: any) => any;} {\n  return
noSideEffects()\n    => {\n      const metaCtor = makeMetadataCtor(props);\n\n      function DecoratorFactory(\n        this: unknown|typeof
DecoratorFactory, ...args: any[]): (cls: Type<T>) => any {\n        if (this instanceof DecoratorFactory) {\n\n
metaCtor.call(this, ...args);\n          return this as typeof DecoratorFactory;\n        }\n\n        const annotationInstance =
new (DecoratorFactory as any)(...args);\n          return function TypeDecorator(cls: Type<T>) {\n            if (typeFn)\n              typeFn(cls, ...args);\n            // Use of Object.defineProperty is important since it creates non-enumerable property
which\n            // prevents the property is copied during subclassing.\n            const annotations =
cls.hasOwnProperty(ANNOTATIONS) ?\n              (cls as any)[ANNOTATIONS] :\n              (Object.defineProperty(cls, ANNOTATIONS, {value: []}) as any)[ANNOTATIONS];\n\n
annotations.push(annotationInstance);\n\n\n            if (additionalProcessing) additionalProcessing(cls);\n\n            return
cls;\n\n          };\n        }\n\n        if (parentClass) {\n          DecoratorFactory.prototype = Object.create(parentClass.prototype);\n        }\n\n        DecoratorFactory.prototype.ngMetadataName = name;\n        (DecoratorFactory as any).annotationCls =
DecoratorFactory;\n        return DecoratorFactory as any;\n      });\n\n\nfunction makeMetadataCtor(props?: (...args:
any[]) => any): any {\n  return function ctor(this: any, ...args: any[]) {\n    if (props) {\n      const values =
props(...args);\n      for (const propName in values) {\n        this[propName] = values[propName];\n      }\n    }\n  };\n}\n\nexport function makeParamDecorator(\n  name: string, props?: (...args: any[]) => any, parentClass?: any):
any {\n  return noSideEffects() => {\n    const metaCtor = makeMetadataCtor(props);\n    function
ParamDecoratorFactory(\n      this: unknown|typeof ParamDecoratorFactory, ...args: any[]): any {\n      if (this
instanceof ParamDecoratorFactory) {\n        metaCtor.apply(this, args);\n        return this;\n      }\n\n      const annotationInstance = new (<any>ParamDecoratorFactory)(...args);\n      (<any>ParamDecorator).annotation = annotationInstance;\n      return ParamDecorator;\n\n      function
ParamDecorator(cls: any, unusedKey: any, index: number): any {\n        // Use of Object.defineProperty is important
since it creates non-enumerable property which\n        // prevents the property is copied during subclassing.\n        const parameters = cls.hasOwnProperty(PARAMETERS) ?\n          (cls as any)[PARAMETERS] :\n          Object.defineProperty(cls, PARAMETERS, {value: []})[PARAMETERS];\n\n        // there might be gaps if some in
between parameters do not have annotations.\n        // we pad with nulls.\n        while (parameters.length <= index)\n          parameters.push(null);\n\n        (parameters[index] = parameters[index] ||
[]).push(annotationInstance);\n        return cls;\n      }\n    }\n    if (parentClass) {\n

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```

isDelegateCtor(typeStr: string): boolean {\n  return ES5_DELEGATE_CTOR.test(typeStr) ||\n  ES2015_INHERITED_CLASS_WITH_DELEGATE_CTOR.test(typeStr) ||\n  (ES2015_INHERITED_CLASS.test(typeStr) &&\n  !ES2015_INHERITED_CLASS_WITH_CTOR.test(typeStr));\n}\n\nexport class ReflectionCapabilities implements\n  PlatformReflectionCapabilities {\n  private _reflect: any;\n\n  constructor(reflect?: any) {\n    this._reflect = reflect ||\n    global['Reflect'];\n  }\n\n  factory<T>(t: Type<T>): (args: any[]) => T {\n    return (...args: any[]) => new\n    t(...args);\n  }\n\n  /** @internal */\n  _zipTypesAndAnnotations(paramTypes: any[], paramAnnotations: any[]):\n  any[][] {\n    let result: any[][];\n\n    if (typeof paramTypes === 'undefined') {\n      result =\n      newArray(paramAnnotations.length);\n    } else {\n      result = newArray(paramTypes.length);\n    }\n\n    for (let i\n    = 0; i < result.length; i++) {\n      // TS outputs Object for parameters without types, while Traceur omits\n      // the\n      annotations. For now we preserve the Traceur behavior to aid\n      // migration, but this can be revisited.\n      if\n      (typeof paramTypes === 'undefined') {\n        result[i] = [];\n      } else if (paramTypes[i] && paramTypes[i] !=\n      Object) {\n        result[i] = [paramTypes[i]];\n      } else {\n        result[i] = [];\n      }\n      if (paramAnnotations && paramAnnotations[i] != null) {\n        result[i] =\n        result[i].concat(paramAnnotations[i]);\n      }\n    }\n\n    return result;\n  }\n\n  private _ownParameters(type:\n  Type<any>, parentCtor: any): any[][] | null {\n    const typeStr = type.toString();\n    // If we have no decorators, we\n    only have function.length as metadata.\n    // In that case, to detect whether a child class declared an own constructor\n    or not,\n    // we need to look inside of that constructor to check whether it is\n    // just calling the parent.\n    // This\n    also helps to work around for https://github.com/Microsoft/TypeScript/issues/12439\n    // that sets\n    'design:paramtypes' to []\n    // if a class inherits from another class but has no ctor declared itself.\n    if\n    (isDelegateCtor(typeStr)) {\n      return null;\n    }\n\n    // Prefer the direct API.\n    if ((<any>type).parameters &&\n    (<any>type).parameters !== parentCtor.parameters) {\n      return (<any>type).parameters;\n    }\n\n    // API of tsickle for lowering decorators to properties on the class.\n    const tsickleCtorParams =\n    (<any>type).ctorParameters;\n    if (tsickleCtorParams && tsickleCtorParams !== parentCtor.ctorParameters) {\n    // Newer tsickle uses a function closure\n    // Retain the non-function case for compatibility with older tsickle\n    const ctorParameters =\n    typeof tsickleCtorParams === 'function' ? tsickleCtorParams() : tsickleCtorParams;\n\n    const paramTypes = ctorParameters.map((ctorParam: any) => ctorParam && ctorParam.type);\n    const\n    paramAnnotations = ctorParameters.map(\n    (ctorParam: any) =>\n    ctorParam &&\n    convertTsickleDecoratorIntoMetadata(ctorParam.decorators));\n    return\n    this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n  }\n\n  // API for metadata created by\n  invoking the decorators.\n  const paramAnnotations = type.hasOwnProperty(PARAMETERS) && (type as\n  any)[PARAMETERS];\n  const\n  paramTypes = this._reflect && this._reflect.getOwnMetadata &&\n  this._reflect.getOwnMetadata('design:paramtypes', type);\n  if (paramTypes || paramAnnotations) {\n    return\n    this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n  }\n\n  // If a class has no decorators, at least\n  create metadata\n  // based on function.length.\n  // Note: We know that this is a real constructor as we checked\n  // the\n  content of the constructor above.\n  return newArray<any[]>(type.length);\n}\n\nparameters(type:\n  Type<any>): any[][] {\n  // Note: only report metadata if we have at least one class decorator\n  // to stay in sync\n  with the static reflector.\n  if (!isType(type)) {\n    return [];\n  }\n  const parentCtor = getParentCtor(type);\n  let parameters = this._ownParameters(type, parentCtor);\n  if (!parameters && parentCtor !== Object) {\n    parameters = this.parameters(parentCtor);\n  }\n  return parameters || [];\n}\n\nprivate\n  _ownAnnotations(typeOrFunc:\n  Type<any>, parentCtor: any): any[] | null {\n  // Prefer the direct API.\n  if ((<any>typeOrFunc).annotations &&\n  (<any>typeOrFunc).annotations !== parentCtor.annotations) {\n    let annotations =\n    (<any>typeOrFunc).annotations;\n    if (typeof annotations === 'function' && annotations.annotations) {\n    annotations = annotations.annotations;\n    }\n    return annotations;\n  }\n\n  // API of tsickle for lowering\n  decorators to properties on the class.\n  if ((<any>typeOrFunc).decorators && (<any>typeOrFunc).decorators !==\n  parentCtor.decorators) {\n    return convertTsickleDecoratorIntoMetadata((<any>typeOrFunc).decorators);\n  }\n}

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}\n\n // API for metadata created by invoking the decorators.\n if
(typeOrFunc.hasOwnProperty(ANNOTATIONS)) {\n return (typeOrFunc as any)[ANNOTATIONS];\n }\n
return null;\n }\n\n annotations(typeOrFunc: Type<any>): any[] {\n if (!isType(typeOrFunc)) {\n return [];\n
}\n\n const parentCtor
= getParentCtor(typeOrFunc);\n const ownAnnotations = this._ownAnnotations(typeOrFunc, parentCtor) || [];\n
const parentAnnotations = parentCtor !== Object ? this.annotations(parentCtor) : [];\n return
parentAnnotations.concat(ownAnnotations);\n }\n\n private _ownPropMetadata(typeOrFunc: any, parentCtor:
any): {[key: string]: any[]}|null {\n // Prefer the direct API.\n if ((<any>typeOrFunc).propMetadata &&\n
(<any>typeOrFunc).propMetadata !== parentCtor.propMetadata) {\n let propMetadata =
(<any>typeOrFunc).propMetadata;\n if (typeof propMetadata === 'function' && propMetadata.propMetadata)
{\n propMetadata = propMetadata.propMetadata;\n }\n return propMetadata;\n }\n\n // API of tsickle
for lowering decorators to properties on the class.\n if ((<any>typeOrFunc).propDecorators &&\n
(<any>typeOrFunc).propDecorators !== parentCtor.propDecorators) {\n const propDecorators =
(<any>typeOrFunc).propDecorators;\n
const propMetadata = <{[key: string]: any[]}>{};\n Object.keys(propDecorators).forEach(prop => {\n
propMetadata[prop] = convertTsickleDecoratorIntoMetadata(propDecorators[prop]);\n });\n return
propMetadata;\n }\n\n // API for metadata created by invoking the decorators.\n if
(typeOrFunc.hasOwnProperty(PROP_METADATA)) {\n return (typeOrFunc as any)[PROP_METADATA];\n
}\n\n return null;\n }\n\n propMetadata(typeOrFunc: any): {[key: string]: any[]} {\n if (!isType(typeOrFunc)) {\n
return {};\n }\n\n const parentCtor = getParentCtor(typeOrFunc);\n const propMetadata: {[key: string]: any[]}
= {};\n if (parentCtor !== Object) {\n const parentPropMetadata = this.propMetadata(parentCtor);\n
Object.keys(parentPropMetadata).forEach((propName) => {\n propMetadata[propName] =
parentPropMetadata[propName];\n });\n }\n\n const ownPropMetadata = this._ownPropMetadata(typeOrFunc,
parentCtor);\n if (ownPropMetadata)
{\n Object.keys(ownPropMetadata).forEach((propName) => {\n const decorators: any[] = [];\n if
(propMetadata.hasOwnProperty(propName)) {\n decorators.push(...propMetadata[propName]);\n }\n
decorators.push(...ownPropMetadata[propName]);\n propMetadata[propName] = decorators;\n });\n }\n
return propMetadata;\n }\n\n ownPropMetadata(typeOrFunc: any): {[key: string]: any[]} {\n if
(!isType(typeOrFunc)) {\n return {};\n }\n\n return this._ownPropMetadata(typeOrFunc,
getParentCtor(typeOrFunc)) || {};\n }\n\n hasLifecycleHook(type: any, lcProperty: string): boolean {\n return
type instanceof Type && lcProperty in type.prototype;\n }\n\n\nfunction
convertTsickleDecoratorIntoMetadata(decoratorInvocations: any[]): any[] {\n if (!decoratorInvocations) {\n
return [];\n }\n\n return decoratorInvocations.map(decoratorInvocation => {\n const decoratorType =
decoratorInvocation.type;\n const annotationCls = decoratorType.annotationCls;\n
const annotationArgs = decoratorInvocation.args ? decoratorInvocation.args : [];\n return new
annotationCls(...annotationArgs);\n });\n }\n\n\nfunction getParentCtor(ctor: Function): Type<any> {\n const
parentProto = ctor.prototype ? Object.getPrototypeOf(ctor.prototype) : null;\n const parentCtor = parentProto ?
parentProto.constructor : null;\n // Note: We always use `Object` as the null value\n // to simplify checking later
on.\n return parentCtor || Object;\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {global} from './global';\nndeclare global {\n /**\n * Values of
ngDevMode\n * Depending on the current state of the application, ngDevMode may have one of several values.\n
*\n * For convenience, the “truthy” value which enables dev mode is also an object which
contains\n * Angular’s performance counters. This is not necessary, but cuts down on boilerplate for the\n * perf
counters.\n *\n * ngDevMode may also be set to false. This can happen in one of a few ways:\n * - The user
explicitly sets `window.ngDevMode = false` somewhere in their app.\n * - The user calls `enableProdMode()`.\n
*\n * - The URL contains a `ngDevMode=false` text.\n * Finally, ngDevMode may not have been defined at all.\n
*/\n\nconst ngDevMode: null|NgDevModePerfCounters;\n\ninterface NgDevModePerfCounters {\n

```

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namedConstructors: boolean;\n firstCreatePass: number;\n tNode: number;\n tView: number;\n
rendererCreateTextNode: number;\n rendererSetText: number;\n rendererCreateElement: number;\n
rendererAddEventListener: number;\n rendererSetAttribute: number;\n rendererRemoveAttribute: number;\n
rendererSetProperty: number;\n rendererSetClassName: number;\n rendererAddClass: number;\n
rendererRemoveClass: number;\n
rendererSetStyle: number;\n rendererRemoveStyle: number;\n rendererDestroy: number;\n
rendererDestroyNode: number;\n rendererMoveNode: number;\n rendererRemoveNode: number;\n
rendererAppendChild: number;\n rendererInsertBefore: number;\n rendererCreateComment: number;\n
})\n\nexport function ngDevModeResetPerfCounters(): NgDevModePerfCounters {\n const locationString =
typeof location !== 'undefined' ? location.toString() : '';\n const newCounters: NgDevModePerfCounters = {\n
namedConstructors: locationString.indexOf('ngDevMode=namedConstructors') !== -1,\n firstCreatePass: 0,\n
tNode: 0,\n tView: 0,\n rendererCreateTextNode: 0,\n rendererSetText: 0,\n rendererCreateElement: 0,\n
rendererAddEventListener: 0,\n rendererSetAttribute: 0,\n rendererRemoveAttribute: 0,\n rendererSetProperty:
0,\n rendererSetClassName: 0,\n rendererAddClass: 0,\n rendererRemoveClass: 0,\n rendererSetStyle: 0,\n
rendererRemoveStyle:
0,\n rendererDestroy: 0,\n rendererDestroyNode: 0,\n rendererMoveNode: 0,\n rendererRemoveNode: 0,\n
rendererAppendChild: 0,\n rendererInsertBefore: 0,\n rendererCreateComment: 0,\n };
\n\n // Make sure to refer
to ngDevMode as [ngDevMode] for closure.\n const allowNgDevModeTrue =
locationString.indexOf('ngDevMode=false') === -1;\n global['ngDevMode'] = allowNgDevModeTrue &&
newCounters;\n return newCounters;\n}\n\n/**\n * This function checks to see if the `ngDevMode` has been set. If
yes,\n * then we honor it, otherwise we default to dev mode with additional checks.\n * The idea is that unless
we are doing production build where we explicitly\n * set `ngDevMode === false` we should be helping the
developer by providing\n * as much early warning and errors as possible.\n * `defineComponent` is guaranteed
to have been called before any component template functions\n * (and thus Ivy instructions), so a single
initialization there is sufficient to ensure
ngDevMode\n * is defined for the entire instruction set.\n *\n * When checking `ngDevMode` on toplevel, always
init it before referencing it\n * (e.g. `(typeof ngDevMode === 'undefined' || ngDevMode) && initNgDevMode()`),
otherwise you can\n * get a `ReferenceError` like in https://github.com/angular/angular/issues/31595.\n *\n *
Details on possible values for `ngDevMode` can be found on its docstring.\n *\n * NOTE:\n * - changes to the
`ngDevMode` name must be synced with `compiler-cli/src/tooling.ts`.\n *\nexport function initNgDevMode():
boolean {\n // The below checks are to ensure that calling `initNgDevMode` multiple times does not\n // reset the
counters.\n // If the `ngDevMode` is not an object, then it means we have not created the perf counters\n // yet.\n if
(typeof ngDevMode === 'undefined' || ngDevMode) {\n if (typeof ngDevMode !== 'object') {\n
ngDevModeResetPerfCounters();\n }\n return typeof ngDevMode !== 'undefined' && !!ngDevMode;\n }\n
return
false;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n/**\n * Used for stringify render output in Ivy.\n * Important! This function is very performance-sensitive and
we should\n * be extra careful not to introduce megamorphic reads in it.\n * Check
`core/test/render3/perf/render_stringify` for benchmarks and alternate implementations.\n *\nexport function
renderStringify(value: any): string {\n if (typeof value === 'string') return value;\n if (value == null) return '';\n //
Use `String` so that it invokes the `toString` method of the value. Note that this\n // appears to be faster than calling
`value.toString` (see `render_stringify` benchmark).\n return String(value);\n}\n\n/**\n * Used to stringify a value
so that it can be displayed in an error message.\n * Important! This function contains a megamorphic
read and should only be\n * used for error messages.\n *\nexport function stringifyForError(value: any): string {\n
if (typeof value === 'function') return value.name || value.toString();\n if (typeof value === 'object' && value !==
null && typeof value.type === 'function') {\n return value.type.name || value.type.toString();\n }\n\n return
renderStringify(value);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this

```

```

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found in the LICENSE file at
https://angular.io/license
import {ImportedNgModuleProviders} from '../di/interface/provider';
import {
  RuntimeError,
  RuntimeErrorCode
} from '../errors';
import {Type} from '../interface/type';
import {stringify}
from '../util/stringify';
import {stringifyForError} from '../util/stringify_utils';
/** Called when directives
inject each other (creating a circular dependency)
export function throwCyclicDependencyError(token:
string, path?: string[]): never {
  const depPath = path ? `Dependency path: ${path.join(' > ')} > ${token}` : '';
  throw new RuntimeError(
    RuntimeErrorCode.CYCLIC_DI_DEPENDENCY,
    `Circular dependency in DI
detected for ${token}${depPath}`);
}
export function throwMixedMultiProviderError() {
  throw new
Error(`Cannot mix multi providers and regular providers`);
}
export function throwInvalidProviderError(
  ngModuleType?: Type<unknown>,
  providers?: any[],
  provider?: any): never {
  if (ngModuleType && providers) {
    const providerDetail = providers.map(v => v === provider ? '?' + provider + '?' : '...');
    throw new
Error(`Invalid provider for the NgModule '${stringify(ngModuleType)}' - only instances of Provider and
Type are allowed, got: [${providerDetail.join(', ')}]`);
  } else if ((provider as
ImportedNgModuleProviders).providers) {
    throw new RuntimeError(
      RuntimeErrorCode.PROVIDER_IN_WRONG_CONTEXT,
      `Invalid providers from 'importProvidersFrom' present in a non-environment injector. 'importProvidersFrom'
can't be used for component providers.`);
  } else {
    throw new Error('Invalid provider');
  }
}
/**
Throws an error when a token is not found in DI.
export function throwProviderNotFoundError(token: any,
injectorName?: string): never {
  const injectorDetails = injectorName ? ` in ${injectorName}` : '';
  throw new
RuntimeError(
  RuntimeErrorCode.PROVIDER_NOT_FOUND,
  ngDevMode && `No provider for
${stringifyForError(token)} found${injectorDetails}`);
}
/**
Special flag indicating that a decorator is of type
`Inject`. It's used to make `Inject` decorator tree-shakable (so we don't have to rely on the `instanceof` checks).
* Note: this flag is not included into the `InjectFlags` since it's an internal-only API.
export const enum
DecoratorFlags {
  Inject = -1
}
/**
Injection flags for DI.
@publicApi
@deprecated use an
options object for `inject` instead.
export enum InjectFlags {
  // TODO(alxhub): make this 'const' (and
remove `InternalInjectFlags` enum) when ngc no longer
writes exports of it into ngfactory files.
/** Check
self and check parent injector if needed
Default = 0b0000,
/** Specifies that an injector should
retrieve a dependency from any injector until reaching the
host element of the current component. (Only used
with Element Injector)
Host = 0b0001,
/** Don't ascend to ancestors of the node requesting injection.
Self = 0b0010,
/** Skip the node that is requesting injection.
SkipSelf = 0b0100,
/** Inject
`defaultValue` instead if token not found.
Optional = 0b1000,
}
/**
This enum is an exact copy of the `InjectFlags` enum above, but the difference is that this is a
const enum, so
actual enum values would be inlined in generated code. The `InjectFlags` enum can
be turned into a const enum
when ViewEngine is removed (see TODO at the `InjectFlags` enum
above). The benefit of inlining is that we
can use these flags at the top level without affecting
tree-shaking (see `no-toplevel-property-access` tslint rule
for more info).
Keep this enum in sync with `InjectFlags` enum above.
export const enum
InternalInjectFlags {
  /** Check self and check parent injector if needed
Default = 0b0000,
/** Specifies that an injector should retrieve a dependency from any injector until reaching the
host element of the
current component. (Only used with Element Injector)
Host = 0b0001,
/** Don't ascend to ancestors of
the node requesting injection.
Self = 0b0010,
/** Skip the node that is requesting
injection.
SkipSelf = 0b0100,
/** Inject `defaultValue` instead if token not found.
Optional =
0b1000,
/** This token is being injected into a pipe.
This flag is intentionally not in the public
facing `InjectFlags` because it is only added by
the compiler and is not a developer applicable flag.
ForPipe = 0b10000,
}
/**
@license
Copyright Google LLC All Rights Reserved.
Use of this
source code is governed by an MIT-style license that can be
found in the LICENSE file at
https://angular.io/license
import {throwProviderNotFoundError} from './render3/errors_di';

```



```

{assertNotEqual} from './util/assert';\nimport {stringify} from './util/stringify';\n\nimport {getInjectableDef,
InjectableDeclaration} from './interface/defs';\nimport {InjectFlags} from './interface/injector';\nimport
{ProviderToken} from './provider_token';\n\n\n/**\n * Current implementation of inject.\n *\n * By default, it
is `injectInjectorOnly`, which makes it `Injector`-only aware. It can be changed\n * to `directiveInject`, which
brings in the `NodeInjector` system of ivy. It is designed this\n * way for two reasons:\n * 1. `Injector` should not
depend on ivy logic.\n * 2. To maintain tree shake-ability we don't want to bring in unnecessary code.\n *\nlet
_injectImplementation: (<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)|\n undefined;\nexport
function getInjectImplementation() {\n return _injectImplementation;\n }\n\n\n/**\n * Sets the current inject
implementation.\n *\nexport function setInjectImplementation(\n impl: (<T>(token: ProviderToken<T>, flags?:
InjectFlags) => T | null)|\n undefined): (<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)|\nundefined
{\n const previous = _injectImplementation;\n _injectImplementation = impl;\n return previous;\n }\n\n\n/**\n *
Injects `root` tokens in limp mode.\n *\n * If no injector exists, we can still inject
tree-shakable providers which have `providedIn` set to\n * `\"root\"`. This is known as the limp mode injection. In
such case the value is stored in the\n * injectable definition.\n *\nexport function injectRootLimpMode<T>(\n
token: ProviderToken<T>, notFoundValue: T|undefined, flags: InjectFlags): T|null {\n const injectableDef:
InjectableDeclaration<T>|null = getInjectableDef(token);\n if (injectableDef && injectableDef.providedIn ===
'root') {\n return injectableDef.value === undefined ? injectableDef.value = injectableDef.factory() :\n
injectableDef.value;\n } \n if (flags & InjectFlags.Optional) return null;\n if (notFoundValue !==
undefined) return notFoundValue;\n throw ProviderNotFoundError(stringify(token), 'Injector');\n }\n\n\n\n/**\n *
Assert that `_injectImplementation` is not `fn`.\n *\n * This is useful, to prevent infinite recursion.\n *\n * @param
fn Function which it should not equal to\n *\nexport function assertInjectImplementationNotEqual(\n
fn: (<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)) {\n ngDevMode &&\n
assertNotEqual(_injectImplementation, fn, 'Calling inject would cause infinite recursion');\n }\n\n\n\n/**\n * @license\n
 * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport
'./util/ng_dev_mode';\n\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from
'./interface/type';\nimport {stringify} from './util/stringify';\n\nimport {resolveForwardRef} from
'./forward_ref';\nimport {getInjectImplementation, injectRootLimpMode} from './inject_switch';\nimport {Injector}
from './injector';\nimport {DecoratorFlags, InjectFlags, InternalInjectFlags} from './interface/injector';\nimport
{ProviderToken} from './provider_token';\n\n\nconst _THROW_IF_NOT_FOUND = {};\nexport const
THROW_IF_NOT_FOUND = _THROW_IF_NOT_FOUND;\n\n\n\n * Name of a property (that we patch onto DI decorator), which is used as an annotation of which\n * InjectFlag this
decorator represents. This allows to avoid direct references to the DI decorators\n * in the code, thus making them
tree-shakable.\n *\nconst DI_DECORATOR_FLAG = '__NG_DI_FLAG__';\n\nexport const
NG_TEMP_TOKEN_PATH = 'ngTempTokenPath';\nconst NG_TOKEN_PATH = 'ngTokenPath';\nconst
NEW_LINE = /\n/gm;\nconst NO_NEW_LINE = '';\nexport const SOURCE = '__source';\n\n\n\n * Current
injector value used by `inject`.\n * - `undefined`: it is an error to call `inject`\n * - `null`: `inject` can be called but
there is no injector (limp-mode).\n * - Injector instance: Use the injector for resolution.\n *\n\nlet _currentInjector:
Injector|undefined|null = undefined;\n\nexport function setCurrentInjector(injector: Injector|null|undefined):
Injector|undefined|null {\n const former = _currentInjector;\n _currentInjector = injector;\n return
former;\n }\n\n\nexport
function injectInjectorOnly<T>(token: ProviderToken<T>): T;\nexport function injectInjectorOnly<T>(token:
ProviderToken<T>, flags?: InjectFlags): T|null;\nexport function injectInjectorOnly<T>(token: ProviderToken<T>,
flags = InjectFlags.Default): T| \n null {\n if (_currentInjector === undefined) {\n throw new RuntimeError(\n
RuntimeErrorCode.MISSING_INJECTION_CONTEXT,\n ngDevMode &&\n `inject() must be called
from an injection context such as a constructor, a factory function, a field initializer, or a function used with
\`EnvironmentInjector#runInContext\`);\n } else if (_currentInjector === null) {\n return
injectRootLimpMode(token, undefined, flags);\n } else {\n return _currentInjector.get(token, flags &

```

InjectFlags.Optional ? null : undefined, flags);  
} }  
Generated instruction: injects a token from the currently active injector.  
(Additional documentation moved to `inject`, as it is the public API, and an alias for this instruction)  
@see inject  
@codeGenApi  
@publicApi This instruction has been emitted by ViewEngine for some time and is deployed to npm.  
^/next export function inject<T>(token: ProviderToken<T>): T;  
next export function inject<T>(token: ProviderToken<T>, flags?: InjectFlags): T|null;  
next export function inject<T>(token: ProviderToken<T>, flags = InjectFlags.Default): T|null {  
return (getInjectImplementation() || injectInjectorOnly)(resolveForwardRef(token), flags);  
}  
Throws an error indicating that a factory function could not be generated by the compiler for a particular class.  
The name of the class is not mentioned here, but will be in the generated factory function name and thus in the stack trace.  
@codeGenApi  
^/next export function invalidFactoryDep(index: number): never {  
throw new RuntimeError(RuntimeErrorCode.INVALID\_FACTORY\_DEPENDENCY, ngDevMode && `This constructor is not compatible with Angular Dependency Injection because its dependency at index \${index} of the parameter list is invalid.  
This can happen if the dependency type is a primitive like a string or if an ancestor of this class is missing an Angular decorator.  
Please check that 1) the type for the parameter at index \${index} is correct and 2) the correct Angular decorators are defined for this class and its ancestors.`);  
}  
Type of the options argument to `inject`.  
@publicApi  
^/next export interface InjectOptions {  
/\*\* Use optional injection, and return `null` if the requested token is not found.  
optional?: boolean;  
/\*\* Start injection at the parent of the current injector.  
skipSelf?: boolean;  
/\*\* Only query the current injector for the token, and don't fall back to the parent injector if it's not found.  
self?: boolean;  
/\*\* Stop injection at the host component's injector. Only relevant when injecting from an element injector, and a no-op for environment injectors.  
host?: boolean;  
}  
@param token A token that represents a dependency that should be injected.  
@returns the injected value if operation is successful, `null` otherwise.  
@throws if called outside of a supported context.  
@publicApi  
^/next export function inject<T>(token: ProviderToken<T>): T;  
/\*\* @param token A token that represents a dependency that should be injected.  
@param flags Control how injection is executed. The flags correspond to injection strategies that can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.  
@returns the injected value if operation is successful, `null` otherwise.  
@throws if called outside of a supported context.  
@publicApi  
@deprecated prefer an options object instead of `InjectFlags`  
^/next export function inject<T>(token: ProviderToken<T>, flags?: InjectFlags): T|null;  
/\*\* @param token A token that represents a dependency that should be injected.  
@param options Control how injection is executed. Options correspond to injection strategies that can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.  
@returns the injected value if operation is successful.  
@throws if called outside of a supported context, or if the token is not found.  
@publicApi  
^/next export function inject<T>(token: ProviderToken<T>, options: InjectOptions & { optional?: false }): T;  
/\*\* @param token A token that represents a dependency that should be injected.  
@param options Control how injection is executed. Options correspond to injection strategies that can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.  
@returns the injected value if operation is successful, `null` if the token is not found and optional injection has been requested.  
@throws if called outside of a supported context, or if the token is not found and optional injection was not requested.  
@publicApi  
^/next export function inject<T>(token: ProviderToken<T>, options: InjectOptions): T|null;  
Injects a token from the currently active injector.  
`inject` is only supported during instantiation of a dependency by the DI system. It can be used during:  
- Construction (via the `constructor`) of a class being instantiated by the DI system, such as an `@Injectable` or `@Component`.  
- In the initializer for fields of such classes.  
- In the factory function specified for `useFactory` of a `Provider` or an `@Injectable`.  
- In the `factory` function specified for an `InjectionToken`.  
@param token A token that represents a dependency that should be injected.  
@param flags Optional flags that control how injection is executed.  
The flags correspond to injection strategies that can be specified

with\n \* parameter decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.\n \* @returns the injected value if operation is successful, `null` otherwise.\n \* @throws if called outside of a supported context.\n \*\n \* @usageNotes\n \* In practice the `inject()` calls are allowed in a constructor, a constructor parameter and a\n \* field initializer:\n \*\n \* ```typescript\n \* @Injectable({providedIn: 'root'})\n \* export class Car {\n \* radio: Radio;\n \* // OK: field initializer\n \* spareTyre = inject(Tyre);\n \* constructor() {\n \* // OK: constructor body\n \* this.radio = inject(Radio);\n \* }\n \* }\n \* ```\n \*\n \* It is also legal to call `inject` from a provider's factory:\n \*\n \* ```typescript\n \* providers: [\n \* {provide: Car, useFactory: () => {\n \* // OK: a class\n \* const engine = inject(Engine);\n \* return new Car(engine);\n \* }}\n \* ]\n \* ```\n \*\n \* Calls to the `inject()` function outside of the class creation context will result in error. Most\n \* notably, calls to `inject()` are disallowed after a class instance was created, in methods\n \* (including lifecycle hooks):\n \*\n \* ```typescript\n \* @Component({ ... })\n \* export class CarComponent {\n \* ngOnInit() {\n \* // ERROR: too late, the component instance was already created\n \* const engine = inject(Engine);\n \* engine.start();\n \* }\n \* }\n \* ```\n \*\n \* @publicApi\n \*\n \* @next\n \* export function inject<T>(\n \* token: ProviderToken<T>, flags: InjectFlags|InjectOptions = InjectFlags.Default): T|null {\n \* if (typeof flags !== 'number') {\n \* // While TypeScript doesn't accept it without a cast, bitwise OR with false-y values in\n \* // JavaScript is a no-op. We can use that for a very codesize-efficient conversion from\n \* // `InjectOptions` to `InjectFlags`.\n \* flags = (InternalInjectFlags.Default | // comment to force a line break in the formatter\n \* ((flags.optional && InternalInjectFlags.Optional) as number) |\n \* ((flags.host && InternalInjectFlags.Host) as number) |\n \* ((flags.self && InternalInjectFlags.Self) as number) |\n \* ((flags.skipSelf && InternalInjectFlags.SkipSelf) as number)) as InjectFlags;\n \* }\n \* return inject(token, flags);\n \* }\n \* export function injectArgs(types: (ProviderToken<any>|any[]|[]): any[] {\n \* const args: any[] = [];\n \* for (let i = 0; i < types.length; i++) {\n \* const arg = resolveForwardRef(types[i]);\n \* if (Array.isArray(arg)) {\n \* if (arg.length === 0) {\n \* throw new RuntimeError(\n \* RuntimeErrorCode.INVALID\_DIFFER\_INPUT,\n \* ngDevMode && 'Arguments array must have arguments.);\n \* }\n \* let type: Type<any>|undefined = undefined;\n \* let flags: InjectFlags = InjectFlags.Default;\n \* for (let j = 0; j < arg.length; j++) {\n \* const meta = arg[j];\n \* const flag = getInjectFlag(meta);\n \* if (typeof flag === 'number') {\n \* // Special case when we handle @Inject decorator.\n \* if (flag === DecoratorFlags.Inject) {\n \* type = meta.token;\n \* } else {\n \* flags |= flag;\n \* }\n \* } else {\n \* type = meta;\n \* }\n \* }\n \* args.push(inject(type!, flags));\n \* } else {\n \* args.push(inject(arg));\n \* }\n \* }\n \* return args;\n \* }\n \* }\n \* }\n \* }\n \*\n \* @next\n \* \* Attaches a given InjectFlag to a given decorator using monkey-patching.\n \* \* Since DI decorators can be used in providers `deps` array (when provider is configured using\n \* \* `useFactory`) without initialization (e.g. `Host`) and as an instance (e.g. `new Host()`), we\n \* \* attach the flag to make it available both as a static property and as a field on decorator\n \* \* instance.\n \* \* @param decorator Provided DI decorator.\n \* \* @param flag InjectFlag that should be applied.\n \* \* @next\n \* export function attachInjectFlag(decorator: any, flag: InternalInjectFlags|DecoratorFlags): any {\n \* decorator[DI\_DECORATOR\_FLAG] = flag;\n \* decorator.prototype[DI\_DECORATOR\_FLAG] = flag;\n \* return decorator;\n \* }\n \* }\n \* }\n \*\n \* @next\n \* \* Reads monkey-patched property that contains InjectFlag attached to a decorator.\n \* \* @param token Token that may contain monkey-patched DI flags property.\n \* \* @next\n \* export function getInjectFlag(token: any): number|undefined {\n \* return token[DI\_DECORATOR\_FLAG];\n \* }\n \* }\n \* }\n \*\n \* @next\n \* export function catchInjectorError(\n \* e: any, token: any, injectorErrorName: string, source: string|null): never {\n \* const tokenPath: any[] = e[NG\_TEMP\_TOKEN\_PATH];\n \* if (token[SOURCE]) {\n \* tokenPath.unshift(token[SOURCE]);\n \* }\n \* e.message = formatError(`\n \* '\n \* + e.message, tokenPath, injectorErrorName, source);\n \* e[NG\_TOKEN\_PATH] = tokenPath;\n \* e[NG\_TEMP\_TOKEN\_PATH] = null;\n \* throw e;\n \* }\n \* }\n \* }\n \*\n \* @next\n \* export function formatError(\n \* text: string, obj: any, injectorErrorName: string, source: string|null = null): string {\n \* text = text && text.charAt(0) === '\n \* && text.charAt(1) == NO\_NEW\_LINE ? text.slice(2) : text;\n \* let context = stringify(obj);\n \* if (Array.isArray(obj))

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    {\n  context = obj.map(stringify).join(' -> '); \n } else if (typeof obj === 'object') {\n  let parts = <string[]>; \n
for (let key in obj) {\n  if (obj.hasOwnProperty(key)) {\n    let value = obj[key]; \n    parts.push(\n      key
+ ':' + (typeof value === 'string' ? JSON.stringify(value) : stringify(value)); \n    } \n } \n context =
`${parts.join(', ')} \n } \n return `${injectorErrorName}${source ? '( ' + source + ' ) : '}${context}: ${\n
text.replace(NEW_LINE, '\n ')} \n`; \n } \n } \n /** \n * @license \n * Copyright Google LLC All Rights Reserved. \n * \n *
Use of this source code is governed by an MIT-style license that can be \n * found in the LICENSE file at
https://angular.io/license \n * \n \n import {makeParamDecorator} from './util/decorators'; \n \n import
{attachInjectFlag} from './injector_compatibility'; \n \n import {DecoratorFlags, InternalInjectFlags} from
 './interface/injector'; \n \n \n /** \n * Type of the Inject decorator / constructor function. \n
* \n * @publicApi \n * \n \n export interface InjectDecorator {\n /** \n * Parameter decorator on a dependency
parameter of a class constructor \n * that specifies a custom provider of the dependency. \n * \n * @usageNotes
* The following example shows a class constructor that specifies a \n * custom provider of a dependency using the
parameter decorator. \n * \n * When `@Inject()` is not present, the injector uses the type annotation of the \n *
parameter as the provider. \n * \n * <code-example path="core/di/ts/metadata_spec.ts"
region="InjectWithoutDecorator"> \n * </code-example> \n * \n * @see ["Dependency Injection
Guide"](guide/dependency-injection) \n * \n * \n (token: any): any; \n new(token: any): Inject; \n } \n \n /** \n * Type
of the Inject metadata. \n * \n * @publicApi \n * \n \n export interface Inject {\n /** \n * A [DI
token](guide/glossary#di-token) that maps to the dependency to be injected. \n * \n token: any; \n } \n \n /** \n * Inject
decorator and metadata. \n
* \n * @Annotation \n * @publicApi \n * \n \n export const Inject: InjectDecorator = attachInjectFlag(\n // Disable
tslint because `DecoratorFlags` is a const enum which gets inlined. \n // tslint:disable-next-line: no-toplevel-
property-access \n makeParamDecorator('Inject', (token: any) => ({token})), DecoratorFlags.Inject); \n \n /** \n *
Type of the Optional decorator / constructor function. \n * \n * @publicApi \n * \n \n export interface OptionalDecorator
{\n /** \n * Parameter decorator to be used on constructor parameters, \n * which marks the parameter as being an
optional dependency. \n * The DI framework provides `null` if the dependency is not found. \n * \n * Can be used
together with other parameter decorators \n * that modify how dependency injection operates. \n * \n *
@usageNotes \n * \n * The following code allows the possibility of a `null` result: \n * \n * <code-example
path="core/di/ts/metadata_spec.ts" region="Optional"> \n * </code-example> \n * \n
* \n * @see ["Dependency Injection Guide"](guide/dependency-injection). \n * \n ( ): any; \n new():
Optional; \n } \n \n /** \n * Type of the Optional metadata. \n * \n * @publicApi \n * \n \n export interface Optional
{\n } \n \n /** \n * Optional decorator and metadata. \n * \n * @Annotation \n * @publicApi \n * \n \n export const Optional:
OptionalDecorator = \n // Disable tslint because `InternalInjectFlags` is a const enum which gets inlined. \n //
tslint:disable-next-line: no-toplevel-property-access \n attachInjectFlag(makeParamDecorator('Optional'),
InternalInjectFlags.Optional); \n \n /** \n * Type of the Self decorator / constructor function. \n * \n * @publicApi
* \n \n \n export interface SelfDecorator {\n /** \n * Parameter decorator to be used on constructor parameters, \n *
which tells the DI framework to start dependency resolution from the local injector. \n * \n * Resolution works
upward through the injector hierarchy, so the children \n * of this class must configure their own providers or
be prepared for a `null` result. \n * \n * @usageNotes \n * \n * In the following example, the dependency can be
resolved \n * by the local injector when instantiating the class itself, but not \n * when instantiating a child. \n * \n
* <code-example path="core/di/ts/metadata_spec.ts" region="Self"> \n * </code-example> \n * \n * @see
`SkipSelf` \n * @see `Optional` \n * \n ( ): any; \n new(): Self; \n } \n \n /** \n * Type of the Self metadata. \n * \n
* @publicApi \n * \n \n export interface Self {\n } \n \n /** \n * Self decorator and metadata. \n * \n * @Annotation
* \n * @publicApi \n * \n \n export const Self: SelfDecorator = \n // Disable tslint because `InternalInjectFlags` is a const
enum which gets inlined. \n // tslint:disable-next-line: no-toplevel-property-access \n
attachInjectFlag(makeParamDecorator('Self'), InternalInjectFlags.Self); \n \n /** \n * Type of the `SkipSelf`
decorator / constructor function. \n * \n * @publicApi \n * \n \n export interface SkipSelfDecorator {\n /** \n
* Parameter decorator to be used on constructor parameters, \n * which tells the DI framework to start
dependency resolution from the parent injector. \n * Resolution works upward through the injector hierarchy, so the

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local injector\n \* is not checked for a provider.\n \*\n \* @usageNotes\n \*\n \* In the following example, the dependency can be resolved when\n \* instantiating a child, but not when instantiating the class itself.\n \*\n \* <code-example path=\"core/di/ts/metadata\_spec.ts\" region=\"SkipSelf\">\n \* </code-example>\n \*\n \* @see [Dependency Injection guide](guide/dependency-injection-in-action#skip).\n \* @see `Self`\n \* @see `Optional`\n \*\n \* \n (\*): any;\n new(): SkipSelf;\n}\n\n/\*\*\n \* Type of the `SkipSelf` metadata.\n \*\n \* @publicApi\n \*\n \* \nexport interface SkipSelf {\n}\n\n/\*\*\n \* `SkipSelf` decorator and metadata.\n \*\n \* @Annotation\n \*\n \* @publicApi\n \*\n \* \nexport const SkipSelf: SkipSelfDecorator =\n // Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.\n // tslint:disable-next-line: no-toplevel-property-access\n attachInjectFlag(makeParamDecorator('SkipSelf'), InternalInjectFlags.SkipSelf);\n\n/\*\*\n \* Type of the `Host` decorator / constructor function.\n \*\n \* @publicApi\n \*\n \* \nexport interface HostDecorator {\n}\n\n/\*\*\n \* Parameter decorator on a view-provider parameter of a class constructor\n \* that tells the DI framework to resolve the view by checking injectors of child\n \* elements, and stop when reaching the host element of the current component.\n \*\n \* @usageNotes\n \*\n \* The following shows use with the `@Optional` decorator, and allows for a `null` result.\n \*\n \* <code-example path=\"core/di/ts/metadata\_spec.ts\" region=\"Host\">\n \* </code-example>\n \*\n \* For an extended example, see [\"Dependency Injection\n \* Guide\"](guide/dependency-injection-in-action#optional).\n \*\n \* \n (\*): any;\n new(): Host;\n}\n\n/\*\*\n \* Type of the Host metadata.\n \*\n \* @publicApi\n \*\n \* \nexport interface Host {\n}\n\n/\*\*\n \* Host decorator and metadata.\n \*\n \* @Annotation\n \*\n \* @publicApi\n \*\n \* \nexport const Host: HostDecorator =\n // Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.\n // tslint:disable-next-line: no-toplevel-property-access\n attachInjectFlag(makeParamDecorator('Host'), InternalInjectFlags.Host);\n\n\", \"/\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*\n \* \n \* The strategy that the default change detector uses to detect changes.\n \* When set, takes effect the next time change detection is triggered.\n \*\n \* @see { @link ChangeDetectorRef#usage-notes Change detection usage }\n \*\n \* @publicApi\n \*\n \* \nexport enum ChangeDetectionStrategy {\n\n /\*\*\n \* Use the `CheckOnce` strategy, meaning that automatic change detection is deactivated\n \*\n \* until reactivated by setting the strategy to `Default` (`CheckAlways`).\n \* Change detection can still be explicitly invoked.\n \* This strategy applies to all child directives and cannot be overridden.\n \*\n \* \n OnPush = 0,\n\n /\*\*\n \* Use the default `CheckAlways` strategy, in which change detection is automatic until\n \* explicitly deactivated.\n \*\n \* \n Default = 1,\n}\n\n/\*\*\n \* Defines the possible states of the default change detector.\n \*\n \* @see `ChangeDetectorRef`\n \*\n \* \nexport enum ChangeDetectorStatus {\n\n /\*\*\n \* A state in which, after calling `detectChanges()`, the change detector\n \* state becomes `Checked`, and must be explicitly invoked or reactivated.\n \*\n \* \n CheckOnce,\n\n /\*\*\n \* A state in which change detection is skipped until the change detector mode\n \* becomes `CheckOnce`.\n \*\n \* \n Checked,\n\n /\*\*\n \* A state in which change detection continues automatically until explicitly\n \* deactivated.\n \*\n \* \n CheckAlways,\n\n /\*\*\n \* A state in which a change detector sub tree is not a part of the main tree and\n \* should be skipped.\n \*\n \* \n Detached,\n\n /\*\*\n \* Indicates that the change detector encountered an error checking a binding\n \* or calling a directive lifecycle method and is now in an inconsistent state. Change\n \* detectors in this state do not detect changes.\n \*\n \* \n Errored,\n\n /\*\*\n \* Indicates that the change detector has been destroyed.\n \*\n \* \n Destroyed,\n}\n\n/\*\*\n \* Reports whether a given strategy is currently the default for change detection.\n \*\n \* @param changeDetectionStrategy The strategy to check.\n \* @returns True if the given strategy is the current default, false otherwise.\n \*\n \* @see `ChangeDetectorStatus`\n \*\n \* @see `ChangeDetectorRef`\n \*\n \* \nexport function isDefaultChangeDetectionStrategy(changeDetectionStrategy: ChangeDetectionStrategy):\n boolean {\n\n return changeDetectionStrategy === null ||\n changeDetectionStrategy === ChangeDetectionStrategy.Default;\n}\n\n\", \"/\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*\n \* \n \* Defines the CSS styles encapsulation policies for the { @link Component } decorator's\n \* `encapsulation` option.\n \*\n \* See



unique IDs for component definitions. \*`\nlet componentDefCount = 0;\n\n\n`\* Create a component definition object.`\n * \n * # Example\n * ```\n * class MyDirective {\n * // Generated by Angular Template Compiler\n * // [Symbol] syntax will not be supported by TypeScript until v2.7\n * static cmp = defineComponent({\n * ... \n * });\n * }\n * ```\n * @codegenApi\n * \nexport function defineComponent<T>(componentDefinition: {\n /**\n * Directive type, needed to configure the injector.\n * \n type: Type<T>;\n /** The selectors that will be used to match nodes to this component. * \n selectors?: CssSelectorList;\n /**\n * The number of nodes, local refs, and pipes in this component template. * \n * Used to calculate the length of this component's LView array, so we * can pre-fill the array and set the binding start index. * \n // TODO(kara): remove queries from this count\n decls: number;\n /**\n * The number of bindings in this component template (including pure fn bindings). * \n * Used to calculate the length of this component's LView array, so we * can pre-fill the array and set the host binding start index. * \n vars: number;\n /**\n * A map of input names. * \n * The format is in: `{{actualPropertyName: string]}:(string|[string, string])}`. * \n * Given:\n * ```\n * class MyComponent {\n * @Input()\n * publicInput1: string;\n * \n * @Input('publicInput2')\n * declaredInput2: string;\n * }\n * ```\n * \n * is described as:\n * ```\n * {\n * publicInput1: 'publicInput1',\n * declaredInput2: ['publicInput2', 'declaredInput2'],\n * }\n * ```\n * \n * Which the minifier may translate to:\n * ```\n * {\n * minifiedPublicInput1: 'publicInput1',\n * minifiedDeclaredInput2: ['publicInput2', 'declaredInput2'],\n * }\n * ```\n * \n * This allows the render to re-construct the minified, public, and declared names * of properties. * \n * NOTE:\n * - Because declared and public name are usually same we only generate the array * `['public', 'declared']` format when they differ. * - The reason why this API and `outputs` API is not the same is that `NgOnChanges` has * inconsistent behavior in that it uses declared names rather than minified or public. For * this reason `NgOnChanges` will be deprecated and removed in future version and this * API will be simplified to be consistent with `output`. * \n * inputs?: {[P in keyof T]?: string | [string, string]};\n /**\n * A map of output names. * \n * The format is in: `{{actualPropertyName: string]:string}`. * \n * Which the minifier may translate to: `{{minifiedPropertyName: string]:string}`. * \n * This allows the render to re-construct the minified and non-minified names * of properties. * \n * outputs?: {[P in keyof T]?: string};\n /**\n * Function executed by the parent template to allow child directive to apply host bindings. * \n * hostBindings?: HostBindingsFunction<T>;\n /**\n * The number of bindings in this directive `hostBindings` (including pure fn bindings). * \n * Used to calculate the length of the component's LView array, so we * can pre-fill the array and set the host binding start index. * \n * hostVars?: number;\n /**\n * Assign static attribute values to a host element. * \n * This property will assign static attribute values as well as class and style * values to a host element. Since attribute values can consist of different types of values, the * `hostAttrs` array must include the values in the following format:\n * \n * attrs = [\n * // static attributes (like `title`, `name`, `id`...)\n * \n * attr1, value1, attr2, value,\n * \n * // a single namespace value (like `x:id`)\n * \n * NAMESPACE_MARKER, namespaceUri1, name1, value1,\n * \n * // another single namespace value (like `x:name`)\n * \n * NAMESPACE_MARKER, namespaceUri2, name2, value2,\n * \n * // a series of CSS classes that will be applied to the element (no spaces)\n * \n * CLASSES_MARKER, class1, class2, class3,\n * \n * // a series of CSS styles (property + value) that will be applied to the element\n * \n * STYLES_MARKER, prop1, value1, prop2, value2\n * ]\n * \n * All non-class and non-style attributes must be defined at the start of the list * first before all class and style values are set. When there is a change in value * type (like when classes and styles are introduced) a marker must be used to separate * the entries. The marker values themselves are set via entries found in the * [AttributeMarker] enum. * \n * hostAttrs?: TAttributes;\n /**\n * Function to create instances of content queries associated with a given directive. * \n * contentQueries?: ContentQueriesFunction<T>;\n /**\n * Defines the name that can be used in the template to assign this directive to a variable. * \n * See: {@link Directive.exportAs}\n * \n * exportAs?: string[];\n /**\n * Template function use for rendering DOM. * \n * This function has following structure. * \n * ```\n * function Template<T>(ctx:T, creationMode: boolean) {\n * if (creationMode) {\n * // Contains creation mode`

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instructions.\n * }\n * // Contains binding update instructions\n * }\n * ```\n * \n * Common instructions
are:\n * Creation mode instructions:\n * - `elementStart`, `elementEnd`\n * - `text`\n * - `container`\n * -
`listener`\n * \n * Binding update instructions:\n * - `bind`\n * - `elementAttribute`\n * - `elementProperty`\n
* - `elementClass`\n * - `elementStyle`\n * \n * \n template: ComponentTemplate<T>;\n\n
/**\n * Constants for the nodes in the component's view.\n * Includes attribute arrays, local definition arrays
etc.\n * \n const?: TConstantsOrFactory;\n\n /**\n * An array of `ngContent[selector]` values that were found
in the template.\n * \n ngContentSelectors?: string[];\n\n /**\n * Additional set of instructions specific to view
query processing. This could be seen as a\n * set of instruction to be inserted into the template function.\n * \n
* Query-related instructions need to be pulled out to a specific function as a timing of\n * execution is different as
compared to all other instructions (after change detection hooks but\n * before view hooks).\n * \n viewQuery?:
ViewQueriesFunction<T>| null;\n\n /**\n * A list of optional features to apply.\n * \n * See: { @link
NgOnChangesFeature}, { @link ProvidersFeature}\n * \n features?: ComponentDefFeature[];\n\n /**\n *
Defines template and style encapsulation options available
for Component's { @link Component}.\n * \n encapsulation?: ViewEncapsulation;\n\n /**\n * Defines arbitrary
developer-defined data to be stored on a renderer instance.\n * This is useful for renderers that delegate to other
renderers.\n * \n * see: animation\n * \n data?: {[kind: string]: any};\n\n /**\n * A set of styles that the
component needs to be present for component to render correctly.\n * \n styles?: string[];\n\n /**\n * The
strategy that the default change detector uses to detect changes.\n * When set, takes effect the next time change
detection is triggered.\n * \n changeDetection?: ChangeDetectionStrategy;\n\n /**\n * Registry of directives,
components, and pipes that may be found in this component's view.\n * \n * This property is either an array of
types or a function that returns the array of types. This\n * function may be necessary to support forward
declarations.\n * \n dependencies?: TypeOrFactory<DependencyTypeList>;\n\n /**\n
* The set of schemas that declare elements to be allowed in the component's template.\n * \n schemas?:
SchemaMetadata[] | null;\n\n /**\n * Whether this directive/component is standalone.\n * \n standalone?:
boolean;\n}): unknown {\n return noSideEffects() => {\n // Initialize ngDevMode. This must be the first
statement in defineComponent.\n // See the `initNgDevMode` docstring for more information.\n (typeof
ngDevMode === 'undefined' || ngDevMode) && initNgDevMode();\n\n const type = componentDefinition.type;\n
const standalone = componentDefinition.standalone === true;\n const declaredInputs: {[key: string]: string} = {}
as any;\n const def: Mutable<ComponentDef<any>, keyof ComponentDef<any>> = {\n type: type,\n
providersResolver: null,\n decls: componentDefinition.decls,\n vars: componentDefinition.vars,\n factory:
null,\n template: componentDefinition.template || null!,\n consts: componentDefinition.consts
|| null,\n ngContentSelectors: componentDefinition.ngContentSelectors,\n hostBindings:
componentDefinition.hostBindings || null,\n hostVars: componentDefinition.hostVars || 0,\n hostAttrs:
componentDefinition.hostAttrs || null,\n contentQueries: componentDefinition.contentQueries || null,\n
declaredInputs: declaredInputs,\n inputs: null!, // assigned in noSideEffects\n outputs: null!, // assigned in
noSideEffects\n exportAs: componentDefinition.exportAs || null,\n onPush:
componentDefinition.changeDetection === ChangeDetectionStrategy.OnPush,\n directiveDefs: null!, // assigned
in noSideEffects\n pipeDefs: null!, // assigned in noSideEffects\n standalone,\n dependencies:
standalone && componentDefinition.dependencies || null,\n getStandaloneInjector: null,\n selectors:
componentDefinition.selectors || EMPTY_ARRAY,\n viewQuery: componentDefinition.viewQuery || null,\n
features: componentDefinition.features
as DirectiveDefFeature[] || null,\n data: componentDefinition.data || {},\n encapsulation:
componentDefinition.encapsulation || ViewEncapsulation.Emulated,\n id: `c${componentDefCount++}`,\n
styles: componentDefinition.styles || EMPTY_ARRAY,\n _: null,\n setInput: null,\n schemas:
componentDefinition.schemas || null,\n tView: null,\n };
const dependencies =
componentDefinition.dependencies;\n const feature = componentDefinition.features;\n def.inputs =
invertObject(componentDefinition.inputs, declaredInputs),\n def.outputs =
invertObject(componentDefinition.outputs),\n feature && feature.forEach((fn) => fn(def));\n def.directiveDefs

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= dependencies ?\n    (() => (typeof dependencies === 'function' ? dependencies() : dependencies))\n
.map(extractDirectiveDef)\n    .filter(nonNull)) :\n    null;\n    def.pipeDefs = dependencies ?\n    (()
=> (typeof dependencies ===
'function' ? dependencies() : dependencies))\n    .map(getPipeDef)\n    .filter(nonNull)) :\n
null;\n\n    return def;\n    });\n}\n\n/**\n * Generated next to NgModules to monkey-patch directive and pipe
references onto a component's\n * definition, when generating a direct reference in the component file would
otherwise create an\n * import cycle.\n * See [this
explanation](https://hackmd.io/Odw80D0pR6yfsOjg_7XCJg?view) for more details.\n *\n * @codeGenApi\n
*\nexport function setComponentScope(\n    type: ComponentType<any>, directives: Type<any>[])((() =>
Type<any>[]),\n    pipes: Type<any>[])((() => Type<any>[])): void {\n    const def = (type.cmp as
ComponentDef<any>);\n    def.directiveDefs = () =>\n        (typeof directives === 'function' ? directives() :
directives).map(extractDirectiveDef) as\n        DirectiveDefList;\n    def.pipeDefs = () =>\n        (typeof pipes ===
'function' ? pipes() : pipes).map(getPipeDef) as\n        PipeDefList;\n}\n\nexport
function extractDirectiveDef(type: Type<any>): DirectiveDef<any>|ComponentDef<any>|null {\n    return
getComponentDef(type) || getDirectiveDef(type);\n}\n\nfunction nonNull<T>(value: T|null): value is T {\n    return
value !== null;\n}\n\n/**\n * @codeGenApi\n *\nexport function defineNgModule<T>(def: {\n    /** Token
representing the module. Used by DI. *\n    type: T;\n    /** List of components to bootstrap. *\n    bootstrap?:
Type<any>[] | (() => Type<any>[]);\n    /** List of components, directives, and pipes declared by this module. *\n
    declarations?: Type<any>[] | (() => Type<any>[]);\n    /** List of modules or `ModuleWithProviders` imported by
this module. *\n    imports?: Type<any>[] | (() => Type<any>[]);\n\n    /**\n     * List of modules,
`ModuleWithProviders`, components, directives, or pipes exported by this\n     * module.\n     *\n    exports?:
Type<any>[] | (() => Type<any>[]);\n    /** The set of schemas that declare elements to be allowed in the
NgModule. *\n    schemas?: SchemaMetadata[]
| null;\n    /** Unique ID for the module that is used with `getModuleFactory`. *\n    id?: string | null;\n}): unknown
{\n    return noSideEffects(() => {\n        const res: NgModuleDef<T> = {\n            type: def.type,\n            bootstrap:
def.bootstrap || EMPTY_ARRAY,\n            declarations: def.declarations || EMPTY_ARRAY,\n            imports: def.imports
|| EMPTY_ARRAY,\n            exports: def.exports || EMPTY_ARRAY,\n            transitiveCompileScopes: null,\n            schemas:
def.schemas || null,\n            id: def.id || null,\n        });\n        return res;\n    });\n}\n\n/**\n * Adds the module
metadata that is necessary to compute the module's transitive scope to an\n * existing module definition.\n *\n * Scope metadata of modules is not used in production builds, so calls to this function can be\n * marked pure to tree-
shake it from the bundle, allowing for all referenced declarations\n * to become eligible for tree-shaking as well.\n
*\n * @codeGenApi\n *\nexport function setNgModuleScope(type: any, scope:
{\n    /** List of components, directives, and pipes declared by this module. *\n    declarations?: Type<any>[]|(() =>
Type<any>[]);\n    /** List of modules or `ModuleWithProviders` imported by this module. *\n    imports?:
Type<any>[] | (() => Type<any>[]);\n    /**\n     * List of modules, `ModuleWithProviders`, components, directives,
or pipes exported by this\n     * module.\n     *\n    exports?: Type<any>[] | (() => Type<any>[]);\n}): unknown {\n
return noSideEffects(() => {\n        const ngModuleDef = getNgModuleDef(type, true);\n        ngModuleDef.declarations
= scope.declarations || EMPTY_ARRAY;\n        ngModuleDef.imports = scope.imports || EMPTY_ARRAY;\n        ngModuleDef.exports
= scope.exports || EMPTY_ARRAY;\n    });\n}\n\n/**\n * Inverts an inputs or outputs lookup
such that the keys, which were the\n * minified keys, are part of the values, and the values are parsed so that\n * the
publicName of the property is the new key\n *\n * e.g. for\n *\n * ```\n * class Comp {\n *     @Input()\n *     propName1:
string;\n *\n *     @Input('publicName2')\n *     declaredPropName2: number;\n * }\n * ```\n *\n * will be serialized
as\n *\n * ```\n * {\n *     propName1: 'propName1',\n *     declaredPropName2: ['publicName2',
'declaredPropName2'],\n * }\n * ```\n *\n * which is then translated by the minifier as:\n *\n * ```\n * {\n *
minifiedPropName1: 'propName1',\n *     minifiedPropName2: ['publicName2', 'declaredPropName2'],\n * }\n * ```\n
*\n * becomes: (public name => minifiedName)\n *\n * ```\n * {\n *     'propName1': 'minifiedPropName1',\n *
'publicName2': 'minifiedPropName2',\n * }\n * ```\n *\n * Optionally the function can take `secondary` which will

```



```

class and style values are set. When there is a change in value
 * type (like when classes and styles are
introduced) a marker must be used to separate
 * the entries. The marker values themselves are set via entries
found in the
 * [AttributeMarker] enum.
 * /\n hostAttrs?: TAttributes;
 * /\n
 * Function to
create instances of content queries associated with a given directive.
 * /\n
 * contentQueries?:
ContentQueriesFunction<T>;
 * /\n
 * Additional set of instructions specific to view query processing.
This could be seen as a
 * set of instructions to be inserted into the template function.
 * /\n
viewQuery?: ViewQueriesFunction<T>| null;
 * /\n
 * Defines the name that can be used in the template to
assign this directive to a variable.
 * /\n
 * See: { @link Directive.exportAs}
 * /\n
 * exportAs?:
string[];
 * /\n
 * }) => never;
 * /\n
 * Create a pipe definition object.
 * /\n
 * # Example
 * ``
 * class MyPipe implements PipeTransform {
 * // Generated by Angular Template
 * Compiler
 * static pipe = definePipe({
 * ...
 * });
 * /\n
 * ``
 * @param pipeDef Pipe definition
generated by the compiler
 * /\n
 * @codeGenApi
 * /\n
 * export function definePipe<T>(pipeDef: {
 * /\n
 * /** Name of
the pipe. Used for matching pipes in template to pipe defs.
 * /\n
 * name: string,
 * /\n
 * /** Pipe class reference. Needed
to extract pipe lifecycle hooks.
 * /\n
 * type: Type<T>,
 * /\n
 * /** Whether the pipe is pure.
 * /\n
 * pure?: boolean,
 * /\n
 * /\n
 * /** Whether the pipe is standalone.
 * /\n
 * standalone?: boolean,
 * /\n
 * }): unknown {
 * /\n
 * return (<PipeDef<T>>){
 * type: pipeDef.type,
 * /\n
 * name: pipeDef.name,
 * /\n
 * factory: null,
 * /\n
 * pure: pipeDef.pure !== false,
 * /\n
 * standalone:
 * pipeDef.standalone === true,
 * /\n
 * onDestroy: pipeDef.type.prototype.ngOnDestroy || null
 * /\n
 * });
 * /\n
 * /\n
 * /\n
 * The
following getter methods retrieve the definition from the type. Currently the retrieval
 *
 * honors inheritance, but in the future we may change the rule to require that definitions are
 * explicit. This would
require some sort of migration strategy.
 * /\n
 * export function getComponentDef<T>(type: any):
ComponentDef<T>|null {
 * /\n
 * return type[NG_COMP_DEF] || null;
 * /\n
 * /\n
 * export function getDirectiveDef<T>(type:
any): DirectiveDef<T>|null {
 * /\n
 * return type[NG_DIR_DEF] || null;
 * /\n
 * /\n
 * export function getPipeDef<T>(type:
any): PipeDef<T>|null {
 * /\n
 * return type[NG_PIPE_DEF] || null;
 * /\n
 * /\n
 * export function isStandalone<T>(type:
Type<T>): boolean {
 * /\n
 * const def = getComponentDef(type) || getDirectiveDef(type) || getPipeDef(type);
 * /\n
 * return
 * def !== null ? def.standalone : false;
 * /\n
 * /\n
 * export function getNgModuleDef<T>(type: any, throwNotFound: true):
NgModuleDef<T>;
 * /\n
 * export function getNgModuleDef<T>(type: any): NgModuleDef<T>|null;
 * /\n
 * export function
 * getNgModuleDef<T>(type: any, throwNotFound?: boolean): NgModuleDef<T>|null {
 * /\n
 * const ngModuleDef =
 * type[NG_MOD_DEF] || null;
 * /\n
 * if
 * (!ngModuleDef && throwNotFound === true) {
 * /\n
 * throw new Error(`Type ${stringify(type)} does not have 'mod'
 * property.`);
 * /\n
 * }
 * /\n
 * return ngModuleDef;
 * /\n
 * /\n
 * /\n
 * @license
 * Copyright Google LLC All Rights Reserved.
 * /\n
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 * /\n
 * import {TNode} from './node';
 * import {RComment, RElement} from
 * './render_dom';
 * import {HOST, LView, NEXT, PARENT, T_HOST,
 * TRANSPLANTED_VIEWS_TO_REFRESH} from './view';
 * /\n
 * /\n
 * /\n
 * Special location which allows easy
identification of type. If we have an array which was
 * retrieved from the `LView` and that array has `true` at
`TYPE` location, we know it is
 * `LContainer`.
 * /\n
 * export const TYPE = 1;
 * /\n
 * /\n
 * Below are constants for
LContainer indices to help us look up LContainer members
 * without having to remember the specific indices.
 * /\n
 * Uglify will inline these when minifying so there shouldn't be a cost.
 * /\n
 * /\n
 * /\n
 * Flag to signify that this `LContainer` may have transplanted views which need to be change
 * detected. (see: `LView[DECLARATION_COMPONENT_VIEW]`).
 * /\n
 * This flag, once set, is never unset for
the `LContainer`. This means that when unset we can skip
 * a lot of work in `refreshEmbeddedViews`. But when
set we still need to verify
 * that the `MOVED_VIEWS` are transplanted and on-push.
 * /\n
 * export const
 * HAS_TRANSPLANTED_VIEWS = 2;
 * /\n
 * /\n
 * PARENT, NEXT, TRANSPLANTED_VIEWS_TO_REFRESH are
indices 3, 4, and 5
 * /\n
 * As we already have these constants in LView, we don't need to re-create them.
 * /\n
 * /\n
 * T_HOST
is index 6
 * /\n
 * We already have this constants in LView, we don't need to re-create it.
 * /\n
 * export const NATIVE =
 * 7;
 * /\n
 * export const VIEW_REFS = 8;
 * /\n
 * export const MOVED_VIEWS = 9;
 * /\n
 * /\n
 * Size of LContainer's header.
Represents the index after which all views in the
 * container will be inserted. We need to keep a record of current
views so we know
 * which views are already

```

in the DOM (and don't need to be re-added) and so we can remove views from the DOM when they are no longer required.

```

export const CONTAINER_HEADER_OFFSET = 10;

```

The state associated with a container. This is an array so that its structure is closer to LView. This helps when traversing the view tree (which is a mix of containers and component views), so we can jump to viewOrContainer[NEXT] in the same way regardless of type.

```

export interface LContainer extends Array<any> {

```

The host element of this LContainer. The host could be an LView if this container is on a component node. In that case, the component LView is its HOST.

```

readonly [HOST]: RElement|RComment|LView;

```

This is a type field which allows us to differentiate `LContainer` from `StylingContext` in an efficient way. The value is always set to `true`.

```

[TYPE]: true;

```

Flag to signify that this `LContainer` may have transplanted views which need to be change detected. (see:

```

LView[DECLARATION_COMPONENT_VIEW])

```

This flag, once set, is never unset for the `LContainer`.

```

[HAS_TRANSPLANTED_VIEWS]: boolean;

```

Access to the parent view is necessary so we can propagate back up from inside a container to parent[NEXT].

```

[PARENT]: LView;

```

This allows us to jump from a container to a sibling container or component view with the same parent, so we can remove listeners efficiently.

```

[NEXT]: LView|LContainer|null;

```

The number of direct transplanted views which need a refresh or have descendants themselves that need a refresh but have not marked their ancestors as Dirty. This tells us that during change detection we should still descend to find those children to refresh, even if the parents are not `Dirty`/`CheckAlways`.

```

[TRANSPLANTED_VIEWS_TO_REFRESH]: number;

```

A collection of views created based on the underlying `` element but inserted into a different `LContainer`. We need to track views created from a given declaration point since queries collect matches from the embedded view declaration point and `_not_` the insertion point.

```

[MOVED_VIEWS]: LView[]|null;

```

Pointer to the `TNode` which represents the host of the container.

```

[T_HOST]: TNode;

```

The comment element that serves as an anchor for this LContainer.

```

readonly [NATIVE]: RComment;

```

TODO(misko): remove as this value can be gotten by unwrapping `[HOST]`.

```

[HOST]: ViewRef[]|null;

```

Array of `ViewRef`s used by any `ViewContainerRef`s that point to this container. This is lazily initialized by `ViewContainerRef` when the first view is inserted.

NOTE: This is stored as `any[]` because `render3` should really not be aware of `ViewRef` and doing so creates circular dependency.

```

[VIEW_REFS]:

```

```

unknown[]|null;

```

Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.

```

export const unusedValueExportToPlacateAjd = 1;

```

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```

import {Injector} from './di/injector';
import {ProviderToken} from './di/provider_token';
import {Type} from './interface/type';
import {SchemaMetadata} from './metadata/schema';
import {Sanitizer} from './sanitization/sanitizer';
import {LContainer} from './container';
import {ComponentDef, ComponentTemplate, DirectiveDef, DirectiveDefList, HostBindingsFunction, PipeDef, PipeDefList, ViewQueriesFunction} from './definition';
import {I18nUpdateOpCodes, T18n, TIcu} from './i18n';
import {TConstants, TNode} from './node';
import {LQueries, TQueries} from './query';
import {Renderer, RendererFactory} from './renderer';
import {RComment, RElement} from './renderer_dom';
import {TStylingKey, TStylingRange} from './styling';

```

Below are constants for LView indices to help us look up LView members without having to remember the specific indices. Uglify will inline these when minifying so there shouldn't be a cost.

```

export const HOST = 0;
export const TVIEW = 1;
export const FLAGS = 2;
export const PARENT = 3;
export const NEXT = 4;
export const TRANSPLANTED_VIEWS_TO_REFRESH = 5;
export const T_HOST = 6;
export const CLEANUP = 7;
export const CONTEXT = 8;
export const INJECTOR = 9;
export const RENDERER_FACTORY = 10;
export const RENDERER = 11;
export const SANITIZER = 12;
export const CHILD_HEAD = 13;
export const CHILD_TAIL = 14;

```

Investigate if the three declarations aren't all same thing.

```

export const DECLARATION_VIEW = 15;
export const DECLARATION_COMPONENT_VIEW = 16;
export const DECLARATION_LCONTAINER

```

```

= 17;\nexport const PREORDER_HOOK_FLAGS = 18;\nexport const QUERIES = 19;\nexport const ID =
20;\nexport const EMBEDDED_VIEW_INJECTOR = 21;\n/**\n * Size of LView's header. Necessary to adjust for
it when setting slots.\n *\n * IMPORTANT: `HEADER_OFFSET` should only be referred to the in the `*`
instructions to translate\n * instruction index into `LView` index. All other indexes should be in the `LView` index
space and\n * there should be no need to refer to `HEADER_OFFSET` anywhere else.\n */\nexport const
HEADER_OFFSET = 22;\n\n// This interface replaces the real LView interface if it is an arg or a\n// return value
of a public instruction. This ensures we don't need to expose\n// the actual interface, which should be kept
private.\nexport interface OpaqueViewState {\n  ' __brand__': 'Brand for OpaqueViewState that nothing will
match';\n}\n\n/**\n * `LView` stores all of the information needed to process the instructions as\n * they are
invoked from the template. Each
embedded view and component view has its\n * own `LView`. When processing a particular view, we set the
`viewData` to that\n * `LView`. When that view is done processing, the `viewData` is set back to\n * whatever the
original `viewData` was before (the parent `LView`).\n *\n * Keeping separate state for each view facilities view
insertion / deletion, so we\n * don't have to edit the data array based on which views are present.\n */\nexport
interface LView<T = unknown> extends Array<any> {\n  /**\n   * Human readable representation of the
`LView`.\n   *\n   * NOTE: This property only exists if `ngDevMode` is set to `true` and it is not present in\n   *
production. Its presence is purely to help debug issue in development, and should not be relied\n   * on in production
application.\n   */\n  debug?: LViewDebug;\n\n  /**\n   * The node into which this `LView` is inserted.\n   */\n  [HOST]: RElement|null;\n\n  /**\n   * The static data for this view. We need a reference to this so we
can easily walk up the\n   * node tree in DI and get the TView.data array associated with a node (where the\n   *
directive defs are stored).\n   */\n  readonly[TVIEW]: TView;\n\n  /** Flags for this view. See LViewFlags for more
info. */\n  [FLAGS]: LViewFlags;\n\n  /**\n   * This may store an { @link LView } or { @link LContainer }. \n   *\n   * `LView` - The parent view. This is needed when we exit the view and must restore the previous\n   * LView.
Without this, the render method would have to keep a stack of\n   * views as it is recursively rendering templates.\n   *\n   * `LContainer` - The current view is part of a container, and is an embedded view.\n   */\n  [PARENT]:
LView|LContainer|null;\n\n  /**\n   * The next sibling LView or LContainer.\n   *\n   * Allows us to propagate
between sibling view states that aren't in the same\n   * container. Embedded views already have a node.next, but it
is only set for\n   * views in the same container. We need a way to link component views
and views\n   * across containers as well.\n   */\n  [NEXT]: LView|LContainer|null;\n\n  /** Queries active for this
view - nodes from a view are reported to those queries. */\n  [QUERIES]: LQueries|null;\n\n  /**\n   * Store the
`TNode` of the location where the current `LView` is inserted into.\n   *\n   * Given:\n   * ``\n   * <div>\n   * <ng-
template><span></span></ng-template>\n   * </div>\n   * ``\n   * \n   * We end up with two `TView`s.\n   * -
`parent` `TView` which contains `<div><!-- anchor --></div>`\n   * - `child` `TView` which contains
`<span></span>`\n   * \n   * Typically the `child` is inserted into the declaration location of the `parent`, but it can
be\n   * inserted anywhere. Because it can be inserted anywhere it is not possible to store the\n   * insertion
information in the `TView` and instead we must store it in the `LView[T_HOST]`.\n   *\n   * So to determine where
is our insertion parent we would execute:\n   * ``\n   * const parentLView = IView[PARENT];\n   *
const parentTNode = IView[T_HOST];\n   * const insertionParent = parentLView[parentTNode.index];\n   *
``\n   * \n   * If `null`, this is the root view of an application (root component is in this view) and it has\n   * no
parents.\n   */\n  [T_HOST]: TNode|null;\n\n  /**\n   * When a view is destroyed, listeners need to be released and
outputs need to be\n   * unsubscribed. This context array stores both listener functions wrapped with\n   * their
context and output subscription instances for a particular view.\n   *\n   * These change per LView instance, so they
cannot be stored on TView. Instead,\n   * TView.cleanup saves an index to the necessary context in this array.\n   *\n   * After `LView` is created it is possible to attach additional instance specific functions at the\n   * end of the
`IView[CLEANUP]` because we know that no more `T` level cleanup functions will be\n   * added here.\n   */\n  [CLEANUP]: any[]|null;\n\n  /**\n   * - For dynamic views, this is
the context with which to render the template (e.g.\n   * `NgForContext`), or `{}` if not defined explicitly.\n   * -
For root view of the root component it's a reference to the component instance itself.\n   * - For components, the

```

context is a reference to the component instance itself. \* - For inline views, the context is null. \*  
[CONTEXT]: T; \*\* An optional Module Injector to be used as fall back after Element Injectors are consulted.  
\* readonly[INJECTOR]: Injector|null; \*\* Factory to be used for creating Renderer. \*  
[RENDERER\_FACTORY]: RendererFactory; \*\* Renderer to be used for this view. \* [RENDERER]:  
Renderer; \*\* An optional custom sanitizer. \* [SANITIZER]: Sanitizer|null; \*\* Reference to the  
first LView or LContainer beneath this LView in the hierarchy. \* Necessary to store this so views can  
traverse through their nested views to remove listeners and call onDestroy callbacks. \* [CHILD\_HEAD]:  
LView|LContainer|null; \*\* The last LView or LContainer beneath this LView in the hierarchy. \*  
The tail allows us to quickly add a new state to the end of the view list without having to propagate starting  
from the first child. \* [CHILD\_TAIL]: LView|LContainer|null; \*\* View where this view's template  
was declared. \* The template for a dynamically created view may be declared in a different view than  
it is inserted. We already track the "insertion view" (view where the template was inserted) in  
LView[PARENT], but we also need access to the "declaration view" (view where the template was declared).  
Otherwise, we wouldn't be able to call the view's template function with the proper contexts. Context should be  
inherited from the declaration view tree, not the insertion view tree. \* Example (AppComponent  
template):  
<ng-template #foo></ng-template> <-- declared here  
--> <some-comp [tpl]="foo"></some-comp> <-- inserted inside this component --> \* The <ng-  
template> above is declared in the AppComponent template, but it will be passed into SomeComp and inserted  
there. In this case, the declaration view would be the AppComponent, but the insertion view would be  
SomeComp. When we are removing views, we would want to traverse through the insertion view to clean up  
listeners. When we are calling the template function during change detection, we need the declaration view to  
get inherited context. \* [DECLARATION\_VIEW]: LView|null; \*\* Points to the declaration  
component view, used to track transplanted `LView`s. \* See: `DECLARATION\_VIEW` which points to the  
actual `LView` where it was declared, whereas `DECLARATION\_COMPONENT\_VIEW` points to the  
component which may not be same as `DECLARATION\_VIEW`. \* Example:  
<#VIEW #myComp> <div  
\*ngIf="true"> <ng-template #myTpl>...</ng-template> </div> </#VIEW> \* In the  
above case `DECLARATION\_VIEW` for `myTpl` points to the `LView` of `ngIf` whereas  
`DECLARATION\_COMPONENT\_VIEW` points to `LView` of the `myComp` which owns the template. \*  
The reason for this is that all embedded views are always check-always whereas the component view can be  
check-always or on-push. When we have a transplanted view it is important to determine if we have  
transplanted a view from check-always declaration to on-push insertion point. In such a case the transplanted  
view needs to be added to the `LContainer` in the declared `LView` and CD during the declared view CD (in  
addition to the CD at the insertion point.) (Any transplanted views which are intra Component are of no interest  
because the CD strategy of declaration and insertion will always be the same, because it is the same component.)  
\* Queries already track moved views in `LView[DECLARATION\_LCONTAINER]` and `LContainer[MOVED\_VIEWS]`. However the queries also track `LView`s which moved within the same component `LView`. Transplanted views are a subset of moved views, and we use  
`DECLARATION\_COMPONENT\_VIEW` to differentiate them. As in this example. \* Example showing  
intra component `LView` movement. \*  
<#VIEW #myComp> <div \*ngIf="condition; then  
thenBlock else elseBlock"></div> <ng-template #thenBlock>Content to render when condition is true.</ng-  
template> <ng-template #elseBlock>Content to render when condition is false.</ng-template> \*  
</#VIEW> \* The `thenBlock` and `elseBlock` is moved but not transplanted. \* Example  
showing inter component `LView` movement (transplanted view). \*  
<#VIEW #myComp> <ng-  
template #myTpl>...</ng-template> <insertion-component [template]="myTpl"></insertion-  
component>

```

* </#VIEW>\n * ``\n * In the above example `myTpl` is passed into a different component. If `insertion-
component`\n * instantiates `myTpl` and `insertion-component` is on-push then the `LContainer` needs to be\n
* marked as containing transplanted views and those views need to be CD as part of the\n * declaration CD.\n *\n
*\n * When change detection runs, it iterates over `[MOVED_VIEWS]` and CDs any child `LView`s where\n *
the `DECLARATION_COMPONENT_VIEW` of the current component and the child `LView` does not match\n
* (it has been transplanted across components.)\n *\n * Note: `[DECLARATION_COMPONENT_VIEW]` points
to itself if the LView is a component view (the\n * simplest / most common case).\n *\n * see also:\n * -
https://hackmd.io/@mhevery/rJUJsvv9H write up of the problem\n * -
`LContainer[HAS_TRANSPLANTED_VIEWS]` which marks which `LContainer` has transplanted views.\n * -
`LContainer[TRANSPLANT_HEAD]` and `LContainer[TRANSPLANT_TAIL]`
storage for transplanted\n * - `LView[DECLARATION_LCONTAINER]` similar problem for queries\n * -
`LContainer[MOVED_VIEWS]` similar problem for queries\n * ^\n [DECLARATION_COMPONENT_VIEW]:
LView;\n\n /**\n * A declaration point of embedded views (ones instantiated based on the content of a\n * <ng-
template>), null for other types of views.\n *\n * We need to track all embedded views created from a given
declaration point so we can prepare\n * query matches in a proper order (query matches are ordered based on their
declaration point and\n * _not_ the insertion point).\n *\n [DECLARATION_LCONTAINER]:
LContainer|null;\n\n /**\n * More flags for this view. See PreOrderHookFlags for more info.\n * ^\n
[PREORDER_HOOK_FLAGS]: PreOrderHookFlags;\n\n /**\n * The number of direct transplanted views which
need a refresh or have descendants themselves\n * that need a refresh but have not marked their ancestors as Dirty.
This tells us
that during\n * change detection we should still descend to find those children to refresh, even if the parents\n *
are not `Dirty`/`CheckAlways`.\n * ^\n [TRANSPLANTED_VIEWS_TO_REFRESH]: number;\n\n /** Unique ID
of the view. Used for `__ngContext__` lookups in the `LView` registry. *\n [ID]: number;\n\n /**\n * Optional
injector assigned to embedded views that takes\n * precedence over the element and module injectors.\n * ^\n
readonly[EMBEDDED_VIEW_INJECTOR]: Injector|null;\n}\n\n /** Flags associated with an LView (saved in
LView[FLAGS]) *\n ^\n export const enum LViewFlags {\n /** The state of the init phase on the first 2 bits *\n
InitPhaseStateIncrementer = 0b00000000001,\n InitPhaseStateMask = 0b00000000011,\n\n /**\n * Whether or
not the view is in creationMode.\n *\n * This must be stored in the view rather than using `data` as a marker so
that\n * we can properly support embedded views. Otherwise, when exiting a child view\n * back into the parent
view, `data` will be defined and `creationMode` will be\n * improperly reported as false.\n * ^\n CreationMode =
0b00000000100,\n\n /**\n * Whether or not this LView instance is on its first processing pass.\n *\n * An
LView instance is considered to be on its `"first pass"` until it\n * has completed one creation mode run and one
update mode run. At this\n * time, the flag is turned off.\n * ^\n FirstLViewPass = 0b00000001000,\n\n /**
Whether this view has default change detection strategy (checks always) or onPush *\n CheckAlways =
0b00000010000,\n\n /** Whether or not this view is currently dirty (needing check) *\n Dirty =
0b00000100000,\n\n /** Whether or not this view is currently attached to change detection tree. *\n Attached =
0b00000100000,\n\n /** Whether or not this view is destroyed. *\n Destroyed = 0b00001000000,\n\n /**
Whether or not this view is the root view *\n IsRoot = 0b00010000000,\n\n /**\n * Whether this moved LView
was needs
to be refreshed at the insertion location because the\n * declaration was dirty.\n * ^\n RefreshTransplantedView =
0b001000000000,\n\n /** Indicates that the view **or any of its ancestors** have an embedded view injector. *\n
HasEmbeddedViewInjector = 0b0010000000000,\n\n /**\n * Index of the current init phase on last 21 bits\n * ^\n
IndexWithinInitPhaseIncrementer = 0b0100000000000,\n IndexWithinInitPhaseShift = 11,\n
IndexWithinInitPhaseReset = 0b0011111111111,\n}\n\n /**\n * Possible states of the init phase:\n * - 00: OnInit
hooks to be run.\n * - 01: AfterContentInit hooks to be run\n * - 10: AfterViewInit hooks to be run\n * - 11: All init
hooks have been run\n * ^\n export const enum InitPhaseState {\n OnInitHooksToBeRun = 0b00,\n
AfterContentInitHooksToBeRun = 0b01,\n AfterViewInitHooksToBeRun = 0b10,\n InitPhaseCompleted =
0b11,\n}\n\n /** More flags associated with an LView (saved in LView[PREORDER_HOOK_FLAGS]) *\n ^\n export

```





LView from scratch.\n \*^/n blueprint: LView;\n/n /\*\*\n \* The template function used to refresh the view of dynamically created views\n \* and components. Will be null for inline views.\n \*^/n template: ComponentTemplate<{}>|null;\n/n /\*\*\n \* A function containing query-related instructions.\n \*^/n viewQuery: ViewQueriesFunction<{}>|null;\n/n /\*\*\n \* A `TNode` representing the declaration location of this `TView` (not part of this TView).\n \*^/n declTNode: TNode|null;\n/n // FIXME(misko): Why does `TView` not have `declarationTView` property?\n/n /\*\*\n \* Whether or not this template has been processed in creation mode. ^/n firstCreatePass: boolean;\n/n /\*\*\n \* Whether or not this template has been processed in update mode (e.g. change detected)\n \*^/n \* `firstUpdatePass` is used by styling to set up `TData` to contain metadata about the styling\n \* instructions. (Mainly to build up a linked list of styling priority order.)\n \*^/n \* Typically this function gets cleared after first execution. If exception is thrown then this\n \* flag can remain turned un until there is first successful (no exception) pass. This means that\n \* individual styling instructions keep track of if they have already been added to the linked\n \* list to prevent double adding.\n \*^/n firstUpdatePass: boolean;\n/n /\*\*\n \* Static data equivalent of LView.data[]. Contains TNodes, PipeDefInternal or TI18n. ^/n data: TData;\n/n /\*\*\n \* The binding start index is the index at which the data array\n \* starts to store bindings only. Saving this value ensures that we\n \* will begin reading bindings at the correct point in the array when\n \* we are in update mode.\n \*^/n \* -1 means that it has not been initialized.\n \*^/n bindingStartIndex: number;\n/n /\*\*\n \* The index where the `\"expando\"` section of `LView` begins. The expando\n \* section contains injectors, directive instances, and host binding values.\n \* Unlike the `\"decls\"` and `\"vars\"` sections of `LView`, the length of this\n \* section cannot be calculated at compile-time because directives are matched\n \* at runtime to preserve locality.\n \*^/n \* We store this start index so we know where to start checking host bindings\n \* in `setHostBindings`.\n \*^/n expandoStartIndex: number;\n/n /\*\*\n \* Whether or not there are any static view queries tracked on this view.\n \*^/n \* We store this so we know whether or not we should do a view query\n \* refresh after creation mode to collect static query results.\n \*^/n staticViewQueries: boolean;\n/n /\*\*\n \* Whether or not there are any static content queries tracked on this view.\n \*^/n \* We store this so we know whether or not we should do a content query\n \* refresh after creation mode to collect static query results.\n \*^/n staticContentQueries: boolean;\n/n /\*\*\n \* A reference to the first child node located in the view.\n \*^/n firstChild: TNode|null;\n/n /\*\*\n \* Stores the OpCodes to be replayed during change-detection to process the `HostBindings`\n \*^/n \* See `HostBindingOpCodes` for encoding details.\n \*^/n hostBindingOpCodes: HostBindingOpCodes|null;\n/n /\*\*\n \* Full registry of directives and components that may be found in this view.\n \*^/n \* It's necessary to keep a copy of the full def list on the TView so it's possible\n \* to render template functions without a host component.\n \*^/n directiveRegistry: DirectiveDefList|null;\n/n /\*\*\n \* Full registry of pipes that may be found in this view.\n \*^/n \* The property is either an array of `PipeDefs` or a function which returns the array of\n \* `PipeDefs`. The function is necessary to be able to support forward declarations.\n \*^/n \* It's necessary to keep a copy of the full def list on the TView so it's possible\n \* to render template functions without a host component.\n \*^/n pipeRegistry: PipeDefList|null;\n/n /\*\*\n \* Array of ngOnInit, ngOnChanges and ngDoCheck hooks that should be executed for this view in\n \* creation mode.\n \*^/n \* This array has a flat structure and contains TNode indices, directive indices (where an\n \* instance can be found in `LView`) and hook functions. TNode index is followed by the directive\n \* index and a hook function. If there are multiple hooks for a given TNode, the TNode index is\n \* not repeated and the next lifecycle hook information is stored right after the previous hook\n \* function. This is done so that at runtime the system can efficiently iterate over all of the\n \* functions to invoke without having to make any decisions/lookups.\n \*^/n preOrderHooks: HookData|null;\n/n /\*\*\n \* Array of ngOnChanges and ngDoCheck hooks that should be executed for this view in update mode.\n \*^/n \* This array has the same structure as the `preOrderHooks` one.\n \*^/n preOrderCheckHooks: HookData|null;\n/n /\*\*\n \* Array of ngAfterContentInit and ngAfterContentChecked hooks that should be executed\n \* for this view in creation mode.\n \*^/n \* Even indices: Directive index\n \*^/n \* Odd indices: Hook function\n \*^/n contentHooks: HookData|null;\n/n /\*\*\n \* Array of ngAfterContentChecked hooks that should be executed for this view in update\n \* mode.\n \*^/n \* Even indices: Directive index\n \*^/n \* Odd indices: Hook function\n \*^/n

contentCheckHooks: HookData|null;\n\n /\*\*\n \* Array of ngAfterViewInit and ngAfterViewChecked hooks that should be executed for\n \* this view in creation mode.\n \*\n \* Even indices: Directive index\n \* Odd indices: Hook function\n \*/\n\n viewHooks: HookData|null;\n\n /\*\*\n \* Array of ngAfterViewChecked hooks that should be executed for this view in\n \* update mode.\n \*\n \* Even indices: Directive index\n \* Odd indices: Hook function\n \*/\n\n viewCheckHooks: HookData|null;\n\n /\*\*\n \* Array of ngOnDestroy hooks that should be executed when this view is destroyed.\n \*\n \* Even indices: Directive index\n \* Odd indices: Hook function\n \*/\n\n destroyHooks: DestroyHookData|null;\n\n /\*\*\n \* When a view is destroyed, listeners need to be released and outputs need to be\n \* unsubscribed. This cleanup array stores both listener data (in chunks of 4)\n \* and output data (in chunks of 2) for a particular view. Combining the arrays\n \* saves on memory (70 bytes per array) and on a few bytes of code size (for two\n \* separate for loops).\n \*\n \* If it's a native DOM listener or output subscription being stored:\n \* 1st index is: event name `name = tView.cleanup[i+0]`\n \* 2nd index is: index of native element or a function that retrieves global target (window,\n \* document or body) reference based on the native element:\n \* `typeof idxOrTargetGetter === 'function': global target getter function\n \* `typeof idxOrTargetGetter === 'number': index of native element`\n \* 3rd index is: index of listener function `listener = lView[CLEANUP][tView.cleanup[i+2]]`\n \* 4th index is: `useCaptureOrIdx = tView.cleanup[i+3]`\n \* `typeof useCaptureOrIdx === 'boolean': useCapture boolean\n \* `typeof useCaptureOrIdx === 'number': `useCaptureOrIdx >= 0`\n \* `removeListener = lView[CLEANUP][useCaptureOrIdx]`\n \* `useCaptureOrIdx < 0` `subscription = lView[CLEANUP][-useCaptureOrIdx]`\n \*\n \* If it's an output subscription or query list destroy hook:\n \* 1st index is: output unsubscribe function / query list destroy function\n \* 2nd index is: index of function context in lView.cleanupInstances[]\n \* `tView.cleanup[i+0].call(lView[CLEANUP][tView.cleanup[i+1]])`\n \*/\n\n cleanup: any[][]|null;\n\n /\*\*\n \* A list of element indices for child components that will need to be\n \* refreshed when the current view has finished its check. These indices have\n \* already been adjusted for the HEADER\_OFFSET.\n \*\n \* components: number[][]|null;\n\n /\*\*\n \* A collection of queries tracked in a given view.\n \*\n \* queries: TQueries|null;\n\n /\*\*\n \* An array of indices pointing to directives with content queries alongside with the\n \* corresponding query index. Each entry in this array is a tuple of:\n \* - index of the first content query index declared by a given directive;\n \* - index of a directive.\n \*\n \* We are storing those indexes so we can refresh content queries as part of a view refresh\n \* process.\n \*/\n\n contentQueries: number[][]|null;\n\n /\*\*\n \* Set of schemas that declare elements to be allowed inside the view.\n \*/\n\n schemas: SchemaMetadata[][]|null;\n\n /\*\*\n \* Array of constants for the view. Includes attribute arrays, local definition arrays etc.\n \* Used for directive matching, attribute bindings, local definitions and more.\n \*/\n\n consts: TConstants|null;\n\n /\*\*\n \* Indicates that there was an error before we managed to complete the first create pass of the\n \* view. This means that the view is likely corrupted and we should try to recover it.\n \*/\n\n incompleteFirstPass: boolean;\n\n /\*\*\n \* Single hook callback function.\n \*/\n\n export type HookFn = () => void;\n\n /\*\*\n \* Information necessary to call a hook. E.g. the callback that\n \* needs to be invoked and the index at which to find its context.\n \*/\n\n export type HookEntry = number|HookFn;\n\n /\*\*\n \* Array of hooks that should be executed for a view and their directive indices.\n \*\n \* For each node of the view, the following data is stored:\n \* 1) Node index (optional)\n \* 2) A series of number/function pairs where:\n \* - even indices are directive indices\n \* - odd indices are hook functions\n \*\n \* Special cases:\n \* - a negative directive index flags an init hook (ngOnInit, ngAfterContentInit, ngAfterViewInit)\n \*/\n\n export type HookData = HookEntry[];\n\n /\*\*\n \* Array of destroy hooks that should be executed for a view and their directive indices.\n \*\n \* The array is set up as a series of number/function or number/(number|function)[]:\n \* - Even indices represent the context with which hooks should be called.\n \* - Odd indices are the hook functions themselves. If a value at an odd index is an array,\n \* it represents the destroy hooks of a `multi` provider where:\n \* - Even indices represent the index of the provider for which we've registered a destroy hook,\n \* inside of the `multi` provider array.\n \* - Odd indices are the destroy hook functions.\n \*\n \* For example:\n \* lView: `[0, 1, 2, AService, 4, [BService, CService, DService]]`\n \* destroyHooks: `[3, AService.ngOnDestroy, 5, [0, BService.ngOnDestroy, 2, DService.ngOnDestroy]]`\n \*\n \* In the example above `AService` is a type provider

with an `ngOnDestroy``, whereas `BService``, `CService`` and `DService`` are part of a `multi`` provider where only `BService`` and `DService`` have an `ngOnDestroy`` hook.

```

export type DestroyHookData =
(HookEntry|HookData)[];
/**
 * Static data that corresponds to the instance-specific data array on an LView.
 * Each node's static data is stored in tData at the same index that it's stored
 * in the data array. Any nodes that do not have static data store a null value in tData to avoid a sparse array.
 * Each pipe's definition is stored here at the same index as its pipe instance in the data array.
 * Each host property's name is stored here at the same index as its value in the data array.
 * Each property binding name is stored here at the same index as its value in the data array.
 * If the binding is an interpolation, the static string values are stored parallel to the dynamic values.
 * Example: id="prefix {{ v0 }} a {{ v1 }} b {{ v2 }}"
 * LView | TView.data----- v0 value | 'a' v1 value | 'b' v2 value | id prefix suffix
 * Injector bloom filters are also stored here.
 */
export type TData =
(TNode|PipeDef<any>|DirectiveDef<any>|ComponentDef<any>|number|TStylingRange|
TStylingKey|ProviderToken<any>|TII8n|I18nUpdateOpCodes|Ticu|null|string)[];

```

Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.

```

export const unusedValueExportToPlacateAjd = 1;

```

`LView`` is a data structure used internally to keep track of views. The `LView`` is designed for efficiency and so at times it is difficult to read or write tests which assert on its values. For this reason when `ngDevMode`` is true we patch a `LView.debug`` property which points to `LViewDebug`` for easier debugging and test writing. It is the intent of `LViewDebug`` to be used in tests.

```

export interface LViewDebug<T = unknown> {
  /**
   * Flags associated with the LView unpacked into a more readable state.
   * See LViewFlags` for the flag meanings.
   */
  readonly flags: {
    initPhaseState: number,
    creationMode: boolean,
    firstViewPass: boolean,
    checkAlways: boolean,
    dirty: boolean,
    attached: boolean,
    destroyed: boolean,
    isRoot: boolean,
    indexWithinInitPhase: number,
  };
  /**
   * Associated TView
   */
  readonly tView: TView;
  /**
   * Parent view (or container)
   */
  readonly parent: LViewDebug|LContainerDebug|null;
  /**
   * Next sibling to the LView
   */
  readonly next: LViewDebug|LContainerDebug|null;
  /**
   * The context used for evaluation of the LView
   */
  readonly context: T;
  /**
   * Hierarchical tree of nodes
   */
  readonly nodes: DebugNode[];
  /**
   * Template structure (no instance data).
   * (Shows how TNodes are connected)
   */
  readonly template: string;
  /**
   * HTML representation of the LView
   */
  /**
   * This is only approximate to actual HTML as child LView`s are removed.
   */
  readonly html: string;
  /**
   * The host element to which this LView` is attached.
   */
  readonly hostHTML: string|null;
  /**
   * Child LView`s
   */
  /**
   * Sub range of LView` containing decls (DOM elements)
   */
  readonly decls: LViewDebugRange;
  /**
   * Sub range of LView` containing vars (bindings)
   */
  readonly vars: LViewDebugRange;
  /**
   * Sub range of LView` containing expando (used by DI)
   */
  readonly expando: LViewDebugRange;
}

```

`LContainer`` is a data structure used internally to keep track of child views. The `LContainer`` is designed for efficiency and so at times it is difficult to read or write tests which assert on its values. For this reason when `ngDevMode`` is true we patch a `LContainer.debug`` property which points to `LContainerDebug`` for easier debugging and test writing. It is the intent of `LContainerDebug`` to be used in tests.

```

export interface LContainerDebug {
  /**
   * Child LView`s
   */
  readonly views: LViewDebug[];
  /**
   * Parent
   */
  readonly parent: LViewDebug|null;
  /**
   * Moved views
   */
  readonly movedViews: LView[]|null;
  /**
   * Host
   */
  readonly host: RElement|RComment|LView;
  /**
   * Next
   */
  readonly next: LViewDebug|LContainerDebug|null;
  /**
   * Has transplanted views
   */
  readonly hasTransplantedViews: boolean;
}

```

`LView`` is subdivided to ranges where the actual data is stored. Some of these ranges such as `decls`` and `vars`` are known at compile time. Other such as `i18n`` and `expando`` are runtime only concepts.

```

export interface LViewDebugRange {
  /**
   * The starting index in LView` where the range begins. (Inclusive)
   */
  start: number;
  /**
   * The ending index in LView` where the range ends. (Exclusive)
   */
  end: number;
}

```

```

/**\n * The length of the range\n */\n length: number;\n\n /**\n * The merged content of the range. `t` contains
data from `TVIEW.data` and `l` contains `LVIEW`\n */\n content:
LVIEWDebugRangeContent[];\n\n /**\n * For convenience the
static and instance portions of `TVIEW` and `LVIEW` are merged into a single\n */\n * object in `LVIEWRange`\n
*/\nexport interface LVIEWDebugRangeContent {\n /**\n * Index into original `LVIEW` or `TVIEW.data`\n */\n
index: number;\n\n /**\n * Value from the `TVIEW.data[index]` location.\n */\n t: any;\n\n /**\n * Value from
the `LVIEW[index]` location.\n */\n l: any;\n}\n\n /**\n * A logical node which comprise into `LVIEW`s.\n */\n
*/\nexport interface DebugNode {\n /**\n * HTML representation of the node.\n */\n html: string|null;\n\n /**\n
*/\n * Associated `TNode`\n */\n tNode: TNode;\n\n /**\n * Human readable node type.\n */\n type: string;\n\n
*/\n * DOM native node.\n */\n native: Node;\n\n /**\n * Child nodes\n */\n children: DebugNode[];\n\n
*/\n * A list of Component/Directive types which need to be instantiated an this location.\n */\n factories:
Type<unknown>[];\n\n /**\n * A list of Component/Directive instances which
were instantiated an this location.\n */\n instances: unknown[];\n\n /**\n * NodeInjector information.\n */\n
injector: NodeInjectorDebug;\n\n /**\n * Injector resolution path.\n */\n injectorResolutionPath:
any;\n}\n\nexport interface NodeInjectorDebug {\n /**\n * Instance bloom. Does the current injector have a
provider with a given bloom mask.\n */\n bloom: string;\n\n /**\n * Cumulative bloom. Do any of the above
injectors have a provider with a given bloom mask.\n */\n cumulativeBloom: string;\n\n /**\n * A list of
providers associated with this injector.\n */\n providers:
(Type<unknown>|DirectiveDef<unknown>|ComponentDef<unknown>>[]);\n\n /**\n * A list of providers
associated with this injector visible to the view of the component only.\n */\n viewProviders:
Type<unknown>[];\n\n /**\n * Location of the parent `TNode`\n */\n parentInjectorIndex:
number;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use
of this source code is governed by an MIT-style license that can be\n */\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {LCONTAINER, TYPE} from './container';\nimport {ComponentDef,
DirectiveDef} from './definition';\nimport {TNode, TNodeFlags} from './node';\nimport {RNode} from
 './render_dom';\nimport {FLAGS, LVIEW, LVIEW_FLAGS} from './view';\n\n /**\n * True if `value` is `LVIEW`\n */\n
@param value wrapped value of `RNode`, `LVIEW`, `LCONTAINER`\n */\nexport function isLVIEW(value:
RNode|LVIEW|LCONTAINER|{}|null): value is LVIEW {\n return Array.isArray(value) && typeof value[TYPE] ===
'object';\n}\n\n /**\n * True if `value` is `LCONTAINER`\n */\n @param value wrapped value of `RNode`, `LVIEW`,
`LCONTAINER`\n */\nexport function isLCONTAINER(value: RNode|LVIEW|LCONTAINER|{}|null): value is LCONTAINER {\n
return Array.isArray(value) && value[TYPE] === true;\n}\n\nexport function isContentQueryHost(tNode: TNode):
boolean {\n return (tNode.flags & TNodeFlags.hasContentQuery)
!== 0;\n}\n\nexport function isComponentHost(tNode: TNode): boolean {\n return (tNode.flags &
TNodeFlags.isComponentHost) === TNodeFlags.isComponentHost;\n}\n\nexport function isDirectiveHost(tNode:
TNode): boolean {\n return (tNode.flags & TNodeFlags.isDirectiveHost) ===
TNodeFlags.isDirectiveHost;\n}\n\nexport function isComponentDef<T>(def: DirectiveDef<T>): def is
ComponentDef<T> {\n return (def as ComponentDef<T>).template !== null;\n}\n\nexport function
isRootView(target: LVIEW): boolean {\n return (target[FLAGS] & LVIEW_FLAGS.IsRoot) !== 0;\n}\n\n", "/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-
style license that can be\n */\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {assertDefined,
assertEqual, assertNumber, throwError} from './util/assert';\nimport {getComponentDef, getNgModuleDef} from
 './definition';\nimport {LCONTAINER} from './interfaces/container';\nimport
 {DirectiveDef} from './interfaces/definition';\nimport {TICU} from './interfaces/i18n';\nimport {NodeInjectorOffset}
from './interfaces/injector';\nimport {TNode} from './interfaces/node';\nimport {isLCONTAINER, isLVIEW} from
 './interfaces/type_checks';\nimport {DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LVIEW,
T_HOST, TVIEW, TVIEW} from './interfaces/view';\n\n [Assert functions do not constraint type when they are
guarded by a truthy\n// expression.](https://github.com/microsoft/TypeScript/issues/37295)\n\nexport function
assertTNodeForLVIEW(tNode: TNode, IVIEW: LVIEW) {\n assertTNodeForTVIEW(tNode,

```

```

IView[TVIEW]);\n\n\nexport function assertTNodeForTView(tNode: TNode, tView: TView) {\n
assertTNode(tNode);\n tNode.hasOwnProperty('tView_') &&\n   assertEquals(\n     (tNode as any as {tView_: TView}).tView_, tView,\n     'This TNode does not belong to this TView.);\n}\n\n\nexport function\nassertTNode(tNode: TNode) {\n  assertDefined(tNode, 'TNode must be defined');\n  if (!(tNode && typeof tNode === 'object' && tNode.hasOwnProperty('directiveStylingLast'))) {\n    throwError('Not of type TNode, got: ' + tNode);\n  }\n}\n\n\nexport function assertTlCu(tlCu: TlCu) {\n
assertDefined(tlCu, 'Expected TlCu to be defined');\n if (!(typeof tlCu.currentCaseLViewIndex === 'number')) {\n
throwError('Object is not of TlCu type.);\n }\n}\n\n\nexport function assertComponentType(\n  actual: any,\n  msg: string = 'Type passed in is not ComponentType, it does not have `cmp` property.);\n if\n(!getComponentDef(actual)) {\n  throwError(msg);\n }\n}\n\n\nexport function assertNgModuleType(\n  actual:\n  any,\n  msg: string = 'Type passed in is not NgModuleType, it does not have `mod` property.);\n if\n(!getNgModuleDef(actual)) {\n  throwError(msg);\n }\n}\n\n\nexport function\nassertCurrentTNodeIsParent(isParent: boolean) {\n  assertEquals(isParent, true, 'currentTNode should be a\n  parent');\n}\n\n\nexport function assertHasParent(tNode: TNode|null)\n  {\n    assertDefined(tNode, 'currentTNode should exist!);\n    assertDefined(tNode!.parent, 'currentTNode should have\n    a parent');\n  }\n}\n\n\nexport function assertDataNext(IView: LView, index: number, arr?: any[]) {\n  if (arr === null) arr =\n  IView;\n  assertEquals(\n    arr.length, index, `index ${index} expected to be at the end of arr (length\n    ${arr.length}`);\n}\n\n\nexport function assertLContainer(value: any): asserts value is LContainer {\n
assertDefined(value, 'LContainer must be defined');\n assertEquals(isLContainer(value), true, 'Expecting\n  LContainer');\n}\n\n\nexport function assertLViewOrUndefined(value: any): asserts value is LView|null|undefined {\n
value && assertEquals(isLView(value), true, 'Expecting LView or undefined or null');\n}\n\n\nexport function\nassertLView(value: any): asserts value is LView {\n  assertDefined(value, 'LView must be defined');\n  assertEquals(isLView(value), true, 'Expecting LView');\n}\n\n\nexport function assertFirstCreatePass(tView: TView,\n  errMessage?:\n  string) {\n  assertEquals(\n    tView.firstCreatePass, true, errMessage || 'Should only be called in first create\n    pass.);\n}\n\n\nexport function assertFirstUpdatePass(tView: TView, errMessage?: string) {\n  assertEquals(\n    tView.firstUpdatePass, true, errMessage || 'Should only be called in first update pass.);\n}\n\n\n/**\n * This is a basic\n  sanity check that an object is probably a directive def. DirectiveDef is\n * an interface, so we can't do a direct\n  instanceof check.\n *^\nexport function assertDirectiveDef<T>(obj: any): asserts obj is DirectiveDef<T> {\n  if\n  (obj.type === undefined || obj.selectors === undefined || obj.inputs === undefined) {\n    throwError(\n    `Expected a DirectiveDef/ComponentDef and this object does not seem to have the expected shape.);\n  }\n}\n\n\nexport function assertIndexInDeclRange(IView: LView, index: number) {\n  const tView = IView[1];\n  assertBetween(HEADER_OFFSET, tView.bindingStartIndex, index);\n}\n\n\nexport function\nassertIndexInVarsRange(IView:\n  LView, index: number) {\n  const tView = IView[1];\n  assertBetween(tView.bindingStartIndex,\n  tView.expandoStartIndex, index);\n}\n\n\nexport function assertIndexInExpandoRange(IView: LView, index:\n  number) {\n  const tView = IView[1];\n  assertBetween(tView.expandoStartIndex, IView.length,\n  index);\n}\n\n\nexport function assertBetween(lower: number, upper: number, index: number) {\n  if (!(lower <=\n  index && index < upper)) {\n    throwError(`Index out of range (expecting ${lower} <= ${index} < ${upper}`);\n  }\n}\n\n\nexport function assertProjectionSlots(IView: LView, errMessage?: string) {\n
assertDefined(IView[DECLARATION_COMPONENT_VIEW], 'Component views should exist.);\n
assertDefined(\n  IView[DECLARATION_COMPONENT_VIEW][T_HOST]!.projection,\n  errMessage ||\n  'Components with projection nodes (<ng-content>) must have projection slots defined.);\n}\n\n\nexport function\nassertParentView(IView: LView|null, errMessage?: string) {\n  assertDefined(\n    IView,\n    errMessage || 'Component views should always have a parent view (component`s host\n    view));\n}\n\n\n/**\n * This is a basic sanity check that the `injectorIndex` seems to point to what looks like a\n * NodeInjector data structure.\n *^\n * @param IView `LView` which should be checked.\n * @param injectorIndex\n  index into the `LView` where the `NodeInjector` is expected.\n *^\nexport function assertNodeInjector(IView:

```

```

LView, injectorIndex: number) {\n  assertIndexInExpandoRange(IView, injectorIndex);\n  assertIndexInExpandoRange(IView, injectorIndex + NodeInjectorOffset.PARENT);\n  assertNumber(IView[injectorIndex + 0], 'injectorIndex should point to a bloom filter');\n  assertNumber(IView[injectorIndex + 1], 'injectorIndex should point to a bloom filter');\n  assertNumber(IView[injectorIndex + 2], 'injectorIndex should point to a bloom filter');\n  assertNumber(IView[injectorIndex + 3], 'injectorIndex should point to a bloom filter');\n  assertNumber(IView[injectorIndex +
  4], 'injectorIndex should point to a bloom filter');\n  assertNumber(IView[injectorIndex + 5], 'injectorIndex should
  point to a bloom filter');\n  assertNumber(IView[injectorIndex + 6], 'injectorIndex should point to a bloom filter');\n
  assertNumber(IView[injectorIndex + 7], 'injectorIndex should point to a bloom filter');\n  assertNumber(\n
  IView[injectorIndex + NodeInjectorOffset.PARENT],\n    'injectorIndex should point to parent
  injector');\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code
  is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
  *\n *\nimport {Type} from './interface/type';\nimport {stringify} from './util/stringify';\nimport
  {NG_FACTORY_DEF} from './fields';\n\n\n/*\n * Definition of what a factory function should look like.\n
  *\n *\nexport type FactoryFn<T> = {\n  /*\n   * Subclasses without an explicit constructor call through to the factory
  of their
  base\n   * definition, providing it with their own constructor to instantiate.\n   *\n   * <U extends T>(t?: Type<U>):
  U;\n\n   /*\n   * If no constructor to instantiate is provided, an instance of type T itself is created.\n   *\n   * (t?:
  undefined): T;\n};\n\n\nexport function getFactoryDef<T>(type: any, throwNotFound: true):
  FactoryFn<T>;\nexport function getFactoryDef<T>(type: any): FactoryFn<T>|null;\nexport function
  getFactoryDef<T>(type: any, throwNotFound?: boolean): FactoryFn<T>|null {\n  const hasFactoryDef =
  type.hasOwnProperty(NG_FACTORY_DEF);\n  if (!hasFactoryDef && throwNotFound === true &&
  ngDevMode) {\n    throw new Error(`Type ${stringify(type)} does not have 'fac' property.`);\n  }\n  return
  hasFactoryDef ? type[NG_FACTORY_DEF] : null;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
  Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the
  LICENSE file at https://angular.io/license\n *\n\n\n/*\n * Represents
  a basic change from a previous to a new value for a single\n * property on a directive instance. Passed as a value in
  a\n * {@link SimpleChanges} object to the `ngOnChanges` hook.\n * \n * @see `OnChanges`\n * \n * @publicApi\n
  *\n *\nexport class SimpleChange {\n  constructor(public previousValue: any, public currentValue: any, public
  firstChange: boolean) {\n  }\n  /*\n   * Check whether the new value is the first value assigned.\n   *\n
  *\n  isFirstChange(): boolean {\n    return this.firstChange;\n  }\n}\n\n\n\n/*\n * A hashtable of changes represented by
  {@link SimpleChange} objects stored\n * at the declared property name they belong to on a Directive or
  Component. This is\n * the type passed to the `ngOnChanges` hook.\n * \n * @see `OnChanges`\n * \n *
  @publicApi\n *\n *\nexport interface SimpleChanges {\n  [propName: string]: SimpleChange;\n}\n\n", "/*\n *
  @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-
  style license that can be\n * found
  in the LICENSE file at https://angular.io/license\n *\n\n\nimport {OnChanges} from
  './../interface/lifecycle_hooks';\nimport {SimpleChange, SimpleChanges} from
  './../interface/simple_change';\nimport {EMPTY_OBJ} from './../util/empty';\nimport {DirectiveDef,
  DirectiveDefFeature} from './interfaces/definition';\n\n\n\n/*\n * The NgOnChangesFeature decorates a component
  with support for the ngOnChanges\n * lifecycle hook, so it should be included in any component that implements\n
  * that hook.\n * \n * If the component or directive uses inheritance, the NgOnChangesFeature MUST\n * be included
  as a feature AFTER {@link InheritDefinitionFeature}, otherwise\n * inherited properties will not be propagated to
  the ngOnChanges lifecycle\n * hook.\n * \n * Example usage:\n * \n * ```\n * static cmp = defineComponent({\n *
  ..\n *   inputs: {name: 'publicName'},\n *   features: [NgOnChangesFeature]\n * });\n * \n * ```\n * \n *
  @codeGenApi\n
  *\n *\nexport function NgOnChangesFeature<T>(): DirectiveDefFeature

```

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    {\n return NgOnChangesFeatureImpl;\n}\n\nexport function NgOnChangesFeatureImpl<T>(definition:
DirectiveDef<T>) {\n if (definition.type.prototype.ngOnChanges) {\n definition.setInput =
ngOnChangesSetInput;\n }\n return rememberChangeHistoryAndInvokeOnChangesHook;\n}\n\n// This option
ensures that the ngOnChanges lifecycle hook will be inherited\n// from superclasses (in
InheritDefinitionFeature).\n/** @nocollapse */\n// tslint:disable-next-line:no-toplevel-property-
access\n(NgOnChangesFeature as DirectiveDefFeature).ngInherit = true;\n\n/**\n * This is a synthetic lifecycle
hook which gets inserted into `TVIEW.preOrderHooks` to simulate\n * `ngOnChanges`.\n * The hook reads the
`NgSimpleChangesStore` data from the component instance and if changes are\n * found it invokes `ngOnChanges`
on the component instance.\n * @param this Component instance. Because this function gets inserted into
`TVIEW.preOrderHooks`,\n * it is guaranteed to be called with component
instance.\n */\nfunction rememberChangeHistoryAndInvokeOnChangesHook(this: OnChanges) {\n const
simpleChangesStore = getSimpleChangesStore(this);\n const current = simpleChangesStore?.current;\n if
(current) {\n const previous = simpleChangesStore!.previous;\n if (previous === EMPTY_OBJ) {\n
simpleChangesStore!.previous = current;\n } else {\n // New changes are copied to the previous store, so that
we don't lose history for inputs\n // which were not changed this time\n for (let key in current) {\n
previous[key] = current[key];\n }\n }\n simpleChangesStore!.current = null;\n
this.ngOnChanges(current);\n }\n}\n\nfunction ngOnChangesSetInput<T>(\n this: DirectiveDef<T>, instance:
T, value: any, publicName: string, privateName: string): void {\n const simpleChangesStore =
getSimpleChangesStore(instance) ||\n setSimpleChangesStore(instance, {previous: EMPTY_OBJ, current:
null});\n const current = simpleChangesStore.current
|| (simpleChangesStore.current = {});\n const previous = simpleChangesStore.previous;\n\n const declaredName =
(this.declaredInputs as {[key: string]: string})[publicName];\n const previousChange = previous[declaredName];\n
current[declaredName] = new SimpleChange(\n previousChange && previousChange.currentValue, value,
previous === EMPTY_OBJ);\n\n (instance as any)[privateName] = value;\n}\n\nconst
SIMPLE_CHANGES_STORE = '__ngSimpleChanges__';\n\nfunction getSimpleChangesStore(instance: any):
null|NgSimpleChangesStore {\n return instance[SIMPLE_CHANGES_STORE] || null;\n}\n\nfunction
setSimpleChangesStore(instance: any, store: NgSimpleChangesStore): NgSimpleChangesStore {\n return
instance[SIMPLE_CHANGES_STORE] = store;\n}\n\n/**\n * Data structure which is monkey-patched on the
component instance and used by `ngOnChanges`\n * life-cycle hook to track previous input values.\n */\ninterface
NgSimpleChangesStore {\n previous: SimpleChanges;\n current: SimpleChanges|null;\n}\n\n"/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n * Profiler
events is an enum used by the profiler to distinguish between different calls of user\n * code invoked throughout the
application lifecycle.\n */\nexport const enum ProfilerEvent {\n /**\n * Corresponds to the point in time before the
runtime has called the template function of a\n * component with `RenderFlags.Create`.\n */\n
TemplateCreateStart,\n\n /**\n * Corresponds to the point in time after the runtime has called the template
function of a\n * component with `RenderFlags.Create`.\n */\n TemplateCreateEnd,\n\n /**\n * Corresponds to
the point in time before the runtime has called the template function of a\n * component with
`RenderFlags.Update`.\n */\n TemplateUpdateStart,\n\n /**\n * Corresponds to the point in time after
the runtime has called the template function of a\n * component with `RenderFlags.Update`.\n */\n
TemplateUpdateEnd,\n\n /**\n * Corresponds to the point in time before the runtime has called a lifecycle hook of
a component\n * or directive.\n */\n LifecycleHookStart,\n\n /**\n * Corresponds to the point in time after the
runtime has called a lifecycle hook of a component\n * or directive.\n */\n LifecycleHookEnd,\n\n /**\n *
Corresponds to the point in time before the runtime has evaluated an expression associated with\n * an event or an
output.\n */\n OutputStart,\n\n /**\n * Corresponds to the point in time after the runtime has evaluated an
expression associated with\n * an event or an output.\n */\n OutputEnd,\n}\n\n/**\n * Profiler function which the
runtime will invoke before and after user code.\n */\nexport interface Profiler {\n (event: ProfilerEvent, instance:
{}|null, hookOrListener?: (e?: any) => any): void;\n}\n\nlet profilerCallback:

```





```

contexts.\n */\nexport function getNativeByIndex(index: number, IView: LView): RNode {\n  ngDevMode &&
assertIndexInRange(IView, index);\n  ngDevMode && assertGreaterThanOrEqual(index, HEADER_OFFSET,
'Expected to be past HEADER_OFFSET');\n  return unwrapRNode(IView[index]);\n}\n\n/**\n * Retrieve an
`RNode` for a given `TNode` and `LView`.\n *\n * This function guarantees in dev mode to retrieve a non-null
`RNode`.\n *\n * @param tNode\n * @param IView\n */\nexport function getNativeByTNode(tNode: TNode,
IView: LView): RNode {\n  ngDevMode && assertTNodeForLView(tNode, IView);\n  ngDevMode &&
assertIndexInRange(IView, tNode.index);\n  const node: RNode = unwrapRNode(IView[tNode.index]);\n  return
node;\n}\n\n/**\n * Retrieve an `RNode` or `null` for a given `TNode` and `LView`.\n *\n * Some `TNode`s don't
have associated `RNode`s. For example `Projection`.\n *\n * @param tNode\n * @param IView\n */\nexport
function getNativeByTNodeOrNull(tNode: TNode|null, IView: LView): RNode|null
{\n  const index = tNode === null ? -1 : tNode.index;\n  if (index !== -1) {\n    ngDevMode &&
assertTNodeForLView(tNode!, IView);\n    const node: RNode|null = unwrapRNode(IView[index]);\n    return
node;\n  }\n  return null;\n}\n\n// fixme(misko): The return Type should be `TNode|null`\nexport function
getTNode(tView: TView, index: number): TNode {\n  ngDevMode && assertGreaterThan(index, -1, 'wrong index
for TNode');\n  ngDevMode && assertLessThan(index, tView.data.length, 'wrong index for TNode');\n  const tNode
= tView.data[index] as TNode;\n  ngDevMode && tNode !== null && assertTNode(tNode);\n  return
tNode;\n}\n\n/**\n * Retrieves a value from any `LView` or `TData`.\n */\nexport function load<T>(view: LView|TData,
index: number): T {\n  ngDevMode && assertIndexInRange(view, index);\n  return view[index];\n}\n\nexport
function GetComponentLViewByIndex(nodeIndex: number, hostView: LView): LView {\n  // Could be an LView
or an LContainer. If LContainer, unwrap to find LView.\n  ngDevMode
&& assertIndexInRange(hostView, nodeIndex);\n  const slotValue = hostView[nodeIndex];\n  const IView =
isLView(slotValue) ? slotValue : slotValue[HOST];\n  return IView;\n}\n\n/**\n * Checks whether a given view is in
creation mode\n */\nexport function isCreationMode(view: LView): boolean {\n  return (view[FLAGS] &
LViewFlags.CreationMode) === LViewFlags.CreationMode;\n}\n\n/**\n * Returns a boolean for whether the view
is attached to the change detection tree.\n *\n * Note: This determines whether a view should be checked, not
whether it's inserted\n * into a container. For that, you'll want `viewAttachedToContainer` below.\n */\nexport
function viewAttachedToChangeDetector(view: LView): boolean {\n  return (view[FLAGS] &
LViewFlags.Attached) === LViewFlags.Attached;\n}\n\n/**\n * Returns a boolean for whether the view is attached to a
container.\n */\nexport function viewAttachedToContainer(view: LView): boolean {\n  return
isLContainer(view[PARENT]);\n}\n\n/**\n * Returns a constant from `TConstants`
instance.\n */\nexport function getConstant<T>(consts: TConstants|null, index: null|undefined): null;\nexport function
getConstant<T>(consts: TConstants, index: number): T|null;\nexport function getConstant<T>(consts:
TConstants|null, index: number|null|undefined): T|null;\nexport function getConstant<T>(consts: TConstants|null,
index: number|null|undefined): T|null {\n  if (index === null || index === undefined) return null;\n  ngDevMode &&
assertIndexInRange(consts!, index);\n  return consts![index] as unknown as T;\n}\n\n/**\n * Resets the pre-order
hook flags of the view.\n *\n * @param IView the LView on which the flags are reset\n */\nexport function
resetPreOrderHookFlags(IView: LView) {\n  IView[PREORDER_HOOK_FLAGS] = 0;\n}\n\n/**\n * Updates the
`TRANSPLANTED_VIEWS_TO_REFRESH` counter on the `LContainer` as well as the parents\n * whose\n * 1.
counter goes from 0 to 1, indicating that there is a new child that has a view to refresh\n * or\n * 2. counter goes
from 1 to 0,
indicating there are no more descendant views to refresh\n */\nexport function
updateTransplantedViewCount(IContainer: LContainer, amount: 1|- 1) {\n
IContainer[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;\n  let viewOrContainer: LView|LContainer =
IContainer;\n  let parent: LView|LContainer|null = IContainer[PARENT];\n  while (parent !== null &&\n
((amount === 1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH] === 1) ||\n      (amount ===
-1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH] === 0))) {\n
parent[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;\n  viewOrContainer = parent;\n  parent =
parent[PARENT];\n  }\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this

```

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```

import {InjectFlags} from './di/interface/injector';
import {assertDefined,
assertEqual, assertGreaterThanOrEqual, assertLessThan, assertNotEqual,
throwError} from './util/assert';
import {assertLViewOrUndefined, assertTNodeForLView,
assertTNodeForTView} from './assert';
import {DirectiveDef} from './interfaces/definition';
import {TNode,
TNodeType} from './interfaces/node';
import {CONTEXT, DECLARATION_VIEW, HEADER_OFFSET, LView,
OpaqueViewState, T_HOST, TData, TVIEW, TView, TViewType} from './interfaces/view';
import {MATH_ML_NAMESPACE, SVG_NAMESPACE} from './namespaces';
import {getTNode} from './util/view_utils';

interface LFrame {
  parent: LFrame;
  child: LFrame;
  state: LView;
  nodes: TNode[];
  locals: any[];
  iview: LView;
  tview: TView;
  currentTNode: TNode;
  selectedIndex: number;
  bindingIndex: number;
  contextLView: LView;
  elementDepthCount: number;
  currentNamespace: string;
  bindingRootIndex: number;
  currentQueryIndex: number;
  currentDirectiveIndex: number;
  inI18nBlock: boolean;
  instructionState: InstructionState;
}

const inner = x().$implicit;
const outer = x().$implicit;

Store the element depth count. This is used to identify the root elements of the template so that we can then attach patch data to only those elements. We know that those are the only places where the patch data could change, this way we will save on number of places where the patching occurs.

Current namespace to be used when creating elements

The root index from which pure function instructions should calculate their binding indices. In component views, this is TView.bindingStartIndex. In a host binding context, this is the TView.expandoStartIndex + any dirs/hostVars before the given dir.

Current index of a View or Content Query which needs to be processed next. We iterate over the list of Queries and increment current query index at every step.

When host binding is executing this points to the directive index. TView.data[currentDirectiveIndex] is DirectiveDef LView[currentDirectiveIndex] is directive instance.

Are we currently in i18n block as denoted by elementStart and elementEnd. This information is needed because while we are in i18n block all elements must be pre-declared in the translation. (i.e. `Hello #2World/#2!` pre-declares element at `#2` location.) This allocates TNodeType.Placeholder element at location `2`. If translator removes `#2` from translation then the runtime must also ensure the element at `2` does not get inserted into the DOM. The translation does not carry information about deleted elements. Therefore the only way to know that an element is deleted is that it was not pre-declared in the translation. This flag works by ensuring that elements which are created without pre-declaration (TNodeType.Placeholder) are not inserted into the DOM render tree. (It does mean that the element still gets instantiated along with all of its behavior [directives])

All implicit instruction state is stored here. It is useful to have a single object where all of the state is stored as a mental model (rather it being spread across many different variables.)

PERF NOTE: Turns out that writing to a true global variable is slower than having an intermediate object with properties.

interface InstructionState {
  currentLFrame: LFrame;
  currentIframe: LFrame;
}

```

whether directives should be matched to elements.\n

```
*\n * When template contains `ngNonBindable` then we need to prevent the runtime from matching\n * directives on children of that element.\n * Example:\n * ```\n * <my-comp my-directive>\n * Should match component / directive.\n * </my-comp>\n * <div ngNonBindable>\n * <my-comp my-directive>\n * Should not match component / directive because we are in ngNonBindable.\n * </my-comp>\n * </div>\n * ```\n */\n bindingsEnabled: boolean;\n}\n\nconst instructionState: InstructionState = {\n  IFrame: createLFrame(null),\n  bindingsEnabled: true,\n};\n\n/**\n * In this mode, any changes in bindings will throw an ExpressionChangedAfterChecked error.\n * Necessary to support ChangeDetectorRef.checkNoChanges().\n * The `checkNoChanges` function is invoked only in ngDevMode=true and verifies that no unintended\n * changes exist in the change detector or its children.\n */\nlet _isInCheckNoChangesMode = false;\n\n/**\n * Returns true if the
```

```
instruction state stack is empty.\n */\n * Intended to be called from tests only (tree shaken otherwise).\n */\nexport function specOnlyIsInstructionStateEmpty(): boolean {\n  return instructionState.IFrame.parent === null;\n}\n\nexport function getElementDepthCount() {\n  return instructionState.IFrame.elementDepthCount;\n}\n\nexport function increaseElementDepthCount() {\n  instructionState.IFrame.elementDepthCount++;\n}\n\nexport function decreaseElementDepthCount() {\n  instructionState.IFrame.elementDepthCount--;\n}\n\nexport function getBindingsEnabled(): boolean {\n  return instructionState.bindingsEnabled;\n}\n\n/**\n * Enables directive matching on elements.\n * Example:\n * ```\n * <my-comp my-directive>\n * Should match component / directive.\n * </my-comp>\n * <div ngNonBindable>\n * <!-- disableBindings() -->\n * <my-comp my-directive>\n * Should not match component / directive because we are in ngNonBindable.\n * </my-comp>\n * <!-- enableBindings() -->\n * </div>\n * ```\n */\n @codeGenApi\n */\nexport function enableBindings(): void {\n  instructionState.bindingsEnabled = true;\n}\n\n/**\n * Disables directive matching on element.\n * Example:\n * ```\n * <my-comp my-directive>\n * Should match component / directive.\n * </my-comp>\n * <div ngNonBindable>\n * <!-- disableBindings() -->\n * <my-comp my-directive>\n * Should not match component / directive because we are in ngNonBindable.\n * </my-comp>\n * <!-- enableBindings() -->\n * </div>\n * ```\n */\n @codeGenApi\n */\nexport function disableBindings(): void {\n  instructionState.bindingsEnabled = false;\n}\n\n/**\n * Return the current `LView`.\n */\nexport function getLView<T>(): LView<T> {\n  return instructionState.IFrame.lView as LView<T>;\n}\n\n/**\n * Return the current `TView`.\n */\nexport function getTView(): TView {\n  return instructionState.IFrame.tView;\n}\n\n/**\n * Restores `contextViewData` to the given OpaqueViewState
```

```
instance.\n */\n * Used in conjunction with the getCurrentView() instruction to save a snapshot\n * of the current view and restore it when listeners are invoked. This allows\n * walking the declaration view tree in listeners to get vars from parent views.\n */\n @param viewToRestore The OpaqueViewState instance to restore.\n @returns Context of the restored OpaqueViewState instance.\n */\n @codeGenApi\n */\nexport function restoreView<T = any>(viewToRestore: OpaqueViewState): T {\n  instructionState.lView = viewToRestore as any as LView;\n  return (viewToRestore as any as LView)[CONTEXT] as unknown as T;\n}\n\n/**\n * Clears the view set in `restoreView` from memory. Returns the passed in\n * value so that it can be used as a return value of an instruction.\n */\n @codeGenApi\n */\nexport function resetView<T>(value?: T): T|undefined {\n  instructionState.lView = null;\n  return value;\n}\n\nexport function getCurrentTNode(): TNode|null {\n
```

```
let currentTNode = getCurrentTNodePlaceholderOk();\n while (currentTNode !== null && currentTNode.type === TNodeType.Placeholder) {\n  currentTNode = currentTNode.parent;\n }\n return currentTNode;\n}\n\nexport function getCurrentTNodePlaceholderOk(): TNode|null {\n  return instructionState.IFrame.currentTNode;\n}\n\nexport function getCurrentParentTNode(): TNode|null {\n  const IFrame = instructionState.IFrame;\n  const currentTNode = IFrame.currentTNode;\n  return IFrame.isParent ? currentTNode : currentTNode!.parent;\n}\n\nexport function setCurrentTNode(tNode: TNode|null, isParent: boolean) {\n  ngDevMode && tNode && assertTNodeForTView(tNode, instructionState.IFrame.tView);\n  const
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IFrame = instructionState.IFrame;\n IFrame.currentTNode = tNode;\n IFrame.isParent = isParent;\n}\n\n\nexport
function isCurrentTNodeParent(): boolean {\n return instructionState.IFrame.isParent;\n}\n\n\nexport function
setCurrentTNodeAsNotParent(): void {\n instructionState.IFrame.isParent = false;\n}\n\n\nexport
function setCurrentTNodeAsParent(): void {\n instructionState.IFrame.isParent = true;\n}\n\n\nexport function
getContextLView(): LView {\n const contextLView = instructionState.IFrame.contextLView;\n ngDevMode &&
assertDefined(contextLView, 'contextLView must be defined.);\n return contextLView!;\n}\n\n\nexport function
isInCheckNoChangesMode(): boolean {\n !ngDevMode && throwError('Must never be called in production
mode');\n return _isInCheckNoChangesMode;\n}\n\n\nexport function setIsInCheckNoChangesMode(mode:
boolean): void {\n !ngDevMode && throwError('Must never be called in production mode');\n
_isInCheckNoChangesMode = mode;\n}\n\n\n// top level variables should not be exported for performance reasons
(PERF_NOTES.md)\nexport function getBindingRoot() {\n const IFrame = instructionState.IFrame;\n let index =
IFrame.bindingRootIndex;\n if (index === -1) {\n index = IFrame.bindingRootIndex =
IFrame.tView.bindingStartIndex;\n }\n return index;\n}\n\n\nexport function
getBindingIndex(): number {\n return instructionState.IFrame.bindingIndex;\n}\n\n\nexport function
setBindingIndex(value: number): number {\n return instructionState.IFrame.bindingIndex = value;\n}\n\n\nexport
function nextBindingIndex(): number {\n return instructionState.IFrame.bindingIndex++;\n}\n\n\nexport function
incrementBindingIndex(count: number): number {\n const IFrame = instructionState.IFrame;\n const index =
IFrame.bindingIndex;\n IFrame.bindingIndex = IFrame.bindingIndex + count;\n return index;\n}\n\n\nexport function
isInI18nBlock() {\n return instructionState.IFrame.inI18n;\n}\n\n\nexport function setInI18nBlock(isInI18nBlock:
boolean): void {\n instructionState.IFrame.inI18n = isInI18nBlock;\n}\n\n\n/**\n * Set a new binding root index so
that host template functions can execute.\n *\n * Bindings inside the host template are 0 index. But because we don't
know ahead of time\n * how many host bindings we have we can't pre-compute them. For this reason they are all\n
* 0 index and we just shift the root so that they match next available location in the LView.\n *\n * @param
bindingRootIndex Root index for `hostBindings`\n *\n * @param currentDirectiveIndex `TData[currentDirectiveIndex]`
will point to the current directive\n * whose `hostBindings` are being processed.\n */\nexport function
setBindingRootForHostBindings(\n bindingRootIndex: number, currentDirectiveIndex: number) {\n const IFrame
= instructionState.IFrame;\n IFrame.bindingIndex = IFrame.bindingRootIndex = bindingRootIndex;\n
setCurrentDirectiveIndex(currentDirectiveIndex);\n}\n\n\n/**\n * When host binding is executing this points to the
directive index.\n *\n * `TView.data[getCurrentDirectiveIndex()]` is `DirectiveDef`\n *\n * `LView[getCurrentDirectiveIndex()]` is directive instance.\n */\nexport function getCurrentDirectiveIndex():
number {\n return instructionState.IFrame.currentDirectiveIndex;\n}\n\n\n/**\n * Sets an index of a directive whose
`hostBindings` are being processed.\n *\n * @param currentDirectiveIndex `TData` index where current directive instance can be found.\n */\nexport
function setCurrentDirectiveIndex(currentDirectiveIndex: number): void {\n
instructionState.IFrame.currentDirectiveIndex = currentDirectiveIndex;\n}\n\n\n/**\n * Retrieve the current
`DirectiveDef` which is active when `hostBindings` instruction is being\n * executed.\n *\n * @param tData Current
`TData` where the `DirectiveDef` will be looked up at.\n */\nexport function getCurrentDirectiveDef(tData: TData):
DirectiveDef<any>|null {\n const currentDirectiveIndex = instructionState.IFrame.currentDirectiveIndex;\n return
currentDirectiveIndex === -1 ? null : tData[currentDirectiveIndex] as DirectiveDef<any>;\n}\n\n\nexport function
getCurrentQueryIndex(): number {\n return instructionState.IFrame.currentQueryIndex;\n}\n\n\nexport function
setCurrentQueryIndex(value: number): void {\n instructionState.IFrame.currentQueryIndex = value;\n}\n\n\n/**\n *
Returns a `TNode` of the location
where the current `LView` is declared at.\n *\n * @param IView an `LView` that we want to find parent `TNode`
for.\n */\nexport function getDeclarationTNode(IView: LView): TNode|null {\n const tView = IView[TVIEW];\n\n //
Return the declaration parent for embedded views\n if (tView.type === TVIEWType.Embedded) {\n ngDevMode
&& assertDefined(tView.declTNode, 'Embedded TNodes should have declaration parents.);\n return
tView.declTNode;\n }\n\n // Components don't have `TView.declTNode` because each instance of component
could be\n // inserted in different location, hence `TView.declTNode` is meaningless.\n // Falling back to

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`T_HOST` in case we cross component boundary.\n if (tView.type === TViewType.Component) {\n return
IView[T_HOST];\n }\n\n // Remaining TNode type is `TViewType.Root` which doesn't have a parent TNode.\n
return null;\n}\n\n**\n * This is a light weight version of the `enterView` which is needed by the DI system.\n *\n *
@param IView `LView` location
of the DI context.\n * @param tNode `TNode` for DI context\n * @param flags DI context flags. if `SkipSelf` flag
is set than we walk up the declaration\n * tree from `tNode` until we find parent declared `TElementNode`.\n *
@returns `true` if we have successfully entered DI associated with `tNode` (or with declared\n * `TNode` if
`flags` has `SkipSelf`). Failing to enter DI implies that no associated\n * `NodeInjector` can be found and we
should instead use `ModuleInjector`.\n * - If `true` than this call must be followed by `leaveDI`\n * - If `false`
than this call failed and we should NOT call `leaveDI`\n */\nexport function enterDI(IView: LView, tNode: TNode,
flags: InjectFlags) {\n ngDevMode && assertLViewOrUndefined(IView);\n\n if (flags & InjectFlags.SkipSelf) {\n
ngDevMode && assertTNodeForTView(tNode, IView[TVIEW]);\n\n let parentTNode = tNode as TNode | null;\n
let parentLView = IView;\n\n while (true) {\n ngDevMode && assertDefined(parentTNode,
'Parent TNode should be defined');\n parentTNode = parentTNode!.parent as TNode | null;\n if (parentTNode
=== null && !(flags & InjectFlags.Host)) {\n parentTNode = getDeclarationTNode(parentLView);\n if
(parentTNode === null) break;\n\n // In this case, a parent exists and is definitely an element. So it will
definitely\n // have an existing IView as the declaration view, which is why we can assume it's defined.\n
ngDevMode && assertDefined(parentLView, 'Parent LView should be defined');\n parentLView =
parentLView[DECLARATION_VIEW];\n\n // In Ivy there are Comment nodes that correspond to ngIf and
NgFor embedded directives\n // We want to skip those and look only at Elements and ElementContainers to
ensure\n // we're looking at true parent nodes, and not content or other types.\n if (parentTNode.type &
(TNodeType.Element | TNodeType.ElementContainer)) {\n break;\n }\n } else
{\n break;\n }\n }\n if (parentTNode === null) {\n // If we failed to find a parent TNode this means
that we should use module injector.\n return false;\n } else {\n tNode = parentTNode;\n IView =
parentLView;\n }\n }\n ngDevMode && assertTNodeForLView(tNode, IView);\n const lFrame =
instructionState.lFrame = allocLFrame();\n lFrame.currentTNode = tNode;\n lFrame.IView = IView;\n\n return
true;\n}\n\n**\n * Swap the current IView with a new IView.\n *\n * For performance reasons we store the IView
in the top level of the module.\n * This way we minimize the number of properties to read. Whenever a new view\n
* is entered we have to store the IView for later, and when the view is\n * exited the state has to be restored\n *\n *
@param newView New IView to become active\n * @returns the previously active IView;\n */\nexport function
enterView(newView: LView): void {\n ngDevMode && assertNotEqual(newView[0], newView[1] as any,
'????');\n
ngDevMode && assertLViewOrUndefined(newView);\n const newLFrame = allocLFrame();\n if (ngDevMode)
{\n assertEquals(newLFrame.isParent, true, 'Expected clean LFrame');\n assertEquals(newLFrame.IView, null,
'Expected clean LFrame');\n assertEquals(newLFrame.tView, null, 'Expected clean LFrame');\n
assertEquals(newLFrame.selectedIndex, -1, 'Expected clean LFrame');\n
assertEquals(newLFrame.elementDepthCount, 0, 'Expected clean LFrame');\n
assertEquals(newLFrame.currentDirectiveIndex, -1, 'Expected clean LFrame');\n
assertEquals(newLFrame.currentNamespace, null, 'Expected clean LFrame');\n
assertEquals(newLFrame.bindingRootIndex, -1, 'Expected clean LFrame');\n
assertEquals(newLFrame.currentQueryIndex, 0, 'Expected clean LFrame');\n }\n const tView =
newView[TVIEW];\n instructionState.lFrame = newLFrame;\n ngDevMode && tView.firstChild &&
assertTNodeForTView(tView.firstChild, tView);\n newLFrame.currentTNode = tView.firstChild!;\n
newLFrame.IView = newView;\n
newLFrame.tView = tView;\n newLFrame.contextLView = newView;\n newLFrame.bindingIndex =
tView.bindingStartIndex;\n newLFrame.inI18n = false;\n}\n\n**\n * Allocates next free LFrame. This function
tries to reuse the `LFrame`s to lower memory pressure.\n */\nfunction allocLFrame() {\n const currentLFrame =
instructionState.lFrame;\n const childLFrame = currentLFrame === null ? null : currentLFrame.child;\n const

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newLFrame = childLFrame === null ? createLFrame(currentLFrame) : childLFrame;\n return
newLFrame;\n}\n\nfunction createLFrame(parent: LFrame|null): LFrame {\n  const lFrame: LFrame = {\n
currentTNode: null,\n  isParent: true,\n  lView: null!,\n  tView: null!,\n  selectedIndex: -1,\n  contextLView:
null,\n  elementDepthCount: 0,\n  currentNamespace: null,\n  currentDirectiveIndex: -1,\n  bindingRootIndex: -
1,\n  bindingIndex: -1,\n  currentQueryIndex: 0,\n  parent: parent!,\n  child: null,\n  inI18n: false,\n  };\n
parent !== null && (parent.child
= lFrame); // link the new LFrame for reuse.\n  return lFrame;\n}\n\n/**\n * A lightweight version of leave which
is used with DI.\n * This function only resets `currentTNode` and `lView` as those are the only properties\n *
used with DI (`enterDI`).\n * NOTE: This function is reexported as `leaveDI`. However `leaveDI` has return
type of `void` where\n * as `leaveViewLight` has `LFrame`. This is so that `leaveViewLight` can be used in
`leaveView`.\n */\nfunction leaveViewLight(): LFrame {\n  const oldLFrame = instructionState.lFrame;\n
instructionState.lFrame = oldLFrame.parent;\n  oldLFrame.currentTNode = null!;\n  oldLFrame.lView = null!;\n
return oldLFrame;\n}\n\n/**\n * This is a lightweight version of the `leaveView` which is needed by the DI
system.\n * NOTE: this function is an alias so that we can change the type of the function to have `void`\n *
return type.\n */\nexport const leaveDI: () => void = leaveViewLight;\n\n/**\n * Leave the current `lView`\n *
This pops the `LFrame` with the associated `lView` from the stack.\n * IMPORTANT: We must zero out
the `LFrame` values here otherwise they will be retained. This is\n * because for performance reasons we don't
release `LFrame` but rather keep it for next use.\n */\nexport function leaveView() {\n  const oldLFrame =
leaveViewLight();\n  oldLFrame.isParent = true;\n  oldLFrame.tView = null!;\n  oldLFrame.selectedIndex = -1;\n
oldLFrame.contextLView = null;\n  oldLFrame.elementDepthCount = 0;\n  oldLFrame.currentDirectiveIndex = -
1;\n  oldLFrame.currentNamespace = null;\n  oldLFrame.bindingRootIndex = -1;\n  oldLFrame.bindingIndex = -1;\n
oldLFrame.currentQueryIndex = 0;\n}\n\nexport function nextContextImpl<T = any>(level: number): T {\n  const
contextLView = instructionState.lFrame.contextLView =>\n    walkUpViews(level,
instructionState.lFrame.contextLView!);\n  return contextLView[CONTEXT] as unknown as T;\n}\n\nfunction
walkUpViews(nestingLevel: number, currentView: lView):
lView {\n  while (nestingLevel > 0) {\n    ngDevMode &&\n      assertDefined(\n
currentView[DECLARATION_VIEW],\n      'Declaration view should be defined if nesting level is greater than
0.);\n    currentView = currentView[DECLARATION_VIEW]!;\n    nestingLevel--;\n  }\n  return
currentView;\n}\n\n/**\n * Gets the currently selected element index.\n * Used with { @link property }
instruction (and more in the future) to identify the index in the\n * current `lView` to act on.\n */\nexport function
getSelectedIndex() {\n  return instructionState.lFrame.selectedIndex;\n}\n\n/**\n * Sets the most recent index
passed to { @link select}\n * Used with { @link property } instruction (and more in the future) to identify the
index in the\n * current `lView` to act on.\n * (Note that if an "exit function" was set earlier (via
`setElementExitFn`) then that will be\n * run if and when the provided `index` value is different from the current
selected index value.)\n */\nexport function setSelectedIndex(index: number) {\n  ngDevMode && index !== -1 &&\n
assertGreaterThanOrEqual(index, HEADER_OFFSET, 'Index must be past HEADER_OFFSET (or -1).);\n  ngDevMode &&\n
assertLessThan(\n    index, instructionState.lFrame.lView.length, 'Can\\'t set index passed
end of lView');\n  instructionState.lFrame.selectedIndex = index;\n}\n\n/**\n * Gets the `tNode` that represents
currently selected element.\n */\nexport function getSelectedTNode() {\n  const lFrame = instructionState.lFrame;\n
return getTNode(lFrame.tView, lFrame.selectedIndex);\n}\n\n/**\n * Sets the namespace used to create elements to
`http://www.w3.org/2000/svg` in global state.\n * @codeGenApi\n */\nexport function namespaceSVG() {\n
instructionState.lFrame.currentNamespace = SVG_NAMESPACE;\n}\n\n/**\n * Sets the namespace used to create
elements to `http://www.w3.org/1998/MathML/` in global state.\n * @codeGenApi\n */\nexport function
namespaceMathML() {\n
instructionState.lFrame.currentNamespace = MATH_ML_NAMESPACE;\n}\n\n/**\n * Sets the namespace used
to create elements to `null`, which forces element creation to use\n * `createElement` rather than
`createElementNS`.\n * @codeGenApi\n */\nexport function namespaceHTML() {\n

```







currentView:

```
LView, arr: HookData, initPhase: InitPhaseState, \n  currentNodeIndex: number|null|undefined): void {\n  ngDevMode && \n    assertEquals(\n      isInCheckNoChangesMode(), false, \n      'Hooks should never be run\n  when in check no changes mode.);\n  const startIndex = currentNodeIndex !== undefined ?\n  (currentView[PREORDER_HOOK_FLAGS] & PreOrderHookFlags.IndexOfTheNextPreOrderHookMaskMask) :\n  0;\n  const nodeIndexLimit = currentNodeIndex !== null ? currentNodeIndex - 1;\n  const max = arr.length - 1; //\n  Stop the loop at length - 1, because we look for the hook at i + 1\n  let lastNodeIndexFound = 0;\n  for (let i =\n  startIndex; i < max; i++) {\n    const hook = arr[i + 1] as number | (() => void);\n    if (typeof hook === 'number') {\n      lastNodeIndexFound = arr[i] as number;\n      if (currentNodeIndex !== null && lastNodeIndexFound >=\n  currentNodeIndex) {\n        break;\n      }\n    } else {\n      const isInitHook = arr[i] < 0;\n      if (isInitHook)\n        currentView[PREORDER_HOOK_FLAGS] += PreOrderHookFlags.NumberOfInitHooksCalledIncrementer;\n      if (lastNodeIndexFound < nodeIndexLimit || nodeIndexLimit == -1) {\n        callHook(currentView, initPhase, arr,\n  i);\n        currentView[PREORDER_HOOK_FLAGS] =\n          (currentView[PREORDER_HOOK_FLAGS] &\n  PreOrderHookFlags.NumberOfInitHooksCalledMask) + i +\n          2;\n      }\n      i++;\n    }\n  }\n  Execute one hook against the current `LView`.\n  * @param currentView The current view\n  * @param\n  initPhaseState the current state of the init phase\n  * @param arr The array in which the hooks are found\n  * @param\n  i The current index within the hook data array\n  * ^\n  function callHook(currentView: LView, initPhase:\n  InitPhaseState, arr: HookData, i: number) {\n    const isInitHook = arr[i] < 0;\n    const hook = arr[i + 1] as () =>\n  void;\n    const directiveIndex = isInitHook ? -arr[i] : arr[i] as number;\n    const directive =\n  currentView[directiveIndex];\n    if (isInitHook)\n      {\n        const indexWithinInitPhase = currentView[FLAGS] >> LViewFlags.IndexWithinInitPhaseShift;\n        // The\n  init phase state must be always checked here as it may have been recursively updated.\n        if (indexWithinInitPhase\n  < (\n          currentView[PREORDER_HOOK_FLAGS] >> PreOrderHookFlags.NumberOfInitHooksCalledShift)\n  && (\n          currentView[FLAGS] & LViewFlags.InitPhaseStateMask) === initPhase) {\n          currentView[FLAGS]\n  += LViewFlags.IndexWithinInitPhaseIncrementer;\n          profiler(ProfilerEvent.LifecycleHookStart, directive,\n  hook);\n          try {\n            hook.call(directive);\n          } finally {\n            profiler(ProfilerEvent.LifecycleHookEnd,\n  directive, hook);\n          }\n        } else {\n          profiler(ProfilerEvent.LifecycleHookStart, directive, hook);\n          try {\n            hook.call(directive);\n          } finally {\n            profiler(ProfilerEvent.LifecycleHookEnd, directive, hook);\n          }\n        }\n      }\n  }\n  * @license\n  * Copyright Google LLC All Rights Reserved.\n  * Use of this\n  source code is governed by an MIT-style license that can be\n  found in the LICENSE file at\n  https://angular.io/license\n  * ^\n  \n  import {InjectFlags} from './di/interface/injector';\n  import {ProviderToken}\n  from './di/provider_token';\n  import {assertDefined, assertEquals} from './util/assert';\n  \n  import\n  {TDirectiveHostNode} from './node';\n  import {LView, TData} from './view';\n  * Offsets of the\n  `NodeInjector` data structure in the expando.\n  * `NodeInjector` is stored in both `LView` as well as\n  `TView.data`. All storage requires 9 words.\n  * First 8 are reserved for bloom filter and the 9th is reserved for the\n  associated `TNode` as well\n  * as parent `NodeInjector` pointer. All indexes are starting with `index` and have an\n  offset as\n  * shown.\n  * `LView` layout:\n  *   * index + 0: cumulative bloom filter\n  *   * index + 1: cumulative\n  bloom filter\n  *   * index + 2: cumulative bloom filter\n  *   * index + 3: cumulative bloom filter\n  *   * index + 4: cumulative\n  bloom filter\n  *   * index + 5: cumulative bloom filter\n  *   * index + 6: cumulative bloom filter\n  *   * index + 7: cumulative bloom filter\n  *   * index + 8: cumulative bloom filter\n  *   * index + PARENT: Index to the parent injector. See\n  `RelativeInjectorLocation`\n  *   * const parent = IView[index + NodeInjectorOffset.PARENT]\n  *   * `TViewData` layout:\n  *   *   * index + 0: cumulative bloom filter\n  *   *   * index + 1: cumulative bloom filter\n  *   *   * index + 2: cumulative bloom filter\n  *   *   * index + 3: cumulative bloom filter\n  *   *   * index + 4: cumulative bloom filter\n  *   *   * index + 5: cumulative bloom filter\n  *   *   * index + 6: cumulative bloom filter\n  *   *   * index + 7: cumulative bloom filter\n  *   *   * index + 8: cumulative bloom filter\n  *   *   * index + TNODE: TNode associated with this `NodeInjector`\n  *   * const tNode = tView.data[index + NodeInjectorOffset.TNODE]\n  *   * ^\n  \n  export const enum\n  NodeInjectorOffset {\n    TNODE = 8,\n    PARENT = 8,\n    BLOOM_SIZE = 8,\n    SIZE = 9,\n  }\n  * Represents
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a relative

location of parent injector.\n \*\n \* The interfaces encodes number of parents `LView`s to traverse and index in the `LView`\n \* pointing to the parent injector.\n \*/\nexport interface RelativeInjectorLocation {\n \_\_brand\_\_:\n 'RelativeInjectorLocationFlags';\n}\n\nexport const enum RelativeInjectorLocationFlags {\n InjectorIndexMask = 0b1111111111111111,\n ViewOffsetShift = 16,\n NO\_PARENT = -1,\n}\n\nexport const NO\_PARENT\_INJECTOR: RelativeInjectorLocation = -1 as any;\n\n/\*\*\n \* Each injector is saved in 9 contiguous slots in `LView` and 9 contiguous slots in\n \* `TView.data`. This allows us to store information about the current node's tokens (which\n \* can be shared in `TView`) as well as the tokens of its ancestor nodes (which cannot be\n \* shared, so they live in `LView`).\n \*\n \* Each of these slots (aside from the last slot) contains a bloom filter. This bloom filter\n \* determines whether a directive is available on the associated node or not. This prevents us\n \* from searching

the directives array at this level unless it's probable the directive is in it.\n \*\n \* See:

[https://en.wikipedia.org/wiki/Bloom\\_filter](https://en.wikipedia.org/wiki/Bloom_filter) for more about bloom filters.\n \*\n \* Because all injectors have been flattened into `LView` and `TViewData`, they cannot typed\n \* using interfaces as they were previously. The start index of each `LInjector` and `TInjector`\n \* will differ based on where it is flattened into the main array, so it's not possible to know\n \* the indices ahead of time and save their types here. The interfaces are still included here\n \* for documentation purposes.\n \*\n \* export interface LInjector extends Array<any> {\n \*\n \* // Cumulative bloom for directive IDs 0-31 (IDs are % BLOOM\_SIZE)\n \* [0]: number;\n \*\n \* // Cumulative bloom for directive IDs 32-63\n \* [1]: number;\n \*\n \* // Cumulative bloom for directive IDs 64-95\n \* [2]: number;\n \*\n \* // Cumulative bloom for directive IDs 96-127\n \* [3]: number;\n \*\n \* // Cumulative bloom for directive IDs 128-159\n \* [4]: number;\n \*\n \* // Cumulative bloom for directive IDs 160 - 191\n \* [5]: number;\n \*\n \* // Cumulative bloom for directive IDs 192 - 223\n \* [6]: number;\n \*\n \* // Cumulative bloom for directive IDs 224 - 255\n \* [7]: number;\n \*\n \* // We need to store a reference to the injector's parent so DI can keep looking up\n \* // the injector tree until it finds the dependency it's looking for.\n \* [PARENT\_INJECTOR]: number;\n \* }\n \*\n \* export interface TInjector extends Array<any> {\n \*\n \* // Shared node bloom for directive IDs 0-31 (IDs are % BLOOM\_SIZE)\n \* [0]: number;\n \*\n \* // Shared node bloom for directive IDs 32-63\n \* [1]: number;\n \*\n \* // Shared node bloom for directive IDs 64-95\n \* [2]: number;\n \*\n \* // Shared node bloom for directive IDs 96-127\n \* [3]: number;\n \*\n \* // Shared node bloom for directive IDs 128-159\n \* [4]: number;\n \*\n \* // Shared node bloom for directive IDs 160 - 191\n \* [5]: number;\n \*\n \* // Shared node bloom for directive IDs 192 - 223\n \* [6]: number;\n \*\n \* // Shared node bloom for directive IDs 224 - 255\n \* [7]: number;\n \*\n \* // Necessary to find directive indices for a particular node.\n \* [TNODE]: TElementNode|TElementContainerNode|TContainerNode;\n \* }\n \*\n \* Factory for creating instances of injectors in the NodeInjector.\n \*\n \* This factory is complicated by the fact that it can resolve `multi` factories as well.\n \*\n \* NOTE: Some of the fields are optional which means that this class has two hidden classes.\n \* - One without `multi` support (most common)\n \* - One with `multi` values, (rare).\n \*\n \* Since VMs can cache up to 4 inline hidden classes this is OK.\n \*\n \* - Single factory: Only `resolving` and `factory` is defined.\n \* - `providers` factory: `componentProviders` is a number and `index = -1`.\n \* - `viewProviders` factory: `componentProviders` is a number and `index`

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points to `providers`.\n */\nexport class NodeInjectorFactory {\n /**\n * The inject implementation to be activated when using the factory.\n */\n injectImpl: null|(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T);\n\n /**\n * Marker set to true during factory invocation to see if we get into recursive loop.\n * Recursive loop causes an error to be displayed.\n */\n resolving = false;\n\n /**\n * Marks that the token can see other Tokens declared in `viewProviders` on the same node.\n */\n canSeeViewProviders: boolean;\n\n /**\n * An array of factories to use in case of `multi` provider.\n */\n multi?: Array<() => any>;\n\n /**\n * Number of `multi`-providers which belong to the component.\n *\n * This is needed because when multiple components and directives declare the `multi` provider\n * they have to be concatenated in the correct order.\n *\n * Example:\n *\n * If we have a component and directive active an a single element as declared
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here\n * ```\n * component:\n * providers: [ {provide: String, useValue: 'component', multi: true} ],\n *
viewProviders: [ {provide: String, useValue: 'componentView', multi: true} ],\n * \n * directive:\n * providers: [
{provide: String, useValue: 'directive', multi: true} ],\n * ```\n * \n * Then the expected results are:\n * \n * ```\n
* providers: ['component', 'directive']\n * viewProviders: ['component', 'componentView', 'directive']\n * ```\n
*\n * The way to think about it is that the `viewProviders` have been inserted after the component\n * but before
the directives, which is why we need to know how many `multi`s have been declared by\n * the component.\n * \n
componentProviders?: number;\n\n /**\n * Current index of the Factory in the `data`. Needed for `viewProviders`
and `providers` merging.\n * See `providerFactory`. \n * \n index?: number;\n\n /**\n * Because the same
`multi` provider can be declared in `providers`
and `viewProviders` it is\n * possible for `viewProviders` to shadow the `providers`. For this reason we store the\n
* `provideFactory` of the `providers` so that `providers` can be extended with `viewProviders`. \n * \n
Example:\n * \n * Given:\n * ```\n * providers: [ {provide: String, useValue: 'all', multi: true} ],\n *
viewProviders: [ {provide: String, useValue: 'viewOnly', multi: true} ],\n * ```\n * \n * We have to return `[all]`
in case of content injection, but `[all, 'viewOnly']` in case\n * of view injection. We further have to make sure that
the shared instances (in our case\n * `all`) are the exact same instance in both the content as well as the view
injection. (We\n * have to make sure that we don't double instantiate.) For this reason the `viewProviders`\n *
`Factory` has a pointer to the shadowed `providers` factory so that it can instantiate the\n * `providers` (`[all]`) and
then extend it with `viewProviders` (`[all] + ['viewOnly']
= \n * `[all, 'viewOnly']`). \n * \n providerFactory?: NodeInjectorFactory|null;\n\n\n constructor(\n /**\n *
Factory to invoke in order to create a new instance.\n * \n public factory:\n * (this: NodeInjectorFactory,
_: undefined,\n /**\n * array where injectables tokens are stored. This is used in\n * case of an
error reporting to produce friendlier errors.\n * \n tData: TData,\n /**\n * array where
existing instances of injectables are stored. This is used in case\n * of multi shadow is needed. See `multi`
field documentation.\n * \n IView: LView,\n /**\n * The TNode of the same element
injector.\n * \n tNode: TDirectiveHostNode) => any,\n /**\n * Set to `true` if the token is
declared in `viewProviders` (or if it is component).\n * \n isVisibleProvider: boolean,\n
injectImplementation:
null(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T)) {\n ngDevMode && assertDefined(factory,
'Factory not specified');\n ngDevMode && assertEquals(typeof factory, 'function', 'Expected factory function.);\n
this.canSeeViewProviders = isVisibleProvider;\n this.injectImpl = injectImplementation;\n } }\n\nexport function
isFactory(obj: any): obj is NodeInjectorFactory {\n return obj instanceof NodeInjectorFactory;\n }\n\n// Note: This
hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\n\nexport const
unusedValueExportToPlacateAjd = 1;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n\nimport {KeyValueArray} from './../util/array_utils';\nimport {TStylingRange} from
'./interfaces/styling';\nimport {TIcu} from './i18n';\nimport {CssSelector} from './projection';\nimport
{RNode} from './render_dom';\nimport {LView, TView} from './view';\n\n\n/**\n * TNodeType corresponds to
the {@link TNode} `type` property.\n * \n * NOTE: type IDs are such that we use each bit to denote a type. This is
done so that we can easily\n * check if the `TNode` is of more than one type.\n * \n * `if (tNode.type ===
TNodeType.Text || tNode.type === TNodeType.Element)`\n * can be written as:\n * \n * `if (tNode.type & (TNodeType.Text
| TNodeType.Element))`\n * \n * However any given `TNode` can only be of one type.\n * \n\nexport const enum
TNodeType {\n /**\n * The TNode contains information about a DOM element aka {@link RText}.\n * \n Text
= 0b1,\n /**\n * The TNode contains information about a DOM element aka {@link RElement}.\n * \n
Element = 0b10,\n /**\n * The TNode contains information about an {@link LContainer} for embedded
views.\n * \n Container = 0b100,\n /**\n * The TNode contains information about an ``
element {@link
RNode}.\n * \n ElementContainer = 0b1000,\n /**\n * The TNode contains information about an `` projection\n * \n Projection = 0b10000,\n /**\n * The TNode contains information about an ICU

```

comment used in `i18n`.  
 Icu = 0b100000, // Combined Types These should never be used for `TNode.type` only as a useful way to check if `TNode.type` is one of several choices.  
 See: <https://github.com/microsoft/TypeScript/issues/35875> why we can't refer to existing enum.  
 AnyRNode = 0b11, // Text | Element, AnyContainer = 0b1100, // Container | ElementContainer, // See:  
 Converts `TNodeType` into human readable text.  
 Make sure this matches with `TNodeType`  
 next export function toTNodeTypeAsString(tNodeType: TNodeType): string {  
 let text = "";  
 (tNodeType & TNodeType.Text) && (text += 'Text');  
 (tNodeType & TNodeType.Element) && (text += 'Element');  
 (tNodeType & TNodeType.Container) && (text += 'Container');  
 (tNodeType & TNodeType.ElementContainer) && (text += 'ElementContainer');  
 (tNodeType & TNodeType.Projection) && (text += 'Projection');  
 (tNodeType & TNodeType.Icu) && (text += 'IcuContainer');  
 (tNodeType & TNodeType.Placeholder) && (text += 'Placeholder');  
 return text.length > 0 ? text.substring(1) : text; }  
 Corresponds to the TNode.flags property.  
 next export const enum TNodeFlags {  
 /\*\* Bit #1 - This bit is set if the node is a host for any directive (including a component) \*/  
 isDirectiveHost = 0x1, // Bit #2 - This bit is set if the node is a host for a component.  
 Setting this bit implies that the `isDirectiveHost` bit is set as well.  
 isComponentHost = 0x2, // Bit #3 - This bit is set if the node has been projected  
 isProjected = 0x4, // Bit #4 - This bit is set if any directive on this node has content queries  
 hasContentQuery = 0x8, // Bit #5 - This bit is set if the node has any "class" inputs  
 hasClassInput = 0x10, // Bit #6 - This bit is set if the node has any "style" inputs  
 hasStyleInput = 0x20, // Bit #7 This bit is set if the node has been detached by i18n  
 isDetached = 0x40, // Bit #8 - This bit is set if the node has directives with host bindings.  
 This flags allows us to guard host-binding logic and invoke it only on nodes that actually have directives with host bindings.  
 hasHostBindings = 0x80, }  
 Corresponds to the TNode.providerIndexes property.  
 next export const enum TNodeProviderIndexes {  
 /\*\* The index of the first provider on this node is encoded on the least significant bits. \*/  
 ProvidersStartIndexMask = 0b000000000000111111111111111111, // The count of view providers from the component on this node is encoded on the 20 most significant bits.  
 CptViewProvidersCountShift = 20, CptViewProvidersCountShifter = 0b000000000010000000000000000000, }  
 A set of marker values to be used in the attributes arrays. These markers indicate that some items are not regular attributes and the processing should be adapted accordingly.  
 next export const enum AttributeMarker {  
 /\*\* An implicit marker which indicates that the value in the array are of `attributeKey`, `attributeValue` format.  
 NOTE: This is implicit as it is the type when no marker is present in array. We indicate that it should not be present at runtime by the negative number.  
 ImplicitAttributes = -1, // Marker indicates that the following 3 values in the attributes array are: namespaceUri, attributeName, attributeValue in that order.  
 NamespaceURI = 0, // Signals class declaration.  
 Each value following `Classes` designates a class name to include on the element.  
 ## Example:  
 Given: `<div class="foo bar baz">...</div>`  
 the generated code is:  
 var \_c1 = [AttributeMarker.Classes, 'foo', 'bar', 'baz'];  
 Classes = 1, // Signals style declaration.  
 Each pair of values following `Styles` designates a style name and value to include on the element.  
 ## Example:  
 Given: `<div style="width:100px; height:200px;`

```

color:red">...</div>\n * ``\n *\n * the generated code is:\n * ``\n * var _c1 = [AttributeMarker.Styles,
'width', '100px', 'height'. '200px', 'color', 'red'];\n * ``\n *\n Styles = 2,\n\n /**\n * Signals that the following
attribute names were extracted from input or output bindings.\n *\n * For example, given the following HTML:\n
*\n * ``\n * <div moo="car" [foo]="exp" (bar)="doSth()">\n * ``\n *\n * the generated code is:\n *\n *
``\n * var _c1 = ['moo', 'car', AttributeMarker.Bindings, 'foo', 'bar'];\n * ``\n *\n Bindings = 3,\n\n /**\n *
Signals that the following attribute names
were hoisted from an inline-template declaration.\n *\n * For example, given the following HTML:\n *\n *
``\n * <div *ngFor="let value of values; trackBy:trackBy" dirA [dirB]="value">\n * ``\n *\n * the
generated code for the `template()` instruction would include:\n *\n * ``\n * ['dirA', ",
AttributeMarker.Bindings, 'dirB', AttributeMarker.Template, 'ngFor', 'ngForOF',\n * 'ngForTrackBy', 'let-value']\n
* ``\n *\n * while the generated code for the `element()` instruction inside the template function would\n *
include:\n *\n * ``\n * ['dirA', ", AttributeMarker.Bindings, 'dirB']\n * ``\n *\n Template = 4,\n\n /**\n *
Signals that the following attribute is `ngProjectAs` and its value is a parsed\n * `CssSelector`.\n *\n * For
example, given the following HTML:\n *\n * ``\n * <h1 attr="value" ngProjectAs="[title]">\n * ``\n *\n
* the generated code for the `element()` instruction would include:\n
*\n * ``\n * ['attr', 'value', AttributeMarker.ProjectAs, ["', 'title', "]]\n * ``\n *\n ProjectAs = 5,\n\n /**\n *
Signals that the following attribute will be translated by runtime i18n\n *\n * For example, given the following
HTML:\n *\n * ``\n * <div moo="car" foo="value" i18n-foo [bar]="binding" i18n-bar>\n * ``\n *\n *
the generated code is:\n *\n * ``\n * var _c1 = ['moo', 'car', AttributeMarker.I18n, 'foo', 'bar'];\n *\n I18n =
6,\n\n /**\n * A combination of:\n * - Attribute names and values.\n * - Special markers acting as flags to alter
attributes processing.\n * - Parsed ngProjectAs selectors.\n *\n export type TAttributes =
(string|AttributeMarker|CssSelector)[];\n\n /**\n * Constants that are associated with a view. Includes:\n * - Attribute
arrays.\n * - Local definition arrays.\n * - Translated messages (i18n).\n *\n export type TConstants =
(TAttributes|string)[];\n\n /**\n * Factory function that returns an array of consts.
Consts can be represented as a function in\n * case any additional statements are required to define consts in the list.
An example is i18n\n * where additional i18n calls are generated, which should be executed when consts are
requested\n * for the first time.\n *\n export type TConstantsFactory = () => TConstants;\n\n /**\n * TConstants type
that describes how the `consts` field is generated on ComponentDef: it can be\n * either an array or a factory
function that returns that array.\n *\n export type TConstantsOrFactory = TConstants|TConstantsFactory;\n\n /**\n *
Binding data (flyweight) for a particular node that is shared between all templates\n * of a specific type.\n *\n * If
a property is:\n * - PropertyAliases: that property's data was generated and this is it\n * - Null: that property's data
was already generated and nothing was found.\n * - Undefined: that property's data has not yet been generated\n
*\n * see: https://en.wikipedia.org/wiki/Flyweight_pattern for
more on the Flyweight pattern\n *\n export interface TNode {\n * /** The type of the TNode. See TNodeType. *\n
type: TNodeType;\n\n /**\n * Index of the TNode in TView.data and corresponding native element in LView.\n
*\n * This is necessary to get from any TNode to its corresponding native element when\n * traversing the node
tree.\n *\n * If index is -1, this is a dynamically created container node or embedded view node.\n *\n index:
number;\n\n /**\n * Insert before existing DOM node index.\n *\n * When DOM nodes are being inserted,
normally they are being appended as they are created.\n * Under i18n case, the translated text nodes are created
ahead of time as part of the\n * `i18nStart` instruction which means that this `TNode` can't just be appended and
instead\n * needs to be inserted using `insertBeforeIndex` semantics.\n *\n * Additionally sometimes it is
necessary to insert new text nodes as a child of this `TNode`. In\n * such a case the
value stores an array of text nodes to insert.\n *\n * Example:\n * ``\n * <div i18n>\n * Hello
<span>World</span>!</div>\n * ``\n *\n * In the above example the `i18nStart` instruction can create `Hello`,
`World` and `!` text\n * nodes. It can also insert `Hello` and `!` text node as a child of `<div>`, but it can't\n
* insert `World` because the `<span>` node has not yet been created. In such a case the\n * `<span>` `TNode` will
have an array which will direct the `<span>` to not only insert\n * itself in front of `!` but also to insert the `World`
(created by `i18nStart`) into\n * `<span>` itself.\n *\n * Pseudo code:\n * ``\n * if (insertBeforeIndex ===

```



be used for attribute selectors.

- \* We merge attrs here so that it can be used in a performant way for initial rendering.
- \* The `attrs` are merged in first pass in following order:
  - \* - Component's `hostAttrs`
  - \* - Directives' `hostAttrs`
  - \* - Template `TNode.attrs` associated with the current `TNode`.
- \* `mergedAttrs: TAttributes|null;`
- \* A set of local names under which a given element is exported in a template and visible to queries. An entry in this array can be created for different reasons:
  - \* - an element itself is referenced, ex.: `

`
  - \* - a component is referenced, ex.: ``
  - \* - a directive is referenced, ex.: ``
- \* A given element might have different local names and those names can be associated with a directive.
- \* We store local names at even indexes while odd indexes are reserved for directive index in a view (or `-1` if there is no associated directive).
- \* Some examples:
  - \* - `

` => `["foo", -1]`
  - \* - `` => `["foo", myCmptIdx]`
  - \* - `` => `["foo", myCmptIdx, "bar", directiveIdx]`
  - \* - `

` => `["foo", -1, "bar", directiveIdx]`
- \* `localNames: (string|number)[]|null;`
- \* Information about input properties that need to be set once from attribute data.
  - \* `initialInputs: InitialInputData|undefined;`
  - \* Input data for all directives on this node. `null` means that there are no directives with inputs on this node.
  - \* `inputs: PropertyAliases|null;`
  - \* Output data for all directives on this node. `null` means that there are no directives with outputs on this node.
  - \* `outputs: PropertyAliases|null;`
  - \* The TView or TViews attached to this node.
  - \* If this TNode corresponds to an LContainer with inline views, the container will need to store separate static data for each of its view blocks (TView[]). Otherwise, nodes in inline views with the same index as nodes in their parent views will overwrite each other, as they are in the same template.
  - \* Each index in this array corresponds to the static data for a certain view. So if you had V(0) and V(1) in a container, you might have:
    - \* `[{tagName: 'div', attrs: ...}, null], // V(0) TView`
    - \* `[{tagName: 'button', attrs: ...}, null] // V(1) TView`
  - \* If this TNode corresponds to an LContainer with a template (e.g. structural directive), the template's TView will be stored here.
  - \* If this TNode corresponds to an element, tViews will be null.
  - \* `tViews: TView|TView[]|null;`
  - \* The next sibling node. Necessary so we can propagate through the root nodes of a view to insert them or remove them from the DOM.
  - \* `next: TNode|null;`
  - \* The next projected sibling. Since in Angular content projection works on the node-by-node basis the act of projecting nodes might change nodes relationship at the insertion point (target view). At the same time we need to keep initial relationship between nodes as expressed in content view.
  - \* `projectionNext: TNode|null;`
  - \* First child of the current node.
    - \* For component nodes, the child will always be a ContentChild (in same view).
    - \* For embedded view nodes, the child will be in their child view.
    - \* `child: TNode|null;`
    - \* Parent node (in the same view only).
    - \* We need a reference to a node's parent so we can append the node to its parent's native element at the appropriate time.
    - \* If the parent would be in a different view (e.g. component host), this property will be null.
    - \* It's important that we don't try to cross component boundaries when retrieving the parent because the parent will change (e.g. index, attrs) depending on where the component was used (and thus shouldn't be stored on TNode). In these cases, we retrieve the parent through LView.node instead (which will be instance-specific).
    - \* If this is an inline view node (V), the parent will be its container.
    - \* `parent: TElementNode|TContainerNode|null;`
    - \* List of projected TNodes for a given component host element OR index into the said nodes.
    - \* For easier discussion assume this example:
      - \* ``'s view definition:
 

```
<child id="c1">content1</child>
<child id="c2"><span>content2</span></child>
```
      - \* ``'s view definition:
 

```
<ng-content id="cont1"></ng-content>
```
    - \* If `Array.isArray(projection)` then `TNode` is a host element.
      - \* `projection` stores the content nodes which are to be projected.
      - \* The nodes represent categories defined by the selector: For example:
 

```
<ng-content/><ng-content select="abc"/>
```
      - \* would represent the heads for `      - \* The nodes we store in `projection` are heads only, we used `next` to get their siblings.
      - \* The nodes `next`

is sorted/rewritten as part of the projection setup.

- \* - `projection` size is equal to the number of projections

`<ng-content>`. The size of `c1`` will be `1`` because `<child>` has only one `<ng-content>`.

- \* - we store `projection`` with the host (`c1``, `c2``) rather than the `<ng-content>` (`cont1``) because the same component (`<child>`) can be used in multiple locations (`c1``, `c2``) and `projection`` as a result have different set of nodes to project.
- \* - without `projection`` it would be difficult to efficiently traverse nodes to be projected.
- \* If `typeof projection == 'number'` then `TNode`` is a `<ng-content>` element:
  - \* - `projection`` is an index of the host's `projection`Nodes``
  - \* This would return the first head node to project:

```
getHost(currentTNode).projection[currentTNode.projection]
```
- \* - When projecting nodes the parent node retrieved may be a `<ng-content>` node, in which case the process is recursive in nature.
  - \* If `projection`` is of type `RNode[]`` then we have a collection of native nodes passed as `projectable nodes`` during dynamic component creation.

```
projection: (TNode|RNode[])[]|number|null;
```
  - \* A collection of all `static values`` for an element (including from host). This field will be populated if and when:
    - \* - There are one or more initial `style`s`` on an element (e.g. `<div style="width:200px;">`)
    - \* - There are one or more initial `style`s`` on a directive/component host (e.g. `@Directive({host: {style: "width:200px;" } })`)
  - \* A collection of all `style` static values`` for an element excluding host sources.
    - \* Populated when there are one or more initial `style`s`` on an element (e.g. `<div style="width:200px;">`)
    - \* Must be stored separately from `tNode.styles`` to facilitate setting directive inputs that shadow the `style`` property. If we used `tNode.styles`` as is for shadowed inputs, we would feed host styles back into directives as `"inputs"`. If we used `tNode.attrs``, we would have to concatenate the attributes on every template pass. Instead, we process once on first create pass and store here.
    - \* `stylesWithoutHost: string|null;`
    - \* A `KeyValueArray`` version of residual `styles``. When there are styling instructions than each instruction stores the static styling which is of lower priority than itself. This means that there may be a higher priority styling than the instruction.
      - \* Imagine: `<div style="color: highest;" my-dir>`
      - \* `@Directive({ host: { style: 'color: lowest;', '[styles.color]': 'exp // styleProp('color', ctx.exp); } })`
    - \* In the above case: `color: lowest`` is stored with `styleProp('color', ctx.exp);`` instruction
    - \* `color: highest`` is the residual and is stored here.
    - \* `undefined``: not initialized.
    - \* `null``: initialized but `styles`` is `null``
    - \* `KeyValueArray``: parsed version of `styles``
    - \* `residualStyles: KeyValueArray<any>|undefined|null;`
    - \* A collection of all class static values for an element (including from host). This field will be populated if and when:
      - \* - There are one or more initial classes on an element (e.g. `<div class="one two three">`)
      - \* - There are one or more initial classes on an directive/component host (e.g. `@Directive({host: {class: "SOME_CLASS" } })`)
    - \* A collection of all class static values for an element excluding host sources.
      - \* Populated when there are one or more initial classes on an element (e.g. `<div class="SOME_CLASS">`)
      - \* Must be stored separately from `tNode.classes`` to facilitate setting directive inputs that shadow the `class`` property. If we used `tNode.classes`` as is for shadowed inputs, we would feed host classes back into directives as `"inputs"`. If we used `tNode.attrs``, we would have to concatenate the attributes on every template pass. Instead, we process once on first create pass and store here.
      - \* `classesWithoutHost: string|null;`
      - \* A `KeyValueArray`` version of residual `classes``
      - \* Same as `TNode.residualStyles`` but for classes.
      - \* `undefined``: not initialized.
      - \* `null``: initialized but `classes`` is `null``
      - \* `KeyValueArray``: parsed version of `classes``
      - \* `residualClasses: KeyValueArray<any>|undefined|null;`
      - \* Stores the head/tail index of the class bindings.
        - \* - If no bindings, the head and tail will both be 0.
        - \* - If there are template bindings, stores the head/tail of the class bindings in the template.
        - \* - If no template bindings but there are host bindings, the head value will point to the last host binding for `"class"` (not the head of the linked list), tail will be 0.
      - \* See: `style_binding_list.ts`` for details.
      - \* This is used by `insertTStylingBinding`` to know where the



```

next styling binding should be\n * inserted so that they can be sorted in priority order.\n */\n classBindings:
TStylingRange;\n\n /**\n * Stores the head/tail index of the class bindings.\n *\n * - If no bindings, the head
and tail will both be 0.\n * - If there are template bindings, stores the head/tail of the style bindings in the
template.\n * - If no template bindings but there are host bindings, the head value will point to the last\n * host
binding for \"style\" (not the head
of the linked list), tail will be 0.\n *\n * See: `style_binding_list.ts` for details.\n *\n * This is used by
`insertTStylingBinding` to know where the next styling binding should be\n * inserted so that they can be sorted in
priority order.\n */\n styleBindings: TStylingRange;\n}\n\n/**\n * See `TNode.insertBeforeIndex`\n */\nexport
type InsertBeforeIndex = null|number|number[];\n\n/**\n * Static data for an element */\nexport interface
TElementNode extends TNode {\n /**\n * Index in the data[] array */\n index: number;\n child:
TElementNode|TTextNode|TElementContainerNode|TContainerNode|TProjectionNode|null;\n\n /**\n * Element
nodes will have parents unless they are the first node of a component or\n * embedded view (which means their
parent is in a different view and must be\n * retrieved using viewData[HOST_NODE]).\n */\n parent:
TElementNode|TElementContainerNode|null;\n\n tViews: null;\n\n /**\n * If this is a component TNode with
projection, this will be
an array of projected\n * TNodes or native nodes (see TNode.projection for more info). If it's a regular element
node\n * or a component without projection, it will be null.\n */\n projection: (TNode|RNode[])[]|null;\n\n /**\n
* Stores tagName\n */\n value: string;\n}\n\n/**\n * Static data for a text node */\nexport interface TTextNode
extends TNode {\n /**\n * Index in the data[] array */\n index: number;\n child: null;\n\n /**\n * Text nodes will have
parents unless they are the first node of a component or\n * embedded view (which means their parent is in a
different view and must be\n * retrieved using LView.node).\n */\n parent:
TElementNode|TElementContainerNode|null;\n\n tViews: null;\n\n projection: null;\n}\n\n/**\n * Static data for an
LContainer */\nexport interface TContainerNode extends TNode {\n /**\n * Index in the data[] array.\n *\n * If
it's -1, this is a dynamically created container node that isn't stored in\n * data[] (e.g. when you inject
ViewContainerRef)\n */\n index: number;\n child: null;\n\n /**\n * Container nodes will have parents unless:\n *\n * - They are
the first node of a component or embedded view\n * - They are dynamically created\n */\n parent:
TElementNode|TElementContainerNode|null;\n\n tViews: TView|TView[]|null;\n\n projection: null;\n\n value:
null;\n}\n\n/**\n * Static data for an <ng-container> */\nexport interface TElementContainerNode extends TNode {\n
/**\n * Index in the LView[] array. */\n index: number;\n child:
TElementNode|TTextNode|TContainerNode|TElementContainerNode|TProjectionNode|null;\n\n parent:
TElementNode|TElementContainerNode|null;\n\n tViews: null;\n\n projection: null;\n}\n\n/**\n * Static data for an ICU
expression */\nexport interface TIcuContainerNode extends TNode {\n /**\n * Index in the LView[] array. */\n index:
number;\n child: null;\n\n parent: TElementNode|TElementContainerNode|null;\n\n tViews: null;\n\n projection: null;\n\n
value: TIcon;\n}\n\n/**\n * Static data for an LProjectionNode\n */\nexport interface TProjectionNode extends TNode {\n
/**\n * Index in the data[] array */\n child: null;\n\n /**\n * Projection nodes will have parents unless they are the first node of a component\n * or embedded view (which
means their parent is in a different view and must be\n * retrieved using LView.node).\n */\n parent:
TElementNode|TElementContainerNode|null;\n\n tViews: null;\n\n /**\n * Index of the projection node. (See
TNode.projection for more info.) */\n projection: number;\n\n value: null;\n}\n\n/**\n * A union type representing
all TNode types that can host a directive.\n */\nexport type TDirectiveHostNode =
TElementNode|TContainerNode|TElementContainerNode;\n\n /**\n * This mapping is necessary so we can set input
properties and output listeners\n * properly at runtime when property names are minified or aliased.\n *\n * Key:
unminified / public input or output name\n * Value: array containing minified / internal name and related directive
index\n *\n * The
value must be an array to support inputs and outputs with the same name\n * on the same node.\n */\nexport type
PropertyAliases = {\n // This uses an object map because using the Map type would be too slow\n [key: string]:
PropertyAliasValue;\n}\n\n /**\n * Store the runtime input or output names for all the directives.\n *\n * i+0:

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directive instance index\n * i+1: privateName\n *\n * e.g. [0, 'change-minified']\n *\nexport type
PropertyAliasValue = (number|string)[];\n\n/**\n * This array contains information about input properties that\n *
need to be set once from attribute data. It's ordered by\n * directive index (relative to element) so it's simple to\n *
look up a specific directive's initial input data.\n *\n * Within each sub-array:\n *\n * i+0: attribute name\n *\n * i+1:
minified/internal input name\n *\n * i+2: initial value\n *\n * If a directive on a node does not have any input
properties\n * that should be set from attributes, its index is set to null\n * to avoid a sparse
array.\n *\n * e.g. [null, ['role-min', 'minified-input', 'button']]\n *\nexport type InitialInputData =
(InitialInputs|null)[];\n\n/**\n * Used by InitialInputData to store input properties\n * that should be set once from
attributes.\n *\n * i+0: attribute name\n *\n * i+1: minified/internal input name\n *\n * i+2: initial value\n *\n * e.g. ['role-
min', 'minified-input', 'button']\n *\nexport type InitialInputs = string[];\n\n// Note: This hack is necessary so we
don't erroneously get a circular dependency\n// failure based on types.\nexport const
unusedValueExportToPlacateAjd = 1;\n\n/**\n * Type representing a set of TNodes that can have local refs (#foo`)
placed on them.\n *\nexport type TNodeWithLocalRefs =
TContainerNode|TElementNode|TElementContainerNode;\n\n/**\n * Type for a function that extracts a value for a
local refs.\n * Example:\n * - `

` - `nativeDivEl` should point to the native `

` element;\n * -
`<ng-template #tplRef>` - `tplRef` should point to the
`TemplateRef` instance;\n *\nexport type LocalRefExtractor = (tNode: TNodeWithLocalRefs, currentView:
LView) => any;\n\n/**\n * Returns `true` if the `TNode` has a directive which has `@Input()` for `class` binding.\n
*\n * ```\n * <div my-dir [class]="exp"></div>\n * ```\n * and\n * ```\n * @Directive({\n * })\n * class
MyDirective {\n *   @Input()\n *   class: string;\n * }\n * ```\n *\n * In the above case it is necessary to write the
reconciled styling information into the\n * directive's input.\n *\n * @param tNode\n *\nexport function
hasClassInput(tNode: TNode) {\n return (tNode.flags & TNodeFlags.hasClassInput) !== 0;\n}\n\n/**\n * Returns
`true` if the `TNode` has a directive which has `@Input()` for `style` binding.\n *\n * ```\n * <div my-dir
[style]="exp"></div>\n * ```\n * and\n * ```\n * @Directive({\n * })\n * class MyDirective {\n *   @Input()\n *
class: string;\n * }\n * ```\n *\n * In the above case it is necessary to write the reconciled styling information
into the\n * directive's input.\n *\n * @param tNode\n *\nexport function hasStyleInput(tNode: TNode) {\n return
(tNode.flags & TNodeFlags.hasStyleInput) !== 0;\n}\n\n"/**\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nimport {assertDefined, throwError} from './util/assert';\nimport
{TNode, TNodeType, toTNodeTypeAsString} from './interfaces/node';\n\nexport function assertTNodeType(\n
tNode: TNode|null, expectedTypes: TNodeType, message?: string): void {\n assertDefined(tNode, 'should be called
with a TNode');\n if ((tNode.type & expectedTypes) === 0) {\n throwError(\n message ||\n `Expected
[${toTNodeTypeAsString(expectedTypes)}] but got ${\n toTNodeTypeAsString(tNode.type)}.`);\n
}\n}\n\nexport function assertPureTNodeType(type: TNodeType) {\n if (!(type === TNodeType.Element ||
\n //\n type === TNodeType.Text || //\n type === TNodeType.Container || //\n type ===
TNodeType.ElementContainer || //\n type === TNodeType.Icu || //\n type ===
TNodeType.Projection || //\n type === TNodeType.Placeholder)) {\n throwError(`Expected TNodeType
to have only a single type selected, but got ${\n toTNodeTypeAsString(type)}.`);\n }\n}\n\n"/**\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport {CharCode} from
'././util/char_code';\nimport {AttributeMarker, TAttributes} from './interfaces/node';\nimport {CssSelector} from
'./interfaces/projection';\nimport {Renderer} from './interfaces/renderer';\nimport {RElement} from
'./interfaces/renderer_dom';\n\n\n/**\n * Assigns all attribute values to the provided element via the
inferred renderer.\n *\n * This function accepts two forms of attribute entries:\n *\n * default: (key, value):\n * attrs
= [key1, value1, key2, value2]\n *\n * namespaced: (NAMESPACE_MARKER, uri, name, value)\n * attrs =
[NAMESPACE_MARKER, uri, name, value, NAMESPACE_MARKER, uri, name, value]\n *\n * The `attrs` array
can contain a mix of both the default and namespaced entries.\n * The `default` values are set without a marker,
but if the function comes across\n * a marker value then it will attempt to set a namespaced value. If the marker is\n


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* not of a namespaced value then the function will quit and return the index value\n * where it stopped during the
iteration of the attrs array.\n *\n * See [AttributeMarker] to understand what the namespace marker value is.\n *\n * Note that this instruction does not support assigning style and class values to\n * an element. See `elementStart` and
`elementHostAttrs` to learn how styling values\n * are applied to an element.\n * @param
renderer The renderer to be used\n * @param native The element that the attributes will be assigned to\n * @param
attrs The attribute array of values that will be assigned to the element\n * @returns the index value that was last
accessed in the attributes array\n */\nexport function setUpAttributes(renderer: Renderer, native: RElement, attrs:
TAttributes): number {\n  let i = 0;\n  while (i < attrs.length) {\n    const value = attrs[i];\n    if (typeof value ===
'number') {\n      // only namespaces are supported. Other value types (such as style/class\n      // entries) are not
supported in this function.\n      if (value !== AttributeMarker.NamespaceURI) {\n        break;\n      }\n      // we
just landed on the marker value ... therefore\n      // we should skip to the next entry\n      i++;\n      const
namespaceURI = attrs[i++] as string;\n      const attrName = attrs[i++] as string;\n      const attrVal = attrs[i++] as
string;\n      ngDevMode && ngDevMode.rendererSetAttribute++;\n      renderer.setAttribute(native, attrName, attrVal, namespaceURI);\n    } else {\n      // attrName is string;\n      const attrName = value as string;\n      const attrVal = attrs[++i];\n      // Standard attributes\n      ngDevMode &&
ngDevMode.rendererSetAttribute++;\n      if (isAnimationProp(attrName)) {\n        renderer.setProperty(native,
attrName, attrVal);\n      } else {\n        renderer.setAttribute(native, attrName, attrVal as string);\n      }\n      i++;\n    }\n  }\n  // another piece of code may iterate over the same attributes array. Therefore\n  // it may be helpful to
return the exact spot where the attributes array exited\n  // whether by running into an unsupported marker or if all
the static values were\n  // iterated over.\n  return i;\n}\n\n/**\n * Test whether the given value is a marker that
indicates that the following\n * attribute values in a `TAttributes` array are only the names of attributes,\n * and not
name-value pairs.\n * @param marker
The attribute marker to test.\n * @returns true if the marker is a `name-only` marker (e.g. `Bindings`, `Template`
or `I18n`).\n */\nexport function isNameOnlyAttributeMarker(marker: string|AttributeMarker|CssSelector) {\n  return
marker === AttributeMarker.Bindings || marker === AttributeMarker.Template ||\n  marker ===
AttributeMarker.I18n;\n}\n\nexport function isAnimationProp(name: string): boolean {\n  // Perf note: accessing
charCodeAt to check for the first character of a string is faster as\n  // compared to accessing a character at index 0
(ex. name[0]). The main reason for this is that\n  // charCodeAt doesn't allocate memory to return a substring.\n
return name.charCodeAt(0) === CharCode.AT_SIGN;\n}\n\n/**\n * Merges `src` `TAttributes` into `dst`
`TAttributes` removing any duplicates in the process.\n *\n * This merge function keeps the order of attrs same.\n
*\n * @param dst Location of where the merged `TAttributes` should end up.\n * @param src `TAttributes` which
should be appended to `dst`\n */\nexport function mergeHostAttrs(dst: TAttributes|null, src: TAttributes|null):
TAttributes|null {\n  if (src === null || src.length === 0) {\n    // do nothing\n  } else if (dst === null || dst.length ===
0) {\n    // We have source, but dst is empty, just make a copy.\n    dst = src.slice();\n  } else {\n    let srcMarker:
AttributeMarker = AttributeMarker.ImplicitAttributes;\n    for (let i = 0; i < src.length; i++) {\n      const item =
src[i];\n      if (typeof item === 'number') {\n        srcMarker = item;\n      } else {\n        if (srcMarker ===
AttributeMarker.NamespaceURI) {\n          // Case where we need to consume `key1`, `key2`, `value` items.\n        }
else if (\n          srcMarker === AttributeMarker.ImplicitAttributes ||\n          srcMarker ===
AttributeMarker.Styles) {\n          // Case where we have to consume `key1` and `value` only.\n        }\n      }\n      mergeHostAttribute(dst, srcMarker, item as string, null, src[++i] as string);\n    }\n  } else {\n    // Case where we have to consume `key1` only.\n    mergeHostAttribute(dst, srcMarker,
item as string, null, null);\n  }\n  }\n  }\n  }\n  return dst;\n}\n\n/**\n * Append `key`/`value` to existing
`TAttributes` taking region marker and duplicates into account.\n *\n * @param dst `TAttributes` to append to.\n *
@param marker Region where the `key`/`value` should be added.\n * @param key1 Key to add to `TAttributes`\n *
@param key2 Key to add to `TAttributes` (in case of `AttributeMarker.NamespaceURI`)\n * @param value Value
to add or to overwrite to `TAttributes` Only used if `marker` is not Class.\n */\nexport function
mergeHostAttribute(\n  dst: TAttributes, marker: AttributeMarker, key1: string, key2: string|null,\n  value:
string|null): void {\n  let i = 0;\n  // Assume that new markers will be inserted at the end.\n  let markerInsertPosition

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`BLOOM_BUCKET_BITS` indicate the bucket offset that the mask\n // should be written to.\n (tView.data as
number[])[injectorIndex + (bloomHash
>> BLOOM_BUCKET_BITS)] |= mask;\n}\n\n/**\n * Creates (or gets an existing) injector for a given element or
container.\n *\n * @param tNode for which an injector should be retrieved / created.\n * @param IView View
where the node is stored\n * @returns Node injector\n *\n\nexport function getOrCreateNodeInjectorForNode(\n
tNode: TElementNode|TContainerNode|TElementContainerNode, IView: LView): number {\n const
existingInjectorIndex = getInjectorIndex(tNode, IView);\n if (existingInjectorIndex !== -1) {\n return
existingInjectorIndex;\n }\n\n const tView = IView[TVIEW];\n if (tView.firstCreatePass) {\n
tNode.injectorIndex = IView.length;\n insertBloom(tView.data, tNode); // foundation for node bloom\n
insertBloom(IView, null); // foundation for cumulative bloom\n insertBloom(tView.blueprint, null);\n }\n\n
const parentLoc = getParentInjectorLocation(tNode, IView);\n const injectorIndex = tNode.injectorIndex;\n\n // If
a parent injector can't be found,
its location is set to -1.\n // In that case, we don't need to set up a cumulative bloom\n if
(hasParentInjector(parentLoc)) {\n const parentIndex = getParentInjectorIndex(parentLoc);\n const parentLView
= getParentInjectorView(parentLoc, IView);\n const parentData = parentLView[TVIEW].data as any;\n //
Creates a cumulative bloom filter that merges the parent's bloom filter\n // and its own cumulative bloom (which
contains tokens for all ancestors)\n for (let i = 0; i < NodeInjectorOffset.BLOOM_SIZE; i++) {\n
IView[injectorIndex + i] = parentLView[parentIndex + i] | parentData[parentIndex + i];\n }\n }\n\n
IView[injectorIndex + NodeInjectorOffset.PARENT] = parentLoc;\n return injectorIndex;\n}\n\n\nfunction
insertBloom(arr: any[], footer: TNode|null): void {\n arr.push(0, 0, 0, 0, 0, 0, 0, 0, footer);\n}\n\n\n\nexport function
getInjectorIndex(tNode: TNode, IView: LView): number {\n if (tNode.injectorIndex === -1 ||\n // If the injector
index is the
same as its parent's injector index, then the index has been\n // copied down from the parent node. No injector
has been created yet on this node.\n (tNode.parent && tNode.parent.injectorIndex === tNode.injectorIndex) ||\n
// After the first template pass, the injector index might exist but the parent values\n // might not have been
calculated yet for this instance\n IView[tNode.injectorIndex + NodeInjectorOffset.PARENT] === null) {\n
return -1;\n } else {\n ngDevMode && assertIndexInRange(IView, tNode.injectorIndex);\n return
tNode.injectorIndex;\n }\n}\n\n\n/**\n * Finds the index of the parent injector, with a view offset if applicable. Used
to set the\n * parent injector initially.\n *\n * @returns Returns a number that is the combination of the number of
LViews that we have to go up\n * to find the LView containing the parent inject AND the index of the injector
within that LView.\n *\n\nexport function getParentInjectorLocation(tNode: TNode, IView:
LView): RelativeInjectorLocation {\n if (tNode.parent && tNode.parent.injectorIndex !== -1) {\n // If we have a
parent `TNode` and there is an injector associated with it we are done, because\n // the parent injector is within the
current `LView`.\n return tNode.parent.injectorIndex as any; // ViewOffset is 0\n }\n\n // When parent injector
location is computed it may be outside of the current view. (ie it could\n // be pointing to a declared parent
location). This variable stores number of declaration parents\n // we need to walk up in order to find the parent
injector location.\n let declarationViewOffset = 0;\n let parentTNode: TNode|null = null;\n let IViewCursor:
LView|null = IView;\n // The parent injector is not in the current `LView`. We will have to walk the declared
parent\n // `LView` hierarchy and look for it. If we walk of the top, that means that there is no parent\n //
`NodeInjector`.\n while (IViewCursor !== null) {\n parentTNode = getTNodeFromLView(IViewCursor);\n\n
if (parentTNode === null) {\n // If we have no parent, than we are done.\n return
NO_PARENT_INJECTOR;\n }\n\n ngDevMode && parentTNode && assertTNodeForLView(parentTNode!,
IViewCursor[DECLARATION_VIEW]!);\n // Every iteration of the loop requires that we go to the declared
parent.\n declarationViewOffset++;\n IViewCursor = IViewCursor[DECLARATION_VIEW];\n\n if
(parentTNode.injectorIndex !== -1) {\n // We found a NodeInjector which points to something.\n return
(parentTNode.injectorIndex | \n (declarationViewOffset << RelativeInjectorLocationFlags.ViewOffsetShift))
as any;\n }\n }\n return NO_PARENT_INJECTOR;\n}\n\n\n/**\n * Makes a type or an injection token public to the
DI system by adding it to an\n * injector's bloom filter.\n *\n * @param di The node injector in which a directive

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will be added\n \* @param token The type or the injection token to be made public\n \*/\nexport function diPublicInInjector(\n

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injectorIndex: number, tView: TView, token: ProviderToken<any>): void {\n  bloomAdd(injectorIndex, tView, token);\n}\n\n/**\n * Inject static attribute value into directive constructor.\n * This method is used with `factory` functions which are generated as part of `defineDirective` or `defineComponent`. The method retrieves the static value of an attribute. (Dynamic attributes are not supported since they are not resolved at the time of injection and can change over time.)\n * # Example\n * Given:\n * ```\n * @Component(...)\n * class MyComponent {\n *   constructor(@Attribute('title') title: string) { ... }\n * }\n * ```\n * When instantiated with\n * ```\n * <my-component title="Hello"></my-component>\n * ```\n * Then factory method generated is:\n * ```\n * MyComponent.cmp = defineComponent({\n *   factory: () => new MyComponent(injectAttribute('title'))\n *   ... \n * })\n * ```\n * @publicApi\n */\nexport function injectAttributeImpl(tNode: TNode, attrNameToInject: string): string|null {\n  ngDevMode && assertTNodeType(tNode, TNodeType.AnyContainer | TNodeType.AnyRNode);\n  ngDevMode && assertDefined(tNode, 'expecting tNode');\n  if (attrNameToInject === 'class') {\n    return tNode.classes;\n  }\n  if (attrNameToInject === 'style') {\n    return tNode.styles;\n  }\n  const attrs = tNode.attrs;\n  if (attrs) {\n    const attrsLength = attrs.length;\n    let i = 0;\n    while (i < attrsLength) {\n      const value = attrs[i];\n      // If we hit a `Bindings` or `Template` marker then we are done.\n      if (isNameOnlyAttributeMarker(value)) break;\n      // Skip namespaced attributes\n      if (value === AttributeMarker.NamespaceURI) {\n        // we skip the next two values\n        // as namespaced attributes looks like\n        // [..., AttributeMarker.NamespaceURI, 'http://someuri.com/test', 'test:exist',\n        // 'existValue', ...]\n        i = i + 2;\n      } else if (typeof value === 'number') {\n        // Skip to the first value of the marked attribute.\n        i++;\n        while (i < attrsLength && typeof attrs[i] === 'string') {\n          i++;\n        }\n      } else if (value === attrNameToInject) {\n        return attrs[i + 1] as string;\n      } else {\n        i = i + 2;\n      }\n    }\n  }\n  return null;\n}\n\nfunction notFoundValueOrThrow<T>(\n  notFoundValue: T|null, token: ProviderToken<T>, flags: InjectFlags): T|null {\n  if ((flags & InjectFlags.Optional) || notFoundValue !== undefined) {\n    return notFoundValue;\n  } else {\n    throwProviderNotFoundError(token, 'NodeInjector');\n  }\n}\n\n/**\n * Returns the value associated to the given token from the ModuleInjector or throws exception\n * @param lView The `LView` that contains the `tNode`\n * @param token The token to look for\n * @param flags Injection flags\n * @param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n * @returns the value from the injector or throws an exception\n */\nexport function lookupTokenUsingModuleInjector<T>(\n  lView: LView, token: ProviderToken<T>, flags: InjectFlags, notFoundValue?: any): T|null {\n  if ((flags & InjectFlags.Optional) && notFoundValue === undefined) {\n    // This must be set or the NullInjector will throw for optional deps\n    notFoundValue = null;\n  }\n  if ((flags & (InjectFlags.Self | InjectFlags.Host)) === 0) {\n    const moduleInjector = lView[INJECTOR];\n    // switch to `injectInjectorOnly` implementation for module injector, since module injector\n    // should not have access to Component/Directive DI scope (that may happen through\n    // `directiveInject` implementation)\n    const previousInjectImplementation = setInjectImplementation(undefined);\n    try {\n      if (moduleInjector) {\n        return moduleInjector.get(token, notFoundValue, flags & InjectFlags.Optional);\n      } else {\n        return injectRootLimpMode(token, notFoundValue, flags & InjectFlags.Optional);\n      }\n    } finally {\n      setInjectImplementation(previousInjectImplementation);\n    }\n  }\n  return notFoundValueOrThrow<T>(notFoundValue, token, flags);\n}\n\n/**\n * Returns the value associated to the given token from the NodeInjectors => ModuleInjector.\n * Look for the injector providing the token by walking up the node injector tree and then\n * the module injector tree.\n * This function patches `token` with `__NG_ELEMENT_ID__` which contains the id for the bloom\n * filter. `-1` is reserved for injecting `Injector` (implemented by `NodeInjector`)\n * @param tNode The Node where the search for the injector should start\n * @param lView The `LView` that contains the `tNode`\n * @param token The token to look for\n * @param flags Injection flags\n * @param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n * @returns the value from the injector, `null` when not found, or `notFoundValue` if provided\n */\nexport function getOrCreateInjectable<T>(\n
```

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tNode: TDirectiveHostNode|null, IView: LView, token: ProviderToken<T>,\n  flags: InjectFlags =
InjectFlags.Default, notFoundValue?: any): T|null {\n  if (tNode !== null) {\n    // If the view or any of its ancestors
have an embedded\n    // view injector, we have to look it up there first.\n    if (IView[FLAGS] &
LViewFlags.HasEmbeddedViewInjector) {\n      const embeddedInjectorValue =\nlookupTokenUsingEmbeddedInjector(tNode, IView, token, flags, NOT_FOUND);\n      if (embeddedInjectorValue
!== NOT_FOUND) {\n        return embeddedInjectorValue;\n      }\n    }\n    // Otherwise try the node injector.\n    const value = lookupTokenUsingNodeInjector(tNode, IView, token, flags, NOT_FOUND);\n    if (value !==
NOT_FOUND) {\n      return value;\n    }\n  }\n  // Finally, fall back to the module injector.\n  return
lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n}\n\n/**\n * Returns the value
associated to the given token from the node injector.\n
*\n * @param tNode The Node where the search for the injector should start\n * @param IView The `LView` that
contains the `tNode`\n * @param token The token to look for\n * @param flags Injection flags\n * @param
notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n * @returns the value from
the injector, `null` when not found, or `notFoundValue` if provided\n */\nfunction
lookupTokenUsingNodeInjector<T>(tNode: TDirectiveHostNode, IView: LView, token: ProviderToken<T>,\n
flags: InjectFlags,\n  notFoundValue?: any) {\n  const bloomHash = bloomHashBitOrFactory(token);\n  // If the ID
stored here is a function, this is a special object like ElementRef or TemplateRef\n  // so just call the factory function
to create it.\n  if (typeof bloomHash === 'function') {\n    if (!enterDI(IView, tNode, flags)) {\n      // Failed to enter
DI, try module injector instead. If a token is injected with the @Host\n      // flag, the module injector is not searched
for that token in Ivy.\n      return (flags & InjectFlags.Host) ?\n        notFoundValueOrThrow<T>(notFoundValue,\n
token, flags) :\n        lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n    }\n    try {\n
      const value = bloomHash(flags);\n      if (value == null && !(flags & InjectFlags.Optional)) {\n
throwProviderNotFoundError(token);\n      } else {\n        return value;\n      }\n    } finally {\n      leaveDI();\n    }\n
  } else if (typeof bloomHash === 'number') {\n    // A reference to the previous injector TView that was found while
climbing the element\n    // injector tree. This is used to know if viewProviders can be accessed on the current\n    //
injector.\n    let previousTView: TView|null = null;\n    let injectorIndex = getInjectorIndex(tNode, IView);\n    let
parentLocation: RelativeInjectorLocation = NO_PARENT_INJECTOR;\n    let hostTElementNode: TNode|null =\n      flags & InjectFlags.Host ? IView[DECLARATION_COMPONENT_VIEW][T_HOST]
:\n      null;\n    // If we should skip this injector, or if there is no injector on this node, start by\n    // searching the
parent injector.\n    if (injectorIndex === -1 || flags & InjectFlags.SkipSelf) {\n      parentLocation = injectorIndex
=== -1 ? getParentInjectorLocation(tNode, IView) :\n        IView[injectorIndex +
NodeInjectorOffset.PARENT];\n    }\n    if (parentLocation === NO_PARENT_INJECTOR ||
!shouldSearchParent(flags, false)) {\n      injectorIndex = -1;\n    } else {\n      previousTView =
IView[TVIEW];\n      injectorIndex = getParentInjectorIndex(parentLocation);\n      IView =
getParentInjectorView(parentLocation, IView);\n    }\n  }\n  // Traverse up the injector tree until we find a
potential match or until we know there\n  // isn't a match.\n  while (injectorIndex !== -1) {\n    ngDevMode
&& assertNodeInjector(IView, injectorIndex);\n    // Check the current injector. If it matches, see if
it contains token.\n    const tView = IView[TVIEW];\n    ngDevMode && \n
assertTNodeForLView(tView.data[injectorIndex + NodeInjectorOffset.TNODE] as TNode, IView);\n    if
(bloomHasToken(bloomHash, injectorIndex, tView.data)) {\n      // At this point, we have an injector which *may*
contain the token, so we step through\n      // the providers and directives associated with the injector's
corresponding node to get\n      // the instance.\n      const instance: T|{}|null = searchTokensOnInjector<T>(tNode,\n
injectorIndex, IView, token, previousTView, flags, hostTElementNode);\n      if (instance !== NOT_FOUND)\n        return instance;\n    }\n    parentLocation = IView[injectorIndex +
NodeInjectorOffset.PARENT];\n    if (parentLocation !== NO_PARENT_INJECTOR && \n
shouldSearchParent(\n      flags,\n      IView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE]
=== hostTElementNode) && \n      bloomHasToken(bloomHash,

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injectorIndex, IView)) {\n    // The def wasn't found anywhere on this node, so it was a false positive.\n    //
    Traverse up the tree and continue searching.\n    previousTView = tView;\n    injectorIndex =
    getParentInjectorIndex(parentLocation);\n    IView = getParentInjectorView(parentLocation, IView);\n    } else
{\n    // If we should not search parent OR If the ancestor bloom filter value does not have the\n    // bit
    corresponding to the directive we can give up on traversing up to find the specific\n    // injector.\n
    injectorIndex = -1;\n    }\n    }\n    }\n    return notFoundValue;\n}\n\nfunction searchTokensOnInjector<T>(\n
injectorIndex: number, IView: LView, token: ProviderToken<T>, previousTView: TView|null,\n
flags: InjectFlags, hostTElementNode: TNode|null) {\n    const currentTView = IView[TVIEW];\n    const tNode =
currentTView.data[injectorIndex + NodeInjectorOffset.TNODE] as TNode;\n    // First, we need to determine
    if view providers can be accessed by the starting element.\n    // There are two possibilities\n    const
    canAccessViewProviders = previousTView == null ?\n    // 1) This is the first invocation `previousTView == null`
    which means that we are at the\n    // `TNode` of where injector is starting to look. In such a case the only time we
    are allowed\n    // to look into the ViewProviders is if:\n    // - we are on a component\n    // - AND the injector
    set `includeViewProviders` to true (implying that the token can see\n    // ViewProviders because it is the
    Component or a Service which itself was declared in\n    // ViewProviders)\n    (isComponentHost(tNode) &&
    includeViewProviders) : \n    // 2) `previousTView != null` which means that we are now walking across the parent
    nodes.\n    // In such a case we are only allowed to look into the ViewProviders if:\n    // - We just crossed from
    child View to Parent View `previousTView != currentTView`\n    // - AND the
    parent TNode is an Element.\n    // This means that we just came from the Component's View and therefore are
    allowed to see\n    // into the ViewProviders.\n    (previousTView != currentTView && ((tNode.type &
    TNodeType.AnyRNode) !== 0));\n    // This special case happens when there is a @host on the inject and when we
    are searching\n    // on the host element node.\n    const isHostSpecialCase = (flags & InjectFlags.Host) &&
    hostTElementNode === tNode;\n    const injectableIdx = locateDirectiveOrProvider(\n    tNode, currentTView,
    token, canAccessViewProviders, isHostSpecialCase);\n    if (injectableIdx !== null) {\n    return
    getNodeInjectable(IView, currentTView, injectableIdx, tNode as TElementNode);\n    } else {\n    return
    NOT_FOUND;\n    }\n}\n\n/**\n * Searches for the given token among the node's directives and providers.\n *
@param tNode TNode on which directives are present.\n * @param tView The tView we are currently processing\n
* @param token Provider token or type of
    a directive to look for.\n * @param canAccessViewProviders Whether view providers should be considered.\n *
@param isHostSpecialCase Whether the host special case applies.\n * @returns Index of a found directive or
    provider, or null when none found.\n */\nexport function locateDirectiveOrProvider<T>(\n    tNode: TNode, tView:
    TView, token: ProviderToken<T>|string, canAccessViewProviders: boolean,\n    isHostSpecialCase:
    boolean|number): number|null {\n    const nodeProviderIndexes = tNode.providerIndexes;\n    const tInjectables =
    tView.data;\n    const injectablesStart = nodeProviderIndexes &
    TNodeProviderIndexes.ProvidersStartIndexMask;\n    const directivesStart = tNode.directiveStart;\n    const
    directiveEnd = tNode.directiveEnd;\n    const cptViewProvidersCount = (\n    nodeProviderIndexes >>
    TNodeProviderIndexes.CptViewProvidersCountShift);\n    const startingIndex = (\n    canAccessViewProviders ?
    injectablesStart : injectablesStart + cptViewProvidersCount;\n    // When the host special case applies,
    only the viewProviders and the component are visible\n    const endIndex = isHostSpecialCase ? injectablesStart +
    cptViewProvidersCount : directiveEnd;\n    for (let i = startingIndex; i < endIndex; i++) {\n    const
    providerTokenOrDef = tInjectables[i] as ProviderToken<any>| DirectiveDef<any>| string;\n    if (i < directivesStart
    && token === providerTokenOrDef ||\n    i >= directivesStart && (providerTokenOrDef as
    DirectiveDef<any>).type === token) {\n    return i;\n    }\n    }\n    if (isHostSpecialCase) {\n    const dirDef =
    tInjectables[directivesStart] as DirectiveDef<any>;\n    if (dirDef && isComponentDef(dirDef) && dirDef.type ===
    token) {\n    return directivesStart;\n    }\n    }\n    return null;\n}\n\n/**\n * Retrieve or instantiate the injectable from
    the `LView` at particular `index`.\n * @param index The index of the injectable.\n * @param value The value of the
    injectable.\n * @returns The injectable or null if it has already been instantiated and so returns the\n * cached
    `injectable`. Otherwise if it detects that the value is still a factory

```

```

it\n * instantiates the `injectable` and caches the value.\n */\nexport function getNodeInjectable(\n  IView: LView,\n  tView: TView, index: number, tNode: TDirectiveHostNode): any {\n  let value = IView[index];\n  const tData =\n  tView.data;\n  if (isFactory(value)) {\n    const factory: NodeInjectorFactory = value;\n    if (factory.resolving) {\n      throwCyclicDependencyError(stringifyForError(tData[index]));\n    }\n    const previousIncludeViewProviders =\n    setIncludeViewProviders(factory.canSeeViewProviders);\n    factory.resolving = true;\n    const\n    previousInjectImplementation =\n    factory.injectImpl ? setInjectImplementation(factory.injectImpl) : null;\n    const success = enterDI(IView, tNode, InjectFlags.Default);\n    ngDevMode &&\n    assertEquals(\n    success, true,\n    'Because flags do not contain `SkipSelf` we expect this to always succeed.);\n    try {\n      value = IView[index] = factory.factory(undefined, tData, IView, tNode);\n      //\n      This code path is hit for both directives and providers.\n      // For perf reasons, we want to avoid searching for\n      hooks on providers.\n      // It does no harm to try (the hooks just won't exist), but the extra\n      // checks are\n      unnecessary and this is a hot path. So we check to see\n      // if the index of the dependency is in the directive range\n      for this\n      // tNode. If it's not, we know it's a provider and skip hook registration.\n      if (tView.firstCreatePass\n      && index >= tNode.directiveStart) {\n        ngDevMode && assertDirectiveDef(tData[index]);\n        registerPreOrderHooks(index, tData[index] as DirectiveDef<any>, tView);\n      }\n    } finally {\n      previousInjectImplementation !== null &&\n      setInjectImplementation(previousInjectImplementation);\n      setIncludeViewProviders(previousIncludeViewProviders);\n      factory.resolving = false;\n      leaveDI();\n    }\n  }\n  return value;\n}\n\n/**\n * Returns the bit in an injector's bloom filter that\n * should be used to determine whether or not\n * the directive might be provided by the injector.\n * When a\n * directive is public, it is added to the bloom filter and given a unique ID that can be\n * retrieved on the Type. When\n * the directive isn't public or the token is not a directive `null`\n * is returned as the node injector can not possibly\n * provide that token.\n * @param token the injection token\n * @returns the matching bit to check in the bloom\n * filter or `null` if the token is not known.\n * When the returned value is negative then it represents special values\n * such as `Injector`.\n */\nexport function bloomHashBitOrFactory(token: ProviderToken<any>|string):\n  number|Function|undefined {\n  ngDevMode && assertDefined(token, 'token must be defined');\n  if (typeof token\n  === 'string') {\n    return token.charCodeAt(0) || 0;\n  }\n  const tokenId: number|undefined =\n  // First check with\n  `hasOwnProperty` so we don't get an inherited ID.\n  token.hasOwnProperty(NG_ELEMENT_ID)\n  ? (token as any)[NG_ELEMENT_ID] : undefined;\n  // Negative token IDs are used for special objects such as\n  `Injector`\n  if (typeof tokenId === 'number') {\n    if (tokenId >= 0) {\n      return tokenId & BLOOM_MASK;\n    }\n    else {\n      ngDevMode &&\n      assertEquals(tokenId, InjectorMarkers.Injector, 'Expecting to get Special Injector\n      Id');\n      return createNodeInjector;\n    }\n  } else {\n    return tokenId;\n  }\n}\n\nexport function\n  bloomHasToken(bloomHash: number, injectorIndex: number, injectorView: LView|TData) {\n  // Create a mask\n  that targets the specific bit associated with the directive we're looking for.\n  // JS bit operations are 32 bits, so this\n  will be a number between 2^0 and 2^31, corresponding\n  // to bit positions 0 - 31 in a 32 bit integer.\n  const mask\n  = 1 << bloomHash;\n  // Each bloom bucket in `injectorView` represents `BLOOM_BUCKET_BITS` number of\n  bits of\n  // `bloomHash`. Any bits in `bloomHash` beyond `BLOOM_BUCKET_BITS` indicate the\n  bucket\n  offset\n  // that should be used.\n  const value = injectorView[injectorIndex + (bloomHash >>\n  BLOOM_BUCKET_BITS)];\n  // If the bloom filter value has the bit corresponding to the directive's bloomBit\n  flipped\n  on,\n  // this injector is a potential match.\n  return !!(value & mask);\n}\n\n/**\n * Returns true if flags prevent\n * parent injector from being searched for tokens\n */\nfunction shouldSearchParent(flags: InjectFlags,\n  isFirstHostTNode: boolean): boolean|number {\n  return !(flags & InjectFlags.Self) && !(flags & InjectFlags.Host\n  && isFirstHostTNode);\n}\n\nexport class NodeInjector implements Injector {\n  constructor(\n    private _tNode:\n    TElementNode|TContainerNode|TElementContainerNode|null,\n    private _IView: LView) {}\n  get(token: any,\n    notFoundValue?: any, flags?: InjectFlags): any {\n    return getOrCreateInjectable(this._tNode, this._IView, token,\n    flags, notFoundValue);\n  }\n}\n\n/**\n * Creates a `NodeInjector` for the current node.\n */\nexport function\n  createNodeInjector():\n  Injector {\n    return new NodeInjector(getCurrentTNode()! as TDirectiveHostNode, getLView()) as any;\n  }\n}\n\n/**\n * @codeGenApi\n */\nexport function\n  getInheritedFactory<T>(type: Type<any>): (type: Type<T>) => T {\n  return

```

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noSideEffects() => {\n  const ownConstructor = type.prototype.constructor;\n  const ownFactory =
ownConstructor[NG_FACTORY_DEF] || getFactoryOf(ownConstructor);\n  const objectPrototype =
Object.prototype;\n  let parent = Object.getPrototypeOf(type.prototype).constructor;\n\n  // Go up the prototype
until we hit `Object`.\n  while (parent && parent !== objectPrototype) {\n    const factory =
parent[NG_FACTORY_DEF] || getFactoryOf(parent);\n\n    // If we hit something that has a factory and the
factory isn't the same as the type,\n    // we've found the inherited factory. Note the check that the factory isn't the
type's\n    // own factory is redundant in most cases, but if the user has custom decorators on the\n    // class, this
lookup will start one level down in the prototype chain, causing us to\n    // find the own factory first and
potentially triggering an infinite loop downstream.\n    if (factory && factory !== ownFactory) {\n      return
factory;\n    }\n\n    parent = Object.getPrototypeOf(parent);\n  }\n\n  // There is no factory defined. Either this
was improper usage of inheritance\n  // (no Angular decorator on the superclass) or there is no constructor at all\n  // in the inheritance chain. Since the two cases cannot be distinguished, the\n  // latter has to be assumed.\n  return
t => new t();\n  });\n}\n\nfunction getFactoryOf<T>(type: Type<any>): ((type?: Type<T>) => T | null)|null {\n  if
(isForwardRef(type)) {\n    return () => {\n      const factory = getFactoryOf<T>(resolveForwardRef(type));\n
return factory && factory();\n    };\n  }\n  return getFactoryDef<T>(type);\n}\n\n/**\n * Returns a value from the
closest embedded or node injector.\n * @param tNode
The Node where the search for the injector should start\n * @param lView The `LView` that contains the `tNode`\n
* @param token The token to look for\n * @param flags Injection flags\n * @param notFoundValue The value to
return when the injection flags is `InjectFlags.Optional`\n * @returns the value from the injector, `null` when not
found, or `notFoundValue` if provided\n */\nfunction lookupTokenUsingEmbeddedInjector<T>(\n  tNode:
TDirectiveHostNode, lView: LView, token: ProviderToken<T>, flags: InjectFlags,\n  notFoundValue?: any) {\n
let currentTNode: TDirectiveHostNode|null = tNode;\n  let currentLView: LView|null = lView;\n  // When an
LView with an embedded view injector is inserted, it'll likely be interlaced with\n  // nodes who may have injectors
(e.g. node injector -> embedded view injector -> node injector).\n  // Since the bloom filters for the node injectors
have already been constructed and we don't\n  // have a way of extracting the records from an injector, the
only way to maintain the correct\n  // hierarchy when resolving the value is to walk it node-by-node while
attempting to resolve\n  // the token at each level.\n  while (currentTNode !== null && currentLView !== null &&\n
(currentLView[FLAGS] & LViewFlags.HasEmbeddedViewInjector) &&\n    !(currentLView[FLAGS] &
LViewFlags.IsRoot)) {\n    ngDevMode && assertTNodeForLView(currentTNode, currentLView);\n\n    // Note
that this lookup on the node injector is using the `Self` flag, because\n    // we don't want the node injector to look at
any parent injectors since we\n    // may hit the embedded view injector first.\n    const nodeInjectorValue =
lookupTokenUsingNodeInjector(\n      currentTNode, currentLView, token, flags | InjectFlags.Self,
NOT_FOUND);\n    if (nodeInjectorValue !== NOT_FOUND) {\n      return nodeInjectorValue;\n    }\n\n    // Has
an explicit type due to a TS bug: https://github.com/microsoft/TypeScript/issues/33191\n    let parentTNode:
TElementNode|TContainerNode|null
= currentTNode.parent;\n\n    // `TNode.parent` includes the parent within the current view only. If it doesn't
exist,\n    // it means that we've hit the view boundary and we need to go up to the next view.\n    if (!parentTNode)
{\n      // Before we go to the next LView, check if the token exists on the current embedded injector.\n      const
embeddedViewInjector = currentLView[EMBEDDED_VIEW_INJECTOR];\n      if (embeddedViewInjector) {\n        const
embeddedViewInjectorValue =\n          embeddedViewInjector.get(token, NOT_FOUND as T | {}, flags);\n\n        if
(embeddedViewInjectorValue !== NOT_FOUND) {\n          return embeddedViewInjectorValue;\n        }\n      }\n
}\n\n    // Otherwise keep going up the tree.\n    parentTNode = getTNodeFromLView(currentLView);\n    currentLView
= currentLView[DECLARATION_VIEW];\n  }\n\n  currentTNode = parentTNode;\n}\n\nreturn
notFoundValue;\n}\n\n/** Gets the TNode associated with an LView inside of the declaration
view. */\nfunction getTNodeFromLView(lView: LView): TElementNode|TElementContainerNode|null {\n  const
tView = lView[TVIEW];\n  const tViewType = tView.type;\n  // The parent pointer differs based on
`TView.type`.\n  if (tViewType === TViewType.Embedded) {\n    ngDevMode &&
assertDefined(tView.declTNode, 'Embedded TNodes should have declaration parents.);\n    return

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tView.declTNode as TElementContainerNode;\n } else if (tViewType === TViewType.Component) {\n //
Components don't have `TView.declTNode` because each instance of component could be\n // inserted in different
location, hence `TView.declTNode` is meaningless.\n return lView[T_HOST] as TElementNode;\n }\n\n return
null;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\nimport {injectAttributeImpl} from './di';\nimport {getCurrentTNode} from './state';\n\n/*\n * Facade for the attribute injection from DI.\n *\n * @codeGenApi\n */\nexport function
injectAttribute(attrsNameToInject: string): string|null {\n return injectAttributeImpl(getCurrentTNode()!,
attrsNameToInject);\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {injectAttribute} from './render3/instructions/di_attr';\nimport
{makeParamDecorator} from './util/decorators';\n\n\n/*\n * Type of the Attribute decorator / constructor
function.\n *\n * @publicApi\n */\nexport interface AttributeDecorator {\n /**\n * Parameter decorator for a
directive constructor that designates\n * a host-element attribute whose value is injected as a constant string
literal.\n *\n * @usageNotes\n *\n * Suppose we have an `<input>` element and want to know its `type`.\n *\n
* ``html\n * <input
type="text">\n * ``\n *\n * The following example uses the decorator to inject the string literal `text` in a
directive.\n *\n * {@example core/ts/metadata/metadata.ts region='attributeMetadata'}\n *\n * The following
example uses the decorator in a component constructor.\n *\n * {@example core/ts/metadata/metadata.ts
region='attributeFactory'}\n *\n * (name: string): any;\n new(name: string): Attribute;\n}\n\n\n/*\n * Type of
the Attribute metadata.\n *\n * @publicApi\n */\nexport interface Attribute {\n /**\n * The name of the attribute
whose value can be injected.\n *\n * attributeName: string;\n}\n\n\n\n/*\n * Attribute decorator and metadata.\n *\n
* @Annotation\n * @publicApi\n */\nexport const Attribute: AttributeDecorator = makeParamDecorator(\n
'Attribute',\n (attributeName?: string) =>\n ((attributeName, __NG_ELEMENT_ID__: () =>
injectAttribute(attributeName!)));\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport {R3DependencyMetadataFacade} from
'././compiler/compiler_facade';\nimport {RuntimeError, RuntimeErrorCode} from '././errors';\nimport {Type}
from '././interface/type';\nimport {ReflectionCapabilities} from '././reflection/reflection_capabilities';\nimport
{Host, Inject, Optional, Self, SkipSelf} from '././metadata';\nimport {Attribute} from '././metadata_attr';\n\nlet
_reflect: ReflectionCapabilities|null = null;\n\nexport function getReflect(): ReflectionCapabilities {\n return
(_reflect = _reflect || new ReflectionCapabilities());\n}\n\nexport function reflectDependencies(type: Type<any>):
R3DependencyMetadataFacade[] {\n return convertDependencies(getReflect().parameters(type));\n}\n\nexport
function convertDependencies(deps: any[]): R3DependencyMetadataFacade[] {\n return deps.map(dep =>
reflectDependency(dep));\n}\n\nfunction
reflectDependency(dep: any|any[]): R3DependencyMetadataFacade {\n const meta:
R3DependencyMetadataFacade = {\n token: null,\n attribute: null,\n host: false,\n optional: false,\n self:
false,\n skipSelf: false,\n };\n\n if (Array.isArray(dep) && dep.length > 0) {\n for (let j = 0; j < dep.length; j++)
{\n const param = dep[j];\n if (param === undefined) {\n // param may be undefined if type of dep is not
set by ngts\n continue;\n }\n\n const proto = Object.getPrototypeOf(param);\n\n if (param instanceof
Optional || proto.ngMetadataName === 'Optional') {\n meta.optional = true;\n } else if (param instanceof
SkipSelf || proto.ngMetadataName === 'SkipSelf') {\n meta.skipSelf = true;\n } else if (param instanceof Self
|| proto.ngMetadataName === 'Self') {\n meta.self = true;\n } else if (param instanceof Host ||
proto.ngMetadataName === 'Host') {\n meta.host = true;\n
}\n } else if (param instanceof Inject) {\n meta.token = param.token;\n } else if (param instanceof Attribute) {\n
if (param.attributeName === undefined) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n ngDevMode && `Attribute name must be
defined.`);\n }\n meta.attribute = param.attributeName;\n } else {\n meta.token = param;\n }\n
}\n
}

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} else if (dep === undefined || (Array.isArray(dep) && dep.length === 0)) {
  meta.token = null;
} else {
  meta.token = dep;
}
return meta;
}

/**
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 * found in the LICENSE file at
 * https://angular.io/license
 */
import {Type} from './interface/type';
import {NgModuleType} from
 './metadata/ng_module_def';
import {getNgModuleDef} from './render3/definition';
import {stringify} from
 './util/stringify';
const modules = new
 Map<string, NgModuleType>();
/**
 * Whether to check for duplicate NgModule registrations.
 * This
 * can be disabled for testing.
 */
let checkForDuplicateNgModules = true;
function assertSameOrNotExisting(
  id: string, type: Type<any> | null, incoming: Type<any>): void {
  if (type && type !== incoming &&
    checkForDuplicateNgModules) {
    throw new Error(`Duplicate module registered for ${id} -
      ${stringify(type)} vs ${stringify(type.name)}`);
  }
}
/**
 * Adds the given NgModule type to Angular's
 * NgModule registry.
 * This is generated as a side-effect of NgModule compilation. Note that the `id` is passed
 * explicitly and not read from the NgModule definition. This is for two reasons: it avoids a
 * megamorphic read, and in JIT there's a chicken-and-egg problem where the NgModule may not be
 * fully resolved when it's
 * registered.
 */
@codeGenApi
export function registerNgModuleType(ngModuleType: NgModuleType, id: string): void {
  const existing =
    modules.get(id) || null;
  assertSameOrNotExisting(id, existing, ngModuleType);
  modules.set(id,
    ngModuleType);
}
export function clearModulesForTest(): void {
  modules.clear();
}
export function
  getRegisteredNgModuleType(id: string): NgModuleType | undefined {
  return modules.get(id);
}
/**
 * Control whether the NgModule registration system enforces that each NgModule type registered has
 * a unique
 * id.
 * This is useful for testing as the NgModule registry cannot be properly reset between tests with
 * Angular's current API.
 */
export function setAllowDuplicateNgModuleIdsForTest(allowDuplicates: boolean):
  void {
  checkForDuplicateNgModules = !allowDuplicates;
}

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 * found in
 * the LICENSE file
 * at https://angular.io/license
 */
import {RElement} from './interfaces/renderer_dom';
/**
 * @codeGenApi
 */
export function resolveWindow(element: RElement & {ownerDocument: Document}) {
  return element.ownerDocument.defaultView;
}
/**
 * @codeGenApi
 */
export function
  resolveDocument(element: RElement & {ownerDocument: Document}) {
  return
    element.ownerDocument;
}
/**
 * @codeGenApi
 */
export function resolveBody(element:
  RElement & {ownerDocument: Document}) {
  return element.ownerDocument.body;
}
/**
 * The special
 * delimiter we use to separate property names, prefixes, and suffixes
 * in property binding metadata. See
 * storeBindingMetadata().
 * We intentionally use the Unicode "REPLACEMENT CHARACTER" (U+FFFD)
 * as a delimiter
 * because it is a very uncommon character that is unlikely to be part of a user's
 * property names
 * or interpolation strings. If it is in fact used in a property
 * binding, DebugElement.properties
 * will not return the correct value for that
 * binding. However, there should be no runtime effect for real
 * applications.
 * This character is typically rendered as a question mark inside of a diamond.
 * See
 * https://en.wikipedia.org/wiki/Specials_(Unicode_block)
 */
export const INTERPOLATION_DELIMITER =
  ``;
/**
 * Unwrap a value which might be behind a closure (for forward declaration reasons).
 */
export
  function maybeUnwrapFn<T>(value: T | (() => T)): T {
  if (value instanceof Function) {
    return value();
  }
  else {
    return value;
  }
}

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 * this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
/**
 * A schema definition associated with an NgModule.
 */
@see
`@NgModule`, `CUSTOM_ELEMENTS_SCHEMA`, `NO_ERRORS_SCHEMA`
@param name The name
of a defined schema.
@publicApi
export
  interface SchemaMetadata {
    name: string;
  }
/**
 * Defines a schema that allows an NgModule to contain
 * the following:
 * - Non-Angular elements named with dash case (-).
 * - Element properties named with dash
 * case (-).
 * Dash case is the naming convention for custom elements.
 */
@publicApi
export const

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CUSTOM_ELEMENTS_SCHEMA: SchemaMetadata = {\n name: 'custom-elements'\n};\n\n/**\n * Defines a
schema that allows any property on any element.\n *\n * This schema allows you to ignore the errors related to any
unknown elements or properties in a\n * template. The usage of this schema is generally discouraged because it
prevents useful validation\n * and may hide real errors in your template. Consider using the
`CUSTOM_ELEMENTS_SCHEMA` instead.\n *\n * @publicApi\n */\nexport const NO_ERRORS_SCHEMA:
SchemaMetadata = {\n name: 'no-errors-schema'\n};\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed
by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{formatRuntimeError, RuntimeError, RuntimeErrorCode} from '../errors';\nimport {Type} from
'../interface/type';\nimport {CUSTOM_ELEMENTS_SCHEMA, NO_ERRORS_SCHEMA, SchemaMetadata}
from '../metadata/schema';\nimport {throwError} from '../util/assert';\nimport {getComponentDef} from
'../definition';\nimport {ComponentDef} from '../interfaces/definition';\nimport {TNodeType} from
'../interfaces/node';\nimport {RComment, RElement} from '../interfaces/renderer_dom';\nimport {CONTEXT,
DECLARATION_COMPONENT_VIEW, LView} from '../interfaces/view';\nimport {isAnimationProp} from
'../util/attrs_utils';\n\nlet shouldThrowErrorOnUnknownElement = false;\n\n/**\n * Sets a strict mode for JIT-
compiled components to throw an error on unknown elements,\n * instead of just logging the error.\n * (for AOT-
compiled ones this check happens at build time).\n */\nexport function
setUnknownElementStrictMode(shouldThrow:
boolean) {\n shouldThrowErrorOnUnknownElement = shouldThrow;\n}\n\n/**\n * Gets the current value of the
strict mode.\n */\nexport function getUnknownElementStrictMode() {\n return
shouldThrowErrorOnUnknownElement;\n}\n\nlet shouldThrowErrorOnUnknownProperty = false;\n\n/**\n * Sets a
strict mode for JIT-compiled components to throw an error on unknown properties,\n * instead of just logging the
error.\n * (for AOT-compiled ones this check happens at build time).\n */\nexport function
setUnknownPropertyStrictMode(shouldThrow: boolean) {\n shouldThrowErrorOnUnknownProperty =
shouldThrow;\n}\n\n/**\n * Gets the current value of the strict mode.\n */\nexport function
getUnknownPropertyStrictMode() {\n return shouldThrowErrorOnUnknownProperty;\n}\n\n/**\n * Validates that
the element is known at runtime and produces\n * an error if it's not the case.\n * This check is relevant for JIT-
compiled components (for AOT-compiled\n * ones this check happens
at build time).\n *\n * The element is considered known if either:\n * - it's a known HTML element\n * - it's a
known custom element\n * - the element matches any directive\n * - the element is allowed by one of the schemas\n\n
@param element Element to validate\n * @param IView An `LView` that represents a current component that
is being rendered\n * @param tagName Name of the tag to check\n * @param schemas Array of schemas\n *
@param hasDirectives Boolean indicating that the element matches any directive\n */\nexport function
validateElementIsKnown(\n element: RElement, IView: LView, tagName: string|null, schemas:
SchemaMetadata[]|null,\n hasDirectives: boolean): void {\n // If `schemas` is set to `null`, that's an indication that
this Component was compiled in AOT\n // mode where this check happens at compile time. In JIT mode, `schemas`
is always present and\n // defined as an array (as an empty array in case `schemas` field is not defined) and we
should\n // execute
the check below.\n if (schemas === null) return;\n\n // If the element matches any directive, it's considered as
valid.\n if (!hasDirectives && tagName !== null) {\n // The element is unknown if it's an instance of
HTMLUnknownElement, or it isn't registered\n // as a custom element. Note that unknown elements with a dash in
their name won't be instances\n // of HTMLUnknownElement in browsers that support web components.\n const
isUnknown =\n // Note that we can't check for `typeof HTMLUnknownElement === 'function`,\n //
because while most browsers return 'function', IE returns 'object'.\n (typeof HTMLUnknownElement !==
'undefined' && HTMLUnknownElement &&\n element instanceof HTMLUnknownElement) ||\n (typeof
customElements !== 'undefined' && tagName.indexOf('-') > -1 &&\n !customElements.get(tagName));\n\n if
(isUnknown && !matchingSchemas(schemas, tagName)) {\n const isHostStandalone =
isHostComponentStandalone(IView);\n

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const templateLocation = getTemplateLocationDetails(IView);\n    const schemas = `${isHostStandalone ?
'@Component' : '@NgModule'}.schemas`;
let message = `${tagName} is not a known
element${templateLocation}:\n`;
message += `1. If '${tagName}' is an Angular component, then verify that it
is ${\n    isHostStandalone ? 'included in the \\@Component.imports\\' of this component' :\n    'a
part of an @NgModule where this component is declared'}.`;
if (tagName && tagName.indexOf('-') > -1)
{\n    message +=\n        `2. If '${tagName}' is a Web Component then add
'CUSTOM_ELEMENTS_SCHEMA' to the ${\n        schemas} of this component to suppress this message.`;
} else {\n    message +=\n        `2. To allow any element add 'NO_ERRORS_SCHEMA' to the ${schemas} of
this component.`;
}
if (shouldThrowErrorOnUnknownElement) {\n    throw new
RuntimeError(RuntimeErrorCode.UNKNOWN_ELEMENT,
message);\n    } else {\n    console.error(formatRuntimeError(RuntimeErrorCode.UNKNOWN_ELEMENT,
message));
}\n    }\n    }\n    }\n\n/**\n * Validates that the property of the element is known at runtime and
returns\n * false if it's not the case.\n * This check is relevant for JIT-compiled components (for AOT-compiled\n *
ones this check happens at build time).\n * The property is considered known if either:\n * - it's a known
property of the element\n * - the element is allowed by one of the schemas\n * - the property is used for
animations\n * \n * @param element Element to validate\n * @param propName Name of the property to check\n *
@param tagName Name of the tag hosting the property\n * @param schemas Array of schemas\n */
export
function isValidProperty(\n    element: RElement|RComment, propName: string, tagName: string|null,\n    schemas:
SchemaMetadata[]|null): boolean {\n    // If `schemas` is set to `null`, that's an indication that this Component was
compiled in AOT\n    // mode where this check happens at compile time. In JIT mode, `schemas` is always present
and\n    // defined as an array (as an empty array in case `schemas` field is not defined) and we should\n    // execute
the check below.\n    if (schemas === null) return true;\n    // The property is considered valid if the element matches
the schema, it exists on the element,\n    // or it is synthetic, and we are in a browser context (web worker nodes
should be skipped).\n    if (matchingSchemas(schemas, tagName) || propName in element ||
isAnimationProp(propName)) {\n    return true;\n    }\n    // Note: `typeof Node` returns 'function' in most browsers,
but on IE it is 'object' so we\n    // need to account for both here, while being careful with `typeof null` also returning
'object'.\n    return typeof Node === 'undefined' || Node === null || !(element instanceof Node);\n    }\n\n/**\n * Logs or
throws an error that a property is not supported on an element.\n * \n * @param propName Name
of the invalid property\n * @param tagName Name of the tag hosting the property\n * @param nodeType Type of
the node hosting the property\n * @param IView An `LView` that represents a current component\n */
export
function handleUnknownPropertyError(\n    propName: string, tagName: string|null, nodeType: TNodeType, IView:
LView): void {\n    // Special-case a situation when a structural directive is applied to\n    // an ``
element, for example: `

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    message += `\\n1. If '${tagName}' is an Angular component and it has the ` +n      `('${propName}' input, then
verify that it is ${importLocation}.`;\\n // May be a Web Component?\\n  if (tagName && tagName.indexOf('-') >
-1) {\\n    message += `\\n2. If '${tagName}' is a Web Component then add 'CUSTOM_ELEMENTS_SCHEMA' `
+n      `to the ${schemas} of this component to suppress this message.`;\\n    message += `\\n3. To allow any
property add 'NO_ERRORS_SCHEMA' to ` +n      `the ${schemas} of this component.`;\\n  } else {\\n // If it's
expected, the error can be suppressed by the `NO_ERRORS_SCHEMA` schema.\\n    message += `\\n2. To allow
any property add 'NO_ERRORS_SCHEMA' to ` +n      `the ${schemas} of this component.`;\\n  }\\n }\\n}\\n
reportUnknownPropertyError(message);\\n}\\n\\nexport function reportUnknownPropertyError(message: string) {\\n if
(shouldThrowErrorOnUnknownProperty) {\\n  throw new
RuntimeError(RuntimeErrorCode.UNKNOWN_BINDING,
  message);\\n } else {\\n  console.error(formatRuntimeError(RuntimeErrorCode.UNKNOWN_BINDING,
  message));\\n  }\\n}\\n}\\n\\n/**\\n * WARNING: this is a **dev-mode only** function (thus should always be guarded by
the `ngDevMode`)\\n * and must **not** be used in production bundles. The function makes megamorphic reads,
which might\\n * be too slow for production mode and also it relies on the constructor function being available.\\n *\\n
* Gets a reference to the host component def (where a current component is declared).\\n *\\n * @param IView An
`LView` that represents a current component that is being rendered.\\n */\\nfunction
getDeclarationComponentDef(IView: LView): ComponentDef<unknown>|null {\\n !ngDevMode &&
throwError('Must never be called in production mode');\\n\\n  const declarationLView =
IView[DECLARATION_COMPONENT_VIEW] as LView<Type<unknown>>;\\n  const context =
declarationLView[CONTEXT];\\n\\n  // Unable to obtain a context.\\n  if (!context) return null;\\n\\n  return
context.constructor ?
  getComponentDef(context.constructor) : null;\\n}\\n}\\n\\n/**\\n * WARNING: this is a **dev-mode only** function
(thus should always be guarded by the `ngDevMode`)\\n * and must **not** be used in production bundles. The
function makes megamorphic reads, which might\\n * be too slow for production mode.\\n *\\n * Checks if the current
component is declared inside of a standalone component template.\\n *\\n * @param IView An `LView` that
represents a current component that is being rendered.\\n */\\nexport function isHostComponentStandalone(IView:
LView): boolean {\\n !ngDevMode && throwError('Must never be called in production mode');\\n\\n  const
componentDef = getDeclarationComponentDef(IView);\\n  // Treat host component as non-standalone if we can't
obtain the def.\\n  return !!componentDef?.standalone;\\n}\\n}\\n\\n/**\\n * WARNING: this is a **dev-mode only**
function (thus should always be guarded by the `ngDevMode`)\\n * and must **not** be used in production bundles.
The function makes megamorphic reads,
which might\\n * be too slow for production mode.\\n *\\n * Constructs a string describing the location of the host
component template. The function is used\\n * in dev mode to produce error messages.\\n *\\n * @param IView An
`LView` that represents a current component that is being rendered.\\n */\\nexport function
getTemplateLocationDetails(IView: LView): string {\\n !ngDevMode && throwError('Must never be called in
production mode');\\n\\n  const hostComponentDef = getDeclarationComponentDef(IView);\\n  const
componentClassName = hostComponentDef?.type?.name;\\n  return componentClassName ? ` (used in the
`${componentClassName}' component template)` : ";\\n}\\n}\\n\\n/**\\n * The set of known control flow directives and
their corresponding imports.\\n * We use this set to produce a more precise error message with a note\\n * that the
`CommonModule` should also be included.\\n */\\nexport const KNOWN_CONTROL_FLOW_DIRECTIVES = new
Map([\\n  ['ngIf', 'NgIf'], ['ngFor', 'NgFor'], ['ngSwitchCase', 'NgSwitchCase'],\\n
  ['ngSwitchDefault', 'NgSwitchDefault']\\n]);\\n}\\n\\n/**\\n * Returns true if the tag name is allowed by specified
schemas.\\n * @param schemas Array of schemas\\n * @param tagName Name of the tag\\n */\\nexport function
matchingSchemas(schemas: SchemaMetadata[]|null, tagName: string|null): boolean {\\n if (schemas !== null) {\\n
for (let i = 0; i < schemas.length; i++) {\\n  const schema = schemas[i];\\n  if (schema ===
NO_ERRORS_SCHEMA ||\\n  schema === CUSTOM_ELEMENTS_SCHEMA && tagName &&
tagName.indexOf('-') > -1) {\\n  return true;\\n  }\\n }\\n }\\n}\\n\\n return false;\\n}\\n"}/**\\n * @license\\n *
Copyright Google LLC All Rights Reserved.\\n * Use of this source code is governed by an MIT-style license

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that can be\n * found in the LICENSE file at https://angular.io/license\n * /\n\nimport { ViewEncapsulation } from\n './metadata/view';\n\n\n/**\n * Used by `RendererFactory2` to associate custom rendering data and styles\n * with a rendering implementation.\n * @publicApi\n\n * /\n\nexport interface RendererType2 {\n /**\n * A unique identifying string for the new renderer, used when\n creating\n * unique styles for encapsulation.\n * /\n id: string;\n /**\n * The view encapsulation type, which\n determines how styles are applied to\n * DOM elements. One of\n * - `Emulated` (default): Emulate native\n scoping of styles.\n * - `Native`: Use the native encapsulation mechanism of the renderer.\n * - `ShadowDom`:\n Use modern [Shadow\n * DOM](https://w3c.github.io/webcomponents/spec/shadow/) and\n * create a\n ShadowRoot for component's host element.\n * - `None`: Do not provide any template or style encapsulation.\n\n * /\n encapsulation: ViewEncapsulation;\n /**\n * Defines CSS styles to be stored on a renderer instance.\n\n * /\n styles: (string|any[])[];\n /**\n * Defines arbitrary developer-defined data to be stored on a renderer instance.\n\n * /\n\n This is useful for renderers that delegate to other renderers.\n\n * /\n data: {[kind:\n string]: any};\n}\n\n\n/**\n * Flags for renderer-specific style modifiers.\n * @publicApi\n * /\n\nexport enum\n RendererStyleFlags2 {\n // TODO(misko): This needs to be refactored into a separate file so that it can be imported\n from\n // `node_manipulation.ts` Currently doing the import cause resolution order to change and fails\n // the tests.\n The work around is to have hard coded value in `node_manipulation.ts` for now.\n /**\n * Marks a style as\n important.\n\n * /\n Important = 1 << 0,\n /**\n * Marks a style as using dash case naming (this-is-dash-case).\n\n * /\n DashCase = 1 << 1\n}\n\n\n /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n * /\n\n\n /**\n * Disallowed strings in the comment.\n\n * see:\n https://html.spec.whatwg.org/multipage/syntax.html#comments\n\n * /\n\nconst COMMENT_DISALLOWED = /<|>|\n >|<!--|-->|--!>|<!--$/g;\n\n\n * Delimiter in the disallowed strings which needs to be wrapped with zero with character.\n\n * /\n\nconst\n COMMENT_DELIMITER = /(<|>)/;\nconst COMMENT_DELIMITER_ESCAPED = '\\u200B$1\\u200B';\n\n\n /**\n * Escape the content of comment strings so that it can be safely inserted into a comment node.\n\n * The issue is\n that HTML does not specify any way to escape comment end text inside the comment.\n\n * Consider: `<!-- The way\n you close a comment is with `>`, and `-->` at the beginning or by `-->` or\n * `--!>` at the end. `-->`. Above the\n * `-->` is meant to be text not an end to the comment. This\n * can be created programmatically through DOM\n APIs. (`<!--` are also disallowed.)\n\n * see: https://html.spec.whatwg.org/multipage/syntax.html#comments\n\n * /\n\n * ` `.\n * div.innerHTML = div.innerHTML\n * ` `.\n\n * One would expect that the above code would be safe to\n do, but it turns out that because comment\n * text is not escaped, the comment may contain text which will\n prematurely\n * close the comment\n * opening up the application for XSS attack. (In SSR we programmatically create comment\n nodes which\n * may contain such text and expect them to be safe.)\n\n * This function escapes the comment text\n by looking for comment delimiters (`<` and `>`) and\n * surrounding them with `> ` where the ` ` is a zero width\n space `\\u200B`. The result is that if a\n * comment contains any of the comment start/end delimiters (such as `<!--`,\n * `-->` or `--!>`) the\n * text it will render normally but it will not cause the HTML parser to close/open the\n comment.\n\n * @param value text to make safe for comment node by escaping the comment open/close\n character\n * sequence.\n\n * /\n\nexport function escapeCommentText(value: string): string {\n return\n value.replace(\n COMMENT_DISALLOWED, (text) => text.replace(COMMENT_DELIMITER,\n COMMENT_DELIMITER_ESCAPED));\n}\n\n\n /**\n * @license\n * Copyright Google LLC All Rights\n Reserved.\n\n * Use of this source code is governed by an\n * MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * /\n\n\nimport\n {assertNumber} from '../util/assert';\n\nimport {ID, LView} from './view';\n\n\n // Keeps track of the currently-active\n LViews.\n\nconst TRACKED_LVIEWS = new Map<number, LView>();\n\n // Used for generating unique IDs for\n LViews.\n\nlet uniqueIdCounter = 0;\n\n\n /**\n * Gets a unique ID that can be assigned to an LView.\n\n * /\n\nexport function\n getUniqueLViewId(): number {\n return uniqueIdCounter++;\n}\n\n\n /**\n * Starts tracking an LView.\n\n * /\n\nexport\n function registerLView(lView: LView): void {\n ngDevMode && assertNumber(lView[ID], 'LView must have an
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ID in order to be registered');\n TRACKED_LVIEWS.set(IView[ID], IView);\n}\n\n/** Gets an LView by its
unique ID. */\nexport function getLViewById(id: number): LView|null {\n  ngDevMode && assertNumber(id, 'ID
used for LView lookup must be a number');\n  return TRACKED_LVIEWS.get(id) || null;\n}\n\n/** Stops tracking
an LView. */\nexport function unregisterLView(IView:
LView): void {\n  ngDevMode && assertNumber(IView[ID], 'Cannot stop tracking an LView that does not have an
ID');\n  TRACKED_LVIEWS.delete(IView[ID]);\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {getLViewById} from './lview_tracking';\nimport
{RNode} from './renderer_dom';\nimport {LView} from './view';\n\n\n/**\n * The internal view context which is
specific to a given DOM element, directive or\n * component instance. Each value in here (besides the LView and
element node details)\n * can be present, null or undefined. If undefined then it implies the value has not been\n *
looked up yet, otherwise, if null, then a lookup was executed and nothing was found.\n * \n * Each value will get
filled when the respective value is examined within the getContext\n * function. The component, element
and each directive instance will share the same instance\n * of the context.\n */\nexport class LContext {\n  /**\n
 * The instance of the Component node.\n */\n  public component: { }|null|undefined;\n\n  /**\n
 * The list of active
directives that exist on this element.\n */\n  public directives: any[]|null|undefined;\n\n  /**\n
 * The map of local
references (local reference name => element or directive instance) that\n * exist on this element.\n */\n  public
localRefs: {[key: string]: any}|null|undefined;\n\n  /** Component's parent view data. */\n  get IView(): LView|null
{\n    return getLViewById(this.IViewId);\n  }\n\n  constructor(\n    /**\n     * ID of the component's parent view
data.\n     */\n    private IViewId: number,\n\n    /**\n     * The index instance of the node.\n     */\n    public
nodeIndex: number,\n\n    /**\n     * The instance of the DOM node that is attached to the lNode.\n     */\n    public
native: RNode) {\n  }\n\n",/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport
'./util/ng_dev_mode';\nimport {assertDefined, assertDomNode} from './util/assert';\nimport {EMPTY_ARRAY}
from './util/empty';\nimport {assertLView} from './assert';\nimport {LContext} from './interfaces/context';\nimport
{getLViewById, registerLView} from './interfaces/lview_tracking';\nimport {TNode, TNodeFlags} from
'./interfaces/node';\nimport {RElement, RNode} from './interfaces/renderer_dom';\nimport {isLView} from
'./interfaces/type_checks';\nimport {CONTEXT, HEADER_OFFSET, HOST, ID, LView, TVIEW} from
'./interfaces/view';\nimport {getComponentLViewByIndex, unwrapRNode} from './util/view_utils';\n\n\n\n/**\n
 * Returns the matching `LContext` data for a given DOM node, directive or component instance.\n * \n * This function
will examine the provided DOM element, component,
or directive instance\n */\n * monkey-patched property to derive the `LContext` data. Once called then the monkey-
patched\n * value will be that of the newly created `LContext`.\n * \n * If the monkey-patched value is the `LView`
instance then the context value for that\n * target will be created and the monkey-patch reference will be updated.
Therefore when this\n * function is called it may mutate the provided element\n */\n */\n */\n */\n */\n */\n */\n
 */\n * If the monkey-patch value is not detected then the code will
walk up the DOM until an element\n * is found which contains a monkey-patch reference. When that occurs then
the provided element\n * will be updated with a new context (which is then returned). If the monkey-patch value is
not\n * detected for a component/directive instance then it will throw an error (all components and\n * directives
should be automatically monkey-patched by ivy).\n * \n * @param target Component,
Directive or DOM Node.\n */\nexport function getLContext(target: any): LContext|null {\n  let mpValue =
readPatchedData(target);\n  if (mpValue) {\n    // only when it's an array is it considered an LView instance\n // ...
otherwise it's an already constructed LContext instance\n    if (isLView(mpValue)) {\n      const IView: LView =
mpValue!;\n      let nodeIndex: number;\n      let component: any = undefined;\n      let directives:
any[]|null|undefined = undefined;\n      if (isComponentInstance(target)) {\n        nodeIndex =
findViaComponent(IView, target);\n        if (nodeIndex == -1) {\n          throw new Error("The provided component
was not found in the application");\n        }\n        component = target;\n      } else if (isDirectiveInstance(target)) {\n

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nodeIndex = findViaDirective(IView, target);\n    if (nodeIndex === -1) {\n        throw new Error('The provided\n    directive was not found in the application');\n    }\n    directives = getDirectivesAtNodeIndex(nodeIndex,\n    IView, false);\n    } else {\n        nodeIndex = findViaNativeElement(IView, target as RElement);\n        if\n    (nodeIndex === -1) {\n            return null;\n        }\n    }\n\n    // the goal is not to fill the entire context full of data\n    because the lookups\n    // are expensive. Instead, only the target data (the element, component, container, ICU\n    // expression or directive details) are filled into the context. If called multiple times\n    // with different target\n    values then the missing target data will be filled in.\n    const native = unwrapRNode(IView[nodeIndex]);\n    const existingCtx = readPatchedData(native);\n    const context: LContext = (existingCtx &&\n    !Array.isArray(existingCtx)) ?\n        existingCtx :\n        createLContext(IView, nodeIndex, native);\n\n    // only\n    when the component has been discovered then update the monkey-patch\n    if (component && context.component\n    === undefined) {\n        context.component\n    = component;\n        attachPatchData(context.component, context);\n    }\n\n    // only when the directives have\n    been discovered then update the monkey-patch\n    if (directives && context.directives === undefined) {\n        context.directives = directives;\n        for (let i = 0; i < directives.length; i++) {\n            attachPatchData(directives[i],\n            context);\n        }\n    }\n\n    attachPatchData(context.native, context);\n    mpValue = context;\n    }\n    } else {\n        const rElement = target as RElement;\n        ngDevMode && assertDomNode(rElement);\n\n        // if the context is not\n        found then we need to traverse upwards up the DOM\n        // to find the nearest element that has already been monkey\n        patched with data\n        let parent = rElement as any;\n        while (parent = parent.parentNode) {\n            const\n            parentContext = readPatchedData(parent);\n            if (parentContext) {\n                const IView =\n                Array.isArray(parentContext) ? parentContext as LView : parentContext.IView;\n\n                // the edge of the app was also reached here through another means\n                // (maybe because the DOM was\n                changed manually).\n                if (!IView) {\n                    return null;\n                }\n\n                const index =\n                findViaNativeElement(IView, rElement);\n                if (index >= 0) {\n                    const native =\n                    unwrapRNode(IView[index]);\n                    const context = createLContext(IView, index, native);\n                    attachPatchData(native, context);\n                    mpValue = context;\n                    break;\n                }\n            }\n\n            }\n\n            return\n            (mpValue as LContext) || null;\n        }\n\n        // **\n        * Creates an empty instance of a `LContext` context\n        *\n        /\n        function\n        createLContext(IView: LView, nodeIndex: number, native: RNode): LContext {\n            return new LContext(IView[ID],\n            nodeIndex, native);\n        }\n\n        // **\n        * Takes a component instance and returns the view for that component.\n        *\n        *\n        @param componentInstance\n        * @returns The component's view\n        *\n        /\n        export function\n        GetComponentViewByInstance(componentInstance: {}):\n        LView {\n            let patchedData = readPatchedData(componentInstance);\n            let IView: LView;\n\n            if\n            (isLView(patchedData)) {\n                const contextLView: LView = patchedData;\n                const nodeIndex =\n                findViaComponent(contextLView, componentInstance);\n                IView = GetComponentLViewByIndex(nodeIndex,\n                contextLView);\n                const context = createLContext(contextLView, nodeIndex, IView[HOST] as RElement);\n                context.component = componentInstance;\n                attachPatchData(componentInstance, context);\n                attachPatchData(context.native, context);\n            } else {\n                const context = patchedData as unknown as LContext;\n                const contextLView = context.IView!;\n                ngDevMode && assertLView(contextLView);\n                IView =\n                GetComponentLViewByIndex(context.nodeIndex, contextLView);\n            }\n            return IView;\n        }\n\n        // **\n        * This property\n        will be monkey-patched on elements, components and directives.\n        *\n        /\n        const MONKEY_PATCH_KEY_NAME =\n        '__ngContext__';\n\n        // **\n        * Assigns the given data to the given target (which could be a component,\n        *\n        *\n        * directive or DOM node instance) using monkey-patching.\n        *\n        /\n        export function\n        attachPatchData(target: any, data:\n        LView|LContext) {\n            ngDevMode && assertDefined(target, 'Target expected');\n            // Only attach the ID of the view\n            in order to avoid memory leaks (see #41047). We only do this\n            // for `LView`, because we have control over when\n            an `LView` is created and destroyed, whereas\n            // we can't know when to remove an `LContext`. \n            if\n            (isLView(data)) {\n                target[MONKEY_PATCH_KEY_NAME] = data[ID];\n                registerLView(data);\n            } else {\n                target[MONKEY_PATCH_KEY_NAME] = data;\n            }\n        }\n\n        // **\n        * Returns the monkey-patch value data present\n        on the target (which could be\n        * a component, directive or a DOM node).\n        *\n        /\n        export function\n        readPatchedData(target: any): LView|LContext|null {\n            ngDevMode && assertDefined(target, 'Target expected');\n
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const data = target[MONKEY_PATCH_KEY_NAME];\n return (typeof data === 'number') ? getLViewById(data)
: data || null;\n}\n\nexport
function readPatchedLView<T>(target: any): LView<T>|null {\n const value = readPatchedData(target);\n if
(value) {\n return (isLView(value) ? value : value.IView) as LView<T>;\n } \n return null;\n}\n\nexport function
isComponentInstance(instance: any): boolean {\n return instance && instance.constructor &&
instance.constructor.cmp;\n}\n\nexport function isDirectiveInstance(instance: any): boolean {\n return instance &&
instance.constructor && instance.constructor.dir;\n}\n\n/**\n * Locates the element within the given LView and
returns the matching index\n *^\nfunction findViaNativeElement(IView: LView, target: RElement): number {\n
const tView = IView[TVIEW];\n for (let i = HEADER_OFFSET; i < tView.bindingStartIndex; i++) {\n if
(unwrapRNode(IView[i]) === target) {\n return i;\n } \n } \n return -1;\n}\n\n/**\n * Locates the next tNode
(child, sibling or parent).\n *^\nfunction traverseNextElement(tNode: TNode): TNode|null {\n if (tNode.child) {\n
return
tNode.child;\n } else if (tNode.next) {\n return tNode.next;\n } else {\n // Let's take the following template:
<div><span>text</span></div><component/>\n // After checking the text node, we need to find the next parent
that has a "next" TNode,\n // in this case the parent `div`, so that we can find the component.\n while
(tNode.parent && !tNode.parent.next) {\n tNode = tNode.parent;\n } \n return tNode.parent &&
tNode.parent.next;\n } \n}\n\n/**\n * Locates the component within the given LView and returns the matching
index\n *^\nfunction findViaComponent(IView: LView, componentInstance: {}): number {\n const
componentIndices = IView[TVIEW].components;\n if (componentIndices) {\n for (let i = 0; i <
componentIndices.length; i++) {\n const elementComponentIndex = componentIndices[i];\n const
componentView = getComponentLViewByIndex(elementComponentIndex, IView);\n if
(componentView[CONTEXT] === componentInstance) {\n return elementComponentIndex;\n
}\n } \n } else {\n const rootComponentView = getComponentLViewByIndex(HEADER_OFFSET,
IView);\n const rootComponent = rootComponentView[CONTEXT];\n if (rootComponent ===
componentInstance) {\n // we are dealing with the root element here therefore we know that the\n // element is
the very first element after the HEADER data in the IView\n return HEADER_OFFSET;\n } \n } \n return -
1;\n}\n\n/**\n * Locates the directive within the given LView and returns the matching index\n *^\nfunction
findViaDirective(IView: LView, directiveInstance: {}): number {\n // if a directive is monkey patched then it will
(by default)\n // have a reference to the LView of the current view. The\n // element bound to the directive being
search lives somewhere\n // in the view data. We loop through the nodes and check their\n // list of directives for
the instance.\n let tNode = IView[TVIEW].firstChild;\n while (tNode) {\n const directiveIndexStart
= tNode.directiveStart;\n const directiveIndexEnd = tNode.directiveEnd;\n for (let i = directiveIndexStart; i <
directiveIndexEnd; i++) {\n if (IView[i] === directiveInstance) {\n return tNode.index;\n } \n } \n
tNode = traverseNextElement(tNode);\n } \n return -1;\n}\n\n/**\n * Returns a list of directives extracted from the
given view based on the\n * provided list of directive index values.\n *^\n * @param nodeIndex The node index\n *
@param IView The target view data\n * @param includeComponents Whether or not to include components in
returned directives\n *^\nexport function getDirectivesAtNodeIndex(\n nodeIndex: number, IView: LView,
includeComponents: boolean): any[]|null {\n const tNode = IView[TVIEW].data[nodeIndex] as TNode;\n let
directiveStartIndex = tNode.directiveStart;\n if (directiveStartIndex == 0) return EMPTY_ARRAY;\n const
directiveEndIndex = tNode.directiveEnd;\n if (!includeComponents && tNode.flags &
TNodeFlags.isComponentHost)
directiveStartIndex++;\n return IView.slice(directiveStartIndex, directiveEndIndex);\n}\n\nexport function
getComponentAtNodeIndex(nodeIndex: number, IView: LView): {}|null {\n const tNode =
IView[TVIEW].data[nodeIndex] as TNode;\n let directiveStartIndex = tNode.directiveStart;\n return tNode.flags &
TNodeFlags.isComponentHost ? IView[directiveStartIndex] : null;\n}\n\n/**\n * Returns a map of local references
(local reference name => element or directive instance) that\n * exist on a given element.\n *^\nexport function
discoverLocalRefs(IView: LView, nodeIndex: number): {[key: string]: any}|null {\n const tNode =
IView[TVIEW].data[nodeIndex] as TNode;\n if (tNode && tNode.localNames) {\n const result: {[key: string]:

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any } = {};
let localIndex = tNode.index + 1;
for (let i = 0; i < tNode.localNames.length; i += 2) {
  result[tNode.localNames[i]] = IView[localIndex];
  localIndex++;
}
return result;
}
return null;
}
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license
 * that can be found in the LICENSE file at https://angular.io/license
 */
@fileoverview
 * This file provides mechanism by which code relevant to the `TicuContainerNode` is only loaded if ICU is present in the template.
 */
import {TicuContainerNode} from '../interfaces/node';
import {RNode} from '../interfaces/renderer_dom';
import {LView} from '../interfaces/view';
let _icuContainerIterate: (TicuContainerNode: TicuContainerNode, IView: LView) => () => RNode | null;
/**
 * Iterator which provides ability to visit all of the `TicuContainerNode` root `RNode`s.
 */
export function icuContainerIterate(ticuContainerNode: TicuContainerNode, IView: LView): () => RNode | null {
  return _icuContainerIterate(ticuContainerNode, IView);
}
/**
 * Ensures that `IcuContainerVisitor`'s implementation is present.
 * This function is invoked when i18n instruction comes across an ICU. The purpose is to allow the bundler to tree shake ICU logic and only load it if ICU instruction is executed.
 */
export function ensureIcuContainerVisitorLoaded(loader: () => ((TicuContainerNode: TicuContainerNode, IView: LView) => () => RNode | null)) {
  if (_icuContainerIterate === undefined) {
    // Do not inline this function. We want to keep `ensureIcuContainerVisitorLoaded` light, so it can be inlined into call-site.
    _icuContainerIterate = loader();
  }
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
 * Expresses a single CSS Selector.
 * Beginning of array - First index: element name
 * - Subsequent odd indices: attr keys
 * - Subsequent even indices: attr values
 * After SelectorFlags.CLASS flag
 * - Class name values
 * SelectorFlags.NOT flag - Changes the mode to NOT
 * - Can be combined with other flags to set the element / attr / class mode
 * e.g. SelectorFlags.NOT | SelectorFlags.ELEMENT
 * Example:
 * Original: `div.foo.bar[attr1=val1][attr2]`
 * Parsed: ['div', 'attr1', 'val1', 'attr2', ' ', SelectorFlags.CLASS, 'foo', 'bar']
 * Original: `div[attr1]:not(.foo[attr2])`
 * Parsed: [
 * 'div', 'attr1', ' ',
 * SelectorFlags.NOT | SelectorFlags.ATTRIBUTE 'attr2', ' ',
 * SelectorFlags.CLASS, 'foo'
 * ]
 * See more examples in node_selector_matcher_spec.ts
 */
export type CssSelector = (string | SelectorFlags)[];
 * A list of CssSelectors.
 * A directive or component can have multiple selectors. This type is used for directive defs so any of the selectors in the list will match that directive.
 * Original: `form, [ngForm]`
 * Parsed: [['form'], [' ', 'ngForm', '']]
 */
export type CssSelectorList = CssSelector[];
 * List of slots for a projection. A slot can be either based on a parsed CSS selector which will be used to determine nodes which are projected into that slot.
 * When set to `""`, the slot is reserved and can be used for multi-slot projection using {@link ViewContainerRef#createComponent}. The last slot that specifies the wildcard selector will retrieve all projectable nodes which do not match any selector.
 */
export type ProjectionSlots = (CssSelectorList | "")[];
 * Flags used to build up CssSelectors
 */
export const enum SelectorFlags {
  /** Indicates this is the beginning of a new negative selector */
  NOT = 0b0001,
  /** Mode for matching attributes */
  ATTRIBUTE = 0b0010,
  /** Mode for matching tag names */
  ELEMENT = 0b0100,
  /** Mode for matching class names */
  CLASS = 0b1000,
}
}
}
Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.
export const unusedValueExportToPlacateAjd = 1;
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
import {RendererStyleFlags2, RendererType2} from '../render/api_flags';
import {TrustedHTML, TrustedScript, TrustedScriptURL} from '../util/security/trusted_type_defs';
import {RComment, RElement, RNode, RText} from '../renderer_dom';
 * The goal here is to make sure that the browser DOM API is the Renderer.
 * We do this by defining a subset of DOM API to be the renderer and then use that at runtime for

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rendering.\n \*\n \* At runtime we can then use the DOM api directly, in server or web-worker\n \* it will be easy to implement such API.\n \*\n\nexport type GlobalTargetName = 'document'|'window'|'body';\n\nexport type GlobalTargetResolver = (element: any) => EventTarget;\n\n\n\*\*\n \* Procedural style of API needed to create elements and text nodes.\n

\*\n \* In non-native browser environments (e.g. platforms such as web-workers), this is the\n \* facade that enables element manipulation. In practice, this is implemented by `Renderer2`.\n \*\n\nexport interface Renderer {\n destroy(): void;\n createComment(value: string): RComment;\n createElement(name: string, namespace?: string|null): RElement;\n createText(value: string): RText;\n /\*\*\n \* This property is allowed to be null / undefined,\n \* in which case the view engine won't call it.\n \* This is used as a performance optimization for production mode.\n \*/\n destroyNode?: ((node: RNode) => void)|null;\n appendChild(parent: RElement, newChild: RNode): void;\n insertBefore(parent: RNode, newChild: RNode, refChild: RNode|null, isMove?: boolean): void;\n removeChild(parent: RElement, oldChild: RNode, isHostElement?: boolean): void;\n selectRootElement(selectorOrNode: string|any, preserveContent?: boolean): RElement;\n\n parentNode(node: RNode): RElement|null;\n

nextSibling(node: RNode): RNode|null;\n\n setAttribute(\n el: RElement, name: string, value: string|TrustedHTML|TrustedScript|TrustedScriptURL,\n namespace?: string|null): void;\n removeAttribute(el: RElement, name: string, namespace?: string|null): void;\n addClass(el: RElement, name: string): void;\n removeClass(el: RElement, name: string): void;\n setStyle(el: RElement, style: string, value: any, flags?: RendererStyleFlags2): void;\n removeStyle(el: RElement, style: string, flags?: RendererStyleFlags2): void;\n setProperty(el: RElement, name: string, value: any): void;\n setValue(node: RText|RComment, value: string): void;\n\n // TODO(misko): Deprecate in favor of addEventListener/removeEventListener\n listen(\n target: GlobalTargetName|RNode, eventName: string,\n callback: (event: any) => boolean | void): () => void;\n}\n\nexport interface RendererFactory {\n createRenderer(hostElement: RElement|null, rendererType: RendererType2|null): Renderer;\n begin?():\n

void;\n end?(): void;\n}\n\n\n// Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n \*/\nimport {assertDefined} from\n'./../util/assert';\nimport {assertLView} from './assert';\nimport {readPatchedLView} from\n'./context\_discovery';\nimport {LContainer} from './interfaces/container';\nimport {isLContainer, isLView} from\n'./interfaces/type\_checks';\nimport {CHILD\_HEAD, CONTEXT, FLAGS, LView, LViewFlags, NEXT, PARENT}\nfrom './interfaces/view';\n\n\n\*\*\n \* Gets the parent LView of the passed LView, if the PARENT is an LContainer,\n will get the parent of\n \* that LContainer, which is an LView\n \* @param IView the IView whose parent to get\n \*\n\nexport function getLViewParent(IView:\n

LView): LView|null {\n ngDevMode && assertLView(IView);\n const parent = IView[PARENT];\n return isLContainer(parent) ? parent[PARENT]! : parent;\n}\n\n\n\*\*\n \* Retrieve the root view from any component or `LView` by walking the parent `LView` until\n \* reaching the root `LView`.\n \*\n \* @param componentOrLView any component or `LView`\n \*\n\nexport function getRootView<T>(componentOrLView: LView|{}): LView<T> {\n ngDevMode && assertDefined(componentOrLView, 'component');\n let IView = isLView(componentOrLView) ? componentOrLView : readPatchedLView(componentOrLView)!;\n while (IView && !(IView[FLAGS] & LViewFlags.IsRoot)) {\n IView = getLViewParent(IView)!;\n }\n ngDevMode && assertLView(IView);\n return IView as LView<T>;\n}\n\n\n\*\*\n \* Returns the context information associated with the application where the target is situated. It\n \* does this by walking the parent views until it gets to the root view, then getting the context\n \* off of that.\n \*\n \* @param\n

viewOrComponent the `LView` or component to get the root context for.\n \*\n\nexport function getRootContext<T>(viewOrComponent: LView<T>|{}): T {\n const rootView = getRootView(viewOrComponent);\n ngDevMode &&\n assertDefined(rootView[CONTEXT], 'Root view has no context. Perhaps it is disconnected?');\n return rootView[CONTEXT] as T;\n}\n\n\n\*\*\n \* Gets the first\n

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`LContainer` in the LView or `null` if none exists.\n *^next function getNextLContainer(LView: LView):
LContainer|null {\n return getNextLContainer(LView[CHILD_HEAD]);\n}\n\n/**\n * Gets the next `LContainer`
that is a sibling of the given container.\n *^next function getNextLContainer(container: LContainer):
LContainer|null {\n return getNextLContainer(container[NEXT]);\n}\n\nfunction
getNextLContainer(viewOrContainer: LContainer|LView|null) {\n while (viewOrContainer !== null &&
!isLContainer(viewOrContainer)) {\n viewOrContainer = viewOrContainer[NEXT];\n }\n return
viewOrContainer as LContainer
| null;\n}\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*^next\nimport {ViewEncapsulation} from './metadata/view';\nimport {RendererStyleFlags2} from
'./render/api_flags';\nimport {addToArray, removeFromArray} from './util/array_utils';\nimport {assertDefined,
assertEqual, assertFunction, assertString} from './util/assert';\nimport {escapeCommentText} from
'./util/dom';\nimport {assertLContainer, assertLView, assertParentView, assertProjectionSlots,
assertTNodeForLView} from './assert';\nimport {attachPatchData} from './context_discovery';\nimport
{icuContainerIterate} from './i18n/i18n_tree_shaking';\nimport {CONTAINER_HEADER_OFFSET,
HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS, NATIVE, unusedValueExportToPlacateAjd as
unused1} from './interfaces/container';\nimport {ComponentDef} from './interfaces/definition';\nimport
{NodeInjectorFactory} from './interfaces/injector';\nimport {unregisterLView} from
'./interfaces/lview_tracking';\nimport {TElementNode, TIcuContainerNode, TNode, TNodeFlags, TNodeType,
TProjectionNode, unusedValueExportToPlacateAjd as unused2} from './interfaces/node';\nimport
{unusedValueExportToPlacateAjd as unused3} from './interfaces/projection';\nimport {Renderer,
unusedValueExportToPlacateAjd as unused4} from './interfaces/renderer';\nimport {RComment, RElement, RNode,
RTemplate, RText} from './interfaces/renderer_dom';\nimport {isLContainer, isLView} from
'./interfaces/type_checks';\nimport {CHILD_HEAD, CLEANUP, DECLARATION_COMPONENT_VIEW,
DECLARATION_LCONTAINER, DestroyHookData, FLAGS, HookData, HookFn, HOST, LView, LViewFlags,
NEXT, PARENT, QUERIES, RENDERER, T_HOST, TVIEW, TView, TViewType,
unusedValueExportToPlacateAjd as unused5} from './interfaces/view';\nimport {assertTNodeType} from
'./node_assert';\nimport {profiler, ProfilerEvent} from './profiler';\nimport
{getLViewParent} from './util/view_traversal_utils';\nimport {getNativeByTNode, unwrapRNode,
updateTransplantedViewCount} from './util/view_utils';\n\n\nconst unusedValueToPlacateAjd = unused1 +
unused2 + unused3 + unused4 + unused5;\n\nconst enum WalkTNodeTreeAction {\n /** node create in the native
environment. Run on initial creation. *\n Create = 0,\n /**\n * node insert in the native environment.\n * Run
when existing node has been detached and needs to be re-attached.\n * Insert = 1,\n /** node detach from the
native environment *\n Detach = 2,\n /** node destruction using the renderer's API *\n Destroy =
3,\n}\n\n\n\n/**\n * NOTE: for performance reasons, the possible actions are inlined within the function instead of\n
* being passed as an argument.\n *^next\nfunction applyToElementOrContainer(\n action: WalkTNodeTreeAction,
renderer: Renderer, parent: RElement|null,\n INodeToHandle: RNode|LContainer|LView, beforeNode?:
RNode|null) {\n // If this
slot was allocated for a text node dynamically created by i18n, the text node itself\n // won't be created until
i18nApply() in the update block, so this node should be skipped.\n // For more info, see "ICU expressions should
work inside an ngTemplateOutlet inside an ngFor"\n // in `i18n_spec.ts`.\n if (INodeToHandle !== null) {\n let
LContainer: LContainer|undefined;\n let isComponent = false;\n // We are expecting an RNode, but in the case of
a component or LContainer the `RNode` is\n // wrapped in an array which needs to be unwrapped. We need to
know if it is a component and if\n // it has LContainer so that we can process all of those cases appropriately.\n if
(isLContainer(INodeToHandle)) {\n LContainer = INodeToHandle;\n } else if (isLView(INodeToHandle)) {\n
isComponent = true;\n ngDevMode && assertDefined(INodeToHandle[HOST], 'HOST must be defined for a
component LView');\n INodeToHandle = INodeToHandle[HOST]!;\n }\n const rNode:

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RNode = unwrapRNode(INodeToHandle);\n\n  if (action === WalkTNodeTreeAction.Create && parent !== null)
{\n  if (beforeNode == null) {\n    nativeAppendChild(renderer, parent, rNode);\n  } else {\n
nativeInsertBefore(renderer, parent, rNode, beforeNode || null, true);\n  }\n  } else if (action ===
WalkTNodeTreeAction.Insert && parent !== null) {\n    nativeInsertBefore(renderer, parent, rNode, beforeNode ||
null, true);\n  } else if (action === WalkTNodeTreeAction.Detach) {\n    nativeRemoveNode(renderer, rNode,
isComponent);\n  } else if (action === WalkTNodeTreeAction.Destroy) {\n    ngDevMode &&
ngDevMode.rendererDestroyNode++;\n    renderer.destroyNode!(rNode);\n  }\n  if (IContainer != null) {\n
applyContainer(renderer, action, IContainer, parent, beforeNode);\n  }\n  }\n}\n\nexport function
createTextNode(renderer: Renderer, value: string): RText {\n  ngDevMode &&
ngDevMode.rendererCreateTextNode++;\n  ngDevMode && ngDevMode.rendererSetText++;\n
  return renderer.createTextNode(value);\n}\n\nexport function updateTextNode(renderer: Renderer, rNode: RText, value:
string): void {\n  ngDevMode && ngDevMode.rendererSetText++;\n  renderer.setValue(rNode,
value);\n}\n\nexport function createCommentNode(renderer: Renderer, value: string): RComment {\n  ngDevMode
&& ngDevMode.rendererCreateComment++;\n  return
renderer.createComment(escapeCommentText(value));\n}\n\n/**\n * Creates a native element from a tag name,
using a renderer.\n * @param renderer A renderer to use\n * @param name the tag name\n * @param namespace
Optional namespace for element.\n * @returns the element created\n */\nexport function createElement(\n
renderer: Renderer, name: string, namespace: string|null): RElement {\n  ngDevMode &&
ngDevMode.rendererCreateElement++;\n  return renderer.createElement(name, namespace);\n}\n\n/**\n *
Removes all DOM elements associated with a view.\n * \n * Because some root nodes of the view may be
containers,
we sometimes need\n * to propagate deeply into the nested containers to remove all elements in the\n * views
beneath it.\n * \n * @param tView The `TView` of the `LView` from which elements should be added or removed\n
* @param IView The view from which elements should be added or removed\n */\nexport function
removeViewFromContainer(tView: TView, IView: LView): void {\n  const renderer = IView[RENDERER];\n
  applyView(tView, IView, renderer, WalkTNodeTreeAction.Detach, null, null);\n  IView[HOST] = null;\n
  IView[T_HOST] = null;\n}\n\n/**\n * Adds all DOM elements associated with a view.\n * \n * Because some root
nodes of the view may be containers, we sometimes need\n * to propagate deeply into the nested containers to add
all elements in the\n * views beneath it.\n * \n * @param tView The `TView` of the `LView` from which elements
should be added or removed\n * @param parentTNode The `TNode` where the `LView` should be attached to.\n *
@param renderer Current renderer to use for DOM
manipulations.\n * @param IView The view from which elements should be added or removed\n * @param
parentNativeNode The parent `RElement` where it should be inserted into.\n * @param beforeNode The node
before which elements should be added, if insert mode\n */\nexport function addViewToContainer(\n  tView:
TView, parentTNode: TNode, renderer: Renderer, IView: LView, parentNativeNode: RElement,\n  beforeNode:
RNode|null): void {\n  IView[HOST] = parentNativeNode;\n  IView[T_HOST] = parentTNode;\n
  applyView(tView, IView, renderer, WalkTNodeTreeAction.Insert, parentNativeNode, beforeNode);\n}\n\n/**\n *
Detach a `LView` from the DOM by detaching its nodes.\n * \n * @param tView The `TView` of the `LView` to be
detached\n * @param IView the `LView` to be detached.\n */\nexport function renderDetachView(tView: TView,
IView: LView) {\n  applyView(tView, IView, IView[RENDERER], WalkTNodeTreeAction.Detach, null,
null);\n}\n\n/**\n * Traverses down and up the tree of views and containers
to remove listeners and\n * call onDestroy callbacks.\n * \n * Notes:\n * - Because it's used for onDestroy calls, it
needs to be bottom-up.\n * - Must process containers instead of their views to avoid splicing\n * when views are
destroyed and re-added.\n * - Using a while loop because it's faster than recursion\n * - Destroy only called on
movement to sibling or movement to parent (laterally or up)\n * \n * @param rootView The view to destroy\n
*/\nexport function destroyViewTree(rootView: LView): void {\n  // If the view has no children, we can clean it up
and return early.\n  let IViewOrLContainer = rootView[CHILD_HEAD];\n  if (!IViewOrLContainer) {\n    return
cleanUpView(rootView[TVIEW], rootView);\n  }\n  while (IViewOrLContainer) {\n    let next:

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declarationViewIndex = movedViews.indexOf(IView);\n const insertionLContainer = IView[PARENT] as
LContainer;\n ngDevMode && assertLContainer(insertionLContainer);\n\n // If the view was marked for refresh
but then detached before it was checked (where the flag\n // would be cleared and the counter decremented), we
need to decrement the view counter here\n // instead.\n if (IView[FLAGS] &
LViewFlags.RefreshTransplantedView) {\n   IView[FLAGS] &= ~LViewFlags.RefreshTransplantedView;\n
updateTransplantedViewCount(insertionLContainer, -1);\n } \n\n movedViews.splice(declarationViewIndex,
1);\n}\n\n/**\n * Detaches a view from a container.\n * This method removes the view from the container's
array of active views. It also\n * removes the view's elements from the DOM.\n * @param IContainer The
container from which to detach a view\n * @param removeIndex The index of the view to detach\n * @returns
Detached LView instance.\n */\nexport function detachView(IContainer: LContainer, removeIndex: number):
LView|undefined {\n  if (IContainer.length <= CONTAINER_HEADER_OFFSET) return;\n\n  const
indexInContainer = CONTAINER_HEADER_OFFSET + removeIndex;\n  const viewToDetach =
IContainer[indexInContainer];\n\n  if (viewToDetach) {\n    const declarationLContainer =
viewToDetach[DECLARATION_LCONTAINER];\n    if (declarationLContainer !== null &&
declarationLContainer !== IContainer) {\n      detachMovedView(declarationLContainer, viewToDetach);\n
}\n\n    if (removeIndex > 0) {\n      IContainer[indexInContainer - 1][NEXT] = viewToDetach[NEXT] as
LView;\n    }\n    const removedLView = removeFromArray(IContainer, CONTAINER_HEADER_OFFSET +
removeIndex);\n    removeViewFromContainer(viewToDetach[TVIEW], viewToDetach);\n\n    // notify query that a
view has been removed\n    const IQueries = removedLView[QUERIES];\n    if (IQueries !== null) {\n
IQueries.detachView(removedLView[TVIEW]);\n    }\n\n    viewToDetach[PARENT] = null;\n
viewToDetach[NEXT] = null;\n    // Unsets the attached flag\n    viewToDetach[FLAGS] &=
~LViewFlags.Attached;\n  }\n  return viewToDetach;\n}\n\n/**\n * A standalone function which destroys an
LView,\n * conducting clean up (e.g. removing listeners, calling onDestroys).\n * @param tView The `TView`
of the `LView` to be destroyed\n * @param IView The view to be destroyed.\n */\nexport function
destroyLView(tView: TView, IView: LView) {\n  if (!(IView[FLAGS] & LViewFlags.Destroyed)) {\n    const
renderer = IView[RENDERER];\n    if (renderer.destroyNode) {\n      applyView(tView, IView, renderer,
WalkTNodeTreeAction.Destroy, null, null);\n    }\n    destroyViewTree(IView);\n  }\n}\n\n/**\n * Calls
onDestroys hooks for all directives and pipes in a given view and then removes all\n * listeners. Listeners are
removed as the last step so events delivered in the onDestroys hooks\n * can be propagated to @Output listeners.\n
*\n * @param tView `TView` for the `LView` to clean up.\n * @param IView The LView to clean up\n
*/\nfunction cleanUpView(tView: TView, IView: LView): void {\n  if (!(IView[FLAGS] &
LViewFlags.Destroyed)) {\n    // Usually the Attached flag is removed when the view is detached from its parent,
however\n    // if it's a root view, the flag won't be unset hence why we're also removing on destroy.\n
IView[FLAGS] &= ~LViewFlags.Attached;\n\n    // Mark the LView as destroyed *before* executing the
onDestroy hooks. An onDestroy hook\n    // runs arbitrary user code, which could include its own
`viewRef.destroy()` (or similar). If\n    // We don't flag the view
as destroyed before the hooks, this could lead to an infinite loop.\n    // This also aligns with the ViewEngine
behavior. It also means that the onDestroy hook is\n    // really more of an "afterDestroy" hook if you think about
it.\n    IView[FLAGS] |= LViewFlags.Destroyed;\n\n    executeOnDestroys(tView, IView);\n
processCleanups(tView, IView);\n    // For component views only, the local renderer is destroyed at clean up time.\n
if (IView[TVIEW].type === TViewType.Component) {\n      ngDevMode && ngDevMode.rendererDestroy++;\n
IView[RENDERER].destroy();\n    }\n\n    const declarationContainer =
IView[DECLARATION_LCONTAINER];\n    // we are dealing with an embedded view that is still inserted into a
container\n    if (declarationContainer !== null && isLContainer(IView[PARENT])) {\n      // and this is a projected
view\n      if (declarationContainer !== IView[PARENT]) {\n        detachMovedView(declarationContainer,
IView);\n      }\n      // For embedded views still
attached to a container: remove query result from this view.\n      const IQueries = IView[QUERIES];\n      if
(IQueries !== null) {\n        IQueries.detachView(tView);\n      }\n    }\n\n    // Unregister the view once everything

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else has been cleaned up.\n  unregisterLView(IView);\n  }\n}\n\n/** Removes listeners and unsubscribes from
output subscriptions */\nfunction processCleanups(tView: TView, IView: LView): void {\n  const tCleanup =
tView.cleanup;\n  const lCleanup = IView[CLEANUP];\n  // `lCleanup` contains both share information with
`tCleanup` as well as instance specific\n  // information appended at the end. We need to know where the end of the
`tCleanup` information\n  // is, and we track this with `lastLCleanupIndex`.\n  let lastLCleanupIndex = -1;\n  if
(tCleanup !== null) {\n    for (let i = 0; i < tCleanup.length - 1; i += 2) {\n      if (typeof tCleanup[i] === 'string') {\n
// This is a native DOM listener\n        const idxOrTargetGetter = tCleanup[i +
1];\n        const target = typeof idxOrTargetGetter === 'function' ?\n          idxOrTargetGetter(IView) :\n        unwrapRNode(IView[idxOrTargetGetter]);\n        const listener = lCleanup[lastLCleanupIndex = tCleanup[i + 2]);\n
const useCaptureOrSubIdx = tCleanup[i + 3];\n        if (typeof useCaptureOrSubIdx === 'boolean') {\n          //
native DOM listener registered with Renderer3\n          target.removeEventListener(tCleanup[i], listener,
useCaptureOrSubIdx);\n        } else {\n          if (useCaptureOrSubIdx >= 0) {\n            // unregister\n
lCleanup[lastLCleanupIndex = useCaptureOrSubIdx]();\n          } else {\n            // Subscription\n
lCleanup[lastLCleanupIndex = -useCaptureOrSubIdx].unsubscribe();\n          }\n        }\n        i += 2;\n      } else {\n
// This is a cleanup function that is grouped with the index of its context\n        const context =
lCleanup[lastLCleanupIndex = tCleanup[i + 1]);\n        tCleanup[i].call(context);\n
      }\n    }\n  }\n  if (lCleanup !== null) {\n    for (let i = lastLCleanupIndex + 1; i < lCleanup.length; i++) {\n
const instanceCleanupFn = lCleanup[i];\n    ngDevMode && assertFunction(instanceCleanupFn, 'Expecting
instance cleanup function.);\n    instanceCleanupFn();\n  }\n  IView[CLEANUP] = null;\n  }\n}\n\n/** Calls
onDestroy hooks for this view */\nfunction executeOnDestroys(tView: TView, IView: LView): void {\n  let
destroyHooks: DestroyHookData|null;\n  if (tView !== null && (destroyHooks = tView.destroyHooks) !== null) {\n
for (let i = 0; i < destroyHooks.length; i += 2) {\n    const context = IView[destroyHooks[i] as number];\n    //
Only call the destroy hook if the context has been requested.\n    if (!(context instanceof NodeInjectorFactory)) {\n
const toCall = destroyHooks[i + 1] as HookFn | HookData;\n    if (Array.isArray(toCall)) {\n      for (let j =
0; j < toCall.length; j += 2) {\n        const callContext
= context[toCall[j] as number];\n        const hook = toCall[j + 1] as HookFn;\n
        profiler(ProfilerEvent.LifecycleHookStart, callContext, hook);\n        try {\n          hook.call(callContext);\n
        } finally {\n          profiler(ProfilerEvent.LifecycleHookEnd, callContext, hook);\n        }\n      }\n    }
else {\n      profiler(ProfilerEvent.LifecycleHookStart, context, toCall);\n      try {\n
toCall.call(context);\n      } finally {\n        profiler(ProfilerEvent.LifecycleHookEnd, context, toCall);\n
      }\n    }\n  }\n}\n\n/**\n * Returns a native element if a node can be inserted into the given parent.\n
*\n * There are two reasons why we may not be able to insert a element immediately.\n * - Projection: When
creating a child content element of a component, we have to skip the\n * insertion because the content of a
component will be projected.\n * - `<component><content>delayed`
due to projection</content></component>\n * - Parent container is disconnected: This can happen when we are
inserting a view into\n * parent container, which itself is disconnected. For example the parent container is part\n
* of a View which has not been inserted or is made for projection but has not been inserted\n * into destination.\n
*\n * @param tView: Current `TView`.\n * @param tNode: `TNode` for which we wish to retrieve render parent.\n
*\n * @param IView: Current `LView`.\n */\nexport function getParentRElement(tView: TView, tNode: TNode, IView:
LView): RElement|null {\n  return getClosestRElement(tView, tNode.parent, IView);\n}\n\n/**\n * Get closest
`RElement` or `null` if it can't be found.\n * If `TNode` is `TNodeType.Element` => return `RElement` at
`LView[tNode.index]` location.\n * If `TNode` is `TNodeType.ElementContainer|IcuContain` => return the parent
(recursively).\n * If `TNode` is `null` then return host `RElement`.\n * - return `null` if projection\n
* - return `null` if parent container is disconnected (we have no parent.)\n * @param tView: Current
`TView`.\n * @param tNode: `TNode` for which we wish to retrieve `RElement` (or `null` if host element is\n
* needed).\n * @param IView: Current `LView`.\n * @returns `null` if the `RElement` can't be determined at this time
(no parent / projection)\n */\nexport function getClosestRElement(tView: TView, tNode: TNode|null, IView:
LView): RElement|null {\n  let parentTNode: TNode|null = tNode;\n  // Skip over element and ICU containers as

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those are represented by a comment node and\n // can't be used as a render parent.\n while (parentTNode !== null
&&\n (parentTNode.type & (TNodeType.ElementContainer | TNodeType.Icu))) {\n tNode = parentTNode;\n
parentTNode = tNode.parent;\n }\n\n // If the parent tNode is null, then we are inserting across views: either into
an embedded view\n // or a component view.\n if (parentTNode === null) {\n // We are inserting
a root element of the component view into the component host element and\n // it should always be eager.\n
return IView[HOST];\n } else {\n ngDevMode && assertTNodeType(parentTNode, TNodeType.AnyRNode |
TNodeType.Container);\n if (parentTNode.flags & TNodeFlags.isComponentHost) {\n ngDevMode &&
assertTNodeForLView(parentTNode, IView);\n const encapsulation =\n
(tView.data[parentTNode.directiveStart] as ComponentDef<unknown>).encapsulation;\n // We've got a parent
which is an element in the current view. We just need to verify if the\n // parent element is not a component.
Component's content nodes are not inserted immediately\n // because they will be projected, and so doing insert
at this point would be wasteful.\n // Since the projection would then move it to its final destination. Note that we
can't\n // make this assumption when using the Shadow DOM, because the native projection placeholders\n //
(<content> or <slot>)
have to be in place as elements are being inserted.\n if (encapsulation === ViewEncapsulation.None ||\n
encapsulation === ViewEncapsulation.Emulated) {\n return null;\n }\n }\n\n return
getNativeByTNode(parentTNode, IView) as RElement;\n }\n}\n\n/**\n * Inserts a native node before another
native node for a given parent.\n * This is a utility function that can be used when native nodes were determined.\n
*\n*/\nexport function nativeInsertBefore(\n renderer: Renderer, parent: RElement, child: RNode, beforeNode:
RNode|null,\n isMove: boolean): void {\n ngDevMode && ngDevMode.rendererInsertBefore++;\n
renderer.insertBefore(parent, child, beforeNode, isMove);\n}\n\nfunction nativeAppendChild(renderer: Renderer,
parent: RElement, child: RNode): void {\n ngDevMode && ngDevMode.rendererAppendChild++;\n ngDevMode
&& assertDefined(parent, 'parent node must be defined');\n renderer.appendChild(parent, child);\n}\n\nfunction
nativeAppendOrInsertBefore(\n
renderer: Renderer, parent: RElement, child: RNode, beforeNode: RNode|null, isMove: boolean) {\n if
(beforeNode !== null) {\n nativeInsertBefore(renderer, parent, child, beforeNode, isMove);\n } else {\n
nativeAppendChild(renderer, parent, child);\n }\n}\n\n/** Removes a node from the DOM given its native parent.
*\n*/\nfunction nativeRemoveChild(\n renderer: Renderer, parent: RElement, child: RNode, isHostElement?:
boolean): void {\n renderer.removeChild(parent, child, isHostElement);\n}\n\n/** Checks if an element is a
`<template>` node. *\n*/\nfunction isTemplateNode(node: RElement): node is RTemplate {\n return node.tagName
=== 'TEMPLATE' && (node as RTemplate).content !== undefined;\n}\n\n/**\n * Returns a native parent of a given
native node.\n *\n*/\nexport function nativeParentNode(renderer: Renderer, node: RNode): RElement|null {\n return
renderer.parentNode(node);\n}\n\n/**\n * Returns a native sibling of a given native node.\n *\n*/\nexport function
nativeNextSibling(renderer:
Renderer, node: RNode): RNode|null {\n return renderer.nextSibling(node);\n}\n\n/**\n * Find a node in front of
which `currentTNode` should be inserted.\n *\n * This method determines the `RNode` in front of which we should
insert the `currentRNode`. This\n * takes `TNode.insertBeforeIndex` into account if i18n code has been invoked.\n
*\n * @param parentTNode parent `TNode`\n * @param currentTNode current `TNode` (The node which we would
like to insert into the DOM)\n * @param IView current `LView`\n *\n*/\nfunction
getInsertInFrontOfRNode(parentTNode: TNode, currentTNode: TNode, IView: LView): RNode|null {\n return
_getInsertInFrontOfRNodeWithI18n(parentTNode, currentTNode, IView);\n}\n\n/**\n * Find a node in front of
which `currentTNode` should be inserted. (Does not take i18n into\n * account)\n *\n * This method determines the
`RNode` in front of which we should insert the `currentRNode`. This\n * does not take `TNode.insertBeforeIndex`
into account.\n *\n * @param
parentTNode parent `TNode`\n * @param currentTNode current `TNode` (The node which we would like to insert
into the DOM)\n * @param IView current `LView`\n *\n*/\nexport function getInsertInFrontOfRNodeWithNoI18n(\n
parentTNode: TNode, currentTNode: TNode, IView: LView): RNode|null {\n if (parentTNode.type &
(TNodeType.ElementContainer | TNodeType.Icu)) {\n return getNativeByTNode(parentTNode, IView);\n }\n
}

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return null;\n}\n\n/**\n * Tree shakable boundary for `getInsertInFrontOfRNodeWithI18n` function.\n *\n * This function will only be set if i18n code runs.\n */\nlet _getInsertInFrontOfRNodeWithI18n: (parentTNode: TNode, currentTNode: TNode, IView: LView) =>\n  RNode | null = getInsertInFrontOfRNodeWithNoI18n;\n\n/**\n * Tree shakable boundary for `processI18nInsertBefore` function.\n *\n * This function will only be set if i18n code runs.\n */\nlet _processI18nInsertBefore: (\n  renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[],\n  parentRElement: RElement|null) => void;\n\nexport function setI18nHandling(\n  getInsertInFrontOfRNodeWithI18n: (parentTNode: TNode, currentTNode: TNode, IView: LView) =>\n    RNode | null,\n  processI18nInsertBefore: (\n    renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[],\n    parentRElement: RElement|null) => void) {\n  _getInsertInFrontOfRNodeWithI18n = getInsertInFrontOfRNodeWithI18n;\n  _processI18nInsertBefore = processI18nInsertBefore;\n}\n\n/**\n * Appends the `child` native node (or a collection of nodes) to the `parent`.\n *\n * @param tView The `TView` to be appended\n * @param IView The current LView\n * @param childRNode The native child (or children) that should be appended\n * @param childTNode The TNode of the child element\n */\nexport function appendChild(\n  tView: TView, IView: LView, childRNode: RNode|RNode[], childTNode: TNode): void {\n  const parentRNode = getParentRElement(tView, childTNode, IView);\n  const renderer = IView[RENDERER];\n  const parentTNode: TNode = childTNode.parent || IView[T_HOST]!;\n  const anchorNode = getInsertInFrontOfRNode(parentTNode, childTNode, IView);\n  if (parentRNode !== null) {\n    if (Array.isArray(childRNode)) {\n      for (let i = 0; i < childRNode.length; i++) {\n        nativeAppendOrInsertBefore(renderer, parentRNode, childRNode[i], anchorNode, false);\n      }\n    } else {\n      nativeAppendOrInsertBefore(renderer, parentRNode, childRNode, anchorNode, false);\n    }\n  }\n  _processI18nInsertBefore !== undefined &&\n    _processI18nInsertBefore(renderer, childTNode, IView, childRNode, parentRNode);\n}\n\n/**\n * Returns the first native node for a given LView, starting from the provided TNode.\n *\n * Native nodes are returned in the order in which those appear in the native tree (DOM).\n */\nfunction getFirstNativeNode(IView: LView, tNode: TNode|null): RNode|null {\n  if (tNode !== null) {\n    ngDevMode &&\n      assertTNodeType(\n        tNode,\n        TNodeType.AnyRNode | TNodeType.AnyContainer | TNodeType.Icu | TNodeType.Projection);\n\n    const tNodeType = tNode.type;\n    if (tNodeType & TNodeType.AnyRNode) {\n      return getNativeByTNode(tNode, IView);\n    } else if (tNodeType & TNodeType.Container) {\n      return getBeforeNodeForView(-1, IView[tNode.index]);\n    } else if (tNodeType & TNodeType.ElementContainer) {\n      const eIcuContainerChild = tNode.child;\n      if (eIcuContainerChild !== null) {\n        return getFirstNativeNode(IView, eIcuContainerChild);\n      } else {\n        const rNodeOrLContainer = IView[tNode.index];\n        if (isLContainer(rNodeOrLContainer)) {\n          return getBeforeNodeForView(-1, rNodeOrLContainer);\n        } else {\n          return unwrapRNode(rNodeOrLContainer);\n        }\n      }\n    } else if (tNodeType & TNodeType.Icu) {\n      let nextRNode = icuContainerIterate(tNode as TIcuContainerNode, IView);\n      let rNode: RNode|null = nextRNode();\n      // If the ICU container has no nodes, then we use the ICU anchor as the node.\n      return rNode || unwrapRNode(IView[tNode.index]);\n    } else {\n      const projectionNodes = getProjectionNodes(IView, tNode);\n      if (projectionNodes !== null) {\n        if (Array.isArray(projectionNodes)) {\n          return projectionNodes[0];\n        }\n        const parentView = getLViewParent(IView[DECLARATION_COMPONENT_VIEW]);\n        ngDevMode &&\n          assertParentView(parentView);\n        return getFirstNativeNode(parentView!, projectionNodes);\n      } else {\n        return getFirstNativeNode(IView, tNode.next);\n      }\n    }\n  }\n  return null;\n}\n\nexport function getProjectionNodes(IView: LView, tNode: TNode|null): TNode|RNode[]|null {\n  if (tNode !== null) {\n    const componentView = IView[DECLARATION_COMPONENT_VIEW];\n    const componentHost = componentView[T_HOST] as TElementNode;\n    const slotIdx = tNode.projection as number;\n    ngDevMode &&\n      assertProjectionSlots(IView);\n    return

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componentHost.projection![slotIdx];\n } \n return null;\n}\n\nexport function
getBeforeNodeForView(viewIndexInContainer: number, IContainer: LContainer): RNode|\n null {\n const
nextViewIndex = CONTAINER_HEADER_OFFSET + viewIndexInContainer + 1;\n if (nextViewIndex <
IContainer.length) {\n const IView = IContainer[nextViewIndex] as LView;\n const firstTNodeOfView =
IView[TVIEW].firstChild;\n if (firstTNodeOfView !== null) {\n return getFirstNativeNode(IView,
firstTNodeOfView);\n } \n } \n\n return IContainer[NATIVE];\n}\n\n/**\n * Removes a native node itself using a
given renderer. To remove the node we are looking up its\n * parent from the native tree as not all platforms /
browsers support the equivalent of\n * node.remove().\n * @param renderer A renderer to be used\n * @param
rNode The native node that should be removed\n * @param isHostElement A flag indicating if a node to be
removed is a host of a component.\n */\nexport function nativeRemoveNode(renderer:
Renderer, rNode: RNode, isHostElement?: boolean): void {\n ngDevMode &&
ngDevMode.rendererRemoveNode++;\n const nativeParent = nativeParentNode(renderer, rNode);\n if
(nativeParent) {\n nativeRemoveChild(renderer, nativeParent, rNode, isHostElement);\n } \n}\n\n/**\n *
Performs the operation of `action` on the node. Typically this involves inserting or removing\n * nodes on the
LView or projection boundary.\n */\nfunction applyNodes(\n renderer: Renderer, action: WalkTNodeTreeAction,
tNode: TNode|null, IView: LView,\n parentRElement: RElement|null, beforeNode: RNode|null, isProjection:
boolean) {\n while (tNode !== null) {\n ngDevMode && assertTNodeForLView(tNode, IView);\n ngDevMode
&&\n assertTNodeType(\n tNode,\n TNodeType.AnyRNode | TNodeType.AnyContainer |
TNodeType.Projection | TNodeType.Icu);\n const rawSlotValue = IView[tNode.index];\n const tNodeType =
tNode.type;\n if (isProjection) {\n if (action ===
WalkTNodeTreeAction.Create) {\n rawSlotValue && attachPatchData(unwrapRNode(rawSlotValue),
IView);\n tNode.flags |= TNodeFlags.isProjected;\n } \n } \n if ((tNode.flags & TNodeFlags.isDetached)
!== TNodeFlags.isDetached) {\n if (tNodeType & TNodeType.ElementContainer) {\n applyNodes(renderer,
action, tNode.child, IView, parentRElement, beforeNode, false);\n applyToElementOrContainer(action,
renderer, parentRElement, rawSlotValue, beforeNode);\n } else if (tNodeType & TNodeType.Icu) {\n const
nextRNode = icuContainerIterate(tNode as TIcuContainerNode, IView);\n let rNode: RNode|null;\n while
(rNode = nextRNode()) {\n applyToElementOrContainer(action, renderer, parentRElement, rNode,
beforeNode);\n } \n applyToElementOrContainer(action, renderer, parentRElement, rawSlotValue,
beforeNode);\n } else if (tNodeType & TNodeType.Projection) {\n applyProjectionRecursive(\n
renderer,
action, IView, tNode as TProjectionNode, parentRElement, beforeNode);\n } else {\n ngDevMode &&
assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.Container);\n applyToElementOrContainer(action,
renderer, parentRElement, rawSlotValue, beforeNode);\n } \n } \n\n tNode
= isProjection ? tNode.projectionNext : tNode.next;\n } \n}\n\n/**\n * `applyView` performs operation on the
view as specified in `action` (insert, detach, destroy)\n * \n * Inserting a view without projection or containers at top
level is simple. Just iterate over the\n * root nodes of the View, and for each node perform the `action`.\n * \n *
Things get more complicated with containers and projections. That is because coming across:\n * - Container:
implies that we have to insert/remove/destroy the views of that container as well\n * which in turn can have
their own Containers at the View roots.\n * - Projection: implies that we have to insert/remove/destroy the nodes of
the projection.\n * \n * The\n * complication is that the nodes we are projecting can themselves have Containers\n * or
other Projections.\n * \n * As you can see this is a very recursive problem. Yes recursion is not most efficient but
the\n * code is complicated enough that trying to implemented with recursion becomes unmaintainable.\n * \n *
@param tView The `TView` which needs to be inserted, detached, destroyed\n * @param IView The LView which
needs to be inserted, detached, destroyed.\n * @param renderer Renderer to use\n * @param action action to
perform (insert, detach, destroy)\n * @param parentRElement parent DOM element for insertion (Removal does not
need it).\n * @param beforeNode Before which node the insertions should happen.\n */\nfunction applyView(\n
tView: TView, IView: LView, renderer: Renderer, action: WalkTNodeTreeAction.Destroy,\n parentRElement:

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null, beforeNode: null): void;\nfunction applyView(\n  tView: TView, IView: LView, renderer: Renderer,
  action: WalkTreeNodeTreeAction,\n  parentRElement: RElement|null, beforeNode: RNode|null): void;\nfunction
applyView(\n  tView: TView, IView: LView, renderer: Renderer, action: WalkTreeNodeTreeAction,\n
parentRElement: RElement|null, beforeNode: RNode|null): void {\n  applyNodes(renderer, action, tView.firstChild,
IView, parentRElement, beforeNode, false);\n}\n\n/**\n * `applyProjection` performs operation on the projection.\n
*\n * Inserting a projection requires us to locate the projected nodes from the parent component. The\n *
complication is that those nodes themselves could be re-projected from their parent component.\n *\n * @param
tView The `TView` of `LView` which needs to be inserted, detached, destroyed\n * @param IView The `LView`
which needs to be inserted, detached, destroyed.\n * @param tProjectionNode node to project\n */\nexport function
applyProjection(tView: TView, IView: LView, tProjectionNode: TProjectionNode) {\n  const renderer =
IView[RENDERER];\n  const parentRNode
= getParentRElement(tView, tProjectionNode, IView);\n  const parentTNode = tProjectionNode.parent ||
IView[T_HOST]!;\n  let beforeNode = getInsertInFrontOfRNode(parentTNode, tProjectionNode, IView);\n
applyProjectionRecursive(\n    renderer, WalkTreeNodeTreeAction.Create, IView, tProjectionNode, parentRNode,
beforeNode);\n}\n\n/**\n * `applyProjectionRecursive` performs operation on the projection specified by `action`
(insert,\n * detach, destroy)\n *\n * Inserting a projection requires us to locate the projected nodes from the parent
component. The\n * complication is that those nodes themselves could be re-projected from their parent
component.\n *\n * @param renderer Render to use\n * @param action action to perform (insert, detach, destroy)\n
*\n * @param IView The LView which needs to be inserted, detached, destroyed.\n * @param tProjectionNode node to
project\n * @param parentRElement parent DOM element for insertion/removal.\n * @param beforeNode Before
which node the insertions
should happen.\n */\nfunction applyProjectionRecursive(\n  renderer: Renderer, action: WalkTreeNodeTreeAction,
IView: LView, tProjectionNode: TProjectionNode,\n  parentRElement: RElement|null, beforeNode: RNode|null)
{\n  const componentLView = IView[DECLARATION_COMPONENT_VIEW];\n  const componentNode =
componentLView[T_HOST] as TElementNode;\n  ngDevMode &&\n    assertEquals(typeof
tProjectionNode.projection, 'number', 'expecting projection index');\n  const nodeToProjectOrRNodes =
componentNode.projection![tProjectionNode.projection]!;\n  if (Array.isArray(nodeToProjectOrRNodes)) {\n    //
This should not exist, it is a bit of a hack. When we bootstrap a top level node and we\n    // need to support passing
projectable nodes, so we cheat and put them in the TNode\n    // of the Host TView. (Yes we put instance info at the
T Level). We can get away with it\n    // because we know that that TView is not shared and therefore it will not be a
problem.\n    // This should be refactored
and cleaned up.\n    for (let i = 0; i < nodeToProjectOrRNodes.length; i++) {\n      const rNode =
nodeToProjectOrRNodes[i];\n      applyToElementOrContainer(action, renderer, parentRElement, rNode,
beforeNode);\n    }\n  } else {\n    let nodeToProject: TNode|null = nodeToProjectOrRNodes;\n    const
projectedComponentLView = componentLView[PARENT] as LView;\n    applyNodes(\n      renderer, action,
nodeToProject, projectedComponentLView, parentRElement, beforeNode, true);\n    }\n}\n\n/**\n *
`applyContainer` performs an operation on the container and its views as specified by\n * `action` (insert, detach,
destroy)\n *\n * Inserting a Container is complicated by the fact that the container may have Views which\n *
themselves have containers or projections.\n *\n * @param renderer Renderer to use\n * @param action action to
perform (insert, detach, destroy)\n * @param IContainer The LContainer which needs to be inserted, detached,
destroyed.\n * @param parentRElement parent DOM
element for insertion/removal.\n * @param beforeNode Before which node the insertions should happen.\n
*/\nfunction applyContainer(\n  renderer: Renderer, action: WalkTreeNodeTreeAction, IContainer: LContainer,\n
parentRElement: RElement|null, beforeNode: RNode|null|undefined) {\n  ngDevMode &&
assertLContainer(IContainer);\n  const anchor = IContainer[NATIVE]; // LContainer has its own before node.\n
const native = unwrapRNode(IContainer);\n  // An LContainer can be created dynamically on any node by injecting
ViewContainerRef.\n  // Asking for a ViewContainerRef on an element will result in a creation of a separate
anchor\n  // node (comment in the DOM) that will be different from the LContainer's host node. In this\n  //

```

particular case we need to execute action on 2 nodes:\n // - container's host node (this is done in the executeActionOnElementOrContainer)\n // - container's host node (this is done here)\n if (anchor !== native) {\n // This is very strange to me (Misko).

I would expect that the native is same as anchor. I\n // don't see a reason why they should be different, but they are.\n //\n // If they are we need to process the second anchor as well.\n applyToElementOrContainer(action, renderer, parentRElement, anchor, beforeNode);\n } for (let i = CONTAINER\_HEADER\_OFFSET; i < lContainer.length; i++) {\n const lView = lContainer[i] as lView;\n applyView(lView[lVIEW], lView, renderer, action, parentRElement, anchor);\n }\n\n/\*\*\n \* Writes class/style to element.\n \* @param renderer Renderer to use.\n \* @param isClassBased `true` if it should be written to `class` (`false` to write to `style`)\n \* @param rNode The Node to write to.\n \* @param prop Property to write to. This would be the class/style name.\n \* @param value Value to write. If `null`/`undefined`/`false` this is considered a remove (set/add\n \* otherwise).\n \*/\nexport function applyStyling(\n renderer: Renderer, isClassBased: boolean, rNode: RElement, prop: string, value: any) {\n if (isClassBased) {\n // We actually want JS true/false here because any truthy value should add the class\n if (!value) {\n ngDevMode && ngDevMode.rendererRemoveClass++;\n renderer.removeClass(rNode, prop);\n } else {\n ngDevMode && ngDevMode.rendererAddClass++;\n renderer.addClass(rNode, prop);\n } } else {\n let flags = prop.indexOf('-') === -1 ? undefined : RendererStyleFlags2.DashCase as number;\n if (value === null /\*\* || value === undefined \*/) {\n ngDevMode && ngDevMode.rendererRemoveStyle++;\n renderer.removeStyle(rNode, prop, flags);\n } else {\n // A value is important if it ends with `!important`. The style\n // parser strips any semicolons at the end of the value.\n const isImportant = typeof value === 'string' ? value.endsWith('!important') : false;\n if (isImportant) {\n // !important has to be stripped from the value for it to be valid.\n value = value.slice(0, -10);\n flags |= RendererStyleFlags2.Important;\n }\n ngDevMode && ngDevMode.rendererSetStyle++;\n renderer.setStyle(rNode, prop, value, flags);\n } } }\n\n/\*\*\n \* Write `cssText` to `RElement`.\n \* This function does direct write without any reconciliation. Used for writing initial values, so\n \* that static styling values do not pull in the style parser.\n \* @param renderer Renderer to use\n \* @param element The element which needs to be updated.\n \* @param newValue The new class list to write.\n \*/\nexport function writeDirectStyle(renderer: Renderer, element: RElement, newValue: string) {\n ngDevMode && assertString(newValue, '\\`newValue\\` should be a string');\n renderer.setAttribute(element, 'style', newValue);\n ngDevMode && ngDevMode.rendererSetStyle++;\n }\n\n/\*\*\n \* Write `className` to `RElement`.\n \* This function does direct write without any reconciliation. Used for writing initial values, so\n \* that static styling values do not pull in the style parser.\n \* @param renderer Renderer to use\n \* @param element The element which needs to be updated.\n \* @param newValue The new class list to write.\n \*/\nexport function writeDirectClass(renderer: Renderer, element: RElement, newValue: string) {\n ngDevMode && assertString(newValue, '\\`newValue\\` should be a string');\n if (newValue === "") {\n // There are tests in `google3` which expect `element.getAttribute('class')` to be `null`.\n renderer.removeAttribute(element, 'class');\n } else {\n renderer.setAttribute(element, 'class', newValue);\n }\n ngDevMode && ngDevMode.rendererSetClassName++;\n }\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at\n \* https://angular.io/license\n \*/\n \* @fileoverview\n \* A module to facilitate use of a Trusted Types policy internally within\n \* Angular. It lazily

constructs the Trusted Types policy, providing helper\n \* utilities for promoting strings to Trusted Types. When Trusted Types are not\n \* available, strings are used as a fallback.\n \* @security All use of this module is security-sensitive and should go through\n \* security review.\n \*/\nimport {global} from './global';\nimport {TrustedHTML, TrustedScript, TrustedScriptURL, TrustedTypePolicy, TrustedTypePolicyFactory} from './trusted\_type\_defs';\n\n/\*\*\n \* The Trusted Types policy, or null if Trusted Types are not\n \* enabled/supported, or undefined if the policy has not been created yet.\n \*/\nlet policy: TrustedTypePolicy|null|undefined;\n\n/\*\*\n \* Returns the Trusted Types policy, or null if Trusted Types are not\n \* enabled/supported. The first call to this function will create the policy.\n \*/\nfunction getPolicy(): TrustedTypePolicy|null {\n if (policy === undefined) {\n



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policy = null;\n  if (global.trustedTypes) {\n    try {\n      policy = (global.trustedTypes
as TrustedTypePolicyFactory).createPolicy('angular', {\n      createHTML: (s: string) => s,\n      createScript:
(s: string) => s,\n      createScriptURL: (s: string) => s,\n    });\n    } catch {\n      // trustedTypes.createPolicy
throws if called with a name that is\n      // already registered, even in report-only mode. Until the API changes,\n      // catch the error not to break the applications functionally. In such\n      // cases, the code will fall back to using
strings.\n    }\n  }\n  return policy;\n}\n\n/**\n * Unsafely promote a string to a TrustedHTML, falling back
to strings when\n * Trusted Types are not available.\n * @security This is a security-sensitive function; any use of
this function\n * must go through security review. In particular, it must be assured that the\n * provided string will
never cause an XSS vulnerability if used in a context\n * that will be interpreted as HTML by a browser, e.g. when
assigning to\n * element.innerHTML.\n
*/\nexport function trustedHTMLFromString(html: string): TrustedHTML|string {\n  return
getPolicy()?.createHTML(html) || html;\n}\n\n/**\n * Unsafely promote a string to a TrustedScript, falling back to
strings when\n * Trusted Types are not available.\n * @security In particular, it must be assured that the provided
string will\n * never cause an XSS vulnerability if used in a context that will be\n * interpreted and executed as a
script by a browser, e.g. when calling eval.\n */\nexport function trustedScriptFromString(script: string):
TrustedScript|string {\n  return getPolicy()?.createScript(script) || script;\n}\n\n/**\n * Unsafely promote a string to a
TrustedScriptURL, falling back to strings\n * when Trusted Types are not available.\n * @security This is a
security-sensitive function; any use of this function\n * must go through security review. In particular, it must be
assured that the\n * provided string will never cause an XSS vulnerability if used in a context\n
* that will cause a browser to load and execute a resource, e.g. when\n * assigning to script.src.\n */\nexport
function trustedScriptURLFromString(url: string): TrustedScriptURL|string {\n  return
getPolicy()?.createScriptURL(url) || url;\n}\n\n/**\n * Unsafely call the Function constructor with the given string
arguments. It\n * is only available in development mode, and should be stripped out of\n * production code.\n *
@security This is a security-sensitive function; any use of this function\n * must go through security review. In
particular, it must be assured that it\n * is only called from development code, as use in production code can lead
to\n * XSS vulnerabilities.\n */\nexport function newTrustedFunctionForDev(...args: string[]): Function {\n  if
(typeof ngDevMode === 'undefined') {\n    throw new Error('newTrustedFunctionForDev should never be called in
production');\n  }\n  if (!global.trustedTypes) {\n    // In environments that don't support Trusted Types, fall back
to the most\n    // straightforward implementation:\n    return new Function(...args);\n  }\n  // Chrome currently
does not support passing TrustedScript to the Function\n  // constructor. The following implements the workaround
proposed on the page\n  // below, where the Chromium bug is also referenced:\n  //
https://github.com/w3c/webappsec-trusted-types/wiki/Trusted-Types-for-function-constructor\n  const fnArgs =
args.slice(0, -1).join(';');\n  const fnBody = args[args.length - 1];\n  const body = `(function
anonymous(${fnArgs}) { ${fnBody} })`;\n  // Using eval directly confuses the compiler and prevents this
module from\n  // being stripped out of JS binaries even if not used. The global['eval']\n  // indirection fixes that.\n  const fn = global['eval'](trustedScriptFromString(body) as string) as Function;\n  if (fn.bind === undefined) {\n    //
Workaround for a browser bug that only exists in Chrome 83, where passing\n    // a TrustedScript to eval just
returns the TrustedScript
back without\n    // evaluating it. In that case, fall back to the most straightforward\n    // implementation:\n    return
new Function(...args);\n  }\n  // To completely mimic the behavior of calling "new Function", two more\n  //
things need to happen:\n  // 1. Stringifying the resulting function should return its source code\n  fn.toString = () =>
body;\n  // 2. When calling the resulting function, `this` should refer to `global`\n  return fn.bind(global);\n}\n\nWhen Trusted Types support in Function constructors is widely available,\n // the implementation of this function
can be simplified to:\n // return new Function(...args.map(a => trustedScriptFromString(a)));\n}\n\n", "/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {RuntimeError,
RuntimeErrorCode} from '../errors';\nimport {getTemplateLocationDetails}

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from './render3/instructions/element_validation';\nimport {TNodeType} from './render3/interfaces/node';\nimport
{RComment, RElement} from './render3/interfaces/renderer_dom';\nimport {RENDERER} from
'./render3/interfaces/view';\nimport {nativeRemoveNode} from './render3/node_manipulation';\nimport {getLView,
getSelectedTNode} from './render3/state';\nimport {getNativeByTNode} from './render3/util/view_utils';\nimport
{trustedHTMLFromString} from './util/security/trusted_types';\n\n\n**\n * Validation function invoked at runtime
for each binding that might potentially\n * represent a security-sensitive attribute of an <iframe>.\n * See
`IFRAME_SECURITY_SENSITIVE_ATTRS` in the\n * `packages/compiler/src/schema/dom_security_schema.ts`
script for the full list\n * of such attributes.\n *\n * @codeGenApi\n */\nexport function
validateIframeAttribute(attrValue: any, tagName: string, attrName: string) {\n  const IView = getLView();\n  const
tNode = getSelectedTNode(!);\n  const
element = getNativeByTNode(tNode, IView) as RElement | RComment;\n\n  // Restrict any dynamic bindings of
security-sensitive attributes/properties\n  // on an <iframe> for security reasons.\n  if (tNode.type ===
TNodeType.Element && tagName.toLowerCase() === 'iframe') {\n    const iframe = element as
HTMLIFrameElement;\n\n    // Unset previously applied `src` and `srcdoc` if we come across a situation when\n    //
a security-sensitive attribute is set later via an attribute/property binding.\n    iframe.src = ";\n    iframe.srcdoc =
trustedHTMLFromString("") as unknown as string;\n\n    // Also remove the <iframe> from the document.\n    nativeRemoveNode(IView[RENDERER], iframe);\n\n    const errorMessage = ngDevMode &&\n      `Angular has
detected that the \\`${attrName}\\` was applied `+\n      `as a binding to an
<iframe>${getTemplateLocationDetails(IView)}. `+\n      `For security reasons, the \\`${attrName}\\` can be set
on an <iframe> `+\n      `as a
static attribute only. \\`+\n      `To fix this, switch the \\`${attrName}\\` binding to a static attribute `+\n
`in a template or in host bindings section.`;\n    throw new
RuntimeError(RuntimeErrorCode.UNSAFE_IFRAME_ATTRS, errorMessage);\n  }\n  return
attrValue;\n}\n\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n *\n * Most of the use of `document` in Angular is from within the DI system so it is possible to simply\n *
inject the `DOCUMENT` token and are done.\n *\n * Ivy is special because it does not rely upon the DI and must
get hold of the document some other\n * way.\n *\n * The solution is to define `getDocument()` and
`setDocument()` top-level functions for ivy.\n *\n * Wherever ivy needs the global document, it calls `getDocument()`
instead.\n *\n * When running ivy outside of a browser environment,
it is necessary to call `setDocument()` to\n * tell ivy what the global `document` is.\n *\n * Angular does this for us
in each of the standard platforms (`Browser`, `Server`, and `WebWorker`)\n * by calling `setDocument()` when
providing the `DOCUMENT` token.\n */\nlet DOCUMENT: Document|undefined = undefined;\n\n**\n * Tell ivy
what the `document` is for this platform.\n *\n * It is only necessary to call this if the current platform is not a
browser.\n *\n * @param document The object representing the global `document` in this environment.\n */\nexport
function setDocument(document: Document|undefined): void {\n  DOCUMENT = document;\n}\n\n**\n * Access
the object that represents the `document` for this platform.\n *\n * Ivy calls this whenever it needs to access the
`document` object.\n *\n * For example to create the renderer or to do sanitization.\n */\nexport function
getDocument(): Document {\n  if (DOCUMENT !== undefined) {\n    return DOCUMENT;\n  } else if (typeof
document
!== 'undefined') {\n    return document;\n  }\n  // No "document" can be found. This should only happen if we are
running ivy outside Angular and\n  // the current platform is not a browser. Since this is not a supported scenario at
the moment\n  // this should not happen in Angular apps.\n  // Once we support running ivy outside of Angular we
will need to publish `setDocument()` as a\n  // public API. Meanwhile we just return `undefined` and let the
application fail.\n  return undefined!;\n}\n\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n *\n * @fileoverview\n * A module to facilitate use of a Trusted Types policy
internally within\n * Angular specifically for bypassSecurityTrust* and custom sanitizers. It\n * lazily constructs the

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Trusted Types policy, providing helper utilities for\n * promoting strings to Trusted
Types. When Trusted Types are not available,\n * strings are used as a fallback.\n * @security All use of this
module is security-sensitive and should go through\n * security review.\n */\n\nimport {global} from
'./global';\nimport {TrustedHTML, TrustedScript, TrustedScriptURL, TrustedTypePolicy,
TrustedTypePolicyFactory} from './trusted_type_defs';\n\n/**\n * The Trusted Types policy, or null if Trusted
Types are not\n * enabled/supported, or undefined if the policy has not been created yet.\n */\nlet policy:
TrustedTypePolicy|null|undefined;\n\n/**\n * Returns the Trusted Types policy, or null if Trusted Types are not\n *
enabled/supported. The first call to this function will create the policy.\n */\nfunction getPolicy():
TrustedTypePolicy|null {\n  if (policy === undefined) {\n    policy = null;\n    if (global.trustedTypes) {\n      try {\n
        policy = (global.trustedTypes as TrustedTypePolicyFactory)\n          .createPolicy('angular#unsafe-bypass',
{\n
          createHTML: (s: string) => s,\n
          createScript: (s: string) => s,\n
          createScriptURL: (s: string) => s,\n
        });\n      } catch {\n        // trustedTypes.createPolicy throws if
called with a name that is\n        // already registered, even in report-only mode. Until the API changes,\n        //
catch the error not to break the applications functionally. In such\n        // cases, the code will fall back to using
strings.\n      }\n    }\n    return policy;\n  }\n\n  /**\n   * Unsafely promote a string to a TrustedHTML, falling back
to strings when\n   * Trusted Types are not available.\n   * @security This is a security-sensitive function; any use of
this function\n   * must go through security review. In particular, it must be assured that it\n   * is only passed strings
that come directly from custom sanitizers or the\n   * bypassSecurityTrust* functions.\n   */\n  export function
trustedHTMLFromStringBypass(html: string): TrustedHTML|string
  {\n    return getPolicy()?.createHTML(html) || html;\n  }\n\n  /**\n   * Unsafely promote a string to a TrustedScript,
falling back to strings when\n   * Trusted Types are not available.\n   * @security This is a security-sensitive function;
any use of this function\n   * must go through security review. In particular, it must be assured that it\n   * is only
passed strings that come directly from custom sanitizers or the\n   * bypassSecurityTrust* functions.\n   */\n  export
function trustedScriptFromStringBypass(script: string): TrustedScript|string {\n    return
getPolicy()?.createScript(script) || script;\n  }\n\n  /**\n   * Unsafely promote a string to a TrustedScriptURL, falling
back to strings\n   * when Trusted Types are not available.\n   * @security This is a security-sensitive function; any use
of this function\n   * must go through security review. In particular, it must be assured that it\n   * is only passed
strings that come directly from custom sanitizers or the\n   * bypassSecurityTrust* functions.\n   */\n  export function
trustedScriptURLFromStringBypass(url: string): TrustedScriptURL|string {\n    return
getPolicy()?.createScriptURL(url) || url;\n  }\n\n  /**\n   * @license\n   * Copyright Google LLC All Rights Reserved.\n   *
\n   * Use of this source code is governed by an MIT-style license that can be\n   * found in the LICENSE file at
https://angular.io/license\n   */\n  export const enum BypassType {\n    Url = 'URL',\n    Html = 'HTML',\n    ResourceUrl = 'ResourceURL',\n    Script = 'Script',\n    Style = 'Style',\n  }\n\n  /**\n   * Marker interface for a value that's
safe to use in a particular context.\n   * @publicApi\n   */\n  export interface SafeValue {} \n\n  /**\n   * Marker
interface for a value that's safe to use as HTML.\n   * @publicApi\n   */\n  export interface SafeHtml extends
SafeValue {} \n\n  /**\n   * Marker interface for a value that's safe to use as style (CSS).\n   * @publicApi\n   */\n
  export interface SafeStyle extends SafeValue {} \n\n  /**\n   * Marker interface for a value that's safe to use
as JavaScript.\n   * @publicApi\n   */\n  export interface SafeScript extends SafeValue {} \n\n  /**\n   * Marker
interface for a value that's safe to use as a URL linking to a document.\n   * @publicApi\n   */\n  export interface
SafeUrl extends SafeValue {} \n\n  /**\n   * Marker interface for a value that's safe to use as a URL to load executable
code from.\n   * @publicApi\n   */\n  export interface SafeResourceUrl extends SafeValue {} \n\n  \n  abstract class
SafeValueImpl implements SafeValue {\n    constructor(public changingThisBreaksApplicationSecurity: string)
{\n    }\n\n    abstract getTypeName(): string;\n\n    toString() {\n      return `SafeValue must use [property]=binding:
${this.changingThisBreaksApplicationSecurity}` +\n        ` (see https://g.co/ng/security#xss)`;\n    }\n  }\n\n  class
SafeHtmlImpl extends SafeValueImpl implements SafeHtml {\n    override getTypeName() {\n      return
BypassType.Html;\n    }\n  }\n\n  class SafeStyleImpl extends SafeValueImpl implements SafeStyle {\n    override
getTypeName() {\n

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    return BypassType.Style;\n } }\n\nclass SafeScriptImpl extends SafeValueImpl implements SafeScript {\n
    override getTypeName() {\n    return BypassType.Script;\n } }\n\nclass SafeUrlImpl extends SafeValueImpl
    implements SafeUrl {\n    override getTypeName() {\n    return BypassType.Url;\n } }\n\nclass SafeResourceUrlImpl
    extends SafeValueImpl implements SafeResourceUrl {\n    override getTypeName() {\n    return
    BypassType.ResourceUrl;\n } }\n\nexport function unwrapSafeValue(value: SafeValue): string;\nexport function
    unwrapSafeValue<T>(value: T): T;\nexport function unwrapSafeValue<T>(value: T|SafeValue): T {\n    return value
    instanceof SafeValueImpl ? value.changingThisBreaksApplicationSecurity as any as T :\n
    value as any as T;\n}\n\nexport function allowSanitizationBypassAndThrow(\n    value: any, type:
    BypassType.Html): value is SafeHtml;\nexport function allowSanitizationBypassAndThrow(\n    value: any, type:
    BypassType.ResourceUrl): value
    is SafeResourceUrl;\nexport function allowSanitizationBypassAndThrow(\n    value: any, type:
    BypassType.Script): value is SafeScript;\nexport function allowSanitizationBypassAndThrow(\n    value: any, type:
    BypassType.Style): value is SafeStyle;\nexport function allowSanitizationBypassAndThrow(value: any, type:
    BypassType.Url): value is SafeUrl;\nexport function allowSanitizationBypassAndThrow(value: any, type:
    BypassType): boolean;\nexport function allowSanitizationBypassAndThrow(value: any, type: BypassType):
    boolean {\n    const actualType = getSanitizationBypassType(value);\n    if (actualType !== null && actualType !==
    type) {\n        // Allow ResourceURLs in URL contexts, they are strictly more trusted.\n        if (actualType ===
    BypassType.ResourceUrl && type === BypassType.Url) return true;\n        throw new Error(\n            `Required a safe
    ${type}, got a ${actualType} (see https://g.co/ng/security#xss)`);\n    }\n    return actualType === type;\n}\n\nexport
    function getSanitizationBypassType(value:
    any): BypassType|null {\n    return value instanceof SafeValueImpl && value.getTypeName() as BypassType ||
    null;\n}\n\n/**\n * Mark `html` string as trusted.\n *\n * This function wraps the trusted string in `String` and brands
    it in a way which makes it\n * recognizable to {@link htmlSanitizer} to be trusted implicitly.\n *\n * @param
    trustedHtml `html` string which needs to be implicitly trusted.\n *\n * @returns a `html` which has been branded to be
    implicitly trusted.\n */\nexport function bypassSanitizationTrustHtml(trustedHtml: string): SafeHtml {\n    return new
    SafeHtmlImpl(trustedHtml);\n}\n\n/**\n * Mark `style` string as trusted.\n *\n * This function wraps the trusted string
    in `String` and brands it in a way which makes it\n * recognizable to {@link styleSanitizer} to be trusted
    implicitly.\n *\n * @param trustedStyle `style` string which needs to be implicitly trusted.\n *\n * @returns a `style`
    hich has been branded to be implicitly trusted.\n */\nexport function bypassSanitizationTrustStyle(trustedStyle:
    string): SafeStyle {\n    return new SafeStyleImpl(trustedStyle);\n}\n\n/**\n * Mark `script` string as trusted.\n *\n *
    This function wraps the trusted string in `String` and brands it in a way which makes it\n * recognizable to {@link
    scriptSanitizer} to be trusted implicitly.\n *\n * @param trustedScript `script` string which needs to be implicitly
    trusted.\n *\n * @returns a `script` which has been branded to be implicitly trusted.\n */\nexport function
    bypassSanitizationTrustScript(trustedScript: string): SafeScript {\n    return new
    SafeScriptImpl(trustedScript);\n}\n\n/**\n * Mark `url` string as trusted.\n *\n * This function wraps the trusted string
    in `String` and brands it in a way which makes it\n * recognizable to {@link urlSanitizer} to be trusted implicitly.\n
    *\n * @param trustedUrl `url` string which needs to be implicitly trusted.\n *\n * @returns a `url` which has been
    branded to be implicitly trusted.\n */\nexport function bypassSanitizationTrustUrl(trustedUrl:
    string): SafeUrl {\n    return new SafeUrlImpl(trustedUrl);\n}\n\n/**\n * Mark `url` string as trusted.\n *\n * This
    function wraps the trusted string in `String` and brands it in a way which makes it\n * recognizable to {@link
    resourceUrlSanitizer} to be trusted implicitly.\n *\n * @param trustedResourceUrl `url` string which needs to be
    implicitly trusted.\n *\n * @returns a `url` which has been branded to be implicitly trusted.\n */\nexport function
    bypassSanitizationTrustResourceUrl(trustedResourceUrl: string): SafeResourceUrl {\n    return new
    SafeResourceUrlImpl(trustedResourceUrl);\n}\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
    Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
    LICENSE file at https://angular.io/license\n */\n\nimport { trustedHTMLFromstring } from
    './util/security/trusted_types';\n\n/**\n * This helper is used to get hold of an inert tree of DOM elements containing
    dirty HTML\n * that needs sanitizing.\n

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* Depending upon browser support we use one of two strategies for doing this.\n * Default: DOMParser strategy\n
* Fallback: InertDocument strategy\n *^nextor function getInertBodyHelper(defaultDoc: Document):
InertBodyHelper {\n  const inertDocumentHelper = new InertDocumentHelper(defaultDoc);\n  return
isDOMParserAvailable() ? new DOMParserHelper(inertDocumentHelper) : inertDocumentHelper;\n}\n\nnextor
interface InertBodyHelper {\n /**\n * Get an inert DOM element containing DOM created from the dirty HTML
string provided.\n */\n getInertBodyElement(html: string) => HTMLElement | null;\n}\n\n/**\n * Uses
DOMParser to create and fill an inert body element.\n * This is the default strategy used in browsers that support
it.\n */\n\nclass DOMParserHelper implements InertBodyHelper {\n  constructor(private inertDocumentHelper:
InertBodyHelper) {\n\n  getInertBodyElement(html: string): HTMLElement|null {\n // We add these extra
elements to ensure that the rest of the
content is parsed as expected\n // e.g. leading whitespace is maintained and tags like `` do not get hoisted
to the\n // `` tag. Note that the `` tag is closed implicitly to prevent unclosed tags\n // in `html`
from consuming the otherwise explicit `` tag.\n  html = '<body><remove></remove>' + html;\n  try {\n
const body = new window.DOMParser()\n                .parseFromString(trustedHTMLFromString(html) as string,
'text/html')\n                .body as HTMLBodyElement;\n    if (body === null) {\n // In some browsers (e.g.
Mozilla/5.0 iPad AppleWebKit Mobile) the `body` property only\n // becomes available in the following tick of
the JS engine. In that case we fall back to\n // the `inertDocumentHelper` instead.\n    return
this.inertDocumentHelper.getInertBodyElement(html);\n  }\n  body.removeChild(body.firstChild!);\n  return
body;\n } catch {\n  return null;\n }\n }\n}\n\n/**\n
* Use an HTML5 `template` element, if supported, or an inert body element created via\n * `createHTMLDocument`
to create and fill an inert DOM element.\n * This is the fallback strategy if the browser does not support
DOMParser.\n */\n\nclass InertDocumentHelper implements InertBodyHelper {\n  private inertDocument:
Document;\n\n  constructor(private defaultDoc: Document) {\n  this.inertDocument =
this.defaultDoc.implementation.createHTMLDocument('sanitization-inert');\n\n  if (this.inertDocument.body ==
null) {\n // usually there should be only one body element in the document, but IE doesn't have any, so\n // we
need to create one.\n    const inertHtml = this.inertDocument.createElement('html');\n
this.inertDocument.appendChild(inertHtml);\n    const inertBodyElement =
this.inertDocument.createElement('body');\n    inertHtml.appendChild(inertBodyElement);\n  }\n }\n\n  getInertBodyElement(html: string): HTMLElement|null {\n // Prefer using <template>
element if supported.\n  const templateEl = this.inertDocument.createElement('template');\n  if ('content' in
templateEl) {\n    templateEl.innerHTML = trustedHTMLFromString(html) as string;\n    return templateEl;\n  }\n\n  // Note that previously we used to do something like `this.inertDocument.body.innerHTML = html`\n //
and we returned the inert `body` node. This was changed, because IE seems to treat setting\n // `innerHTML` on
an inserted element differently, compared to one that hasn't been inserted\n // yet. In particular, IE appears to split
some of the text into multiple text nodes rather\n // than keeping them in a single one which ends up messing with
Ivy's i18n parsing further\n // down the line. This has been worked around by creating a new inert `body` and
using it as\n // the root node in which we insert the HTML.\n  const inertBody =
this.inertDocument.createElement('body');\n  inertBody.innerHTML = trustedHTMLFromString(html) as
string;\n\n  // Support: IE 11 only\n // strip custom-namespaced attributes on IE<=11\n  if ((this.defaultDoc as
any).documentMode) {\n    this.stripCustomNsAttrs(inertBody);\n  }\n\n  return inertBody;\n }\n\n /**\n
* When IE11 comes across an unknown namespaced attribute e.g. 'xlink:foo' it adds 'xmlns:ns1'\n * attribute to
declare ns1 namespace and prefixes the attribute with 'ns1' (e.g.\n * 'ns1:xlink:foo').\n * This is undesirable
since we don't want to allow any of these custom attributes. This method\n * strips them all.\n */\n\n private
stripCustomNsAttrs(el: Element) {\n  const elAttrs = el.attributes;\n  // loop backwards so that we can support
removals.\n  for (let i = elAttrs.length - 1; 0 < i; i--) {\n    const attrib = elAttrs.item(i);\n    const attrName =
attrib!.name;\n    if (attrName === 'xmlns:ns1' || attrName.indexOf('ns1:') === 0) {\n
el.removeAttribute(attrName);\n    }\n  }\n  let childNode = el.firstChild as Node

```



```

'bdi,bdo,big,br,cite,code,del,dfn,em,font,i,img,ins,kbd,label,map,mark,picture,q,ruby,rp,rt,s,' +\n
'samp,small,source,span,strike,strong,sub,sup,time,track,tt,u,var,video'));\n\nexport
const VALID_ELEMENTS =\n  merge(VOID_ELEMENTS, BLOCK_ELEMENTS, INLINE_ELEMENTS,
OPTIONAL_END_TAG_ELEMENTS);\n\n// Attributes that have href and hence need to be sanitized\nexport const
URI_ATTRS = tagSet('background,cite,href,itemtype,longdesc,poster,src,xlink:href');\n\nconst HTML_ATTRS =
tagSet(\n
'abbr,accesskey,align,alt,autoplay,axis,bgcolor,border,cellpadding,cellspacing,class,clear,color,cols,colspan,' +\n
'compact,controls,coords,datetime,default,dir,download,face,headers,height,hidden,hreflang,hspace,' +\n
'ismap,itemscope,itemprop,kind,label,lang,language,loop,media,muted,nohref,nowrap,open,preload,rel,rev,role,rows
, rowspan, rules,' +\n
'scope,scrolling,shape,size,sizes,span,srclang,srcset,start,summary,tabindex,target,title,translate,type,usemap,' +\n
'valign,value,vspace,width');\n\n// Accessibility attributes as per WAI-ARIA 1.1 (W3C Working Draft 14 December
2018)\nconst ARIA_ATTRS = tagSet(\n  'aria-activedescendant,aria-atomic,aria-autocomplete,aria-busy,aria-
checked,aria-colcount,aria-colindex,'
+\n  'aria-colspan,aria-controls,aria-current,aria-describedby,aria-details,aria-disabled,aria-dropeffect,' +\n  'aria-
errormessage,aria-expanded,aria-flowto,aria-grabbed,aria-haspopup,aria-hidden,aria-invalid,' +\n  'aria-
keyshortcuts,aria-label,aria-labelledby,aria-level,aria-live,aria-modal,aria-multiline,' +\n  'aria-
multiselectable,aria-orientation,aria-owns,aria-placeholder,aria-posinset,aria-pressed,aria-readonly,' +\n  'aria-relevant,aria-
required,aria-roledescription,aria-rowcount,aria-rowindex,aria-rowspan,aria-selected,' +\n  'aria-setsize,aria-
sort,aria-valuemax,aria-valuemin,aria-valuenow,aria-valuetext');\n\n// NB: This currently consciously doesn't
support SVG. SVG sanitization has had several security\n// issues in the past, so it seems safer to leave it out if
possible. If support for binding SVG via\n// innerHTML is required, SVG attributes should be added here.\n\n//
NB: Sanitization does not allow <form> elements or other active elements (<button> etc). Those\n// can be
sanitized, but they increase security surface area without a legitimate use case, so they\n// are left out here.\n\nexport
const VALID_ATTRS = merge(URI_ATTRS, HTML_ATTRS, ARIA_ATTRS);\n\n// Elements whose content
should not be traversed/preserved, if the elements themselves are invalid.\n\n// Typically, `<invalid>Some
content</invalid>` would traverse (and in this case preserve)\n// `Some content`, but strip `invalid-element`
opening/closing tags. For some elements, though, we\n// don't want to preserve the content, if the elements
themselves are going to be removed.\nconst SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS =
tagSet('script,style,template');\n\n/**\n * SanitizingHtmlSerializer serializes a DOM fragment, stripping out any
unsafe elements and unsafe\n * attributes.\n *\n * class SanitizingHtmlSerializer {\n // Explicitly track if something
was stripped, to avoid accidentally
warning of sanitization just\n // because characters were re-encoded.\n public sanitizedSomething = false;\n
private buf: string[] = [];\n\n sanitizeChildren(el: Element): string {\n // This cannot use a TreeWalker, as it has to
run on Angular's various DOM adapters.\n // However this code never accesses properties off of `document`
before deleting its contents\n // again, so it shouldn't be vulnerable to DOM clobbering.\n let current: Node =
el.firstChild!;\n let traverseContent = true;\n while (current) {\n if (current.nodeType ===
Node.ELEMENT_NODE) {\n traverseContent = this.startElement(current as Element);\n } else if
(current.nodeType === Node.TEXT_NODE) {\n this.chars(current.nodeValue!);\n } else {\n // Strip
non-element, non-text nodes.\n this.sanitizedSomething = true;\n }\n if (traverseContent &&
current.firstChild) {\n current = current.firstChild!;\n continue;\n }\n while
(current) {\n // Leaving the element. Walk up and to the right, closing tags as we go.\n if (current.nodeType
=== Node.ELEMENT_NODE) {\n this.endElement(current as Element);\n }\n\n let next =
this.checkClobberedElement(current, current.nextSibling!);\n\n if (next) {\n current = next;\n
break;\n }\n\n current = this.checkClobberedElement(current, current.parentNode!);\n }\n }\n return
this.buf.join('');\n }\n\n /**\n * Sanitizes an opening element tag (if valid) and returns whether the element's
contents should\n * be traversed. Element content must always be traversed (even if the element itself is not\n *
valid/safe), unless the element is one of `SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS`. \n *\n

```

```

* @param element The element to sanitize.\n
* @return True if the element's contents should be traversed.\n
*/\n
private startElement(element: Element): boolean {\n
  const tagName =\n
    element.nodeName.toLowerCase();\n
  if (!VALID_ELEMENTS.hasOwnProperty(tagName)) {\n
    this.sanitizedSomething = true;\n
    return\n
    !SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS.hasOwnProperty(tagName);\n
  }\n
  this.buf.push('<');\n
  this.buf.push(tagName);\n
  const elAttrs = element.attributes;\n
  for (let i = 0; i <\n
    elAttrs.length; i++) {\n
    const elAttr = elAttrs.item(i);\n
    const attrName = elAttr!.name;\n
    const lower =\n
    attrName.toLowerCase();\n
    if (!VALID_ATTRS.hasOwnProperty(lower)) {\n
      this.sanitizedSomething =\n
      true;\n
      continue;\n
    }\n
    let value = elAttr!.value;\n
    // TODO(martinprobst): Special case image URIs for\n
    data:image/...\n
    if (URI_ATTRS[lower]) value = _sanitizeUrl(value);\n
    this.buf.push(' ', attrName, '='\n
    encodeEntities(value), '\"');\n
  }\n
  this.buf.push('>');\n
  return true;\n
}\n\n
private endElement(current:\n
Element) {\n
  const tagName = current.nodeName.toLowerCase();\n
  if\n
  (VALID_ELEMENTS.hasOwnProperty(tagName)\n
  && !VOID_ELEMENTS.hasOwnProperty(tagName)) {\n
    this.buf.push('</');\n
    this.buf.push(tagName);\n
    this.buf.push('>');\n
  }\n
}\n\n
private chars(chars: string) {\n
  this.buf.push(encodeEntities(chars));\n
}\n\n
checkClobberedElement(node: Node, nextNode: Node): Node {\n
  if (nextNode &&\n
  (node.compareDocumentPosition(nextNode) &\n
  Node.DOCUMENT_POSITION_CONTAINED_BY)\n
  === Node.DOCUMENT_POSITION_CONTAINED_BY) {\n
    throw new Error('Failed to sanitize html because\n
    the element is clobbered: ${\n
    (node as Element).outerHTML}`);\n
  }\n
  return nextNode;\n
}\n\n
//\n
Regular Expressions for parsing tags and attributes\n
const SURROGATE_PAIR_REGEXP = /[\u00D800-\n
\u00DBFF][\u00DC00-\u00DFFF]/g;\n
// ! to ~ is the ASCII range.\n
const NON_ALPHANUMERIC_REGEXP = /([^\n
#-\n
~ !])/g;\n
//\n
**\n
* Escapes all potentially dangerous characters, so that the\n
* resulting string can be safely inserted\n
into attribute or\n
* element\n
text.\n
* @param value\n
*/\n
function encodeEntities(value: string) {\n
  return value.replace(/&/g, '&amp;')\n
.replace(\n
  SURROGATE_PAIR_REGEXP,\n
  function(match: string) {\n
    const hi =\n
    match.charCodeAt(0);\n
    const low = match.charCodeAt(1);\n
    return '&#'+ (((hi - 0xD800) * 0x400) +\n
    (low - 0xDC00) * 0x1000) + ';' +\n
    ');\n
  })\n
.replace(\n
  NON_ALPHANUMERIC_REGEXP,\n
  function(match: string) {\n
    return '&#'+ match.charCodeAt(0) + ';' +\n
    ');\n
  })\n
.replace(/</g, '&lt;')\n
.replace(/>/g, '&gt;');\n
}\n\n
let inertBodyHelper: InertBodyHelper;\n
//\n
**\n
* Sanitizes the given unsafe, untrusted\n
HTML fragment, and returns HTML text that is safe to add to\n
* the DOM in a browser environment.\n
*/\n
export\n
function _sanitizeHtml(defaultDoc: any, unsafeHtmlInput: string): TrustedHTML|string {\n
  let inertBodyElement:\n
  HTMLElement|null = null;\n
  try {\n
    inertBodyHelper = inertBodyHelper\n
    || getInertBodyHelper(defaultDoc);\n
    // Make sure unsafeHtml is actually a string (TypeScript types are not\n
    enforced at runtime).\n
    let unsafeHtml = unsafeHtmlInput ? String(unsafeHtmlInput) : '';\n
    inertBodyElement =\n
    inertBodyHelper.getInertBodyElement(unsafeHtml);\n
    // mXSS protection. Repeatedly parse the document to\n
    make sure it stabilizes, so that a browser\n
    // trying to auto-correct incorrect HTML cannot cause formerly inert\n
    HTML to become dangerous.\n
    let mXSSAttempts = 5;\n
    let parsedHtml = unsafeHtml;\n
    do {\n
      if\n
      (mXSSAttempts === 0) {\n
        throw new Error('Failed to sanitize html because the input is unstable');\n
      }\n
      mXSSAttempts--;\n
      unsafeHtml = parsedHtml;\n
      parsedHtml = inertBodyElement!.innerHTML;\n
      inertBodyElement = inertBodyHelper.getInertBodyElement(unsafeHtml);\n
    } while (unsafeHtml !==\n
    parsedHtml);\n
    const sanitizer = new SanitizingHtmlSerializer();\n
    const safeHtml =\n
    sanitizer.sanitizeChildren(\n
    getTemplateContent(inertBodyElement!) as Element | inertBodyElement);\n
    if ((typeof ngDevMode ===\n
    'undefined' || ngDevMode) && sanitizer.sanitizedSomething) {\n
      console.warn(\n
      'WARNING: sanitizing\n
      HTML stripped some content, see https://g.co/ng/security#xss');\n
    }\n
    return\n
    trustedHTMLFromString(safeHtml);\n
  } finally {\n
    // In case anything goes wrong, clear out inertElement to reset\n
    the entire DOM structure.\n
    if (inertBodyElement) {\n
      const parent = getTemplateContent(inertBodyElement) ||\n
      inertBodyElement;\n
      while (parent.firstChild) {\n
        parent.removeChild(parent.firstChild);\n
      }\n
    }\n
  }\n
}

```



```

}\n}\n\nexport function getTemplateContent(el: Node): Node|null {\n  return 'content' in (el as any /**
Microsoft/TypeScript#21517 */) && isTemplateElement(el) ?\n    el.content :\n    null;\n}\n\nfunction
isTemplateElement(el: Node): el is HTMLTemplateElement {\n  return el.nodeType === Node.ELEMENT_NODE
&& el.nodeName ===
  'TEMPLATE';\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n/**\n * A SecurityContext marks a location that has dangerous security implications, e.g. a DOM property\n *
like `innerHTML` that could cause Cross Site Scripting (XSS) security bugs when improperly\n * handled.\n * \n *
See DomSanitizer for more details on security in Angular applications.\n * \n * @publicApi\n */\n\nexport enum
SecurityContext {\n  NONE = 0,\n  HTML = 1,\n  STYLE = 2,\n  SCRIPT = 3,\n  URL = 4,\n  RESOURCE_URL =
5,\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport { RuntimeError, RuntimeErrorCode } from './errors';\nimport { getDocument } from
'./render3/interfaces/document';\nimport
  { SANITIZER } from './render3/interfaces/view';\nimport { getLView } from './render3/state';\nimport
  { renderStringify } from './render3/util/stringify_utils';\nimport { TrustedHTML, TrustedScript, TrustedScriptURL }
from './util/security/trusted_type_defs';\nimport { trustedHTMLFromString, trustedScriptURLFromString } from
'./util/security/trusted_types';\nimport { trustedHTMLFromStringBypass, trustedScriptFromStringBypass,
trustedScriptURLFromStringBypass } from './util/security/trusted_types_bypass';\nimport
  { allowSanitizationBypassAndThrow, BypassType, unwrapSafeValue } from './bypass';\nimport { _sanitizeHtml as
_sanitizeHtml } from './html_sanitizer';\nimport { Sanitizer } from './sanitizer';\nimport { SecurityContext } from
'./security';\nimport { _sanitizeUrl as _sanitizeUrl } from './url_sanitizer';\n\n\n/**\n * An `html` sanitizer which
converts untrusted `html` **string** into trusted string by removing\n * dangerous content.\n * \n * This method
parses the `html` and locates
  potentially dangerous content (such as urls and\n * javascript) and removes it.\n * \n * It is possible to mark a string
as trusted by calling { @link bypassSanitizationTrustHtml }.\n * \n * @param unsafeHtml untrusted `html`, typically
from the user.\n * @returns `html` string which is safe to display to user, because all of the dangerous javascript\n *
and urls have been removed.\n * \n * @codeGenApi\n */\n\nexport function sanitizeHtml(unsafeHtml: any):
TrustedHTML|string {\n  const sanitizer = getSanitizer();\n  if (sanitizer) {\n    return
trustedHTMLFromStringBypass(sanitizer.sanitize(SecurityContext.HTML, unsafeHtml) || "");\n  }\n  if
  (allowSanitizationBypassAndThrow(unsafeHtml, BypassType.Html)) {\n    return
trustedHTMLFromStringBypass(unwrapSafeValue(unsafeHtml));\n  }\n  return _sanitizeHtml(getDocument(),
renderStringify(unsafeHtml));\n}\n\n\n/**\n * A `style` sanitizer which converts untrusted `style` **string** into
trusted string by removing\n * dangerous content.\n * \n * It
  is possible to mark a string as trusted by calling { @link bypassSanitizationTrustStyle }.\n * \n * @param unsafeStyle
untrusted `style`, typically from the user.\n * @returns `style` string which is safe to bind to the `style` properties.\n
*\n * @codeGenApi\n */\n\nexport function sanitizeStyle(unsafeStyle: any): string {\n  const sanitizer =
getSanitizer();\n  if (sanitizer) {\n    return sanitizer.sanitize(SecurityContext.STYLE, unsafeStyle) || "";}\n  if
  (allowSanitizationBypassAndThrow(unsafeStyle, BypassType.Style)) {\n    return unwrapSafeValue(unsafeStyle);\n  }\n
  return renderStringify(unsafeStyle);\n}\n\n\n/**\n * A `url` sanitizer which converts untrusted `url` **string**
into trusted string by removing\n * dangerous\n * content.\n * \n * This method parses the `url` and locates
  potentially dangerous content (such as javascript) and\n * removes it.\n * \n * It is possible to mark a string as trusted
by calling { @link bypassSanitizationTrustUrl }.\n * \n * @param unsafeUrl untrusted
`url`, typically from the user.\n * @returns `url` string which is safe to bind to the `src` properties such as `

```

`_sanitizeUrl(renderStringify(unsafeUrl));`  
 A `url` sanitizer which only lets trusted `url`'s through.  
 This passes only `url`'s marked trusted by calling `{ @link bypassSanitizationTrustResourceUrl }`.  
 @param unsafeResourceUrl untrusted `url`, typically from the user.  
 @returns `url` string which is safe to bind to the `src` properties such as `<img src>`, because only trusted `url`'s have been allowed to pass.  
 @codeGenApi  
 \*/  
 export

```
function sanitizeResourceUrl(unsafeResourceUrl: any): TrustedScriptURL|string {
  const sanitizer = getSanitizer();
  if (sanitizer) {
    return trustedScriptURLFromStringBypass(
      sanitizer.sanitize(SecurityContext.RESOURCE_URL, unsafeResourceUrl) || "");
  }
  if (allowSanitizationBypassAndThrow(unsafeResourceUrl, BypassType.ResourceUrl)) {
    return trustedScriptURLFromStringBypass(unwrapSafeValue(unsafeResourceUrl));
  }
  throw new RuntimeError(
    RuntimeErrorCode.UNSAFE_VALUE_IN_RESOURCE_URL,
    ngDevMode && 'unsafe value used in a resource URL context (see https://g.co/ng/security#xss);
```

A `script` sanitizer which only lets trusted javascript through.  
 This passes only `script`'s marked trusted by calling `{ @link bypassSanitizationTrustScript }`.  
 @param unsafeScript untrusted `script`, typically from the user.  
 @returns `url` string which is safe to bind to the `<script>` element such as `<img src>`,  
 because only trusted `scripts` have been allowed to pass.  
 @codeGenApi  
 \*/  
 export function

```
sanitizeScript(unsafeScript: any): TrustedScript|string {
  const sanitizer = getSanitizer();
  if (sanitizer) {
    return trustedScriptFromStringBypass(
      sanitizer.sanitize(SecurityContext.SCRIPT, unsafeScript) || "");
  }
  if (allowSanitizationBypassAndThrow(unsafeScript, BypassType.Script)) {
    return trustedScriptFromStringBypass(unwrapSafeValue(unsafeScript));
  }
  throw new RuntimeError(
    RuntimeErrorCode.UNSAFE_VALUE_IN_SCRIPT,
    ngDevMode && 'unsafe value used in a script context');
```

A template tag function for promoting the associated constant literal to a TrustedHTML.  
 Interpolation is explicitly not allowed.  
 @param html constant template literal containing trusted HTML.  
 @returns TrustedHTML wrapping `html`.  
 @security This is a security-sensitive function and should only be used to  
 convert constant values

of attributes and properties found in application-provided Angular templates to TrustedHTML.  
 @codeGenApi  
 \*/  
 export function trustConstantHtml(html: TemplateStringsArray): TrustedHTML|string {  
 // The following runtime check ensures that the function was called as a  
 // template tag (e.g. `trustConstantHtml`content``), without any interpolation  
 // (e.g. `not trustConstantHtml`content ${variable}``). A  
 TemplateStringsArray  
 // is an array with a `raw` property that is also an array. The associated  
 // template literal has no interpolation if and only if the length of the  
 // TemplateStringsArray is 1.  
 if (ngDevMode && (!Array.isArray(html) || !Array.isArray(html.raw) || html.length !== 1)) {  
 throw new Error(`Unexpected interpolation in trusted HTML constant: \${html.join('?')}`);  
 }  
 return

```
trustedHTMLFromString(html[0]);
```

A template tag function for promoting the associated constant literal to a TrustedScriptURL. Interpolation is explicitly not allowed.  
 @param url constant template literal containing a trusted script URL.  
 @returns TrustedScriptURL wrapping `url`.  
 @security This is a security-sensitive function and should only be used to  
 convert constant values of attributes and properties found in application-provided Angular templates to TrustedScriptURL.  
 @codeGenApi  
 \*/  
 export function trustConstantResourceUrl(url: TemplateStringsArray): TrustedScriptURL|string {  
 // The following runtime check ensures that the function was called as a  
 // template tag (e.g. `trustConstantResourceUrl`content``), without any  
 // interpolation (e.g. `not trustConstantResourceUrl`content ${variable}``). A  
 // TemplateStringsArray is an array with a `raw` property that is also an  
 // array. The associated template literal has no interpolation if and only if  
 // the length of the  
 TemplateStringsArray is 1.  
 if (ngDevMode && (!Array.isArray(url) || !Array.isArray(url.raw) || url.length !== 1)) {  
 throw new Error(`Unexpected interpolation in trusted URL constant: \${url.join('?')}`);  
 }  
 return trustedScriptURLFromString(url[0]);

Detects which sanitizer to use for URL property, based on tag name and prop name.  
 The rules are based on the RESOURCE\_URL context config from  
 `packages/compiler/src/schema/dom\_security\_schema.ts`.  
 If tag and prop names don't match Resource URL

```

schema, use URL sanitizer.\n *\nexport function getUrlSanitizer(tag: string, prop: string) {\n  if ((prop === 'src' &&\n    (tag === 'embed' || tag === 'frame' || tag === 'iframe' || tag === 'media' ||\n      tag === 'script')) ||\n    (prop === 'href' && (tag === 'base' || tag === 'link')))\n    return sanitizeResourceUrl;\n  }\n  return\n  sanitizeUrl;\n}\n\n/**\n * Sanitizes URL, selecting sanitizer function based on tag and property names.\n *\n * This function is used in case we can't define security context at compile time, when only prop\n * name is available. This happens when we generate host bindings for Directives/Components. The\n * host element is unknown at compile time, so we defer calculation of specific sanitizer to\n * runtime.\n *\n * @param unsafeUrl untrusted `url`, typically from the user.\n * @param tag target element tag name.\n * @param prop name of the property that contains the value.\n * @returns `url` string which is safe to bind.\n *\n * @codeGenApi\n *\nexport function sanitizeUrlOrResourceUrl(unsafeUrl: any, tag: string, prop: string): any {\n  return\n  getUrlSanitizer(tag, prop)(unsafeUrl);\n}\n\nexport function validateAgainstEventProperties(name: string) {\n  if\n  (name.toLowerCase().startsWith('on')) {\n    const errorMessage =\n      `Binding to event property '${name}' is disallowed for security reasons,`\n      +\n      `please use (${name.slice(2)})=...`\n      +\n      `\\nIf '${name}' is a directive input, make sure the directive is imported by the`\n      +\n      `current module.`;\n    throw\n    new RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING, errorMessage);\n  }\n}\n\nexport function\n  validateAgainstEventAttributes(name: string) {\n  if (name.toLowerCase().startsWith('on')) {\n    const\n    errorMessage =\n      `Binding to event attribute '${name}' is disallowed for security reasons,`\n      +\n      `please use\n      (${name.slice(2)})=...`;\n    throw new RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING,\n      errorMessage);\n  }\n}\n\nfunction getSanitizer(): Sanitizer|null {\n  const IView = getLView();\n  return IView &&\n  IView[\"SANITIZER\"];\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n *\nimport {Type} from './interface/type';\nimport {assertLessThan} from\n './util/assert';\nimport {defineInjectable} from './interface/defs';\n\n/**\n * Creates a token that can be used in a DI\n * Provider.\n *\n * Use an `InjectionToken`\n * whenever the type you are injecting is not reified (does not have a\n * runtime representation) such as when\n * injecting an interface, callable type, array or\n * parameterized type.\n *\n * `InjectionToken` is parameterized on\n * `T` which is the type of object which will be returned by\n * the `Injector`. This provides an additional level of type\n * safety.\n *\n * ```\n * interface MyInterface {...}\n * const myInterface = injector.get(new\n * InjectionToken<MyInterface>('SomeToken'));\n * // myInterface is inferred to be MyInterface.\n * ```\n *\n * When\n * creating an `InjectionToken`, you can optionally specify a factory function which returns\n * (possibly by creating) a\n * default value of the parameterized type `T`. This sets up the\n * `InjectionToken` using this factory as a provider as\n * if it was defined explicitly in the\n * application's root injector. If the factory function, which takes zero arguments,\n * needs to inject\n * dependencies, it can do so using the `inject` function.\n *\n * As you can see in the Tree-shakable InjectionToken example below.\n *\n * Additionally, if a `factory` is\n * specified you can also specify the `providedIn` option, which\n * overrides the above behavior and marks the token\n * as belonging to a particular `NgModule`. As\n * mentioned above, `root` is the default value for `providedIn`.\n *\n * @usageNotes\n * ### Basic Examples\n *\n * ### Plain InjectionToken\n *\n * @example\n * core/di/ts/injector_spec.ts region='InjectionToken'}\n *\n * ### Tree-shakable InjectionToken\n *\n * @example\n * core/di/ts/injector_spec.ts region='ShakableInjectionToken'}\n *\n * @publicApi\n *\nexport class\n  InjectionToken<T> {\n  /** @internal */\n  readonly ngMetadataName = 'InjectionToken';\n  readonly prov:\n  unknown;\n  /**\n   * @param _desc Description for the token,\n   * used only for debugging\n   * purposes,\n   * it should but does not need to be unique\n   * @param options Options for the token's usage,\n   as described\n   above\n   */\n  constructor(protected _desc: string, options?: {\n    providedIn?:\n    Type<any>|'root'|'platform'|any|null, factory: () => T\n  }) {\n    this.prov = undefined;\n    if (typeof options ===\n    'number') {\n      (typeof ngDevMode === 'undefined' || ngDevMode) &&\n      assertLessThan(options, 0, 'Only\n      negative numbers are supported here');\n      // This is a special hack to assign __NG_ELEMENT_ID__ to this\n      instance.\n      // See `InjectorMarkers`\n      (this as any).__NG_ELEMENT_ID__ = options;\n    } else if (options

```

```

!== undefined) {\n    this.prov = defineInjectable({\n        token: this,\n        providedIn: options.providedIn ||
'root',\n        factory: options.factory,\n    });\n    }\n }\n\n /**\n  * @internal\n  * ^\n  get multi():
InjectionToken<Array<T>> {\n    return this as InjectionToken<Array<T>>;\n  }\n\n  toString(): string {\n    return
`InjectionToken ${this._desc}`;\n  }\n}\n\nexport interface InjectableDefToken<T> extends InjectionToken<T>
{\n  prov: unknown;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * ^\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * ^\n\nimport { InjectionToken } from './injection_token';\n\n/**\n * A multi-provider
token for initialization functions that will run upon construction of an\n * environment injector.\n * ^\n *
@publicApi\n * ^\nexport const ENVIRONMENT_INITIALIZER = new InjectionToken<() =>
void>(ENVIRONMENT_INITIALIZER);\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * ^\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * ^\n\nimport { InjectionToken } from './injection_token';\nimport { Injector } from
'./injector';\nimport { InjectorMarkers } from './injector_marker';\n\n\n/**\n * An InjectionToken that gets the
current `Injector` for `createInjector()`-style injectors.\n * ^\n * Requesting this token instead of `Injector` allows `StaticInjector` to be tree-shaken from a\n * project.\n * ^\n *
@publicApi\n * ^\nexport const INJECTOR = new InjectionToken<Injector>(\n  'INJECTOR',\n  // Disable tslint
because this is const enum which gets inlined not top level prop access.\n  // tslint:disable-next-line: no-toplevel-
property-access\n  InjectorMarkers.Injector as any, // Special value used by Ivy to identify `Injector`.\n);\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * ^\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport { Type } from
'./interface/type';\nimport { InjectionToken } from './injection_token';\n\nexport const INJECTOR_DEF_TYPES =
new InjectionToken<Type<unknown>>('INJECTOR_DEF_TYPES');\n\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * ^\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport { stringify } from
'./util/stringify';\nimport { Injector } from './injector';\nimport { THROW_IF_NOT_FOUND } from
'./injector_compatibility';\n\nexport class NullInjector implements Injector {\n  get(token: any, notFoundValue: any
= THROW_IF_NOT_FOUND): any {\n    if (notFoundValue === THROW_IF_NOT_FOUND) {\n      const error
= new Error(`NullInjectorError: No provider for ${stringify(token)}!`);\n      error.name = 'NullInjectorError';\n
throw error;\n    }\n    return notFoundValue;\n  }\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * ^\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n * ^\n\nexport { EMPTY_ARRAY } from './util/empty';\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * ^\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport { RuntimeError, RuntimeErrorCode } from
'./errors';\nimport { Type } from './interface/type';\nimport { getComponentDef } from './render3/definition';\nimport
{ getFactoryDef } from './render3/definition_factory';\nimport { throwCyclicDependencyError,
throwInvalidProviderError } from './render3/errors_di';\nimport { stringifyForError } from
'./render3/util/stringify_utils';\nimport { deepForEach } from './util/array_utils';\nimport { getClosureSafeProperty }
from './util/property';\nimport { stringify } from './util/stringify';\nimport { EMPTY_ARRAY } from
'./view';\n\nimport { resolveForwardRef } from './forward_ref';\nimport { ENVIRONMENT_INITIALIZER } from
'./initializer_token';\nimport { inject as inject } from './injector_compatibility';\nimport { getInjectorDef, InjectorType,
InjectorTypeWithProviders } from './interface/defs';\nimport { ClassProvider, ConstructorProvider, ExistingProvider,
FactoryProvider, ImportedNgModuleProviders,
ModuleWithProviders, Provider, StaticClassProvider, TypeProvider, ValueProvider } from
'./interface/provider';\nimport { INJECTOR_DEF_TYPES } from './internal_tokens';\n\n\n/**\n * A source of providers
for the `importProvidersFrom` function.\n * ^\n * @developerPreview\n * @publicApi\n * ^\nexport type
ImportProvidersSource =\nType<unknown>|ModuleWithProviders<unknown>|Array<ImportProvidersSource>;\n\n\n/**\n * Collects providers

```

from all NgModules and standalone components, including transitively imported ones. Providers extracted via `importProvidersFrom` are only usable in an application injector or another environment injector (such as a route injector). They should not be used in component providers. More information about standalone components can be found in [this guide](guide/standalone-components). @usageNotes

The results of the `importProvidersFrom` call can be used in the `bootstrapApplication` call:

```

typescript
await bootstrapApplication(RootComponent, { providers: [ importProvidersFrom(NgModuleOne,
NgModuleTwo) ] });

```

You can also use the `importProvidersFrom` results in the `providers` field of a route, when a standalone component is used:

```

typescript
export const ROUTES: Route[] = [
  { path: 'foo', providers: [ importProvidersFrom(NgModuleOne, NgModuleTwo) ],
  component: YourStandaloneComponent } ];

```

@returns Collected providers from the specified list of types.

@publicApi @developerPreview

```

function
importProvidersFrom(...sources: ImportProvidersSource[]): ImportedNgModuleProviders {
  return { providers:
    internalImportProvidersFrom(true, sources) };
}
function internalImportProvidersFrom(
  checkForStandaloneCmp: boolean, ...sources: ImportProvidersSource[]): Provider[] {
  const providersOut:
    SingleProvider[] = [];
  const
    dedup = new Set<Type<unknown>>(); // already seen types
  let injectorTypesWithProviders:
    InjectorTypeWithProviders<unknown>[];
  deepForEach(sources, source => {
    if ((typeof
      ngDevMode === 'undefined' || ngDevMode) && checkForStandaloneCmp) {
      const cmpDef =
        getComponentDef(source);
      if (cmpDef?.standalone) {
        throw new RuntimeError(
          RuntimeErrorCode.IMPORT_PROVIDERS_FROM_STANDALONE,
          `Importing providers supports
            NgModule or ModuleWithProviders but got a standalone component` +
            stringifyForError(source));
      }
      // Narrow `source` to access the internal type analogue for
      `ModuleWithProviders`.
      const internalSource = source as Type<unknown>;
      InjectorTypeWithProviders<unknown>;
      if (walkProviderTree(internalSource, providersOut, [], dedup)) {
        injectorTypesWithProviders ||= [];
        injectorTypesWithProviders.push(internalSource);
      }
      // Collect
      all providers
      from `ModuleWithProviders` types.
      if (injectorTypesWithProviders !== undefined) {
        processInjectorTypesWithProviders(injectorTypesWithProviders, providersOut);
      }
      return
      providersOut;
    }
    /**
     * Collects all providers from the list of `ModuleWithProviders` and appends them to the
     * provided array.
     */
    function processInjectorTypesWithProviders(
      typesWithProviders:
        InjectorTypeWithProviders<unknown>[], providersOut: Provider[]): void {
      for (let i = 0; i <
        typesWithProviders.length; i++) {
        const { ngModule, providers } = typesWithProviders[i];
        deepForEach(providers!, provider => {
          ngDevMode && validateProvider(provider, providers ||
            EMPTY_ARRAY, ngModule);
          providersOut.push(provider);
        });
      }
    }
    /**
     * Internal type for a
     * single provider in a deep provider array.
     */
    export type SingleProvider =
      TypeProvider|ValueProvider|ClassProvider|ConstructorProvider|
      ExistingProvider|FactoryProvider|StaticClassProvider;
    /**
     * The logic visits an `InjectorType`, an `InjectorTypeWithProviders`, or a standalone `ComponentType`, and all
     * of its transitive providers and collects providers.
     * If an `InjectorTypeWithProviders` that declares providers
     * besides the type is specified, the function will return "true" to indicate that the providers of the type definition
     * need to be processed. This allows us to process providers of injector types after all imports of an injector
     * definition are processed. (following View Engine semantics: see FW-1349)
     */
    export function
      walkProviderTree(
        container: Type<unknown>|InjectorTypeWithProviders<unknown>, providersOut:
          SingleProvider[],
        parents: Type<unknown>[], dedup: Set<Type<unknown>>): container is
          InjectorTypeWithProviders<unknown> {
        container = resolveForwardRef(container);
        if (!container) return
        false;
        // The actual type which had the definition. Usually `container`, but may be an unwrapped type
        // from
        `InjectorTypeWithProviders`.

```

```

let defType: Type<unknown>|null = null;\n\n let injDef = getInjectorDef(container);\n const cmpDef = !injDef
&& getComponentDef(container);\n if (!injDef && !cmpDef) {\n // `container` is not an injector type or a
component type. It might be:\n // * An `InjectorTypeWithProviders` that wraps an injector type.\n // * A
standalone directive or pipe that got pulled in from a standalone component's\n // dependencies.\n // Try to
unwrap it as an `InjectorTypeWithProviders` first.\n const ngModule: Type<unknown>|undefined =\n (container as InjectorTypeWithProviders<any>).ngModule as Type<unknown>|undefined;\n injDef =
getInjectorDef(ngModule);\n if (injDef) {\n defType = ngModule!;\n } else {\n // Not a component or
injector type, so ignore it.\n return false;\n }\n } else if (cmpDef && !cmpDef.standalone) {\n return false;\n
} else {\n defType = container as Type<unknown>;\n }\n\n // Check for circular
dependencies.\n if (ngDevMode && parents.indexOf(defType) !== -1) {\n const defName =
stringify(defType);\n const path = parents.map(stringify);\n throwCyclicDependencyError(defName, path);\n
}\n\n // Check for multiple imports of the same module\n const isDuplicate = dedup.has(defType);\n\n if (cmpDef)
{\n if (isDuplicate) {\n // This component definition has already been processed.\n return false;\n }\n
dedup.add(defType);\n if (cmpDef.dependencies) {\n const deps =\n // type of cmpDef.dependencies ===
'function' ? cmpDef.dependencies() : cmpDef.dependencies;\n for (const dep of deps) {\n
walkProviderTree(dep, providersOut, parents, dedup);\n }\n }\n } else if (injDef) {\n // First, include
providers from any imports.\n if (injDef.imports !== null && !isDuplicate) {\n // Before processing defType's
imports, add it to the set of parents. This way, if it ends\n // up deeply importing itself, this can
be detected.\n ngDevMode && parents.push(defType);\n // Add it to the set of dedups. This way we can
detect multiple imports of the same module\n dedup.add(defType);\n\n let importTypesWithProviders:
(InjectorTypeWithProviders<any>[])|undefined;\n try {\n deepForEach(injDef.imports, imported => {\n
if (walkProviderTree(imported, providersOut, parents, dedup)) {\n importTypesWithProviders ||= [];\n
// If the processed import is an injector type with providers, we store it in the\n // list of import types with
providers, so that we can process those afterwards.\n importTypesWithProviders.push(imported);\n }\n
});\n } finally {\n // Remove it from the parents set when finished.\n ngDevMode && parents.pop();\n
}\n\n // Imports which are declared with providers (TypeWithProviders) need to be processed\n // after all
imported modules are processed. This is
similar to how View Engine\n // processes/merges module imports in the metadata resolver. See: FW-1349.\n
if (importTypesWithProviders !== undefined) {\n
processInjectorTypesWithProviders(importTypesWithProviders, providersOut);\n }\n }\n\n if (!isDuplicate)
{\n // Track the InjectorType and add a provider for it.\n // It's important that this is done after the def's
imports.\n const factory = getFactoryDef(defType) || (() => new defType!());\n // Append extra providers to
make more info available for consumers (to retrieve an injector\n // type), as well as internally (to calculate an
injection scope correctly and eagerly\n // instantiate a `defType` when an injector is created).\n
providersOut.push(\n // Provider to create `defType` using its factory.\n // {provide: defType, useFactory:
factory, deps: EMPTY_ARRAY},\n\n // Make this `defType` available to an internal logic that calculates
injector
scope.\n // {provide: INJECTOR_DEF_TYPES, useValue: defType, multi: true},\n\n // Provider to
eagerly instantiate `defType` via `ENVIRONMENT_INITIALIZER`.\n // {provide:
ENVIRONMENT_INITIALIZER, useValue: () => inject(defType!), multi: true} //\n );\n }\n\n // Next,
include providers listed on the definition itself.\n const defProviders = injDef.providers;\n if (defProviders !==
null && !isDuplicate) {\n const injectorType = container as InjectorType<any>;\n deepForEach(defProviders,
provider => {\n ngDevMode && validateProvider(provider, defProviders as SingleProvider[], injectorType);\n
providersOut.push(provider);\n });\n }\n } else {\n // Should not happen, but just in case.\n return
false;\n }\n\n return (\n defType !== container &&\n (container as
InjectorTypeWithProviders<any>).providers !== undefined);\n\n\nfunction validateProvider(\n provider:
SingleProvider, providers: SingleProvider[],

```

```

containerType: Type<unknown>): void {\n  if (isTypeProvider(provider) || isValueProvider(provider) ||
isFactoryProvider(provider) ||\n    isExistingProvider(provider)) {\n    return;\n  }\n  // Here we expect the
provider to be a `useClass` provider (by elimination).\n  const classRef = resolveForwardRef(\n    provider &&
((provider as StaticClassProvider | ClassProvider).useClass || provider.provide));\n  if (!classRef) {\n
throwInvalidProviderError(containerType, providers, provider);\n  }\n}\n\n\nexport const USE_VALUE =\ngetClosureSafeProperty<ValueProvider>({provide: String, useValue: getClosureSafeProperty});\n\n\nexport function
isValueProvider(value: SingleProvider): value is ValueProvider {\n  return value !== null && typeof value ===
'object' && USE_VALUE in value;\n}\n\n\nexport function isExistingProvider(value: SingleProvider): value is
ExistingProvider {\n  return !!(value && (value as ExistingProvider).useExisting);\n}\n\n\nexport function
isFactoryProvider(value:
SingleProvider): value is FactoryProvider {\n  return !!(value && (value as
FactoryProvider).useFactory);\n}\n\n\nexport function isTypeProvider(value: SingleProvider): value is TypeProvider
{\n  return typeof value === 'function';\n}\n\n\nexport function isClassProvider(value: SingleProvider): value is
ClassProvider {\n  return !!(value as StaticClassProvider | ClassProvider).useClass;\n}\n}\n\n\n/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {InjectionToken} from
'./injection_token';\n\n\nexport type InjectorScope = 'root'|'platform'|'environment';\n\n\n/**\n * An internal token
whose presence in an injector indicates that the injector should treat itself\n * as a root scoped injector when
processing requests for unknown tokens which may indicate\n * they are provided in the root scope.\n */\nexport
const INJECTOR_SCOPE =
  new InjectionToken<InjectorScope|null>('Set Injector scope.);\n\n\n/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport './util/ng_dev_mode';\nimport {RuntimeError,
RuntimeErrorCode} from './errors';\nimport {OnDestroy} from './interface/lifecycle_hooks';\nimport {Type} from
'./interface/type';\nimport {GetComponentDef} from './render3/definition';\nimport {FactoryFn, getFactoryDef}
from './render3/definition_factory';\nimport {throwCyclicDependencyError, throwInvalidProviderError,
throwMixedMultiProviderError} from './render3/errors_di';\nimport {newArray} from './util/array_utils';\nimport
{EMPTY_ARRAY} from './util/empty';\nimport {stringify} from './util/stringify';\n\nimport {resolveForwardRef}
from './forward_ref';\nimport {ENVIRONMENT_INITIALIZER} from './initializer_token';\nimport
{setInjectImplementation}
from './inject_switch';\nimport {InjectionToken} from './injection_token';\nimport {Injector} from
'./injector';\nimport {catchInjectorError, injectArgs, NG_TEMP_TOKEN_PATH, setCurrentInjector,
THROW_IF_NOT_FOUND, inject} from './injector_compatibility';\nimport {INJECTOR} from
'./injector_token';\nimport {getInheritedInjectableDef, getInjectableDef, InjectorType, InjectableDeclaration} from
'./interface/defs';\nimport {InjectFlags} from './interface/injector';\nimport {ClassProvider, ConstructorProvider,
ImportedNgModuleProviders, Provider, StaticClassProvider} from './interface/provider';\nimport
{INJECTOR_DEF_TYPES} from './internal_tokens';\nimport {NullInjector} from './null_injector';\nimport
{importProvidersFrom, isExistingProvider, isFactoryProvider, isTypeProvider, isValueProvider, SingleProvider}
from './provider_collection';\nimport {ProviderToken} from './provider_token';\nimport {INJECTOR_SCOPE,
InjectorScope} from './scope';\n\n\n/**\n * Marker which indicates that
a value has not yet been created from the factory function.\n */\nconst NOT_YET = {};\n\n\n/**\n * Marker which
indicates that the factory function for a token is in the process of being called.\n */\n\n * If the injector is asked
to inject a token with its value set to CIRCULAR, that indicates\n * injection of a dependency has recursively
attempted to inject the original token, and there is\n * a circular dependency among the providers.\n */\nconst
CIRCULAR = {};\n\n\n/**\n * A lazily initialized NullInjector.\n */\nlet NULL_INJECTOR: Injector|undefined =
undefined;\n\n\nexport function getNullInjector(): Injector {\n  if (NULL_INJECTOR === undefined) {\n
NULL_INJECTOR = new NullInjector();\n  }\n  return NULL_INJECTOR;\n}\n\n\n\n/**\n * An entry in the injector
which tracks information about the given token, including a possible\n * current value.\n */\ninterface Record<T>

```

```

{\n factory: (() => T)|undefined;\n value: T|{\n multi: any[]|undefined;\n}\n\n/**\n * An `Injector` that's part of
the
environment injector hierarchy, which exists outside of the\n * component tree.\n *\n * @developerPreview\n */\nexport abstract class EnvironmentInjector implements Injector {\n /**\n * Retrieves an instance from the
injector based on the provided token.\n * @returns The instance from the injector if defined, otherwise the
`notFoundValue`.\n * @throws When the `notFoundValue` is `undefined` or
`Injector.THROW_IF_NOT_FOUND`.\n *\n abstract get<T>(token: ProviderToken<T>, notFoundValue?: T,
flags?: InjectFlags): T;\n /**\n * @deprecated from v4.0.0 use ProviderToken<T>\n * @suppress {duplicate}\n */\n abstract get(token: any, notFoundValue?: any): any;\n\n /**\n * Runs the given function in the context of this
`EnvironmentInjector`.\n *\n * Within the function's stack frame, `inject` can be used to inject dependencies from
this\n * injector. Note that `inject` is only usable synchronously, and cannot be used in any\n * asynchronous
callbacks or after any
`await` points.\n *\n * @param fn the closure to be run in the context of this injector\n * @returns the return
value of the function, if any\n */\n abstract runInContext<ReturnT>(fn: () => ReturnT): ReturnT;\n\n abstract
destroy(): void;\n\n /**\n * @internal\n */\n abstract onDestroy(callback: () => void): void;\n}\n\nexport class
R3Injector extends EnvironmentInjector {\n /**\n * Map of tokens to records which contain the instances of those
tokens.\n * - `null` value implies that we don't have the record. Used by tree-shakable injectors\n * to prevent
further searches.\n *\n private records = new Map<ProviderToken<any>, Record<any>|null>();\n\n /**\n * Set
of values instantiated by this injector which contain `ngOnDestroy` lifecycle hooks.\n *\n private
_ngOnDestroyHooks = new Set<OnDestroy>();\n\n private _onDestroyHooks: Array<() => void> = [];\n\n /**\n * Flag indicating that this injector was previously destroyed.\n *\n get destroyed():
boolean {\n return this._destroyed;\n }\n\n private _destroyed = false;\n\n private injectorDefTypes:
Set<Type<unknown>>;\n\n constructor(\n providers: Array<Provider|ImportedNgModuleProviders>, readonly
parent: Injector,\n readonly source: string|null, readonly scopes: Set<InjectorScope>) {\n super();\n // Start
off by creating Records for every provider.\n\n forEachSingleProvider(providers, provider =>
this.processProvider(provider));\n\n // Make sure the INJECTOR token provides this injector.\n\n
this.records.set(INJECTOR, makeRecord(undefined, this));\n\n // And `EnvironmentInjector` if the current
injector is supposed to be env-scoped.\n\n if (scopes.has('environment')) {\n this.records.set(EnvironmentInjector,
makeRecord(undefined, this));\n }\n\n // Detect whether this injector has the APP_ROOT_SCOPE token and
thus should provide\n\n // any injectable scoped to APP_ROOT_SCOPE.\n\n const record =
this.records.get(INJECTOR_SCOPE) as Record<InjectorScope|null>;\n\n if (record != null && typeof record.value === 'string') {\n this.scopes.add(record.value as InjectorScope);\n
}\n\n this.injectorDefTypes =\n new Set(this.get(INJECTOR_DEF_TYPES).multi, EMPTY_ARRAY,
InjectFlags.Self);\n\n /**\n * Destroy the injector and release references to every instance or provider
associated with it.\n *\n * Also calls the `OnDestroy` lifecycle hooks of every instance that was created for which
a\n * hook was found.\n *\n override destroy(): void {\n this.assertNotDestroyed();\n\n // Set destroyed =
true first, in case lifecycle hooks re-enter destroy().\n\n this._destroyed = true;\n\n try {\n // Call all the lifecycle
hooks.\n\n for (const service of this._ngOnDestroyHooks) {\n service.ngOnDestroy();\n }\n\n for (const
hook of this._onDestroyHooks) {\n hook();\n }\n\n } finally {\n // Release all references.\n\n
this.records.clear();\n\n this._ngOnDestroyHooks.clear();\n\n this.injectorDefTypes.clear();\n\n this._onDestroyHooks.length = 0;\n\n }\n\n\n override
onDestroy(callback: () => void): void {\n this._onDestroyHooks.push(callback);\n }\n\n\n override
runInContext<ReturnT>(fn: () => ReturnT): ReturnT {\n this.assertNotDestroyed();\n\n const previousInjector =
setCurrentInjector(this);\n\n const previousInjectImplementation = setInjectImplementation(undefined);\n\n try {\n
return fn();\n\n } finally {\n setCurrentInjector(previousInjector);\n\n
setInjectImplementation(previousInjectImplementation);\n\n }\n\n\n override get<T>(\n token:
ProviderToken<T>, notFoundValue: any = THROW_IF_NOT_FOUND,\n flags = InjectFlags.Default): T {\n
this.assertNotDestroyed();\n\n // Set the injection context.\n\n const previousInjector = setCurrentInjector(this);\n

```



```

const previousInjectImplementation = setInjectImplementation(undefined);\n try {\n // Check for the SkipSelf
flag.\n
  if (!(flags & InjectFlags.SkipSelf)) {\n // SkipSelf isn't set, check if the record belongs to this injector.\n
let record: Record<T>|undefined|null = this.records.get(token);\n if (record === undefined) {\n // No
record, but maybe the token is scoped to this injector. Look for an injectable\n // def with a scope matching
this injector.\n const def = couldBeInjectableType(token) && getInjectableDef(token);\n if (def &&
this.injectableDefInScope(def)) {\n // Found an injectable def and it's scoped to this injector. Pretend as if it
was here\n // all along.\n record = makeRecord(injectableDefOrInjectorDefFactory(token),
NOT_YET);\n } else {\n record = null;\n }\n this.records.set(token, record);\n }\n //
If a record was found, get the instance for it and return it.\n if (record != null /* NOT null || undefined */) {\n
return
this.hydrate(token, record);\n }\n }\n // Select the next injector based on the Self flag - if self is set, the
next injector is\n // the NullInjector, otherwise it's the parent.\n const nextInjector = !(flags & InjectFlags.Self)
? this.parent : getNullInjector();\n // Set the notFoundValue based on the Optional flag - if optional is set and
notFoundValue\n // is undefined, the value is null, otherwise it's the notFoundValue.\n notFoundValue =
(flags & InjectFlags.Optional) && notFoundValue === THROW_IF_NOT_FOUND ?\n null :\n notFoundValue;\n return nextInjector.get(token, notFoundValue);\n } catch (e: any) {\n if (e.name ===
'NullInjectorError') {\n const path: any[] = e[NG_TEMP_TOKEN_PATH] = e[NG_TEMP_TOKEN_PATH] ||
[];\n path.unshift(stringify(token));\n if (previousInjector) {\n // We still have a parent injector, keep
throwing\n throw e;\n } else {\n
// Format & throw the final error message when we don't have any previous injector\n return
catchInjectorError(e, token, 'R3InjectorError', this.source);\n }\n } else {\n throw e;\n }\n } finally
{\n // Lastly, restore the previous injection context.\n
setInjectImplementation(previousInjectImplementation);\n setCurrentInjector(previousInjector);\n }\n }\n\n
/** @internal */\n resolveInjectorInitializers() {\n const previousInjector = setCurrentInjector(this);\n const
previousInjectImplementation = setInjectImplementation(undefined);\n try {\n const initializers =
this.get(ENVIRONMENT_INITIALIZER.multi, EMPTY_ARRAY, InjectFlags.Self);\n if (ngDevMode &&
!Array.isArray(initializers)) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_MULTI_PROVIDER,\n 'Unexpected type of the
`ENVIRONMENT_INITIALIZER` token value ' +\n `(expected an array, but got ${typeof initializers}).
` +\n 'Please check that the `ENVIRONMENT_INITIALIZER` token is configured as a ' +\n
`multi: true` provider.);\n }\n for (const initializer of initializers) {\n initializer();\n }\n } finally {\n
setCurrentInjector(previousInjector);\n setInjectImplementation(previousInjectImplementation);\n }\n }\n\n
override toString() {\n const tokens: string[] = [];\n const records = this.records;\n for (const token of
records.keys()) {\n tokens.push(stringify(token));\n }\n return `R3Injector[${tokens.join(', ')}];\n }\n\n
private assertNotDestroyed(): void {\n if (this._destroyed) {\n throw new RuntimeError(\n
RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,\n ngDevMode && 'Injector has already been
destroyed.);\n }\n }\n\n /**\n * Process a `SingleProvider` and add it.\n */\n private processProvider(provider:
SingleProvider): void {\n // Determine the token from
the provider. Either it's its own token, or has a {provide: ...}\n // property.\n provider =
resolveForwardRef(provider);\n let token: any =\n isTypeProvider(provider) ? provider :
resolveForwardRef(provider && provider.provide);\n // Construct a `Record` for the provider.\n const record
= providerToRecord(provider);\n if (!isTypeProvider(provider) && provider.multi === true) {\n // If the
provider indicates that it's a multi-provider, process it specially.\n // First check whether it's been defined
already.\n let multiRecord = this.records.get(token);\n if (multiRecord) {\n // It has. Throw a nice error
if\n if (ngDevMode && multiRecord.multi === undefined) {\n throwMixedMultiProviderError();\n
}\n } else {\n multiRecord = makeRecord(undefined, NOT_YET, true);\n multiRecord.factory = () =>
injectArgs(multiRecord!.multi!);\n this.records.set(token, multiRecord);\n }\n }

```

```

token = provider;\n    multiRecord.multi!.push(provider);\n  } else {\n    const existing =
this.records.get(token);\n    if (ngDevMode && existing && existing.multi !== undefined) {\n
throwMixedMultiProviderError();\n    }\n  }\n  this.records.set(token, record);\n }\n\n private
hydrate<T>(token: ProviderToken<T>, record: Record<T>): T {\n  if (ngDevMode && record.value ===
CIRCULAR) {\n    throwCyclicDependencyError(stringify(token));\n  } else if (record.value === NOT_YET) {\n
    record.value = CIRCULAR;\n    record.value = record.factory!();\n  }\n  if (typeof record.value === 'object'
&& record.value && hasOnDestroy(record.value)) {\n    this._ngOnDestroyHooks.add(record.value);\n  }\n
return record.value as T;\n }\n\n private injectableDefInScope(def: InjectableDeclaration<any>): boolean {\n  if
(!def.providedIn) {\n    return false;\n  }\n  const providedIn = resolveForwardRef(def.providedIn);\n  if (typeof
providedIn ===
'string') {\n    return providedIn === 'any' || (this.scopes.has(providedIn));\n  } else {\n    return
this.injectorDefTypes.has(providedIn);\n  }\n }\n\n\nfunction injectableDefOrInjectorDefFactory(token:
ProviderToken<any>): FactoryFn<any> {\n  // Most tokens will have an injectable def directly on them, which
specifies a factory directly.\n  const injectableDef = getInjectableDef(token);\n  const factory = injectableDef !==
null ? injectableDef.factory : getFactoryDef(token);\n\n  if (factory !== null) {\n    return factory;\n  }\n\n  //
InjectionTokens should have an injectable def (prov) and thus should be handled above.\n  // If it's missing that, it's
an error.\n  if (token instanceof InjectionToken) {\n    throw new RuntimeError(\n
RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n    ngDevMode && `Token ${stringify(token)} is
missing a prov definition.`);\n  }\n\n  // Undecorated types can sometimes be created if they have no constructor
arguments.\n  if (token
instanceof Function) {\n    return getUndecoratedInjectableFactory(token);\n  }\n\n  // There was no way to resolve
a factory for this token.\n  throw new RuntimeError(RuntimeErrorCode.INVALID_INJECTION_TOKEN,
ngDevMode && 'unreachable');\n }\n\n\nfunction getUndecoratedInjectableFactory(token: Function) {\n  // If the
token has parameters then it has dependencies that we cannot resolve implicitly.\n  const paramLength =
token.length;\n  if (paramLength > 0) {\n    const args: string[] = newArray(paramLength, '?');\n    throw new
RuntimeError(\n    RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n    ngDevMode && `Can't resolve
all parameters for ${stringify(token)}: (${args.join(', ')}`);\n  }\n\n  // The constructor function appears to have no
parameters.\n  // This might be because it inherits from a super-class. In which case, use an injectable\n  // def from
an ancestor if there is one.\n  // Otherwise this really is a simple class with no dependencies, so return a factory
that\n
  // just instantiates the zero-arg constructor.\n  const inheritedInjectableDef = getInheritedInjectableDef(token);\n  if
(inheritedInjectableDef !== null) {\n    return () => inheritedInjectableDef.factory(token as Type<any>);\n  } else
{\n    return () => new (token as Type<any>)();\n  }\n }\n\n\nfunction providerToRecord(provider: SingleProvider):
Record<any> {\n  if (isValueProvider(provider)) {\n    return makeRecord(undefined, provider.useValue);\n  } else
{\n    const factory: (() => any)|undefined = providerToFactory(provider);\n    return makeRecord(factory,
NOT_YET);\n  }\n }\n\n\n/**\n * Converts a `SingleProvider` into a factory function.\n *\n * @param provider
provider to convert to factory\n */\nexport function providerToFactory(\n  provider: SingleProvider,
ngModuleType?: InjectorType<any>, providers?: any[]): () => any {\n  let factory: (() => any)|undefined =
undefined;\n  if (ngDevMode && isImportedNgModuleProviders(provider)) {\n
throwInvalidProviderError(undefined,
providers, provider);\n  }\n\n  if (isTypeProvider(provider)) {\n    const unwrappedProvider =
resolveForwardRef(provider);\n    return getFactoryDef(unwrappedProvider) ||
injectableDefOrInjectorDefFactory(unwrappedProvider);\n  } else {\n    if (isValueProvider(provider)) {\n
factory = () => resolveForwardRef(provider.useValue);\n    } else if (isFactoryProvider(provider)) {\n    factory =
() => provider.useFactory(...injectArgs(provider.deps || []));\n    } else if (isExistingProvider(provider)) {\n
factory = () => inject(resolveForwardRef(provider.useExisting));\n    } else {\n    const classRef =
resolveForwardRef(\n    provider &&\n    ((provider as StaticClassProvider | ClassProvider).useClass ||
provider.provide));\n    if (ngDevMode && !classRef) {\n    throwInvalidProviderError(ngModuleType,

```

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providers, provider);\n  }\n  if (hasDeps(provider)) {\n    factory = () => new
(classRef)(...injectArgs(provider.deps));\n  } else {\n
    return getFactoryDef(classRef) || injectableDefOrInjectorDefFactory(classRef);\n  }\n  }\n  }\n  return
factory);\n}\n\nfunction makeRecord<T>(\n  factory: (() => T)|undefined, value: T|{, multi: boolean = false):
Record<T> {\n  return {\n    factory: factory,\n    value: value,\n    multi: multi ? [] : undefined,\n  };\n}\n\nfunction
hasDeps(value: ClassProvider|ConstructorProvider|\n  StaticClassProvider): value is ClassProvider & {deps:
any[]} {\n  return !! (value as any).deps;\n}\n\nfunction hasOnDestroy(value: any): value is OnDestroy {\n  return
value !== null && typeof value === 'object' &&\n  typeof (value as OnDestroy).ngOnDestroy ===
'function';\n}\n\nfunction couldBeInjectableType(value: any): value is ProviderToken<any> {\n  return (typeof
value === 'function') ||\n  (typeof value === 'object' && value instanceof InjectionToken);\n}\n\nfunction
isImportedNgModuleProviders(provider: Provider|ImportedNgModuleProviders):\n  provider is
ImportedNgModuleProviders
{\n  return !! (provider as ImportedNgModuleProviders).providers;\n}\n\nfunction forEachSingleProvider(\n
providers: Array<Provider|ImportedNgModuleProviders>,\n  fn: (provider: SingleProvider) => void): void {\n
  (const provider of providers) {\n    if (Array.isArray(provider)) {\n      forEachSingleProvider(provider, fn);\n    }
    else if (isImportedNgModuleProviders(provider)) {\n      forEachSingleProvider(provider.providers, fn);\n    } else
{\n      fn(provider);\n    }\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport { ChangeDetectorRef } from './change_detection/change_detection';\nimport
{ Injector } from './di/injector';\nimport { EnvironmentInjector } from './di/r3_injector';\nimport { Type } from
'./interface/type';\nimport { ElementRef } from './element_ref';\nimport
{ NgModuleRef } from './ng_module_factory';\nimport { ViewRef } from './view_ref';\n\n/**\n * Represents a
component created by a `ComponentFactory`.\n * Provides access to the component instance and related objects,\n *
and provides the means of destroying the instance.\n */\n * @publicApi\n */\nexport abstract class
ComponentRef<C> {\n  /**\n   * Updates a specified input name to a new value. Using this method will properly
mark for check\n   * component using the `OnPush` change detection strategy. It will also assure that the\n   *
`OnChanges` lifecycle hook runs when a dynamically created component is change-detected.\n   */\n   * @param
name The name of an input.\n   * @param value The new value of an input.\n   */\n   abstract setInput(name: string,
value: unknown): void;\n\n  /**\n   * The host or anchor [element](guide/glossary#element) for this component
instance.\n   */\n   abstract get location(): ElementRef;\n\n  /**\n   * The [dependency
injector](guide/glossary#injector) for this
component instance.\n   */\n   abstract get injector(): Injector;\n\n  /**\n   * This component instance.\n   */\n
   abstract get instance(): C;\n\n  /**\n   * The [host view](guide/glossary#view-tree) defined by the template\n   *
for this component instance.\n   */\n   abstract get hostView(): ViewRef;\n\n  /**\n   * The change detector for this
component instance.\n   */\n   abstract get changeDetectorRef(): ChangeDetectorRef;\n\n  /**\n   * The type of this
component (as created by a `ComponentFactory` class).\n   */\n   abstract get componentType(): Type<any>;\n\n
  /**\n   * Destroys the component instance and all of the data structures associated with it.\n   */\n   abstract
destroy(): void;\n\n  /**\n   * A lifecycle hook that provides additional developer-defined cleanup\n   *
functionality for the component.\n   * @param callback A handler function that cleans up developer-defined data\n   *
associated with this component. Called when the `destroy()` method is invoked.\n   */\n   abstract
onDestroy(callback: Function): void;\n}\n\n/**\n * Base class for a factory that can create a component
dynamically.\n * Instantiate a factory for a given type of component with `resolveComponentFactory()`.\n * Use the
resulting `ComponentFactory.create()` method to create a component of that type.\n */\n * @see [Dynamic
Components](guide/dynamic-component-loader)\n */\n * @publicApi\n */\n * @deprecated Angular no longer
requires Component factories. Please use other APIs where\n * Component class can be used directly.\n */\nexport
abstract class ComponentFactory<C> {\n  /**\n   * The component's HTML selector.\n   */\n   abstract get
selector(): string;\n\n  /**\n   * The type of component the factory will create.\n   */\n   abstract get
componentType(): Type<any>;\n\n  /**\n   * Selector for all <ng-content> elements in the component.\n   */\n   abstract get

```

```

ngContentSelectors(): string[];
/**
 * The inputs of the component.
 */
abstract get inputs(): { propName:
string,
templateName: string }[];
/**
 * The outputs of the component.
 */
abstract get outputs(): { propName:
string, templateName: string }[];
/**
 * Creates a new component.
 */
abstract create(injector:
Injector, projectableNodes?: any[][], rootSelectorOrNode?: string|any,
environmentInjector?:
EnvironmentInjector|NgModuleRef<any>): ComponentRef<C>;
}
",
/**
 * @license
 * Copyright Google
LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import {Type} from './interface/type';
import {stringify}
from './util/stringify';
import {ComponentFactory} from './component_factory';
export function
noComponentFactoryError(component: Function) {
const error = Error(`No component factory found for ${
stringify(component)}. Did you add it to @NgModule.entryComponents?`);
(error as
any)[ERROR_COMPONENT] = component;
return error;
}
const ERROR_COMPONENT = 'ngComponent';
export function getComponent(error:
Error): Type<any> {
return (error as any)[ERROR_COMPONENT];
}
}
class
_NullComponentFactoryResolver implements ComponentFactoryResolver {
resolveComponentFactory<T>(component: {new(...args: any[]): T}): ComponentFactory<T> {
throw
noComponentFactoryError(component);
}
}
/**
 * A simple registry that maps `Components` to generated
`ComponentFactory` classes
 * that can be used to create instances of components.
 * Use to obtain the factory for
a given component type,
 * then use the factory's `create()` method to create a component of that type.
 * Note: since v13, dynamic component creation via
 * [ViewContainerRef.createComponent](api/core/ViewContainerRef#createComponent)
 * does not require
resolving component factory: component class can be used directly.
 * @publicApi
 * @deprecated
Angular no longer requires Component factories. Please
use other APIs where
 * Component class can be used directly.
 */
export abstract class
ComponentFactoryResolver {
static NULL: ComponentFactoryResolver = (/* __PURE__ */ new
_NullComponentFactoryResolver());
/**
 * Retrieves the factory object that creates a component of the given
type.
 * @param component The component type.
 */
abstract resolveComponentFactory<T>(component:
Type<T>): ComponentFactory<T>;
}
",
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
https://angular.io/license
 */
import {TNode} from './render3/interfaces/node';
import {RElement} from
'./render3/interfaces/render_dom';
import {LView} from './render3/interfaces/view';
import {getCurrentTNode,
getLView} from './render3/state';
import {getNativeByTNode} from './render3/util/view_utils';
/**
 * Creates
an ElementRef from the most recent node.
 * @returns The ElementRef instance to use
 */
export function injectElementRef(): ElementRef {
return
createElementRef(getCurrentTNode()!, getLView());
}
/**
 * Creates an ElementRef given a node.
 * @param tNode The node for which you'd like an ElementRef
 * @param IView The view to which the node
belongs
 * @returns The ElementRef instance to use
 */
export function createElementRef(tNode: TNode,
IView: LView): ElementRef {
return new ElementRef(getNativeByTNode(tNode, IView) as
RElement);
}
}
/**
 * A wrapper around a native element inside of a View.
 * An `ElementRef` is backed
by a render-specific element. In the browser, this is usually a DOM
 * element.
 * @security Permitting direct
access to the DOM can make your application more vulnerable to
 * XSS attacks. Carefully review any use of
`ElementRef` in your code. For more detail, see the
 * [Security Guide](https://g.co/ng/security).
 */
@publicApi
export // Note: We don't expose
things like `Injector`, `ViewContainer`, ... here,
// i.e. users have to ask for what they need. With that, we can build
better analysis tools
// and could do better codegen in the future.
export class ElementRef<T = any> {
/**
 * The underlying native element or `null` if direct access to native elements is not supported
 * (e.g. when the
application runs in a web worker).
 */
nativeElement: T | null;
/**
 * <div class="callout is-critical">
 * <header>Use with
caution</header>
 * <p>
 * Use this API as the last resort when direct access to DOM is needed. Use

```

```

templating and data-binding provided by Angular instead. Alternatively you can take a look at {@link Renderer2} which provides API that can safely be used even when direct access to native elements is not supported. Relying on direct DOM access creates tight coupling between your application and rendering layers which will make it impossible to separate the two and deploy your application into a web worker.
nativeElement: T; constructor(nativeElement: T) { this.nativeElement = nativeElement; }
@internal @nocollapse static __NG_ELEMENT_ID__: () => ElementRef =
injectElementRef; Unwraps `ElementRef` and return the `nativeElement`. @param value value to unwrap @returns `nativeElement` if `ElementRef` otherwise returns value as is.
unwrapElementRef<T, R>(value: T)ElementRef<R>: T|R { return value instanceof ElementRef ? value.nativeElement : value; }
*/
@license Copyright Google LLC All Rights Reserved. Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
import { InjectionToken } from './di/injection_token';
import { isLView } from './render3/interfaces/type_checks';
import { RENDERER } from './render3/interfaces/view';
import { getCurrentTNode, getLView } from './render3/state';
import { getComponentLViewByIndex } from './render3/util/view_utils';
import { RenderStyleFlags2, RenderType2 } from './api_flags';
export const Renderer2Interceptor = new InjectionToken<Renderer2[]>('Renderer2Interceptor');
*/
Creates and initializes a custom renderer that implements the `Renderer2` base class.
@publicApi
export abstract class RendererFactory2 {
  */
  Creates and initializes a custom renderer for a host DOM element.
  @param hostElement The element to render.
  @param type The base class to implement.
  @returns The new custom renderer instance.
  abstract createRenderer(hostElement: any, type: RenderType2|null): Renderer2;
  */
  A callback invoked when rendering has begun.
  abstract begin?(): void;
  */
  A callback invoked when rendering has completed.
  abstract end?(): void;
  */
  Use with animations test-only mode. Notifies the test when rendering has completed.
  @returns The asynchronous result of the developer-defined function.
  abstract whenRenderingDone?(): Promise<any>;
}
*/
Extend this base class to implement custom rendering. By default, Angular renders a template into DOM. You can use custom rendering to intercept rendering calls, or to render to something other than DOM.
Create your custom renderer using `RendererFactory2`.
Use a custom renderer to bypass Angular's templating and make custom UI changes that can't be expressed declaratively.
For example if you need to set a property or an attribute whose name is not statically known, use the `setProperty()` or `setAttribute()` method.
@publicApi
export abstract class Renderer2 {
  */
  Use to store arbitrary developer-defined data on a renderer instance, as an object containing key-value pairs.
  This is useful for renderers that delegate to other renderers.
  abstract get data(): {[key: string]: any};
  */
  Implement this callback to destroy the renderer or the host element.
  abstract destroy(): void;
  */
  Implement this callback to create an instance of the host element.
  @param name An identifying name for the new element, unique within the namespace.
  @param namespace The namespace for the new element.
  @returns The new element.
  abstract createElement(name: string, namespace?: string|null): any;
  */
  Implement this callback to add a comment to the DOM of the host element.
  @param value The comment text.
  @returns The modified element.
  abstract createComment(value: string): any;
  */
  Implement this callback to add text to the DOM of the host element.
  @param value The text string.
  @returns The modified element.
  abstract createText(value: string): any;
  */
  If null or undefined, the view engine won't call it. This is used as a performance optimization for production mode.
  // TODO(issue/24571): remove '!'.
  destroyNode!: ((node: any) => void)|null;
  */
  Appends a child to a given parent node in the host element DOM.
  @param parent The parent node.
  @param newChild The new child node.
  abstract appendChild(parent: any, newChild: any): void;
  */
  Implement this callback to insert a child node at a given position in a parent node in the host element DOM.

```

\* @param parent The parent node.\n \* @param newChild The new child nodes.\n \* @param refChild The existing child node before which `newChild` is inserted.\n \* @param isMove Optional argument which signifies if the current `insertBefore` is a result of a\n \* move. Animation uses this information to trigger move animations. In the past the Animation\n \* would always assume that any `insertBefore` is a move. This is not strictly true because\n \* with runtime i18n it is possible to invoke `insertBefore` as a result of i18n and it should\n \* not trigger an animation move.\n \*/\n abstract insertBefore(parent: any, newChild: any, refChild: any, isMove?: boolean): void;\n /\*\*\n \* Implement this callback to remove a child node from the host element's DOM.\n \* @param parent The parent node.\n \* @param oldChild The child node to remove.\n \* @param isHostElement Optionally signal to the renderer whether this element is a host element\n \* or not\n \*/\n abstract removeChild(parent: any, oldChild: any, isHostElement?: boolean): void;\n /\*\*\n \* Implement this callback to prepare an element to be bootstrapped\n \* as a root element, and return the element instance.\n \* @param selectorOrNode The DOM element.\n \* @param preserveContent Whether the contents of the root element\n \* should be preserved, or cleared upon bootstrap (default behavior).\n \* Use with `ViewEncapsulation.ShadowDom` to allow simple native\n \* content projection via `` elements.\n \*/\n @returns The root element.\n \*/\n abstract selectRootElement(selectorOrNode: string|any, preserveContent?: boolean): any;\n /\*\*\n \* Implement this callback to get the parent of a given node\n \* in the host element's DOM.\n \* @param node The child node to query.\n \* @returns The parent node, or null if there is no parent.\n \* For WebWorkers, always returns true.\n \* This is because the check is synchronous,\n \* and the caller can't rely on checking for null.\n \*/\n abstract parentNode(node: any): any;\n /\*\*\n \* Implement this callback to get the next sibling node of a given node\n \* in the host element's DOM.\n \* @returns The sibling node, or null if there is no sibling.\n \* For WebWorkers, always returns a value.\n \* This is because the check is synchronous,\n \* and the caller can't rely on checking for null.\n \*/\n abstract nextSibling(node: any): any;\n /\*\*\n \* Implement this callback to set an attribute value for an element in the DOM.\n \* @param el The element.\n \* @param name The attribute name.\n \* @param value The new value.\n \* @param namespace The namespace.\n \*/\n abstract setAttribute(el: any, name: string, value: string, namespace?: string|null): void;\n /\*\*\n \* Implement this callback to remove an attribute from an element in the DOM.\n \* @param el The element.\n \* @param name The attribute name.\n \* @param namespace The namespace.\n \*/\n abstract removeAttribute(el: any, name: string, namespace?: string|null): void;\n /\*\*\n \* Implement this callback to add a class to an element in the DOM.\n \* @param el The element.\n \* @param name The class name.\n \*/\n abstract addClass(el: any, name: string): void;\n /\*\*\n \* Implement this callback to remove a class from an element in the DOM.\n \* @param el The element.\n \* @param name The class name.\n \*/\n abstract removeClass(el: any, name: string): void;\n /\*\*\n \* Implement this callback to set a CSS style for an element in the DOM.\n \* @param el The element.\n \* @param style The name of the style.\n \* @param value The new value.\n \* @param flags Flags for style variations. No flags are set by default.\n \*/\n abstract setStyle(el: any, style: string, value: any, flags?: RendererStyleFlags2): void;\n /\*\*\n \* Implement this callback to remove the value from a CSS style for an element in the DOM.\n \* @param el The element.\n \* @param style The name of the style.\n \* @param flags Flags for style variations to remove, if set. ???\n \*/\n abstract removeStyle(el: any, style: string, flags?: RendererStyleFlags2): void;\n /\*\*\n \* Implement this callback to set the value of a property of an element in the DOM.\n \* @param el The element.\n \* @param name The property name.\n \* @param value The new value.\n \*/\n abstract setProperty(el: any, name: string, value: any): void;\n /\*\*\n \* Implement this callback to set the value of a node in the host element.\n \* @param node The node.\n \* @param value The new value.\n \*/\n abstract setValue(node: any, value: string): void;\n /\*\*\n \* Implement this callback to start an event listener.\n \* @param target The context in which to listen for events. Can be\n \* the entire window or document, the body of the document, or a specific\n \* DOM element.\n \* @param eventName The event to listen for.\n \* @param callback A handler function to invoke when the event occurs.\n \* @returns An "unlisten" function for disposing of this handler.\n \*/\n abstract listen(\n target: 'window'|'document'|'body'|any, eventName: string,\n callback: (event: any) => boolean | void): () => void;\n /\*\*\n \* @internal\n \* @nocollapse\n \*/\n static \_\_NG\_ELEMENT\_ID\_\_: () => Renderer2 = () =>

```

injectRenderer2();\n}\n\n/** Injects a Renderer2 for the current component. */\nexport function injectRenderer2():
  Renderer2 {\n // We need the Renderer to be based on the component that it's being injected into, however since\n // DI happens before we've entered its view, `getView` will return the parent view instead.\n const IView =
  getView();\n const tNode = getCurrentTNode(!);\n const nodeAtIndex =
  getComponentLViewByIndex(tNode.index, IView);\n return (isLView(nodeAtIndex) ? nodeAtIndex :
  IView)[RENDERER] as Renderer2;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n */\n\nimport {defineInjectable} from './di/interface/defs';\nimport {SecurityContext}
  from './security';\n\n/**\n * Sanitizer is used by the views to sanitize potentially dangerous values.\n *\n *
  @publicApi\n */\nexport abstract class Sanitizer {\n abstract sanitize(context: SecurityContext, value:
  { }|string|null): string|null;\n /** @nocollapse
  *\n static prov = /** @pureOrBreakMyCode */ defineInjectable({\n token: Sanitizer,\n providedIn: 'root',\n
  factory: () => null,\n });\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
  this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n */\n\n/**\n * @description Represents the version of Angular\n *\n * @publicApi\n */\nexport class Version {\n public readonly major: string;\n public readonly minor: string;\n public readonly
  patch: string;\n\n constructor(public full: string) {\n this.major = full.split('.')[0];\n this.minor =
  full.split('.')[1];\n this.patch = full.split('.')[2].join('.');\n }\n}\n\n/**\n * @publicApi\n */\nexport const
  VERSION = new Version('14.3.0');\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use
  of this source code is governed by an MIT-style license that can be\n * found in the LICENSE
  file at https://angular.io/license\n */\n\n// This default value is when checking the hierarchy for a token.\n\n// It
  means both:\n// - the token is not provided by the current injector,\n// - only the element injectors should be checked
  (ie do not check module injectors\n\n mod1\n\n \n\n el1 mod2\n\n \n\n el2\n\n\n//
  When requesting el2.injector.get(token), we should check in the following order and return the\n// first found
  value:\n// - el2.injector.get(token, default)\n// - el1.injector.get(token,
  NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR) -> do not check the module\n// -
  mod2.injector.get(token, default)\n\nexport const NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR =
  { }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
  governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport const ERROR_ORIGINAL_ERROR = 'ngOriginalError';\n\nexport
  function wrappedError(message: string, originalError: any): Error {\n const msg = `${message} caused by: ${\n
  originalError instanceof Error ? originalError.message : originalError}`;\n const error = Error(msg);\n (error as
  any)[ERROR_ORIGINAL_ERROR] = originalError;\n return error;\n}\n\nexport function getOriginalError(error:
  Error): Error {\n return (error as any)[ERROR_ORIGINAL_ERROR];\n}\n\n"/**\n * @license\n * Copyright
  Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
  * found in the LICENSE file at https://angular.io/license\n */\n\nimport {getOriginalError} from
  './util/errors';\n\n/**\n * Provides a hook for centralized exception handling.\n *\n * The default implementation of
  `ErrorHandler` prints error messages to the `console`. To\n * intercept error handling, write a custom exception
  handler that replaces this default as\n * appropriate for your app.\n *\n * @usageNotes\n * ### Example\n *\n *
  ```\n\n * class MyErrorHandler implements ErrorHandler {\n *   handleError(error) {\n *     // do something with the
  exception\n *   }\n * }\n *\n * @NgModule({\n *   providers: [{provide: ErrorHandler, useClass:
  MyErrorHandler}]\n * })\n * class MyModule {\n *   ```\n *\n * @publicApi\n */\nexport class ErrorHandler {\n
  /**\n * @internal\n */\n _console: Console = console;\n\n handleError(error: any): void {\n const originalError
  = this._findOriginalError(error);\n\n this._console.error('ERROR', error);\n if (originalError) {\n
  this._console.error('ORIGINAL ERROR', originalError);\n }\n }\n\n /** @internal\n */\n _findOriginalError(error: any): Error|null {\n let e = error && getOriginalError(error);\n while (e &&
  getOriginalError(e)) {\n e = getOriginalError(e);\n }\n\n return e || null;\n }\n}\n\n"/**\n * @license\n *

```

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```
export function normalizeDebugBindingName(name: string) {\n // Attribute names with `x` (eg `x-y`) are valid per spec, but unsupported by some browsers\n name = camelCaseToDashCase(name.replace(/[$@]/g, '_'));\n return `ng-reflect-${name}`;\n}\n\nconst CAMEL_CASE_REGEXP = /[A-Z]/g;\n\nfunction camelCaseToDashCase(input: string): string {\n return input.replace(CAMEL_CASE_REGEXP, (...m: any[]) => '-' + m[1].toLowerCase());\n}\n\nexport function normalizeDebugBindingValue(value: any): string {\n try {\n // Limit the size of the value as otherwise the DOM just gets polluted.\n return value != null ? value.toString().slice(0, 30) : value;\n } catch (e) {\n return '[ERROR] Exception while trying to serialize the value';\n }\n}\n\n"/>**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
```

```
import { RuntimeError, RuntimeErrorCode } from './errors';\nimport { Type } from './interface/type';\nimport { GetComponentDef } from './definition';\nimport { TNode } from './interfaces/node';\nimport { LView, TVIEW } from './interfaces/view';\nimport { INTERPOLATION_DELIMITER } from './util/misc_utils';\nimport { stringifyForError } from './util/stringify_utils';\n\n/** Verifies that a given type is a Standalone Component. */\nexport function assertStandaloneComponentType(type: Type<unknown>) {\n assertComponentDef(type);\n const componentDef = GetComponentDef(type!);\n if (!componentDef.standalone) {\n throw new RuntimeError(\n RuntimeErrorCode.TYPE_IS_NOT_STANDALONE,\n `The ${stringifyForError(type)} component is not marked as standalone,` +\n `but Angular expects to have a standalone component here.` +\n `Please make sure the ${stringifyForError(type)} component has` +\n `the \\`standalone: true\\` flag in the decorator.`);\n }\n}\n\n/** Verifies whether a given type is a component */\nexport function assertComponentDef(type: Type<unknown>) {\n if (!GetComponentDef(type)) {\n throw new RuntimeError(\n RuntimeErrorCode.MISSING_GENERATED_DEF,\n `The ${stringifyForError(type)} is not an Angular component,` +\n `make sure it has the \\`@Component\\` decorator.`);\n }\n}\n\n/** Called when there are multiple component selectors that match a given node */\nexport function throwMultipleComponentError(\n tNode: TNode, first: Type<unknown>, second: Type<unknown>): never {\n throw new RuntimeError(\n RuntimeErrorCode.MULTIPLE_COMPONENTS_MATCH,\n `Multiple components match node with tagname ${tNode.value}:` +\n ` ${stringifyForError(first)} and` +\n ` ${stringifyForError(second)}`);\n}\n\n/** Throws an ExpressionChangedAfterChecked error if checkNoChanges mode is on. */\nexport function throwErrorIfNoChangesMode(\n creationMode: boolean,\n oldValue: any, currValue: any, propName?: string): never {\n const field = propName ? ` for '${propName}'` : '';\n let msg = `ExpressionChangedAfterItHasBeenCheckedError: Expression has changed after it was checked. Previous value${field}: '${oldValue}'. Current value: '${currValue}'.`;\n if (creationMode) {\n msg += ` It seems like the view has been created after its parent and its children have been dirty checked.` +\n ` Has it been created in a change detection hook?`;\n }\n throw new\n\nRuntimeError(RuntimeErrorCode.EXPRESSION_CHANGED_AFTER_CHECKED, msg);\n}\n\nfunction constructDetailsForInterpolation(\n lView: LView, rootIndex: number, expressionIndex: number, meta: string, changedValue: any) {\n const [propName, prefix, ...chunks] = meta.split(INTERPOLATION_DELIMITER);\n let oldValue = prefix, newValue = prefix;\n for (let i = 0; i < chunks.length; i++) {\n const slotIdx = rootIndex + i;\n oldValue += `${lView[slotIdx]}${chunks[i]}`;\n\n newValue += `${slotIdx === expressionIndex ? changedValue : lView[slotIdx]}${chunks[i]}`;\n }\n return\n\n{ propName, oldValue, newValue };\n}\n\n/** Constructs an object that contains details for the ExpressionChangedAfterItHasBeenCheckedError:\n * - property name (for property bindings or interpolations)\n * - old and new values, enriched using information from metadata\n * - More information on the metadata storage format can be found in `storePropertyBindingMetadata`\n * - function description.\n */\nexport function getExpressionChangedErrorDetails(\n lView: LView, bindingIndex: number, oldValue: any, newValue: any):\n { propName?: string, oldValue: any, newValue: any } {\n const tData = lView[TVIEW].data;\n const metadata =
```



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tData[bindingIndex];\n\n if (typeof metadata === 'string') {\n // metadata for property interpolation\n if
(metadata.indexOf(INTERPOLATION_DELIMITER) > -1) {\n return constructDetailsForInterpolation(\n
IView, bindingIndex,
bindingIndex, metadata, newValue);\n } \n // metadata for property binding\n return {propName: metadata,
oldValue, newValue};\n }\n\n // metadata is not available for this expression, check if this expression is a part of
the\n // property interpolation by going from the current binding index left and look for a string that\n // contains
INTERPOLATION_DELIMITER, the layout in tView.data for this case will look like this:\n // [..., 'idPrefix and
suffix', null, null, null, ...]\n if (metadata === null) {\n let idx = bindingIndex - 1;\n while (typeof tData[idx] !==
'string' && tData[idx + 1] === null) {\n idx--;\n }\n const meta = tData[idx];\n if (typeof meta === 'string')
{\n const matches = meta.match(new RegExp(INTERPOLATION_DELIMITER, 'g'));\n // first interpolation
delimiter separates property name from interpolation parts (in case of\n // property interpolations), so we subtract
one from total number of found delimiters\n
if (matches && (matches.length - 1) > bindingIndex - idx) {\n return
constructDetailsForInterpolation(IView, idx, bindingIndex, meta, newValue);\n } \n } \n } \n return {propName:
undefined, oldValue, newValue};\n }\n\n", /*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {assertNotEqual} from './util/assert';\nimport {CharCode} from
'./util/char_code';\n\n/**\n * Returns an index of `classToSearch` in `className` taking token boundaries into
account.\n *\n * `classIndexof('AB A', 'A', 0)` will be 3 (not 0 since `AB!==A`)\n *\n * @param className A
string containing classes (whitespace separated)\n * @param classToSearch A class name to locate\n * @param
startIndex Starting location of search\n * @returns an index of the located class (or -1 if not found)\n */\nexport
function classIndexof(\n
className: string, classToSearch: string, startIndex: number): number {\n ngDevMode &&
assertNotEqual(classToSearch, "", 'can not look for "" string.);\n let end = className.length;\n while (true) {\n
const foundIndex = className.indexOf(classToSearch, startIndex);\n if (foundIndex === -1) return
foundIndex;\n if (foundIndex === 0 || className.charCodeAt(foundIndex - 1) <= CharCode.SPACE) {\n //
Ensure that it has leading whitespace\n const length = classToSearch.length;\n if (foundIndex + length ===
end ||\n className.charCodeAt(foundIndex + length) <= CharCode.SPACE) {\n // Ensure that it has
trailing whitespace\n return foundIndex;\n } \n } \n // False positive, keep searching from where we left
off.\n startIndex = foundIndex + 1;\n } \n }\n\n", /*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE
file at https://angular.io/license\n */\n\nimport './util/ng_dev_mode';\nimport {assertDefined, assertEqual,
assertNotEqual} from './util/assert';\nimport {AttributeMarker, TAttributes, TNode, TNodeType,
unusedValueExportToPlacateAjd as unused1} from './interfaces/node';\nimport {CssSelector, CssSelectorList,
SelectorFlags, unusedValueExportToPlacateAjd as unused2} from './interfaces/projection';\nimport {classIndexof}
from './styling/class_differ';\nimport {isNameOnlyAttributeMarker} from './util/attrs_utils';\n\nconst
unusedValueToPlacateAjd = unused1 + unused2;\n\nconst NG_TEMPLATE_SELECTOR = 'ng-template';\n\n/**\n * Search the `TAttributes` to see if it contains `cssClassToMatch` (case insensitive)\n *\n * @param attrs
`TAttributes` to search through.\n * @param cssClassToMatch class to match (lowercase)\n * @param
isProjectionMode Whether or not class matching should look into the attribute `class` in\n * addition to the
`AttributeMarker.Classes`\n */\nfunction isCssClassMatching(\n
attrs: TAttributes, cssClassToMatch: string, isProjectionMode: boolean): boolean {\n // TODO(misko): The fact
that this function needs to know about `isProjectionMode` seems suspect.\n // It is strange to me that sometimes the
class information comes in form of `class` attribute\n // and sometimes in form of `AttributeMarker.Classes`. Some
investigation is needed to determine\n // if that is the right behavior.\n ngDevMode &&\n assertEquals(\n
cssClassToMatch, cssClassToMatch.toLowerCase(), 'Class name expected to be lowercase.);\n let i = 0;\n while (i
< attrs.length) {\n let item = attrs[i++];\n if (isProjectionMode && item === 'class') {\n item = attrs[i] as

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string;\n    if (classIndexOf(item.toLowerCase(), cssClassToMatch, 0) !== -1) {\n        return true;\n    }\n } else
if (item === AttributeMarker.Classes) {\n    // We found the classes section. Start searching for the class.\n
while (i < attrs.length && typeof
    (item = attrs[i++]) === 'string') {\n        // while we have strings\n        if (item.toLowerCase() === cssClassToMatch)
return true;\n    }\n    return false;\n }\n }\n return false;\n}\n\n/**\n * Checks whether the `tNode` represents
an inline template (e.g. `*ngFor`).\n *\n * @param tNode current TNode\n */\nexport function
isInlineTemplate(tNode: TNode): boolean {\n    return tNode.type === TNodeType.Container && tNode.value !==
NG_TEMPLATE_SELECTOR;\n}\n\n/**\n * Function that checks whether a given tNode matches tag-based
selector and has a valid type.\n *\n * Matching can be performed in 2 modes: projection mode (when we project
nodes) and regular\n * directive matching mode:\n * - in the `directive matching` mode we do not take
TContainer's tagName into account if it is\n * different from NG_TEMPLATE_SELECTOR (value different from
NG_TEMPLATE_SELECTOR indicates that a\n * tag name was extracted from * syntax so we would match the
same directive twice);\n * - in the
`projection` mode, we use a tag name potentially extracted from the * syntax processing\n * (applicable to
TNodeType.Container only).\n */\nfunction hasTagAndTypeMatch(\n    tNode: TNode, currentSelector: string,
isProjectionMode: boolean): boolean {\n    const tagNameToCompare =\n        tNode.type === TNodeType.Container
&& !isProjectionMode ? NG_TEMPLATE_SELECTOR : tNode.value;\n    return currentSelector ===
tagNameToCompare;\n}\n\n/**\n * A utility function to match an Ivy node static data against a simple CSS
selector\n *\n * @param node static data of the node to match\n * @param selector The selector to try matching
against the node.\n * @param isProjectionMode If `true` we are matching for content projection, otherwise we are
doing\n * directive matching.\n * @returns true if node matches the selector.\n */\nexport function
isNodeMatchingSelector(\n    tNode: TNode, selector: CssSelector, isProjectionMode: boolean): boolean {\n
ngDevMode && assertDefined(selector[0], 'Selector
should have a tag name');\n    let mode: SelectorFlags = SelectorFlags.ELEMENT;\n    const nodeAttrs = tNode.attrs ||
[];\n\n    // Find the index of first attribute that has no value, only a name.\n    const nameOnlyMarkerIdx =
getNameOnlyMarkerIndex(nodeAttrs);\n\n    // When processing `:not` selectors, we skip to the next `:not` if the\n
// current one doesn't match\n    let skipToNextSelector = false;\n\n    for (let i = 0; i < selector.length; i++) {\n        const
current = selector[i];\n        if (typeof current === 'number') {\n            // If we finish processing a :not selector and it hasn't
failed, return false\n            if (!skipToNextSelector && !isPositive(mode) && !isPositive(current)) {\n                return
false;\n            }\n            // If we are skipping to the next :not() and this mode flag is positive,\n            // it's a part of the current
:not() selector, and we should keep skipping\n            if (skipToNextSelector && isPositive(current)) continue;\n            skipToNextSelector = false;\n            mode = (current
as number) | (mode & SelectorFlags.NOT);\n            continue;\n        }\n        if (skipToNextSelector) continue;\n\n        if
(mode & SelectorFlags.ELEMENT) {\n            mode = SelectorFlags.ATTRIBUTE | mode & SelectorFlags.NOT;\n            if (current !== " && !hasTagAndTypeMatch(tNode, current, isProjectionMode) ||\n                current === " &&
selector.length === 1) {\n                if (isPositive(mode)) return false;\n                skipToNextSelector = true;\n            }\n        } else
{\n            const selectorAttrValue = mode & SelectorFlags.CLASS ? current : selector[++i];\n\n            // special case for
matching against classes when a tNode has been instantiated with\n            // class and style values as separate attribute
values (e.g. ['title', CLASS, 'foo'])\n            if ((mode & SelectorFlags.CLASS) && tNode.attrs !== null) {\n                if
(!isCssClassMatching(tNode.attrs, selectorAttrValue as string, isProjectionMode)) {\n                    if (isPositive(mode))
return false;\n                    skipToNextSelector = true;\n                }\n                continue;\n            }\n            const attrName = (mode & SelectorFlags.CLASS) ? 'class' : current;\n            const
attrIndexInNode =\n                findAttrIndexInNode(attrName, nodeAttrs, isInlineTemplate(tNode),
isProjectionMode);\n\n            if (attrIndexInNode === -1) {\n                if (isPositive(mode)) return false;\n                skipToNextSelector = true;\n                continue;\n            }\n            if (selectorAttrValue !== "") {\n                let nodeAttrValue:
string;\n                if (attrIndexInNode > nameOnlyMarkerIdx) {\n                    nodeAttrValue = ";\n                } else {\n
ngDevMode && \n                    assertNotEqual(\n                        nodeAttrs[attrIndexInNode],
AttributeMarker.NamespaceURI,\n                        "We do not match directives on namespaced attributes");\n                // we

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lowercase the attribute value to be able to match\n      // selectors without case-sensitivity\n      // (selectors are
already in lowercase when generated)\n      nodeAttrValue = (nodeAttrs[attrIndexInNode +
1] as string).toLowerCase();\n      }\n\n      const compareAgainstClassName = mode & SelectorFlags.CLASS ?
nodeAttrValue : null;\n      if (compareAgainstClassName &&\n
classIndexOf(compareAgainstClassName, selectorAttrValue as string, 0) !== -1 ||\n      mode &
SelectorFlags.ATTRIBUTE && selectorAttrValue !== nodeAttrValue) {\n      if (isPositive(mode)) return false;\n
      skipToNextSelector = true;\n      }\n      }\n      }\n      }\n\n      return isPositive(mode) ||
skipToNextSelector;\n\n\nfunction isPositive(mode: SelectorFlags): boolean {\n return (mode &
SelectorFlags.NOT) === 0;\n}\n\n**\n * Examines the attribute's definition array for a node to find the index of
the\n * attribute that matches the given `name`.\n * NOTE: This will not match namespaced attributes.\n *\n * Attribute matching depends upon `isInlineTemplate` and `isProjectionMode`.\n * The following table summarizes
which types of attributes we attempt to match:\n *\n

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* Modes          | Normal Attributes | Bindings Attributes | Template Attributes | I18n\n * Attributes\n *
=====
=====
\n * Inline + Projection | YES          | YES          | NO          |
YES\n * -----
Directive | NO          | NO          | YES          | NO\n * -----
\n * Non-inline + Projection | YES          | YES          | NO
| YES\n * -----
\n * Non-inline +
Directive | YES
| YES          | NO          | YES\n *
=====

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\n *\n * @param name the name of the attribute to find\n * @param attrs the
attribute array to examine\n * @param isInlineTemplate true if the node being matched is an inline template (e.g.
`*ngFor`)\n * rather than a manually expanded template node (e.g. ``).\n * @param isProjectionMode
true if we are matching against content projection otherwise we are\n * matching against directives.\n */\nfunction
findAttrIndexInNode(\n  name: string, attrs: TAttributes|null, isInlineTemplate: boolean,\n  isProjectionMode:
boolean): number {\n  if (attrs === null) return -1;\n\n  let i = 0;\n\n  if (isProjectionMode || !isInlineTemplate) {\n
let bindingsMode = false;\n  while (i < attrs.length) {\n    const maybeAttrName = attrs[i];\n    if
(maybeAttrName === name) {\n      return i;\n    } else if (\n
      maybeAttrName === AttributeMarker.Bindings || maybeAttrName === AttributeMarker.I18n) {\n
bindingsMode = true;\n    } else if (\n      maybeAttrName === AttributeMarker.Classes || maybeAttrName ===
AttributeMarker.Styles) {\n      let value = attrs[++i];\n      // We should skip classes here because we have a
separate mechanism for\n      // matching classes in projection mode.\n      while (typeof value === 'string') {\n
value = attrs[++i];\n      }\n      continue;\n    } else if (maybeAttrName === AttributeMarker.Template) {\n
// We do not care about Template attributes in this scenario.\n      break;\n    } else if (maybeAttrName ===
AttributeMarker.NamespaceURI) {\n      // Skip the whole namespaced attribute and value. This is by design.\n
i += 4;\n      continue;\n    }\n    // In binding mode there are only names, rather than name-value pairs.\n    i +=
bindingsMode ? 1 : 2;\n  }\n  // We did not match the
attribute\n  return -1;\n } else {\n  return matchTemplateAttribute(attrs, name);\n }\n}\n\n\nexport function
isNodeMatchingSelectorList(\n  tNode: TNode, selector: CssSelectorList, isProjectionMode: boolean = false):
boolean {\n  for (let i = 0; i < selector.length; i++) {\n    if (isNodeMatchingSelector(tNode, selector[i],
isProjectionMode)) {\n      return true;\n    }\n  }\n  return false;\n}\n\n\nexport function
getProjectAsAttrValue(tNode: TNode): CssSelector|null {\n  const nodeAttrs = tNode.attrs;\n  if (nodeAttrs != null)
{\n    const ngProjectAsAttrIdx = nodeAttrs.indexOf(AttributeMarker.ProjectAs);\n    // only check for ngProjectAs
in attribute names, don't accidentally match attribute's value\n    // (attribute names are stored at even indexes)\n    if

```

```

((ngProjectAsAttrIdx & 1) === 0) {\n  return nodeAttrs[ngProjectAsAttrIdx + 1] as CssSelector;\n }
return null;\n}\n\nfunction getNameOnlyMarkerIndex(nodeAttrs: TAttributes) {\n for (let i = 0; i <
nodeAttrs.length;
i++) {\n  const nodeAttr = nodeAttrs[i];\n  if (isNameOnlyAttributeMarker(nodeAttr)) {\n  return i;\n }
return nodeAttrs.length;\n}\n\nfunction matchTemplateAttribute(attrs: TAttributes, name: string): number {\n let i =
attrs.indexOf(AttributeMarker.Template);\n if (i > -1) {\n  i++;\n  while (i < attrs.length) {\n  const attr =
attrs[i];\n  // Return in case we checked all template attrs and are switching to the next section in the\n  // attrs
array (that starts with a number that represents an attribute marker).\n  if (typeof attr === 'number') return -1;\n
if (attr === name) return i;\n  i++;\n }
return -1;\n}\n\n/**\n * Checks whether a selector is inside a
CssSelectorList\n * @param selector Selector to be checked.\n * @param list List in which to look for the
selector.\n */\nexport function isSelectorInSelectorList(selector: CssSelector, list: CssSelectorList): boolean {\n
selectorListLoop: for (let i
= 0; i < list.length; i++) {\n  const currentSelectorInList = list[i];\n  if (selector.length !==
currentSelectorInList.length) {\n  continue;\n }
for (let j = 0; j < selector.length; j++) {\n  if (selector[j]
!== currentSelectorInList[j]) {\n  continue selectorListLoop;\n }
}
return true;\n }
return
false;\n}\n\nfunction maybeWrapInNotSelector(isNegativeMode: boolean, chunk: string): string {\n return
isNegativeMode ? `!not(` + chunk.trim() + `)` : chunk;\n}\n\nfunction stringifyCSSSelector(selector: CssSelector):
string {\n let result = selector[0] as string;\n let i = 1;\n let mode = SelectorFlags.ATTRIBUTE;\n let
currentChunk = `);\n let isNegativeMode = false;\n while (i < selector.length) {\n let valueOrMarker =
selector[i];\n if (typeof valueOrMarker === 'string') {\n if (mode & SelectorFlags.ATTRIBUTE) {\n const
attrValue = selector[++i] as string;\n currentChunk += `[` + valueOrMarker + (attrValue.length
> 0 ? `=${` + attrValue + `}` : `)` + `];\n } else if (mode & SelectorFlags.CLASS) {\n currentChunk += `.` +
valueOrMarker;\n } else if (mode & SelectorFlags.ELEMENT) {\n currentChunk += ` ` + valueOrMarker;\n
}
} else {\n //\n // Append current chunk to the final result in case we come across SelectorFlag, which\n
// indicates that the previous section of a selector is over. We need to accumulate content\n // between flags to
make sure we wrap the chunk later in :not() selector if needed, e.g.\n // ``\n // [, Flags.CLASS, '.classA',
Flags.CLASS | Flags.NOT, '.classB', '.classC']\n // ``\n // should be transformed to `.classA :not(.classB
.classC)`.\n //\n // Note: for negative selector part, we accumulate content between flags until we find the\n
// next negative flag. This is needed to support a case where `:not()` rule contains more than\n // one chunk, e.g.
the following\n selector:\n // ``\n // [, Flags.ELEMENT | Flags.NOT, 'p', Flags.CLASS, 'foo', Flags.CLASS | Flags.NOT,
'bar']\n // ``\n // should be stringified to `:not(p.foo) :not(.bar)`\n //\n if (currentChunk !== ` ` &&
!isPositive(valueOrMarker)) {\n result += maybeWrapInNotSelector(isNegativeMode, currentChunk);\n
currentChunk = `);\n }
mode = valueOrMarker;\n // According to CssSelector spec, once we come across
`SelectorFlags.NOT` flag, the negative\n // mode is maintained for remaining chunks of a selector.\n
isNegativeMode = isNegativeMode || !isPositive(mode);\n }
i++;\n }
if (currentChunk !== `)` {\n result +=
maybeWrapInNotSelector(isNegativeMode, currentChunk);\n }
return result;\n}\n\n/**\n * Generates string
representation of CSS selector in parsed form.\n * @param ComponentDef and DirectiveDef are generated with the
selector in parsed form to avoid doing\n * additional parsing at runtime (for
example, for directive matching). However in some cases (for\n * example, while bootstrapping a component), a
string version of the selector is required to query\n * for the host element on the page. This function takes the parsed
form of a selector and returns\n * its string representation.\n * @param selectorList selector in parsed form\n *
@return string representation of a given selector\n */\nexport function stringifyCSSSelectorList(selectorList:
CssSelectorList): string {\n return selectorList.map(stringifyCSSSelector).join(',');\n}\n\n/**\n * Extracts attributes
and classes information from a given CSS selector.\n * @param This function is used while creating a component
dynamically. In this case, the host element\n * (that is created dynamically) should contain attributes and classes
specified in component's CSS\n * selector.\n * @param selector CSS selector in parsed form (in a form of
array)\n * @returns object with `attrs` and `classes` fields that contain extracted

```

```

information\n *^\nexport function extractAttrsAndClassesFromSelector(selector: CssSelector):\n  {attrs: string[],
classes: string[]} {\n  const attrs: string[] = [];\n  const classes: string[] = [];\n  let i = 1;\n  let mode =
SelectorFlags.ATTRIBUTE;\n  while (i < selector.length) {\n    let valueOrMarker = selector[i];\n    if (typeof
valueOrMarker === 'string') {\n      if (mode === SelectorFlags.ATTRIBUTE) {\n        if (valueOrMarker !== ") {\n
        attrs.push(valueOrMarker, selector[++i] as string);\n        }\n        } else if (mode === SelectorFlags.CLASS) {\n
        classes.push(valueOrMarker);\n        }\n        } else {\n          // According to CssSelector spec, once we come across
`SelectorFlags.NOT` flag, the negative\n          // mode is maintained for remaining chunks of a selector. Since
attributes and classes are\n          // extracted only for `"positive"` part of the selector, we can stop here.\n          if
(!isPositive(mode)) break;\n          mode = valueOrMarker;\n        }\n        }\n        i++;\n      }\n      return {attrs, classes};\n    }\n  },"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n^\nexport interface NO_CHANGE {\n  // This is a brand that ensures that this type can
never match anything else\n  __brand__: 'NO_CHANGE';\n}\n\n/** A special value which designates that a value
has not changed. *\n^\nexport const NO_CHANGE: NO_CHANGE =\n  (typeof ngDevMode === 'undefined' ||
ngDevMode) ? {__brand__: 'NO_CHANGE'} : ({} as NO_CHANGE);\n"},"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\nimport {assertGreaterThan} from '../util/assert';\nimport
{assertIndexInDeclRange} from '../assert';\nimport {executeCheckHooks, executeInitAndCheckHooks} from
'../hooks';\nimport
{FLAGS, InitPhaseState, LView, LViewFlags, TView} from '../interfaces/view';\nimport {getLView,
getSelectedIndex, getTView, isInCheckNoChangesMode, setSelectedIndex} from '../state';\n\n/**\n * Advances to
an element for later binding instructions.\n *\n * Used in conjunction with instructions like {@link property} to act
on elements with specified\n * indices, for example those created with {@link element} or {@link elementStart}.\n
*\n * ``ts\n * (rf: RenderFlags, ctx: any) => {\n *   if (rf & 1) {\n *     text(0, 'Hello');\n *     text(1, 'Goodbye')\n *
element(2, 'div');\n *   }\n *   if (rf & 2) {\n *     advance(2); // Advance twice to the <div>.\n *     property('title',
'test');\n *   }\n * }\n * ``\n *\n * @param delta Number of elements to advance forwards by.\n *\n * @codeGenApi\n
*\n^\nexport function advance(delta: number): void {\n  ngDevMode && assertGreaterThan(delta, 0, 'Can only
advance forward');\n  selectIndexInternal(\n    getTView(), getLView(), getSelectedIndex()\n    + delta, !!ngDevMode && isInCheckNoChangesMode());\n}\n\n^\nexport function selectIndexInternal(\n  tView:
TView, lView: LView, index: number, checkNoChangesMode: boolean) {\n  ngDevMode &&
assertIndexInDeclRange(lView, index);\n  // Flush the initial hooks for elements in the view that have been added
up to this point.\n  // PERF WARNING: do NOT extract this to a separate function without running benchmarks\n
if (!checkNoChangesMode) {\n    const hooksInitPhaseCompleted =\n      (lView[FLAGS] &
LViewFlags.InitPhaseStateMask) === InitPhaseState.InitPhaseCompleted;\n    if (hooksInitPhaseCompleted) {\n
      const preOrderCheckHooks = tView.preOrderCheckHooks;\n      if (preOrderCheckHooks !== null) {\n
        executeCheckHooks(lView, preOrderCheckHooks, index);\n      }\n    } else {\n      const preOrderHooks =
tView.preOrderHooks;\n      if (preOrderHooks !== null) {\n        executeInitAndCheckHooks(lView,
preOrderHooks, InitPhaseState.OnInitHooksToBeRun, index);\n      }\n    }\n  }\n}\n\n // We must set the selected index *after* running the hooks, because hooks may have side-
effects\n // that cause other template functions to run, thus updating the selected index, which is global\n // state. If
we run `setSelectedIndex` *before* we run the hooks, in some cases the selected index\n // will be altered by the
time we leave the `advance` instruction.\n  setSelectedIndex(index);\n}\n"},"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\nimport {resolveForwardRef} from '../forward_ref';\nimport
{inject, invalidFactoryDep} from '../injector_compatibility';\nimport {defineInjectable, defineInjector} from
'../interface/defs';\n\n/**\n * A mapping of the @angular/core API surface used in generated expressions to the
actual symbols.\n *\n * This should be kept up to date with the public exports

```



```

{Type} from './interface/type';\nimport {makeDecorator, TypeDecorator} from './util/decorators';\n\nimport
{ClassSansProvider, ConstructorSansProvider, ExistingSansProvider, FactorySansProvider,
StaticClassSansProvider, ValueSansProvider} from './interface/provider';\nimport {compileInjectable} from
'./jit/injectable';\n\nexport {compileInjectable};\n\n/**\n * Injectable providers used in `@Injectable` decorator.\n
*\n * @publicApi\n */\nexport type InjectableProvider =
ValueSansProvider|ExistingSansProvider|StaticClassSansProvider|\n
ConstructorSansProvider|FactorySansProvider|ClassSansProvider;\n\n/**\n * Type of the Injectable decorator /
constructor function.\n *\n * @publicApi\n */\nexport interface InjectableDecorator {\n /**\n * Decorator that
marks a class as available to be\n * provided and injected as a dependency.\n *\n * @see [Introduction to
Services and DI](guide/architecture-services)\n * @see [Dependency Injection Guide](guide/dependency-
injection)\n
*\n * @usageNotes\n *\n * Marking a class with `@Injectable` ensures that the compiler\n * will generate the
necessary metadata to create the class's\n * dependencies when the class is injected.\n *\n * The following
example shows how a service class is properly\n * marked so that a supporting service can be injected upon
creation.\n *\n * <code-example path="core/di/ts/metadata_spec.ts" region="Injectable"></code-example>\n
*\n */\n\n(): TypeDecorator;\n\n(options?: {providedIn: Type<any>|'root'|'platform'|'any'|null})&\n
InjectableProvider): TypeDecorator;\n\nnew(): Injectable;\n\nnew(options?: {providedIn:
Type<any>|'root'|'platform'|'any'|null})&\n\nInjectableProvider): Injectable;\n}\n\n/**\n * Type of the Injectable
metadata.\n *\n * @publicApi\n */\nexport interface Injectable {\n /**\n * Determines which injectors will
provide the injectable.\n *\n * - `Type<any>` - associates the injectable with an `@NgModule` or other
`InjectorType`,\n
*\n * - `null` : Equivalent to `undefined`. The injectable is not provided in any scope automatically\n * and must be
added to a `providers` array of an `[@NgModule](api/core/NgModule#providers)`,\n *
`[@Component](api/core/Directive#providers)` or `[@Directive](api/core/Directive#providers)`. \n *\n * The
following options specify that this injectable should be provided in one of the following\n * injectors:\n * - `root` :
The application-level injector in most apps.\n * - `platform` : A special singleton platform injector shared by all\n
* applications on the page.\n * - `any` : Provides a unique instance in each lazy loaded module while all eagerly
loaded\n * modules share one instance.\n *\n */\n\nprovidedIn?:
Type<any>|'root'|'platform'|'any'|null;\n}\n\n/**\n * Injectable decorator and metadata.\n *\n * @Annotation\n
*\n * @publicApi\n */\nexport const Injectable: InjectableDecorator = makeDecorator(\n\n'Injectable', undefined,
undefined, undefined,\n\n(type:
Type<any>, meta: Injectable) => compileInjectable(type as any, meta));\n\n",\n\n/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {flatten} from './util/array_utils';\nimport
{EMPTY_ARRAY} from './util/empty';\nimport {stringify} from './util/stringify';\n\nimport {Injector} from
'./injector';\nimport {StaticProvider} from './interface/provider';\nimport {importProvidersFrom} from
'./provider_collection';\nimport {getNullInjector, R3Injector} from './r3_injector';\nimport {InjectorScope} from
'./scope';\n\n/**\n * Create a new `Injector` which is configured using a `defType` of `InjectorType<any>`s.\n *\n
*\n * @publicApi\n */\nexport function createInjector(\n\n defType: /* InjectorType<any> */ any, parent: Injector|null =
null,\n\n additionalProviders: StaticProvider[]|null = null, name?: string): Injector {\n\n const
injector =\n\n createInjectorWithoutInjectorInstances(defType, parent, additionalProviders, name);\n\n
injector.resolveInjectorInitializers();\n\n return injector;\n}\n\n/**\n * Creates a new injector without eagerly
resolving its injector types. Can be used in places\n * where resolving the injector types immediately can lead to an
infinite loop. The injector types\n * should be resolved at a later point by calling `_resolveInjectorDefTypes`.\n
*\n * @publicApi\n */\nexport function createInjectorWithoutInjectorInstances(\n\n defType: /* InjectorType<any> */ any, parent:
Injector|null = null,\n\n additionalProviders: StaticProvider[]|null = null, name?: string,\n\n scopes = new
Set<InjectorScope>()): R3Injector {\n\n const providers = [\n\n additionalProviders || EMPTY_ARRAY,\n\n
importProvidersFrom(defType),\n\n ];\n\n name = name || (typeof defType === 'object' ? undefined :

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stringify(defType));\n\n return new R3Injector(providers, parent || getNullInjector(), name || null,
scopes);\n}\n", "/*\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{createInjector} from './create_injector';\nimport {THROW_IF_NOT_FOUND, inject} from
'/injector_compatibility';\nimport {InjectorMarkers} from './injector_marker';\nimport {INJECTOR} from
'/injector_token';\nimport {defineInjectable} from './interface/defs';\nimport {InjectFlags} from
'/interface/injector';\nimport {StaticProvider} from './interface/provider';\nimport {NullInjector} from
'/null_injector';\nimport {ProviderToken} from './provider_token';\n\n/**\n * Concrete injectors implement this
interface. Injectors are configured\n * with [providers](guide/glossary#provider) that associate\n * dependencies of
various types with [injection tokens](guide/glossary#di-token).\n *\n * @see ["DI Providers"](guide/dependency-
injection-providers).\n * @see `StaticProvider`\n
*\n * @usageNotes\n *\n * The following example creates a service injector instance.\n *\n * {@example
core/di/ts/provider_spec.ts region='ConstructorProvider'}\n *\n * ### Usage example\n *\n * {@example
core/di/ts/injector_spec.ts region='Injector'}\n *\n * `Injector` returns itself when given `Injector` as a token:\n *\n *
{@example core/di/ts/injector_spec.ts region='injectInjector'}\n *\n * @publicApi\n */\nexport abstract class
Injector {\n static THROW_IF_NOT_FOUND = THROW_IF_NOT_FOUND;\n static NULL: Injector = (/*
@__PURE__ */ new NullInjector());\n\n /**\n * Retrieves an instance from the injector based on the provided
token.\n * @returns The instance from the injector if defined, otherwise the `notFoundValue`.\n * @throws When
the `notFoundValue` is `undefined` or `Injector.THROW_IF_NOT_FOUND`.\n */\n abstract get<T>(token:
ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T;\n /**\n * @deprecated from v4.0.0 use
ProviderToken<T>\n * @suppress
{duplicate}\n */\n abstract get(token: any, notFoundValue?: any): any;\n\n /**\n * @deprecated from v5 use the
new signature Injector.create(options)\n */\n static create(providers: StaticProvider[], parent?: Injector):
Injector;\n\n /**\n * Creates a new injector instance that provides one or more dependencies,\n * according to a
given type or types of `StaticProvider`.\n *\n * @param options An object with the following properties:\n *
`providers`: An array of providers of the [StaticProvider type](api/core/StaticProvider).\n *
`parent`: (optional) A parent injector.\n *
`name`: (optional) A developer-defined identifying name for the new injector.\n *\n * @returns The new injector instance.\n *\n */\n static create(options: {providers: StaticProvider[], parent?:
Injector, name?: string}): Injector;\n\n static create(\n options: StaticProvider[] | {providers: StaticProvider[],
parent?: Injector, name?: string},\n parent?: Injector): Injector
{\n if (Array.isArray(options)) {\n return createInjector({name: ""}, parent, options, "");\n } else {\n const
name = options.name ?? "";\n return createInjector({name}, options.parent, options.providers, name);\n }\n
}\n\n /** @nocollapse */\n static prov = /** @pureOrBreakMyCode */ defineInjectable({\n token: Injector,\n
providedIn: 'any',\n factory: () => inject(INJECTOR),\n });\n\n /**\n * @internal\n * @nocollapse\n */\n
static __NG_ELEMENT_ID__ = InjectorMarkers.Injector;\n}\n", "/*\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style
license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Type} from
'./interface/type';\nimport {ERROR_ORIGINAL_ERROR, wrappedError} from './util/errors';\nimport {stringify} from
'./util/stringify';\nimport {ReflectiveInjector} from './reflective_injector';\nimport {ReflectiveKey} from
'./reflective_key';\n\nfunction findFirstClosedCycle(keys: any[]): any[] {\n const res: any[] = [];\n for (let i = 0; i <
keys.length; ++i) {\n if (res.indexOf(keys[i]) > -1) {\n res.push(keys[i]);\n return res;\n }\n
res.push(keys[i]);\n }\n return res;\n}\n\nfunction constructResolvingPath(keys: any[]): string {\n if (keys.length >
1) {\n const reversed = findFirstClosedCycle(keys.slice().reverse());\n const tokenStrs = reversed.map(k =>
stringify(k.token));\n return '(' + tokenStrs.join(' -> ') + ');\n }\n return "";\n}\n\nexport interface InjectionError
extends Error {\n keys: ReflectiveKey[];\n injectors: ReflectiveInjector[];\n constructResolvingMessage: (keys:
ReflectiveKey[]) => string;\n addKey(injector: ReflectiveInjector, key: ReflectiveKey): void;\n}\n\nfunction
injectionError(\n injector: ReflectiveInjector, key: ReflectiveKey,\n constructResolvingMessage: (keys:

```



```

ReflectiveKey[] => string, \n  originalError?: Error): InjectionError
  {\n  const keys = [key];\n  const errMsg = constructResolvingMessage(keys);\n  const error =\n    (originalError ?
wrappedError(errMsg, originalError) : Error(errMsg)) as InjectionError;\n  error.addKey = addKey;\n  error.keys =
keys;\n  error.injectors = [injector];\n  error.constructResolvingMessage = constructResolvingMessage;\n  (error as
any)[ERROR_ORIGINAL_ERROR] = originalError;\n  return error;\n}\n\nfunction addKey(this: InjectionError,
injector: ReflectiveInjector, key: ReflectiveKey): void {\n  this.injectors.push(injector);\n  this.keys.push(key);\n  //
Note: This updated message won't be reflected in the `stack` property\n  this.message =
this.constructResolvingMessage(this.keys);\n}\n\n/**\n * Thrown when trying to retrieve a dependency by key from
{@link Injector}, but the\n * {@link Injector} does not have a {@link Provider} for the given key.\n *\n *
@usageNotes\n * ### Example\n *\n * ```typescript\n * class A {\n *   constructor(b:B) {\n *   }\n * }\n *\n *
expect(() => Injector.resolveAndCreate([A])).toThrowError();\n *\n * ```\n *\n */\nexport function
noProviderError(injector: ReflectiveInjector, key: ReflectiveKey): InjectionError {\n  return injectionError(injector,
key, function(keys: ReflectiveKey[]) {\n    const first = stringify(keys[0].token);\n    return `No provider for
${first}!${constructResolvingPath(keys)}`;\n  });\n}\n\n/**\n * Thrown when dependencies form a cycle.\n *\n *
@usageNotes\n * ### Example\n *\n * ```typescript\n * var injector = Injector.resolveAndCreate([\n *   {provide:
'one', useFactory: (two) => 'two'},\n *   {provide: 'two', useFactory: (one) =>
'one'},\n *   {provide: 'one', useFactory: (two) => 'two'}\n * ]);\n *\n * expect(() => injector.get('one')).toThrowError();\n *\n * ```\n *\n *
Retrieving `A` or `B` throws a `CyclicDependencyError` as the graph above cannot be constructed.\n *\n */\nexport
function cyclicDependencyError(\n  injector: ReflectiveInjector, key: ReflectiveKey): InjectionError
  {\n  return injectionError(injector, key, function(keys: ReflectiveKey[]) {\n    return `Cannot instantiate cyclic
dependency!${constructResolvingPath(keys)}`;\n  });\n}\n\n/**\n * Thrown when a constructing type returns with
an Error.\n *\n * The `InstantiationError` class contains the original error plus the dependency graph which caused\n
* this object to be instantiated.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * class A {\n *
  constructor() {\n *    throw new Error('message');\n *  }\n * }\n *\n * var injector =
Injector.resolveAndCreate([A]);\n *\n * try {\n *   injector.get(A);\n * } catch (e) {\n *   expect(e instanceof
InstantiationError).toBe(true);\n *   expect(e.originalException.message).toEqual('message');\n *   expect(e.originalStack).toBeDefined();\n * }\n *\n * ```\n *\n */\nexport function instantiationError(\n  injector:
ReflectiveInjector, originalException: any, originalStack: any, \n  key: ReflectiveKey): InjectionError {\n  return
injectionError(injector,
key, function(keys: ReflectiveKey[]) {\n    const first = stringify(keys[0].token);\n    return
`${originalException.message}: Error during instantiation of ${first}!${\n    constructResolvingPath(keys)}`;\n  },
originalException);\n}\n\n/**\n * Thrown when an object other than {@link Provider} (or `Type`) is passed to
{@link Injector}\n * creation.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * expect(() =>
Injector.resolveAndCreate(['not a type'])).toThrowError();\n *\n * ```\n *\n */\nexport function
invalidProviderError(provider: any) {\n  return Error(\n    `Invalid provider - only instances of Provider and Type
are allowed, got: ${provider}`);\n}\n\n/**\n * Thrown when the class has no annotation information.\n *\n * Lack of
annotation information prevents the {@link Injector} from determining which dependencies\n * need to be injected
into the constructor.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * class A {\n *   constructor(b)
{\n *   }\n *\n *   }\n *\n * expect(() => Injector.resolveAndCreate([A])).toThrowError();\n *\n * ```\n *\n * This error is also thrown
when the class not marked with {@link Injectable} has parameter types.\n *\n * ```typescript\n * class B {\n * }\n *\n *
class A {\n *   constructor(b:B) {\n *   } // no information about the parameter types of A is available at runtime.\n * }\n *\n *
expect(() => Injector.resolveAndCreate([A,B])).toThrowError();\n *\n * ```\n *\n */\nexport function
noAnnotationError(typeOrFunc: Type<any>|Function, params: any[]): Error {\n  const signature: string[] = [];\n
for (let i = 0, ii = params.length; i < ii; i++) {\n    const parameter = params[i];\n    if (!parameter || parameter.length
== 0) {\n      signature.push('?');\n    } else {\n      signature.push(parameter.map(stringify).join(' '));\n    }\n  }\n
return Error(\n    `Cannot resolve all parameters for \\` + stringify(typeOrFunc) + \\`(' +\n    signature.join(', ') + ')`.
'\n  +\n    `Make sure that all the parameters are decorated`

```



```

ResolvedReflectiveProvider {\n /**\n * A key, usually a `Type<any>`.\n */\n key: ReflectiveKey;\n /**\n * Factory function which can return an instance of an object represented by a key.\n */\n resolvedFactories: ResolvedReflectiveFactory[];\n /**\n * Indicates if the provider is a multi-provider or a regular provider.\n */\n multiProvider: boolean;\n}\n\nexport class ResolvedReflectiveProvider_ implements ResolvedReflectiveProvider {\n readonly resolvedFactory: ResolvedReflectiveFactory;\n\n constructor(\n public key: ReflectiveKey, public resolvedFactories: ResolvedReflectiveFactory[],\n public multiProvider: boolean) {\n this.resolvedFactory = this.resolvedFactories[0];\n }\n}\n\n/**\n * An internal resolved representation of a factory function created by resolving `Provider`.\n\n * @publicApi\n */\nexport class ResolvedReflectiveFactory {\n constructor(\n /**\n * Factory function which can return an instance of an object represented by a key.\n */\n public factory: Function,\n /**\n * Arguments (dependencies) to the `factory` function.\n */\n public dependencies: ReflectiveDependency[])\n {}\n}\n\n/**\n * Resolve a single provider.\n */\nfunction resolveReflectiveFactory(provider: NormalizedProvider): ResolvedReflectiveFactory {\n let factoryFn: Function;\n let resolvedDeps: ReflectiveDependency[];\n if (provider.useClass) {\n const useClass = resolveForwardRef(provider.useClass);\n factoryFn = getReflect().factory(useClass);\n resolvedDeps = _dependenciesFor(useClass);\n } else if (provider.useExisting) {\n factoryFn = (aliasInstance: any) => aliasInstance;\n resolvedDeps = [ReflectiveDependency.fromKey(ReflectiveKey.get(provider.useExisting))];\n } else if (provider.useFactory) {\n factoryFn = provider.useFactory;\n resolvedDeps = constructDependencies(provider.useFactory, provider.deps);\n } else {\n factoryFn = () => provider.useValue;\n resolvedDeps = _EMPTY_LIST;\n }\n return new ResolvedReflectiveFactory(factoryFn, resolvedDeps);\n}\n\n/**\n * Converts the `Provider` into `ResolvedProvider`.\n */\nfunction resolveReflectiveProvider(provider: NormalizedProvider): ResolvedReflectiveProvider {\n return new ResolvedReflectiveProvider_(\n ReflectiveKey.get(provider.provide), [resolveReflectiveFactory(provider)],\n provider.multi || false);\n}\n\n/**\n * Resolve a list of Providers.\n */\nexport function resolveReflectiveProviders(providers: Provider[]): ResolvedReflectiveProvider[] {\n const normalized = _normalizeProviders(providers, []);\n const resolved = normalized.map(resolveReflectiveProvider);\n const resolvedProviderMap = mergeResolvedReflectiveProviders(resolved, new Map());\n return Array.from(resolvedProviderMap.values());\n}\n\n/**\n * Merges a list of ResolvedProviders into a list where each key is contained exactly once and\n * multi providers have been merged.\n */\nexport function mergeResolvedReflectiveProviders(\n providers: ResolvedReflectiveProvider[],\n normalizedProvidersMap: Map<number, ResolvedReflectiveProvider>):\n Map<number, ResolvedReflectiveProvider> {\n for (let i = 0; i < providers.length; i++) {\n const provider = providers[i];\n const existing = normalizedProvidersMap.get(provider.key.id);\n if (existing) {\n if (provider.multiProvider !== existing.multiProvider) {\n throw mixingMultiProvidersWithRegularProvidersError(existing, provider);\n }\n if (provider.multiProvider) {\n for (let j = 0; j < provider.resolvedFactories.length; j++) {\n existing.resolvedFactories.push(provider.resolvedFactories[j]);\n }\n } else {\n normalizedProvidersMap.set(provider.key.id, provider);\n }\n } else {\n let resolvedProvider: ResolvedReflectiveProvider;\n if (provider.multiProvider) {\n resolvedProvider = new ResolvedReflectiveProvider_(\n provider.key, provider.resolvedFactories.slice(), provider.multiProvider);\n } else {\n resolvedProvider = provider;\n }\n normalizedProvidersMap.set(provider.key.id, resolvedProvider);\n }\n }\n return normalizedProvidersMap;\n}\n\nfunction _normalizeProviders(\n providers: Provider[], res: NormalizedProvider[]): NormalizedProvider[] {\n providers.forEach(b => {\n if (b instanceof Type) {\n res.push({provide: b, useClass: b} as NormalizedProvider);\n } else if (b && typeof b === 'object' && (b as any).provide !== undefined) {\n res.push(b as NormalizedProvider);\n } else if (Array.isArray(b)) {\n _normalizeProviders(b, res);\n } else {\n throw invalidProviderError(b);\n }\n }\n }

```

```

    }
  };
  return res;
}

export function constructDependencies(
  typeOrFunc: any, dependencies?:
  any[]): ReflectiveDependency[] {
  if (!dependencies) {
    return _dependenciesFor(typeOrFunc);
  } else {
    const params: any[][] = dependencies.map(t => [t]);
    return dependencies.map(t => _extractToken(typeOrFunc, t,
      params));
  }
}

function _dependenciesFor(typeOrFunc: any): ReflectiveDependency[] {
  const params =
  getReflect().parameters(typeOrFunc);
  if (!params) return [];
  if (params.some(p => p == null)) {
    throw
    noAnnotationError(typeOrFunc, params);
  }
  return params.map(p => _extractToken(typeOrFunc, p,
    params));
}

function _extractToken(
  typeOrFunc: any, metadata: any[]|any, params: any[][]):
  ReflectiveDependency {
  let token: any = null;
  let optional = false;

  if (!Array.isArray(metadata)) {
    if
    (metadata instanceof Inject) {
      return _createDependency(metadata.token, optional, null);
    } else
    {
      return _createDependency(metadata, optional, null);
    }
  }

  let visibility: Self|SkipSelf|null = null;
  for (let i = 0; i < metadata.length; ++i) {
    const paramMetadata = metadata[i];
    if (paramMetadata instanceof
      Type) {
      token = paramMetadata;
    } else if (paramMetadata instanceof Inject) {
      token =
      paramMetadata.token;
    } else if (paramMetadata instanceof Optional) {
      optional = true;
    } else if
    (paramMetadata instanceof Self || paramMetadata instanceof SkipSelf) {
      visibility = paramMetadata;
    } else if
    (paramMetadata instanceof InjectionToken) {
      token = paramMetadata;
    }
  }

  token =
  resolveForwardRef(token);
  if (token != null) {
    return _createDependency(token, optional, visibility);
  }
  else {
    throw noAnnotationError(typeOrFunc, params);
  }
}

function _createDependency(
  token: any,
  optional: boolean, visibility: Self|SkipSelf|null): ReflectiveDependency {
  return
  new ReflectiveDependency(ReflectiveKey.get(token), optional, visibility);
}

/**
 * @license
 * Copyright
  Google LLC All Rights Reserved.
  * Use of this source code is governed by an MIT-style license that can be
  * found in the LICENSE file at https://angular.io/license
  */
import {Injector} from './injector';
import
  {THROW_IF_NOT_FOUND} from './injector_compatibility';
import {Provider} from
  './interface/provider';
import {Self, SkipSelf} from './metadata';
import {cyclicDependencyError,
  instantiationError, noProviderError, outOfBoundsError} from './reflective_errors';
import {ReflectiveKey} from
  './reflective_key';
import {ReflectiveDependency, ResolvedReflectiveFactory, ResolvedReflectiveProvider,
  resolveReflectiveProviders} from './reflective_provider';

// Threshold for the dynamic version
const
  UNDEFINED = {};

/**
 * A ReflectiveDependency injection container used for instantiating objects and
  resolving
  * dependencies.
  * An `Injector` is
  a replacement for a `new` operator, which can automatically resolve the
  * constructor dependencies.
  * In
  typical use, application code asks for the dependencies in the constructor and they are
  * resolved by the
  `Injector`.
  * @usageNotes
  * ### Example
  * The following example creates an `Injector` configured to
  create `Engine` and `Car`.
  * ```typescript
  * @Injectable()
  * class Engine {
  * }
  * @Injectable()
  * class Car {
  *   constructor(public engine: Engine) {}
  * }
  * var injector =
  ReflectiveInjector.resolveAndCreate([Car, Engine]);
  * var car = injector.get(Car);
  * expect(car instanceof
  Car).toBe(true);
  * expect(car.engine instanceof Engine).toBe(true);
  * ```
  * Notice, we don't use the `new`
  operator because we explicitly want to have the `Injector`
  * resolve all of the object's dependencies
  automatically.
  * TODO: delete in v14.
  * @deprecated from v5 - slow and brings in a lot of code, Use
  `Injector.create`
  instead.
  * @publicApi
  */
export abstract class ReflectiveInjector implements Injector {
  /**
  * Turns an
  array of provider definitions into an array of resolved providers.
  *
  * A resolution is a process of flattening
  multiple nested arrays and converting individual
  * providers into an array of `ResolvedReflectiveProvider`s.
  *
  * @usageNotes
  * ### Example
  * ```typescript
  * @Injectable()
  * class Engine {
  * }
  * @Injectable()
  * class Car {
  *   constructor(public engine: Engine) {}
  * }
  * var providers =
  ReflectiveInjector.resolve([Car, [[Engine]]]);
  * expect(providers.length).toEqual(2);
  * expect(providers[0] instanceof ResolvedReflectiveProvider).toBe(true);
  * expect(providers[0].key.displayName).toBe("Car");
  * expect(providers[0].dependencies.length).toEqual(1);
  * expect(providers[0].factory).toBeDefined();
  * expect(providers[1].key.displayName).toBe("Engine");
  */

```

```

    * });\n * ```\n * \n * \n static resolve(providers: Provider[]): ResolvedReflectiveProvider[] {\n return
resolveReflectiveProviders(providers);\n } \n\n /**\n * Resolves an array of providers and creates an injector from
those providers.\n * \n * The passed-in providers can be an array of `Type`, `Provider`, \n * or a recursive array of
more providers.\n * \n * @usageNotes\n * ### Example\n * \n * ```\ntypescript\n * @Injectable()\n * class
Engine {\n * }\n * \n * @Injectable()\n * class Car {\n * constructor(public engine:Engine) {\n * }\n * }\n * \n
* var injector = ReflectiveInjector.resolveAndCreate([Car, Engine]);\n * expect(injector.get(Car) instanceof
Car).toBe(true);\n * ```\n * \n * \n static resolveAndCreate(providers: Provider[], parent?: Injector): ReflectiveInjector
{\n const ResolvedReflectiveProviders = ReflectiveInjector.resolve(providers);\n return
ReflectiveInjector.fromResolvedProviders(ResolvedReflectiveProviders,
parent);\n } \n\n /**\n * Creates an injector from previously resolved providers.\n * \n * This API is the
recommended way to construct injectors in performance-sensitive parts.\n * \n * @usageNotes\n * ###
Example\n * \n * ```\ntypescript\n * @Injectable()\n * class Engine {\n * }\n * \n * @Injectable()\n * class
Car {\n * constructor(public engine:Engine) {\n * }\n * }\n * \n * var providers = ReflectiveInjector.resolve([Car,
Engine]);\n * var injector = ReflectiveInjector.fromResolvedProviders(providers);\n * expect(injector.get(Car)
instanceof Car).toBe(true);\n * ```\n * \n * \n static fromResolvedProviders(providers: ResolvedReflectiveProvider[],
parent?: Injector):\n ReflectiveInjector {\n return new ReflectiveInjector_(providers, parent);\n } \n\n\n /**\n
* Parent of this injector.\n * \n * <!-- TODO: Add a link to the section of the user guide talking about hierarchical
injection.\n * -->\n * \n * \n abstract get parent(): Injector|null;\n\n
/**\n * Resolves an array of providers and creates a child injector from those providers.\n * \n * <!-- TODO:
Add a link to the section of the user guide talking about hierarchical injection.\n * -->\n * \n * The passed-in
providers can be an array of `Type`, `Provider`, \n * or a recursive array of more providers.\n * \n *
@usageNotes\n * ### Example\n * \n * ```\ntypescript\n * class ParentProvider {\n * }\n * class ChildProvider {\n
* }\n * \n * var parent = ReflectiveInjector.resolveAndCreate([ParentProvider]);\n * var child =
parent.resolveAndCreateChild([ChildProvider]);\n * \n * expect(child.get(ParentProvider) instanceof
ParentProvider).toBe(true);\n * expect(child.get(ChildProvider) instanceof ChildProvider).toBe(true);\n *
expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));\n * ```\n * \n * \n abstract
resolveAndCreateChild(providers: Provider[]): ReflectiveInjector;\n\n /**\n * Creates a child injector from
previously resolved
providers.\n * \n * <!-- TODO: Add a link to the section of the user guide talking about hierarchical injection.\n
* -->\n * \n * This API is the recommended way to construct injectors in performance-sensitive parts.\n * \n *
@usageNotes\n * ### Example\n * \n * ```\ntypescript\n * class ParentProvider {\n * }\n * class ChildProvider {\n
* }\n * \n * var parentProviders = ReflectiveInjector.resolve([ParentProvider]);\n * var childProviders =
ReflectiveInjector.resolve([ChildProvider]);\n * \n * var parent =
ReflectiveInjector.fromResolvedProviders(parentProviders);\n * var child =
parent.createChildFromResolved(childProviders);\n * \n * expect(child.get(ParentProvider) instanceof
ParentProvider).toBe(true);\n * expect(child.get(ChildProvider) instanceof ChildProvider).toBe(true);\n *
expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));\n * ```\n * \n * \n abstract
createChildFromResolved(providers: ResolvedReflectiveProvider[]): ReflectiveInjector;\n\n
/**\n * Resolves a provider and instantiates an object in the context of the injector.\n * \n * The created object
does not get cached by the injector.\n * \n * @usageNotes\n * ### Example\n * \n * ```\ntypescript\n *
@Injectable()\n * class Engine {\n * }\n * \n * @Injectable()\n * class Car {\n * constructor(public
engine:Engine) {\n * }\n * }\n * \n * var injector = ReflectiveInjector.resolveAndCreate([Engine]);\n * \n * var car
= injector.resolveAndInstantiate(Car);\n * expect(car.engine).toBe(injector.get(Engine));\n *
expect(car).not.toBe(injector.resolveAndInstantiate(Car));\n * ```\n * \n * \n abstract resolveAndInstantiate(provider:
Provider): any;\n\n /**\n * Instantiates an object using a resolved provider in the context of the injector.\n * \n *
The created object does not get cached by the injector.\n * \n * @usageNotes\n * ### Example\n * \n *
```\ntypescript\n * @Injectable()\n * class Engine {\n * }\n * \n

```

```

    * @Injectable()\n    * class Car {\n    *     constructor(public engine:Engine) {}\n    * }\n    * \n    * var injector =
ReflectiveInjector.resolveAndCreate([Engine]);\n    * var carProvider = ReflectiveInjector.resolve([Car])[0];\n    * var
car = injector.instantiateResolved(carProvider);\n    * expect(car.engine).toBe(injector.get(Engine));\n    *
expect(car).not.toBe(injector.instantiateResolved(carProvider));\n    * ```\n    */\n    abstract
instantiateResolved(provider: ResolvedReflectiveProvider): any;\n\n    abstract get(token: any, notFoundValue?:
any): any;\n\n    export class ReflectiveInjector_ implements ReflectiveInjector {\n    private static INJECTOR_KEY
= (/ * @__PURE__ */ ReflectiveKey.get(Injector));\n\n    /** @internal */\n    _constructionCounter: number = 0;\n\n    /**
@internal */\n    public _providers: ResolvedReflectiveProvider[];\n    public readonly parent: Injector|null;\n\n    keyIds: number[];\n    objs: any[];\n\n    /**\n    * Private\n    */\n    constructor(_providers: ResolvedReflectiveProvider[],
_parent?: Injector) {\n    this._providers = _providers;\n    this.parent = _parent || null;\n\n    const len =
_providers.length;\n\n    this.keyIds = [];\n    this.objs = [];\n\n    for (let i = 0; i < len; i++) {\n    this.keyIds[i] =
_providers[i].key.id;\n    this.objs[i] = UNDEFINED;\n    }\n\n    get(token: any, notFoundValue: any =
THROW_IF_NOT_FOUND): any {\n    return this._getByKey(ReflectiveKey.get(token), null, notFoundValue);\n
}\n\n    resolveAndCreateChild(providers: Provider[]): ReflectiveInjector {\n    const ResolvedReflectiveProviders =
ReflectiveInjector.resolve(providers);\n    return this.createChildFromResolved(ResolvedReflectiveProviders);\n
}\n\n    createChildFromResolved(providers: ResolvedReflectiveProvider[]): ReflectiveInjector {\n    const inj = new
ReflectiveInjector_(providers);\n    (inj as {parent: Injector | null}).parent = this;\n    return inj;\n
}\n\n    resolveAndInstantiate(provider: Provider): any {\n    return
this.instantiateResolved(ReflectiveInjector.resolve([provider])[0]);\n
}\n\n    instantiateResolved(provider: ResolvedReflectiveProvider): any {\n    return
this._instantiateProvider(provider);\n
}\n\n    getProviderAtIndex(index: number): ResolvedReflectiveProvider {\n    if (index < 0 || index >= this._providers.length) {\n    throw outOfBoundsError(index);\n
}\n    return
this._providers[index];\n
}\n\n    /** @internal */\n    _new(provider: ResolvedReflectiveProvider): any {\n    if
(this._constructionCounter++ > this._getMaxNumberOfObjects()) {\n    throw cyclicDependencyError(this,
provider.key);\n
}\n    return this._instantiateProvider(provider);\n
}\n\n    private _getMaxNumberOfObjects():
number {\n    return this.objs.length;\n
}\n\n    private _instantiateProvider(provider: ResolvedReflectiveProvider):
any {\n    if (provider.multiProvider) {\n    const res = [];\n    for (let i = 0; i < provider.resolvedFactories.length;
++i) {\n    res[i] = this._instantiate(provider, provider.resolvedFactories[i]);\n
}\n    return res;\n
}\n    else {\n    return this._instantiate(provider, provider.resolvedFactories[0]);\n
}\n
}\n\n    private _instantiate(\n    provider: ResolvedReflectiveProvider,\n    ResolvedReflectiveFactory:
ResolvedReflectiveFactory): any {\n    const factory = ResolvedReflectiveFactory.factory;\n\n    let deps: any[];\n    try {\n    deps =\n        ResolvedReflectiveFactory.dependencies.map(dep =>
this._getByReflectiveDependency(dep));\n    } catch (e: any) {\n    if (e.addKey) {\n    e.addKey(this,
provider.key);\n    }\n    throw e;\n
}\n\n    let obj: any;\n    try {\n    obj = factory(...deps);\n    } catch (e) {\n    throw instantiationError(this, e, (e as Error).stack, provider.key);\n
}\n\n    return obj;\n
}\n\n    private
_getByReflectiveDependency(dep: ReflectiveDependency): any {\n    return this._getByKey(dep.key, dep.visibility,
dep.optional ? null : THROW_IF_NOT_FOUND);\n
}\n\n    private _getByKey(key:
ReflectiveKey, visibility: Self|SkipSelf|null, notFoundValue: any): any {\n    if (key ===
ReflectiveInjector_.INJECTOR_KEY) {\n    return this;\n
}\n\n    if (visibility instanceof Self) {\n    return
this._getByKeySelf(key, notFoundValue);\n
}\n    else {\n    return this._getByKeyDefault(key, notFoundValue,
visibility);\n
}\n
}\n\n    private _getObjByKeyId(keyId: number): any {\n    for (let i = 0; i < this.keyIds.length;
i++) {\n    if (this.keyIds[i] === keyId) {\n    if (this.objs[i] === UNDEFINED) {\n    this.objs[i] =
this._new(this._providers[i]);\n
}\n\n    return this.objs[i];\n
}\n
}\n\n    return UNDEFINED;\n
}\n\n    /** @internal */\n    _throwOrNull(key: ReflectiveKey, notFoundValue: any): any {\n    if (notFoundValue !==
THROW_IF_NOT_FOUND) {\n    return notFoundValue;\n
}\n    else {\n    throw noProviderError(this, key);\n
}\n
}\n
}\n\n    /** @internal */\n    _getByKeySelf(key: ReflectiveKey, notFoundValue: any): any {\n    const
obj = this._getObjByKeyId(key.id);\n    return (obj !== UNDEFINED) ? obj : this._throwOrNull(key,
notFoundValue);\n
}\n\n    /** @internal */\n    _getByKeyDefault(key: ReflectiveKey, notFoundValue: any,

```

```

visibility: Self|SkipSelf|null): any {\n  let inj: Injector|null;\n\n  if (visibility instanceof SkipSelf) {\n    inj = this.parent;\n  } else {\n    inj = this;\n  }\n\n  while (inj instanceof ReflectiveInjector_) {\n    const inj_ = <ReflectiveInjector_>inj;\n    const obj = inj._getObjByKeyId(key.id);\n    if (obj !== UNDEFINED) return obj;\n    inj = inj._parent;\n  }\n\n  if (inj !== null) {\n    return inj.get(key.token, notFoundValue);\n  } else {\n    return this._throwOrNull(key, notFoundValue);\n  }\n}\n\nget displayName(): string {\n  const providers =\n    _mapProviders(this, (b: ResolvedReflectiveProvider) => `${b.key.displayName}`)\n    .join(', ');\n  return `ReflectiveInjector(providers: [${providers}])`;\n}\n\ntoString(): string {\n  return this.displayName;\n}\n}\n\nfunction _mapProviders(injector: ReflectiveInjector_, fn: Function): any[] {\n  const res: any[] = [];\n  for (let i = 0; i < injector._providers.length; ++i) {\n    res[i] = fn(injector.getProviderAtIndex(i));\n  }\n  return res;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n * @module\n * @description\n * The `di` module provides dependency injection container services.\n */\n\nexport * from './metadata';\nexport {InjectFlags} from './interface/injector';\nexport {defineInjectable, defineInjectable, defineInjector, InjectableType, InjectorType} from './interface/defs';\nexport {forwardRef, resolveForwardRef, ForwardRefFn} from './forward_ref';\nexport {Injectable, InjectableDecorator, InjectableProvider} from './injectable';\nexport {Injector} from './injector';\nexport {EnvironmentInjector} from './r3_injector';\nexport {importProvidersFrom, ImportProvidersSource} from './provider_collection';\nexport {ENVIRONMENT_INITIALIZER} from './initializer_token';\nexport {ProviderToken} from './provider_token';\nexport {inject, inject, InjectOptions, invalidFactoryDep} from './injector_compatibility';\nexport {INJECTOR} from './injector_token';\nexport {ReflectiveInjector} from './reflective_injector';\nexport {ClassProvider, ModuleWithProviders, ClassSansProvider, ImportedNgModuleProviders, ConstructorProvider, ConstructorSansProvider, ExistingProvider, ExistingSansProvider, FactoryProvider, FactorySansProvider, Provider, StaticClassProvider, StaticClassSansProvider, StaticProvider, TypeProvider, ValueProvider, ValueSansProvider} from './interface/provider';\nexport {ResolvedReflectiveFactory, ResolvedReflectiveProvider} from './reflective_provider';\nexport {ReflectiveKey} from './reflective_key';\nexport {InjectionToken} from './injection_token';\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n * This file should not be necessary because node resolution should just default to `./di/index`!\n * However it does not seem to work and it breaks:\n * -\n * //packages/animations/browser/test:test_web_chromium-local\n * - //packages/compiler-cli/test:extract_i18n\n * - //packages/compiler-cli/test:ngc\n * - //packages/compiler-cli/test:perform_watch\n * - //packages/compiler-cli/test/diagnostics:check_types\n * - //packages/compiler-cli/test/transformers:test\n * - //packages/compiler/test:test\n * - //tools/public_api_guard:core_api\n * Remove this file once the above is solved or wait until `ngc` is deleted and then it should be safe to delete this file.\n */\n\nexport * from './di/index';\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {InjectFlags, resolveForwardRef} from './../di';\nimport {assertInjectImplementationNotEqual} from './../di/inject_switch';\nimport {inject} from './../di/injector_compatibility';\nimport {ProviderToken} from './../di/provider_token';\nimport {getOrCreateInjectable} from './di';\nimport {TDirectiveHostNode} from './interfaces/node';\nimport {getCurrentTNode, getLView} from './state';\n\n/**\n * Returns the value associated to the given token from the injectors.\n * `directiveInject` is intended to be used for directive, component and pipe factories.\n * All other injection use `inject` which does not walk the node injector tree.\n * Usage example (in factory function):\n *\n * ```ts\n * class SomeDirective {\n *   constructor(directive: DirectiveA) {\n *     static dir = defineDirective({\n *       type: SomeDirective,\n *       factory: () => new SomeDirective(directiveInject(DirectiveA))\n *     });\n *   }\n *\n *   @param token the type or token to inject\n *   @param flags Injection flags\n *   @returns the value from the injector or `null` when not found\n *   @codeGenApi\n */\n\nexport function directiveInject<T>(token:

```

```

ProviderToken<T>): T;\nexport function directiveInject<T>(token: ProviderToken<T>, flags: InjectFlags):
T;\nexport function directiveInject<T>(token: ProviderToken<T>, flags = InjectFlags.Default): T|null {\n const
IView = getLView();\n // Fall back to inject() if view hasn't been created. This situation can happen in tests\n // if
inject utilities are used before bootstrapping.\n if (IView === null) {\n // Verify that we will not get into infinite
loop.\n ngDevMode && assertInjectImplementationNotEqual(directiveInject);\n return inject(token, flags);\n
}\n const tNode = getCurrentTNode();\n return getOrCreateInjectable<T>(\n
  tNode as TDirectiveHostNode, IView, resolveForwardRef(token), flags);\n}\n\n/**\n * Throws an error
indicating that a factory function could not be generated by the compiler for a\n * particular class.\n *\n * This
instruction allows the actual error message to be optimized away when ngDevMode is turned\n * off, saving bytes of
generated code while still providing a good experience in dev mode.\n *\n * The name of the class is not mentioned
here, but will be in the generated factory function name\n * and thus in the stack trace.\n *\n * @codeGenApi\n
*/\nexport function invalidFactory(): never {\n const msg =\n   ngDevMode ? `This constructor was not
compatible with Dependency Injection.` : 'invalid';\n   throw new Error(msg);\n}\n\n"/**\n * @license\n
* Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport './ng_dev_mode';\nimport
{newTrustedFunctionForDev} from './security/trusted_types';\n\n/**\n * THIS FILE CONTAINS CODE WHICH
SHOULD BE TREE SHAKEN AND NEVER CALLED FROM PRODUCTION CODE!!!\n */\n\n/**\n * Creates
an `Array` construction with a given name. This is useful when\n * looking for memory consumption to see what
time of array it is.\n *\n * @param name Name to give to the constructor\n * @returns A subclass of `Array` if
possible. This can only be done in\n *      environments which support `class` construct.\n */\nexport function
createNamedArrayType(name: string): typeof Array {\n // This should never be called in prod mode, so let's verify
that is the case.\n if (ngDevMode) {\n   try {\n     // If this function were compromised the following could lead to
arbitrary\n     // script execution. We bless it with Trusted Types anyway since this\n     // function is stripped out of
production binaries.\n     return (newTrustedFunctionForDev('Array', `return class ${name} extends
Array{}`))(Array);\n   } catch (e) {\n     // If it does not work just give up and fall back to regular Array.\n
return Array;\n   }\n } else {\n   throw new Error(\n     'Looks like we are in \\prod mode\\', but we are creating a
named Array type, which is wrong! Check your code');\n }\n}\n\n"/**\n * @license\n
* Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {KeyValueArray} from './util/array_utils';\nimport
{assertNumber, assertNumberInRange} from './util/assert';\n\n/**\n * Value stored in the `TData` which is needed
to re-concatenate the styling.\n *\n * See: `TStylingKeyPrimitive` and `TStylingStatic`\n */\nexport type
TStylingKey = TStylingKeyPrimitive|TStylingStatic;\n\n/**\n * The primitive portion (`TStylingStatic` removed)
of the value stored in the `TData` which is\n * needed to re-concatenate the styling.\n
*\n * - `string`: Stores the property name. Used with `styleProp`/^classProp` instruction.\n * - `null`: Represents
map, so there is no name. Used with `styleMap`/^classMap`. \n * - `false`: Represents an ignore case. This happens
when `styleProp`/^classProp` instruction\n * is combined with directive which shadows its input `@Input('class')`.
That way the binding\n * should not participate in the styling resolution.\n */\nexport type TStylingKeyPrimitive =
string|null|false;\n\n/**\n * Store the static values for the styling binding.\n *\n * The `TStylingStatic` is just
`KeyValueArray` where key `""` (stored at location 0) contains the\n * `TStylingKey` (stored at location 1). In
other words this wraps the `TStylingKey` such that the\n * `""` contains the wrapped value.\n *\n * When
instructions are resolving styling they may need to look forward or backwards in the linked\n * list to resolve the
value. For this reason we have to make sure that the linked list
also contains\n * the static values. However the list only has space for one item per styling instruction. For this\n
* reason we store the static values here as part of the `TStylingKey`. This means that the\n * resolution function when
looking for a value needs to first look at the binding value, and then\n * at `TStylingKey` (if it exists).\n *\n
* Imagine we have:\n *\n * <div class=""TEMPLATE" my-dir">\n *   @Directive({\n *     host: {\n *       class:
'DIR',\n *       [class.dynamic]: 'exp' // classProp('dynamic', ctx.exp);\n *     }\n *   })\n *\n * In the above case
the linked list will contain one item:\n *\n * // assume binding location: 10 for `classProp('dynamic',

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ctx.exp);\n * tData[10] = <TStylingStatic>[\n *   ": 'dynamic', // This is the wrapped value of `TStylingKey`\n *
'DIR': true, // This is the default static value of directive binding.\n * ];\n * tData[10 + 1] = 0; // We don't have
prev/next.\n *\n * IView[10] = undefined;
    // assume `ctx.exp` is `undefined`\n * IView[10 + 1] = undefined; // Just normalized `IView[10]`\n * ```\n *\n *
So when the function is resolving styling value, it first needs to look into the linked list\n * (there is none) and than
into the static `TStylingStatic` too see if there is a default value for\n * `dynamic` (there is not). Therefore it is safe
to remove it.\n *\n * If setting `true` case:\n * ```\n * IView[10] = true; // assume `ctx.exp` is `true`\n *
IView[10 + 1] = true; // Just normalized `IView[10]`\n * ```\n *\n * So when the function is resolving styling value, it
first needs to look into the linked list\n * (there is none) and than into `TNode.residualClass` (TNode.residualStyle)
which contains\n * ```\n * tNode.residualClass = [\n *   'TEMPLATE': true,\n * ];\n * ```\n *\n * This means that
it is safe to add class.\n *\n * export interface TStylingStatic extends KeyValueArray<any> {} \n /**\n * This is a
branded number which contains previous and
next index.\n *\n * When we come across styling instructions we need to store the `TStylingKey` in the correct\n *
order so that we can re-concatenate the styling value in the desired priority.\n *\n * The insertion can happen either
at the:\n * - end of template as in the case of coming across additional styling instruction in the template\n * - in
front of the template in the case of coming across additional instruction in the\n * `hostBindings`.\n *\n * We use
`TStylingRange` to store the previous and next index into the `TData` where the template\n * bindings can be
found.\n *\n * - bit 0 is used to mark that the previous index has a duplicate for current value.\n * - bit 1 is used to
mark that the next index has a duplicate for the current value.\n * - bits 2-16 are used to encode the next/tail of the
template.\n * - bits 17-32 are used to encode the previous/head of template.\n *\n * NODE: *duplicate* false implies
that it is statically known that this binding will not collide\n
* with other bindings and therefore there is no need to check other bindings. For example the\n * bindings in `

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setTStylingRangePrev(\n  tStylingRange: TStylingRange, previous: number): TStylingRange {\n  ngDevMode &&
assertNumber(tStylingRange, 'expected number');\n  ngDevMode && assertNumberInRange(previous,
0, StylingRange.UNSIGNED_MASK);\n  return (((tStylingRange as any as number) &
~StylingRange.PREV_MASK) |\n    (previous << StylingRange.PREV_SHIFT)) as any;\n}\n\nexport function
setTStylingRangePrevDuplicate(tStylingRange: TStylingRange): TStylingRange {\n  ngDevMode &&
assertNumber(tStylingRange, 'expected number');\n  return ((tStylingRange as any as number) |
StylingRange.PREV_DUPLICATE) as any;\n}\n\nexport function getTStylingRangeNext(tStylingRange:
TStylingRange): number {\n  ngDevMode && assertNumber(tStylingRange, 'expected number');\n  return
((tStylingRange as any as number) & StylingRange.NEXT_MASK) >> StylingRange.NEXT_SHIFT;\n}\n\nexport
function setTStylingRangeNext(tStylingRange: TStylingRange, next: number): TStylingRange {\n  ngDevMode
&& assertNumber(tStylingRange, 'expected number');\n  ngDevMode && assertNumberInRange(next, 0,
StylingRange.UNSIGNED_MASK);\n  return (((tStylingRange as any as number) &
~StylingRange.NEXT_MASK) | /\n
    next << StylingRange.NEXT_SHIFT) as any;\n}\n\nexport function
getTStylingRangeNextDuplicate(tStylingRange: TStylingRange): boolean {\n  ngDevMode &&
assertNumber(tStylingRange, 'expected number');\n  return ((tStylingRange as any as number) &
StylingRange.NEXT_DUPLICATE) ===\n    StylingRange.NEXT_DUPLICATE;\n}\n\nexport function
setTStylingRangeNextDuplicate(tStylingRange: TStylingRange): TStylingRange {\n  ngDevMode &&
assertNumber(tStylingRange, 'expected number');\n  return ((tStylingRange as any as number) |
StylingRange.NEXT_DUPLICATE) as any;\n}\n\nexport function getTStylingRangeTail(tStylingRange:
TStylingRange): number {\n  ngDevMode && assertNumber(tStylingRange, 'expected number');\n  const next =
getTStylingRangeNext(tStylingRange);\n  return next === 0 ? getTStylingRangePrev(tStylingRange) :
next;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is
governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n * \n\n/**\n * Patch a `debug` property on top of the existing
object.\n * \n * NOTE: always call this method with `ngDevMode && attachDebugObject(...)`\n * \n * @param obj
Object to patch\n * @param debug Value to patch\n * \n\nexport function attachDebugObject(obj: any, debug: any):
void {\n  if (ngDevMode) {\n    Object.defineProperty(obj, 'debug', {value: debug, enumerable: false});\n  } else {\n
throw new Error(\n    'This method should be guarded with `ngDevMode` so that it can be tree shaken in
production!');\n  }\n}\n\n"/**\n * Patch a `debug` property getter on top of the existing object.\n * \n * NOTE: always
call this method with `ngDevMode && attachDebugObject(...)`\n * \n * @param obj Object to patch\n * @param
debugGetter Getter returning a value to patch\n * \n\nexport function attachDebugGetter<T>(obj: T, debugGetter:
(this: T) => any): void {\n  if (ngDevMode) {\n    Object.defineProperty(obj, 'debug', {get: debugGetter,
enumerable:
false});\n  } else {\n    throw new Error(\n      'This method should be guarded with `ngDevMode` so that it can be
tree shaken in production!');\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n\nimport {Injector} from '../di/injector';\nimport {Type} from
'../interface/type';\nimport {SchemaMetadata} from '../metadata/schema';\nimport {Sanitizer} from
'../sanitization/sanitizer';\nimport {KeyValueArray} from '../util/array_utils';\nimport {assertDefined} from
'../util/assert';\nimport {createNamedArrayType} from '../util/named_array_type';\nimport {assertNodeInjector}
from '../assert';\nimport {getInjectorIndex, getParentInjectorLocation} from '../di';\nimport
{CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS,
NATIVE} from '../interfaces/container';\nimport {ComponentTemplate,
DirectiveDef, DirectiveDefList, PipeDefList, ViewQueriesFunction} from '../interfaces/definition';\nimport
{NO_PARENT_INJECTOR, NodeInjectorOffset} from '../interfaces/injector';\nimport {AttributeMarker,
InsertBeforeIndex, PropertyAliases, TConstants, TContainerNode, TElementNode, TNode as ITNode, TNodeFlags,
TNodeProviderIndexes, TNodeType, toTNodeTypeAsString} from '../interfaces/node';\nimport {SelectorFlags}

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from './interfaces/projection';\nimport {LQueries, TQueries} from './interfaces/query';\nimport {Renderer,
RendererFactory} from './interfaces/renderer';\nimport {RComment, RElement, RNode} from
 './interfaces/renderer_dom';\nimport {getTStylingRangeNext, getTStylingRangeNextDuplicate,
getTStylingRangePrev, getTStylingRangePrevDuplicate, TStylingKey, TStylingRange} from
 './interfaces/styling';\nimport {CHILD_HEAD, CHILD_TAIL, CLEANUP, CONTEXT, DebugNode,
DECLARATION_VIEW, DestroyHookData, FLAGS, HEADER_OFFSET, HookData, HOST,
HostBindingOpCodes, ID, INJECTOR,
LContainerDebug as ILContainerDebug, LView, LViewDebug as ILViewDebug, LViewDebugRange,
LViewDebugRangeContent, LViewFlags, NEXT, NodeInjectorDebug, PARENT, QUERIES, RENDERER,
RENDERER_FACTORY, SANITIZER, T_HOST, TData, TView as ITView, TVIEW, TView, TViewType,
TViewTypeAsString} from './interfaces/view';\nimport {attachDebugObject} from './util/debug_utils';\nimport
{getParentInjectorIndex, getParentInjectorView} from './util/injector_utils';\nimport {unwrapRNode} from
 './util/view_utils';\n\n/*\n * This file contains conditionally attached classes which provide human readable (debug)
level\n * information for `LView`, `LContainer` and other internal data structures. These data structures\n * are
stored internally as array which makes it very difficult during debugging to reason about the\n * current state of the
system.\n * Patching the array with extra property does change the array's hidden class' but it does not\n *
change the cost of access, therefore this patching
should not have significant if any impact in\n * `ngDevMode` mode. (see: https://jsperf.com/array-vs-monkey-
patch-array)\n * So instead of seeing:\n * ``\n * Array(30) [Object, 659, null, ...]\n * ``\n * You get to
see:\n * ``\n * LViewDebug {\n *   views: [...],\n *   flags: {attached: true, ...}\n *   nodes: [\n *     {html: '<div
id=\"123\">', ..., nodes: [\n *       {html: '<span>', ..., nodes: null}\n *     ]\n *   ]\n * }\n * ``\n *
/>\n\nlet
LVIEW_COMPONENT_CACHE: Map<string|null, Array<any>>|undefined;\nlet LVIEW_EMBEDDED_CACHE:
Map<string|null, Array<any>>|undefined;\nlet LVIEW_ROOT: Array<any>|undefined;\nlet
LVIEW_COMPONENT: Array<any>|undefined;\nlet LVIEW_EMBEDDED: Array<any>|undefined;\n\ninterface
TViewDebug extends ITView {\n  type: TViewType;\n}\n\n/**\n * This function clones a blueprint and creates
LView.\n * Simple slice will keep the same type, and we need it to be LView\n * */\nexport function
cloneToLViewFromTViewBlueprint<T>(tView: TView): LView<T> {\n
  const debugTView = tView as TViewDebug;\n  const IView = getLViewToClone(debugTView.type,
tView.template && tView.template.name);\n  return IView.concat(tView.blueprint) as any;\n}\n\nclass LRootView
extends Array {}\nclass LComponentView extends Array {}\nclass LEmbeddedView extends Array {}
\nfunction
getLViewToClone(type: TViewType, name: string|null): Array<any> {\n  switch (type) {\n    case
TViewType.Root:\n      if (LVIEW_ROOT === undefined) LVIEW_ROOT = new LRootView();\n      return
LVIEW_ROOT;\n    case TViewType.Component:\n      if (!ngDevMode || !ngDevMode.namedConstructors) {\n
        if (LVIEW_COMPONENT === undefined) LVIEW_COMPONENT = new LComponentView();\n        return
LVIEW_COMPONENT;\n      }\n      if (LVIEW_COMPONENT_CACHE === undefined)\n        LVIEW_COMPONENT_CACHE = new Map();\n      let componentArray =
LVIEW_COMPONENT_CACHE.get(name);\n      if (componentArray === undefined) {\n        componentArray =
new (createNamedArrayType('LComponentView' + nameSuffix(name)));\n        LVIEW_COMPONENT_CACHE.set(name, componentArray);\n      }\n      return componentArray;\n    case
TViewType.Embedded:\n      if (!ngDevMode || !ngDevMode.namedConstructors) {\n        if
(LVIEW_EMBEDDED === undefined) LVIEW_EMBEDDED = new LEmbeddedView();\n        return
LVIEW_EMBEDDED;\n      }\n      if (LVIEW_EMBEDDED_CACHE === undefined)\n        LVIEW_EMBEDDED_CACHE = new Map();\n      let embeddedArray =
LVIEW_EMBEDDED_CACHE.get(name);\n      if (embeddedArray === undefined) {\n        embeddedArray =
new (createNamedArrayType('LEmbeddedView' + nameSuffix(name)));\n        LVIEW_EMBEDDED_CACHE.set(name, embeddedArray);\n      }\n      return embeddedArray;\n  }\n}\n\nfunction nameSuffix(text: string|null|undefined): string {\n  if (text == null) return '';\n  const index =
text.lastIndexOf('_Template');\n  return '_' + (index === -1 ? text : text.slice(0, index));\n}\n\n/**\n * This class is a

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debug version of Object literal so that we can have constructor name show up\n
 * in\n * debug tools in ngDevMode.\n */\nexport const TViewConstructor = class TView implements ITView {\n
constructor(\n   public type: TViewType,\n   public blueprint: LView,\n   public template:\n   ComponentTemplate<{}>|null,\n   public queries: TQueries|null,\n   public viewQuery:\n   ViewQueriesFunction<{}>|null,\n   public declTNode: ITNode|null,\n   public data: TData,\n   public\n   bindingStartIndex: number,\n   public expandoStartIndex: number,\n   public hostBindingOpCodes:\n   HostBindingOpCodes|null,\n   public firstCreatePass: boolean,\n   public firstUpdatePass: boolean,\n   public\n   staticViewQueries: boolean,\n   public staticContentQueries: boolean,\n   public preOrderHooks:\n   HookData|null,\n   public preOrderCheckHooks: HookData|null,\n   public contentHooks: HookData|null,\n   public\n   contentCheckHooks: HookData|null,\n   public viewHooks: HookData|null,\n   public viewCheckHooks:\n   HookData|null,\n   public destroyHooks:\n   DestroyHookData|null,\n   public cleanup: any[]|null,\n   public contentQueries: number[]|null,\n   public\n   components: number[]|null,\n   public directiveRegistry: DirectiveDefList|null,\n   public pipeRegistry:\n   PipeDefList|null,\n   public firstChild: ITNode|null,\n   public schemas: SchemaMetadata[]|null,\n   public\n   consts: TConstants|null,\n   public incompleteFirstPass: boolean,\n   public _decls: number,\n   public _vars:\n   number,\n   ) {\n   }\n   get template_(): string {\n     const buf: string[] = [];\n     processTNodeChildren(this.firstChild,\n     buf);\n     return buf.join(");\n   }\n   get type_(): string {\n     return TViewTypeAsString[this.type] ||\n     `TViewType.${this.type}`;\n   }\n }\n\nclass TNode implements ITNode {\n   constructor(\n     public tView_:\n     TView,\n     //\n     public type: TNodeType,\n     //\n     public index: number,\n     //\n     public insertBeforeIndex: InsertBeforeIndex,\n     //\n     public injectorIndex: number,\n     //\n     public directiveStart: number,\n     //\n     public directiveEnd: number,\n     //\n     public directiveStylingLast:\n     number,\n     //\n     public propertyBindings: number[]|null,\n     //\n     public flags: TNodeFlags,\n     //\n     public providerIndexes: TNodeProviderIndexes,\n     //\n     public value: string|null,\n     //\n     public attrs:\n     (string|AttributeMarker|(string|SelectorFlags)[])|null,\n     //\n     public mergedAttrs:\n     (string|AttributeMarker|(string|SelectorFlags)[])|null,\n     //\n     public localNames: (string|number[])|null,\n     //\n     public initialInputs:\n     (string[]|null)|null|undefined,\n     //\n     public inputs: PropertyAliases|null,\n     //\n     public outputs: PropertyAliases|null,\n     //\n     public tViews: ITView|ITView[]|null,\n     //\n     public next: ITNode|null,\n     //\n     public\n     projectionNext: ITNode|null,\n     //\n     public child: ITNode|null,\n     //\n     public parent: TElementNode|TContainerNode|null,\n     //\n     public projection:\n     number|(ITNode|RNode[])|null,\n     //\n     public styles: string|null,\n     //\n     public stylesWithoutHost: string|null,\n     //\n     public residualStyles:\n     KeyValueArray<any>|undefined|null,\n     //\n     public classes: string|null,\n     //\n     public classesWithoutHost: string|null,\n     //\n     public residualClasses:\n     KeyValueArray<any>|undefined|null,\n     //\n     public classBindings: TStylingRange,\n     //\n     public styleBindings: TStylingRange,\n     //\n     ) {\n   }\n }\n\n/**\n * Return a human\n * debug version of the set of `NodeInjector`s which will be consulted when\n * resolving tokens from this\n * `TNode`. \n * \n * When debugging applications, it is often difficult to determine which `NodeInjector`s will be\n * consulted. This method shows a list of `DebugNode`s representing the `TNode`s which will be\n * consulted in order when resolving a token starting at this `TNode`. \n * \n * The original data is stored in `LView` and\n * `TView` with a lot of offset indexes, and so it is\n * difficult to reason about. \n * \n * @param IView The\n * `LView` instance for this `TNode`. \n */\n\n debugNodeInjectorPath(IView: LView): DebugNode[] {\n   const path:\n   DebugNode[] = [];\n   let injectorIndex = getInjectorIndex(this, IView);\n   if (injectorIndex === -1) {\n     //\n     Looks like the current `TNode` does not have `NodeInjector` associated with it => look for\n     // parent

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NodeInjector;\n    const parentLocation = getParentInjectorLocation(this, IView);\n    if (parentLocation !==\n    NO_PARENT_INJECTOR) {\n        // We found a parent, so start searching from the parent location.\n        injectorIndex = getParentInjectorIndex(parentLocation);\n        IView = getParentInjectorView(parentLocation,\n        IView);\n    } else {\n        // No parents have been found, so there are no `NodeInjector`s to consult.\n        }\n    }\n    while (injectorIndex !== -1) {\n        ngDevMode && assertNodeInjector(IView, injectorIndex);\n        const tNode = IView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] as TNode;\n        path.push(buildDebugNode(tNode, IView));\n        const parentLocation = IView[injectorIndex +\n        NodeInjectorOffset.PARENT];\n        if (parentLocation === NO_PARENT_INJECTOR) {\n            injectorIndex = -\n            1;\n        } else {\n            injectorIndex = getParentInjectorIndex(parentLocation);\n            IView =\n            getParentInjectorView(parentLocation, IView);\n        }\n    }\n    return path;\n}\n\nget type_(): string {\n    return toTNodeTypeAsString(this.type) || `TNodeType.${this.type}`;\n}\n\nget flags_(): string {\n    const flags:\n    string[] = [];\n    if (this.flags & TNodeFlags.hasClassInput) flags.push('TNodeFlags.hasClassInput');\n    if\n    (this.flags & TNodeFlags.hasContentQuery) flags.push('TNodeFlags.hasContentQuery');\n    if (this.flags &\n    TNodeFlags.hasStyleInput)\n        flags.push('TNodeFlags.hasStyleInput');\n    if (this.flags & TNodeFlags.hasHostBindings)\n        flags.push('TNodeFlags.hasHostBindings');\n    if (this.flags & TNodeFlags.isComponentHost)\n        flags.push('TNodeFlags.isComponentHost');\n    if (this.flags & TNodeFlags.isDirectiveHost)\n        flags.push('TNodeFlags.isDirectiveHost');\n    if (this.flags & TNodeFlags.isDetached)\n        flags.push('TNodeFlags.isDetached');\n    if (this.flags & TNodeFlags.isProjected)\n        flags.push('TNodeFlags.isProjected');\n    return flags.join('');\n}\n\nget template_(): string {\n    if (this.type &\n    TNodeType.Text) return this.value!;\n    const buf: string[] = [];\n    const tagName = typeof this.value === 'string'\n    && this.value || this.type_;\n    buf.push('<', tagName);\n    if (this.flags) {\n        buf.push(' ', this.flags_);\n    }\n    if (this.attrs) {\n        for (let i = 0; i < this.attrs.length;) {\n            const attrName = this.attrs[i++];\n            if (typeof\n            attrName === 'number') {\n                break;\n            }\n            const attrValue = this.attrs[i++];\n            buf.push(' ', attrName as string, '=', attrValue as string, '\"');\n        }\n    }\n    buf.push('>');\n    processTNodeChildren(this.child, buf);\n    buf.push('<', tagName, '>');\n    return\n    buf.join('');\n}\n\nget styleBindings_(): DebugStyleBindings {\n    return toDebugStyleBinding(this, false);\n}\n\nget classBindings_(): DebugStyleBindings {\n    return toDebugStyleBinding(this, true);\n}\n\nget\n    providerIndexStart_(): number {\n        return this.providerIndexes &\n        TNodeProviderIndexes.ProvidersStartIndexMask;\n    }\n\n    get providerIndexEnd_(): number {\n        return\n        this.providerIndexStart_ +\n        (this.providerIndexes >>>\n        TNodeProviderIndexes.CptViewProvidersCountShift);\n    }\n}\n\nexport const TNodeDebug = TNode;\nexport type\n    TNodeDebug = TNode;\nexport interface DebugStyleBindings extends\n    Array<KeyValueArray<any>|DebugStyleBinding|string|null> {\n}\nexport interface DebugStyleBinding {\n    key:\n    TStylingKey;\n    index:\n    number;\n    isTemplate: boolean;\n    prevDuplicate: boolean;\n    nextDuplicate: boolean;\n    prevIndex: number;\n    nextIndex: number;\n}\n\nfunction toDebugStyleBinding(tNode: TNode, isClassBased: boolean):\n    DebugStyleBindings {\n    const tData = tNode.tView_.data;\n    const bindings: DebugStyleBindings = [] as any;\n    const range = isClassBased ? tNode.classBindings : tNode.styleBindings;\n    const prev =\n    getTStylingRangePrev(range);\n    const next = getTStylingRangeNext(range);\n    let isTemplate = next !== 0;\n    let\n    cursor = isTemplate ? next : prev;\n    while (cursor !== 0) {\n        const itemKey = tData[cursor] as TStylingKey;\n        const\n        itemRange = tData[cursor + 1] as TStylingRange;\n        bindings.unshift({\n            key: itemKey,\n            index:\n            cursor,\n            isTemplate: isTemplate,\n            prevDuplicate: getTStylingRangePrevDuplicate(itemRange),\n            nextDuplicate: getTStylingRangeNextDuplicate(itemRange),\n            nextIndex: getTStylingRangeNext(itemRange),\n            prevIndex: getTStylingRangePrev(itemRange),\n        });\n        if (cursor === prev) isTemplate = false;\n        cursor = getTStylingRangePrev(itemRange);\n    }\n    bindings.push((isClassBased ? tNode.residualClasses : tNode.residualStyles) || null);\n    return\n    bindings;\n}\n\nfunction processTNodeChildren(tNode: ITNode|null, buf: string[]) {\n    while (tNode) {\n

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buf.push((tNode as any as {template_: string}).template_);\n  tNode = tNode.next;\n }\n}\n\nclass TViewData
extends Array {\n  let TVIEWDATA_EMPTY: unknown[]; // can't initialize here or it will not be tree shaken,
because\n      // `LView` constructor could have side-effects.\n/**\n * This function clones a
blueprint and creates TData.\n * Simple slice will keep the same type, and we need it to be TData\n * Next
function cloneToTViewData(list: any[]): TData {\n  if (TVIEWDATA_EMPTY === undefined)
TVIEWDATA_EMPTY = new TViewData();\n  return TVIEWDATA_EMPTY.concat(list) as any;\n }\n}\n\nexport
class LViewBlueprint extends Array
{\n}\n\nexport class MatchesArray extends Array {\n}\n\nexport class TViewComponents extends Array {\n}\n\nexport class
TNodeLocalNames extends Array {\n}\n\nexport class TNodeInitialInputs extends Array {\n}\n\nexport class LCleanup
extends Array {\n}\n\nexport class TCleanup extends Array {\n}\n\nexport function attachLViewDebug(IView: LView)
{\n  attachDebugObject(IView, new LViewDebug(IView));\n }\n}\n\nexport function
attachLContainerDebug(IContainer: LContainer) {\n  attachDebugObject(IContainer, new
LContainerDebug(IContainer));\n }\n}\n\nexport function toDebug<T>(obj: LView<T>): ILViewDebug<T>;\nexport
function toDebug<T>(obj: LView<T>|null): ILViewDebug<T>|null;\nexport function toDebug<T>(obj:
LView<T>|LContainer|null): ILViewDebug<T>|ILContainerDebug|null;\nexport function toDebug(obj: any): any
{\n  if (obj) {\n    const debug = (obj as any).debug;\n    assertDefined(debug, 'Object does not have a debug
representation.);\n    return debug;\n  } else {\n    return obj;\n  }\n}\n}\n\n/**\n * Use this method
to unwrap a native element in `LView` and convert it into HTML for easier\n * reading.\n * @param value
possibly wrapped native DOM node.\n * @param includeChildren If `true` then the serialized HTML form will
include child elements\n * (same\n * as `outerHTML`). If `false` then the serialized HTML form will only contain
the element\n * itself\n * (will not serialize child elements).\n */\nfunction toHtml(value: any, includeChildren:
boolean = false): string|null {\n  const node: Node|null = unwrapRNode(value) as any;\n  if (node) {\n    switch
(node.nodeType) {\n      case Node.TEXT_NODE:\n        return node.textContent;\n      case
Node.COMMENT_NODE:\n        return `<!--${(node as Comment).textContent}-->`;\n      case
Node.ELEMENT_NODE:\n        const outerHTML = (node as Element).outerHTML;\n        if (includeChildren) {\n
          return outerHTML;\n        } else {\n          const innerHTML = '>' + (node as Element).innerHTML + '<';\n
          return (outerHTML.split(innerHTML)[0])
+ '>';\n        }\n      }\n    }\n  }\n  return null;\n }\n}\n\nexport class LViewDebug<T = unknown> implements
ILViewDebug<T> {\n  constructor(private readonly _raw_IView: LView<T>) {\n }\n}\n\n/**\n * Flags associated
with the `LView` unpacked into a more readable state.\n */\n  get flags() {\n    const flags =
this._raw_IView[FLAGS];\n    return {\n      __raw__flags__: flags,\n      initPhaseState: flags &
LViewFlags.InitPhaseStateMask,\n      creationMode: !(flags & LViewFlags.CreationMode),\n      firstViewPass:
!(flags & LViewFlags.FirstLViewPass),\n      checkAlways: !(flags & LViewFlags.CheckAlways),\n      dirty:
!(flags & LViewFlags.Dirty),\n      attached: !(flags & LViewFlags.Attached),\n      destroyed: !(flags &
LViewFlags.Destroyed),\n      isRoot: !(flags & LViewFlags.IsRoot),\n      indexWithinInitPhase: flags >>
LViewFlags.IndexWithinInitPhaseShift,\n    };\n  }\n  get parent(): ILViewDebug<T>|ILContainerDebug|null {\n
return toDebug<T>(this._raw_IView[PARENT]
as LView<T>|LContainer | null);\n }\n  get hostHTML(): string|null {\n    return toHtml(this._raw_IView[HOST],
true);\n }\n  get html(): string {\n    return (this.nodes || []).map(mapToHTML).join('');\n }\n  get context(): T {\n
return this._raw_IView[CONTEXT];\n }\n}\n\n/**\n * The tree of nodes associated with the current `LView`. The
nodes have been normalized into\n * a tree structure with relevant details pulled out for readability.\n */\n  get
nodes(): DebugNode[] {\n    const IView = this._raw_IView;\n    const tNode = IView[TVIEW].firstChild;\n    return
toDebugNodes(tNode, IView);\n }\n  get template(): string {\n    return (this.tView as any as {template_:
string}).template_;\n }\n  get tView(): ITView {\n    return this._raw_IView[TVIEW];\n }\n  get cleanup():
any[]|null {\n    return this._raw_IView[CLEANUP];\n }\n  get injector(): Injector|null {\n    return
this._raw_IView[INJECTOR];\n }\n  get rendererFactory(): RendererFactory {\n    return
this._raw_IView[RENDERER_FACTORY];\n }

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    }\n get renderer(): Renderer {\n return this._raw_IView[RENDERER];\n }\n get sanitizer(): Sanitizer|null {\n
return this._raw_IView[SANITIZER];\n }\n get childHead(): ILViewDebug|ILContainerDebug|null {\n return
toDebug(this._raw_IView[CHILD_HEAD]);\n }\n get next(): ILViewDebug<T>|ILContainerDebug|null {\n
return toDebug<T>(this._raw_IView[NEXT] as LView<T>| LContainer | null);\n }\n get childTail():
ILViewDebug|ILContainerDebug|null {\n return toDebug(this._raw_IView[CHILD_TAIL]);\n }\n get
declarationView(): ILViewDebug|null {\n return toDebug(this._raw_IView[DECLARATION_VIEW]);\n }\n get
queries(): LQueries|null {\n return this._raw_IView[QUERIES];\n }\n get tHost(): ITNode|null {\n return
this._raw_IView[T_HOST];\n }\n get id(): number {\n return this._raw_IView[ID];\n }\n\n get decls():
LViewDebugRange {\n return toLViewRange(this.tView, this._raw_IView, HEADER_OFFSET,
this.tView.bindingStartIndex);\n
}\n\n get vars(): LViewDebugRange {\n return toLViewRange(\n this.tView, this._raw_IView,
this.tView.bindingStartIndex, this.tView.expandoStartIndex);\n }\n\n get expando(): LViewDebugRange {\n
return toLViewRange(\n this.tView, this._raw_IView, this.tView.expandoStartIndex,
this._raw_IView.length);\n }\n\n /**\n * Normalized view of child views (and containers) attached at this
location.\n */\n get childViews(): Array<ILViewDebug<T>|ILContainerDebug> {\n const childViews:
Array<ILViewDebug<T>|ILContainerDebug> = [];\n let child = this.childHead;\n while (child) {\n
childViews.push(child as ILViewDebug<T>| ILContainerDebug);\n child = child.next;\n }\n return
childViews;\n }\n}\n\nfunction mapToHTML(node: DebugNode): string {\n if (node.type === 'ElementContainer')
{\n return (node.children || []).map(mapToHTML).join(");\n } else if (node.type === 'IcuContainer') {\n throw
new Error('Not implemented');\n } else {\n return
toHtml(node.native, true) || ";\n }\n}\n\nfunction toLViewRange(tView: TView, IView: LView, start: number, end:
number): LViewDebugRange {\n let content: LViewDebugRangeContent[] = [];\n for (let index = start; index <
end; index++) {\n content.push({index: index, t: tView.data[index], l: IView[index]});\n }\n return {start: start,
end: end, length: end - start, content: content};\n }\n\n/**\n * Turns a flat list of nodes into a tree by walking the
associated `TNode` tree.\n */\n * @param tNode\n * @param IView\n */\n\nexport function toDebugNodes(tNode:
ITNode|null, IView: LView): DebugNode[] {\n if (tNode) {\n const debugNodes: DebugNode[] = [];\n let
tNodeCursor: ITNode|null = tNode;\n while (tNodeCursor) {\n
debugNodes.push(buildDebugNode(tNodeCursor, IView));\n tNodeCursor = tNodeCursor.next;\n }\n return
debugNodes;\n } else {\n return [];\n }\n}\n\nexport function buildDebugNode(tNode: ITNode, IView: LView):
DebugNode {\n const rawValue
= IView[tNode.index];\n const native = unwrapRNode(rawValue);\n const factories: Type<any>[] = [];\n const
instances: any[] = [];\n const tView = IView[TVIEW];\n for (let i = tNode.directiveStart; i < tNode.directiveEnd;
i++) {\n const def = tView.data[i] as DirectiveDef<any>;\n factories.push(def.type);\n
instances.push(IView[i]);\n }\n return {\n html: toHtml(native),\n type: toTNodeTypeAsString(tNode.type),\n
tNode,\n native: native as any,\n children: toDebugNodes(tNode.child, IView),\n factories,\n instances,\n
injector: buildNodeInjectorDebug(tNode, tView, IView),\n get injectorResolutionPath() {\n return (tNode as
TNode).debugNodeInjectorPath(IView);\n },\n };\n}\n\nfunction buildNodeInjectorDebug(tNode: ITNode,
tView: ITView, IView: LView): NodeInjectorDebug {\n const viewProviders: Type<any>[] = [];\n for (let i =
(tNode as TNode).providerIndexStart_; i < (tNode as TNode).providerIndexEnd_; i++) {\n
viewProviders.push(tView.data[i]
as Type<any>);\n }\n const providers: Type<any>[] = [];\n for (let i = (tNode as TNode).providerIndexEnd_; i <
(tNode as TNode).directiveEnd; i++) {\n providers.push(tView.data[i] as Type<any>);\n }\n const
nodeInjectorDebug = {\n bloom: toBloom(IView, tNode.injectorIndex),\n cumulativeBloom:
toBloom(tView.data, tNode.injectorIndex),\n providers,\n viewProviders,\n parentInjectorIndex: IView[(tNode
as TNode).providerIndexStart_ - 1],\n }; \n return nodeInjectorDebug;\n }\n\n/**\n * Convert a number at `idx`
location in `array` into binary representation.\n */\n * @param array\n * @param idx\n */\n\nfunction binary(array:
any[], idx: number): string {\n const value = array[idx];\n // If not a number we print 8 `?` to retain alignment but
let user know that it was called on\n // wrong type.\n if (typeof value !== 'number') return '????????';\n // We

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prefix 0s so that we have constant length number\n  const text = '00000000' + value.toString(2);\n  return
  text.substring(text.length - 8);\n}\n\n/**\n * Convert a bloom filter at location `idx` in `array` into binary
representation.\n *\n * @param array\n * @param idx\n */\nfunction toBloom(array: any[], idx: number): string {\n
if (idx < 0) {\n  return 'NO_NODE_INJECTOR';\n }\n return `${binary(array, idx + 7)}_${binary(array, idx +
6)}_${binary(array, idx + 5)}_${binary(array, idx + 4)}_${binary(array, idx + 3)}_${binary(array, idx +
2)}_${binary(array, idx + 1)}_${binary(array, idx + 0)}`;\n}\n\nexport class LContainerDebug implements
ILContainerDebug {\n  constructor(private readonly _raw_LContainer: LContainer) {}\n\n  get
hasTransplantedViews(): boolean {\n  return this._raw_LContainer[HAS_TRANSPLANTED_VIEWS];\n }\n  get
views(): ILViewDebug[] {\n  return this._raw_LContainer.slice(CONTAINER_HEADER_OFFSET)\n
.map(toDebug as (l: LView) => ILViewDebug);\n }\n  get parent(): ILViewDebug|null {\n  return
toDebug(this._raw_LContainer[PARENT]);\n }\n\n  get movedViews(): LView[]|null {\n  return this._raw_LContainer[MOVED_VIEWS];\n }\n  get host():
RElement|RComment|LView {\n  return this._raw_LContainer[HOST];\n }\n  get native(): RComment {\n  return
this._raw_LContainer[NATIVE];\n }\n  get next() {\n  return toDebug(this._raw_LContainer[NEXT]);\n
}\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {Injector} from '../di/injector';\nimport {ErrorHandler} from '../error_handler';\nimport
{RuntimeError, RuntimeErrorCode} from '../errors';\nimport {DoCheck, OnChanges, OnInit} from
'../interface/lifecycle_hooks';\nimport {SchemaMetadata} from '../metadata/schema';\nimport
{ViewEncapsulation} from '../metadata/view';\nimport {validateAgainstEventAttributes,
validateAgainstEventProperties} from '../sanitization/sanitization';\nimport
{Sanitizer} from '../sanitization/sanitizer';\nimport {assertDefined, assertEquals, assertGreaterThanOrEqual,
assertIndexInRange, assertNotEqual, assertNotSame, assertSame, assertString} from '../util/assert';\nimport
{escapeCommentText} from '../util/dom';\nimport {normalizeDebugBindingName,
normalizeDebugBindingValue} from '../util/ng_reflect';\nimport {stringify} from '../util/stringify';\nimport
{assertFirstCreatePass, assertFirstUpdatePass, assertLContainer, assertLView, assertTNodeForLView,
assertTNodeForTView} from './assert';\nimport {attachPatchData, readPatchedLView} from
'./context_discovery';\nimport {getFactoryDef} from './definition_factory';\nimport {diPublicInInjector,
getNodeInjectable, getOrCreateNodeInjectorForNode} from './di';\nimport {throwMultipleComponentError} from
'./errors';\nimport {executeCheckHooks, executeInitAndCheckHooks, incrementInitPhaseFlags} from
'./hooks';\nimport {CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer,
MOVED_VIEWS} from './interfaces/container';\nimport {ComponentDef, ComponentTemplate, DirectiveDef,
DirectiveDefListOrFactory, HostBindingsFunction, PipeDefListOrFactory, RenderFlags, ViewQueriesFunction}
from './interfaces/definition';\nimport {NodeInjectorFactory} from './interfaces/injector';\nimport
{getUniqueLViewId} from './interfaces/lview_tracking';\nimport {AttributeMarker, InitialInputData, InitialInputs,
LocalRefExtractor, PropertyAliases, PropertyAliasValue, TAttributes, TConstantsOrFactory, TContainerNode,
TDirectiveHostNode, TElementContainerNode, TElementNode, TIcuContainerNode, TNode, TNodeFlags,
TNodeType, TProjectionNode} from './interfaces/node';\nimport {Renderer, RendererFactory} from
'./interfaces/renderer';\nimport {RComment, RElement, RNode, RText} from './interfaces/renderer_dom';\nimport
{SanitizerFn} from './interfaces/sanitization';\nimport {isComponentDef, isComponentHost, isContentQueryHost,
isRootView} from './interfaces/type_checks';\nimport {CHILD_HEAD,
CHILD_TAIL, CLEANUP, CONTEXT, DECLARATION_COMPONENT_VIEW, DECLARATION_VIEW,
EMBEDDED_VIEW_INJECTOR, FLAGS, HEADER_OFFSET, HOST, HostBindingOpCodes, ID, InitPhaseState,
INJECTOR, LView, LViewFlags, NEXT, PARENT, RENDERER, RENDERER_FACTORY, SANITIZER,
T_HOST, TData, TRANSPLANTED_VIEWS_TO_REFRESH, TVIEW, TView, TViewType} from
'./interfaces/view';\nimport {assertPureTNodeType, assertTNodeType} from './node_assert';\nimport
{updateTextNode} from './node_manipulation';\nimport {isInlineTemplate, isNodeMatchingSelectorList} from
'./node_selector_matcher';\nimport {profiler, ProfilerEvent} from './profiler';\nimport {enterView,

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getBindingsEnabled, getCurrentDirectiveIndex, getCurrentParentTNode, getCurrentTNode,
getCurrentTNodePlaceholderOk, getSelectedIndex, isCurrentTNodeParent, isInCheckNoChangesMode,
isInI18nBlock, leaveView, setBindingIndex, setBindingRootForHostBindings, setCurrentDirectiveIndex,
setCurrentQueryIndex, setCurrentTNode, setInCheckNoChangesMode, setSelectedIndex}
from './state';\nimport {NO_CHANGE} from './tokens';\nimport {mergeHostAttrs} from
 './util/attrs_utils';\nimport {INTERPOLATION_DELIMITER} from './util/misc_utils';\nimport {renderStringify,
stringifyForError} from './util/stringify_utils';\nimport {getFirstLContainer, getLViewParent, getNextLContainer}
from './util/view_traversal_utils';\nimport {getComponentLViewByIndex, getNativeByIndex, getNativeByTNode,
isCreationMode, resetPreOrderHookFlags, unwrapLView, updateTransplantedViewCount,
viewAttachedToChangeDetector} from './util/view_utils';\n\nimport {selectIndexInternal} from './advance';\nimport
{directiveInject} from './di';\nimport {handleUnknownPropertyError, isPropertyValid, matchingSchemas} from
 './element_validation';\nimport {attachLContainerDebug, attachLViewDebug, cloneToLViewFromTViewBlueprint,
cloneToTViewData, LCleanup, LViewBlueprint, MatchesArray, TCleanup, TNodeDebug, TNodeInitialInputs,
TNodeLocalNames, TViewComponents, TViewConstructor} from './lview_debug';\n\n/**\n * Invoke `HostBindingsFunction`s for view.\n * This methods executes `TView.hostBindingOpCodes`. It is
used to execute the\n * `HostBindingsFunction`s associated with the current `LView`.\n * @param tView
Current `TView`.\n * @param IView Current `LView`.\n */\nexport function processHostBindingOpCodes(tView:
TView, IView: LView): void {\n  const hostBindingOpCodes = tView.hostBindingOpCodes;\n  if
(hostBindingOpCodes === null) return;\n  try {\n    for (let i = 0; i < hostBindingOpCodes.length; i++) {\n      const
opCode = hostBindingOpCodes[i] as number;\n      if (opCode < 0) {\n        // Negative numbers are element
indexes.\n        setSelectedIndex(~opCode);\n      } else {\n        // Positive numbers are NumberTuple which store
bindingRootIndex and directiveIndex.\n        const directiveIdx = opCode;\n        const bindingRootIdx =
hostBindingOpCodes[++i] as number;\n        const hostBindingFn = hostBindingOpCodes[++i] as
HostBindingsFunction<any>;\n        setBindingRootForHostBindings(bindingRootIdx, directiveIdx);\n        const context = IView[directiveIdx];\n        hostBindingFn(RenderFlags.Update, context);\n      }\n    }\n  } finally {\n    setSelectedIndex(-1);\n  }\n}\n\n/** Refreshes all content queries declared by directives in a given view */\nfunction
refreshContentQueries(tView: TView, IView: LView): void {\n  const contentQueries = tView.contentQueries;\n  if
(contentQueries !== null) {\n    for (let i = 0; i < contentQueries.length; i += 2) {\n      const queryStartIdx =
contentQueries[i];\n      const directiveDefIdx = contentQueries[i + 1];\n      if (directiveDefIdx !== -1) {\n        const
directiveDef = tView.data[directiveDefIdx] as DirectiveDef<any>;\n        ngDevMode &&
assertDefined(directiveDef, 'DirectiveDef not found.');\n        ngDevMode &&\n        assertDefined(directiveDef.contentQueries, 'contentQueries function should be defined');\n        setCurrentQueryIndex(queryStartIdx);\n        directiveDef.contentQueries!(RenderFlags.Update, IView[directiveDefIdx], directiveDefIdx);\n      }\n    }\n  }\n}\n\n/** Refreshes child components in the current view (update mode). */\nfunction
refreshChildComponents(hostLView: LView, components: number[]): void {\n  for (let i = 0; i <
components.length; i++) {\n    refreshComponent(hostLView, components[i]);\n  }\n}\n\n/** Renders child
components in the current view (creation mode). */\nfunction renderChildComponents(hostLView: LView,
components: number[]): void {\n  for (let i = 0; i < components.length; i++) {\n    renderComponent(hostLView,
components[i]);\n  }\n}\n\nexport function createLView<T>(\n  parentLView: LView|null, tView: TView, context:
T|null, flags: LViewFlags, host: RElement|null,\n  tHostNode: TNode|null, rendererFactory: RendererFactory|null,
renderer: Renderer|null,\n  sanitizer: Sanitizer|null, injector: Injector|null,\n  embeddedViewInjector:
Injector|null): LView {\n  const IView =\n    ngDevMode
? cloneToLViewFromTViewBlueprint(tView) : tView.blueprint.slice() as LView;\n  IView[HOST] = host;\n  IView[FLAGS] = flags | LViewFlags.CreationMode | LViewFlags.Attached | LViewFlags.FirstLViewPass;\n  if
(embeddedViewInjector !== null ||\n    (parentLView && (parentLView[FLAGS] &
LViewFlags.HasEmbeddedViewInjector))) {\n    IView[FLAGS] |= LViewFlags.HasEmbeddedViewInjector;\n  }\n}

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resetPreOrderHookFlags(IView);\n ngDevMode && tView.declTNode && parentLView &&
assertTNodeForLView(tView.declTNode, parentLView);\n IView[PARENT] = IView[DECLARATION_VIEW] =
parentLView;\n IView[CONTEXT] = context;\n IView[RENDERER_FACTORY] = (rendererFactory ||
parentLView && parentLView[RENDERER_FACTORY]);\n ngDevMode &&
assertDefined(IView[RENDERER_FACTORY], 'RendererFactory is required');\n IView[RENDERER] = (renderer
|| parentLView && parentLView[RENDERER]);\n ngDevMode && assertDefined(IView[RENDERER],
'Renderer is required');\n IView[SANITIZER] = sanitizer || parentLView && parentLView[SANITIZER]
|| null;\n IView[INJECTOR as any] = injector || parentLView && parentLView[INJECTOR] || null;\n
IView[T_HOST] = tHostNode;\n IView[ID] = getUniqueLViewId();\n IView[EMBEDDED_VIEW_INJECTOR as
any] = embeddedViewInjector;\n ngDevMode &&\n assertEqual(\n tView.type == TViewType.Embedded
? parentLView !== null : true, true,\n 'Embedded views must have parentLView');\n
IView[DECLARATION_COMPONENT_VIEW] =\n tView.type == TViewType.Embedded ?
parentLView![DECLARATION_COMPONENT_VIEW] : IView;\n ngDevMode &&
attachLViewDebug(IView);\n return IView;\n}\n\n/**\n * Create and stores the TNode, and hooks it up to the
tree.\n * @param tView The current `TView`.\n * @param index The index at which the TNode should be saved
(null if view, since they are not\n * saved).\n * @param type The type of TNode to create\n * @param native The
native element for this node, if applicable\n * @param name The tag name of the associated native element, if
applicable\n * @param attrs Any attrs for the native element, if applicable\n */\nexport function
getOrCreateTNode(\n tView: TView, index: number, type: TNodeType.Element|TNodeType.Text, name:
string|null,\n attrs: TAttributes|null): TElementNode;\nexport function getOrCreateTNode(\n tView: TView,
index: number, type: TNodeType.Container, name: string|null,\n attrs: TAttributes|null): TContainerNode;\nexport
function getOrCreateTNode(\n tView: TView, index: number, type: TNodeType.Projection, name: null,\n attrs:
TAttributes|null): TProjectionNode;\nexport function getOrCreateTNode(\n tView: TView, index: number, type:
TNodeType.ElementContainer, name: string|null,\n attrs: TAttributes|null): TElementContainerNode;\nexport
function getOrCreateTNode(\n tView: TView, index: number, type: TNodeType.Icu, name: null,\n attrs:
TAttributes|null): TElementContainerNode;\nexport function getOrCreateTNode(\n tView: TView, index:
number, type: TNodeType, name: string|null,\n attrs: TAttributes|null):\n
TElementNode&TContainerNode&TElementContainerNode&TProjectionNode&TIcuContainerNode {\n
ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See `createContainerRef` in\n
`view_engine_compatibility` for additional context.\n assertGreaterThanOrEqual(index,
HEADER_OFFSET, 'TNodes can\\'t be in the LView header.);\n // Keep this function short, so that the VM will
inline it.\n ngDevMode && assertPureTNodeType(type);\n let tNode = tView.data[index] as TNode;\n if (tNode
=== null) {\n tNode = createTNodeAtIndex(tView, index, type, name, attrs);\n if (isInI18nBlock()) {\n // If
we are in i18n block then all elements should be pre declared through `Placeholder`\n // See
`TNodeType.Placeholder` and `LFrame.inI18n` for more context.\n // If the `TNode` was not pre-declared than it
means it was not mentioned which means it was\n // removed, so we mark it as detached.\n
tNode.flags |= TNodeFlags.isDetached;\n } } else if (tNode.type & TNodeType.Placeholder) {\n
tNode.type = type;\n tNode.value = name;\n tNode.attrs = attrs;\n const parent = getCurrentParentTNode();\n
tNode.injectorIndex = parent === null ? -1 : parent.injectorIndex;\n ngDevMode &&
assertTNodeForTView(tNode, tView);\n ngDevMode && assertEqual(index, tNode.index, 'Expecting same
index');\n } } setCurrentTNode(tNode, true);\n return tNode as TElementNode & TContainerNode &
TElementContainerNode & TProjectionNode & TIcuContainerNode;\n}\n\nexport function
createTNodeAtIndex(\n tView: TView, index: number, type: TNodeType, name: string|null, attrs:
TAttributes|null) {\n const currentTNode = getCurrentTNodePlaceholderOk();\n const isParent =
isCurrentTNodeParent();\n const parent = isParent ? currentTNode : currentTNode.parent;\n //
Parents cannot cross component boundaries because components will be used in multiple places.\n

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{\n  IView[FLAGS] &= ~LViewFlags.CreationMode;\n  leaveView();\n }\n}\n\n/**\n * Processes a view in
update mode. This includes a number of steps in a specific order:\n * - executing a template function in update
mode;\n * - executing hooks;\n * - refreshing queries;\n * - setting host bindings;\n * - refreshing child (embedded
and component) views.\n */\nexport function refreshView<T>(\n  tView: TView, IView: LView, templateFn:
ComponentTemplate<{}>|null, context: T) {\n  ngDevMode && assertEquals(isCreationMode(IView), false, 'Should
be run in update mode');\n  const flags = IView[FLAGS];\n  if ((flags & LViewFlags.Destroyed) ===
LViewFlags.Destroyed) return;\n  enterView(IView);\n  // Check no changes mode is a dev only mode used to verify
that bindings have not changed\n  // since they were assigned. We do not want to execute lifecycle hooks in that
mode.\n  const isInCheckNoChangesPass = ngDevMode && isInCheckNoChangesMode();\n  try {\n
resetPreOrderHookFlags(IView);\n\n    setBindingIndex(tView.bindingStartIndex);\n    if (templateFn !== null) {\n      executeTemplate(tView, IView,
templateFn, RenderFlags.Update, context);\n    }\n\n    const hooksInitPhaseCompleted =\n      (flags &
LViewFlags.InitPhaseStateMask) === InitPhaseState.InitPhaseCompleted;\n    // execute pre-order hooks (OnInit,
OnChange, DoCheck)\n    // PERF WARNING: do NOT extract this to a separate function without running
benchmarks\n    if (!isInCheckNoChangesPass) {\n      if (hooksInitPhaseCompleted) {\n        const
preOrderCheckHooks = tView.preOrderCheckHooks;\n        if (preOrderCheckHooks !== null) {\n
executeCheckHooks(IView, preOrderCheckHooks, null);\n        }\n      } else {\n        const preOrderHooks =
tView.preOrderHooks;\n        if (preOrderHooks !== null) {\n          executeInitAndCheckHooks(IView,
preOrderHooks, InitPhaseState.OnInitHooksToBeRun, null);\n        }\n        incrementInitPhaseFlags(IView,
InitPhaseState.OnInitHooksToBeRun);\n\n      }\n    }\n\n    // First mark transplanted views that are declared in this IView as needing a refresh at their\n    //
insertion points. This is needed to avoid the situation where the template is defined in this\n    // `LView` but its
declaration appears after the insertion component.\n    markTransplantedViewsForRefresh(IView);\n    refreshEmbeddedViews(IView);\n\n    // Content query results must be refreshed before content hooks are called.\n    if (tView.contentQueries !== null) {\n      refreshContentQueries(tView, IView);\n    }\n\n    // execute content hooks
(AfterContentInit, AfterContentChecked)\n    // PERF WARNING: do NOT extract this to a separate function
without running benchmarks\n    if (!isInCheckNoChangesPass) {\n      if (hooksInitPhaseCompleted) {\n        const
contentCheckHooks = tView.contentCheckHooks;\n        if (contentCheckHooks !== null) {\n
executeCheckHooks(IView, contentCheckHooks);\n        }\n      } else {\n        const contentHooks =
tView.contentHooks;\n        if (contentHooks !== null) {\n          executeInitAndCheckHooks(\n            IView,
contentHooks, InitPhaseState.AfterContentInitHooksToBeRun);\n        }\n        incrementInitPhaseFlags(IView,
InitPhaseState.AfterContentInitHooksToBeRun);\n      }\n    }\n\n    processHostBindingOpCodes(tView,
IView);\n\n    // Refresh child component views.\n    const components = tView.components;\n    if (components !==
null) {\n      refreshChildComponents(IView, components);\n    }\n\n    // View queries must execute after refreshing
child components because a template in this view\n    // could be inserted in a child component. If the view query
executes before child component\n    // refresh, the template might not yet be inserted.\n    const viewQuery =
tView.viewQuery;\n    if (viewQuery !== null) {\n      executeViewQueryFn<T>(RenderFlags.Update, viewQuery,
context);\n    }\n\n    // execute view hooks (AfterViewInit, AfterViewChecked)\n    // PERF WARNING:
do NOT extract this to a separate function without running benchmarks\n    if (!isInCheckNoChangesPass) {\n      if (hooksInitPhaseCompleted) {\n        const viewCheckHooks = tView.viewCheckHooks;\n        if (viewCheckHooks
!== null) {\n          executeCheckHooks(IView, viewCheckHooks);\n        }\n      } else {\n        const viewHooks =
tView.viewHooks;\n        if (viewHooks !== null) {\n          executeInitAndCheckHooks(IView, viewHooks,
InitPhaseState.AfterViewInitHooksToBeRun);\n        }\n        incrementInitPhaseFlags(IView,
InitPhaseState.AfterViewInitHooksToBeRun);\n      }\n    }\n\n    if (tView.firstUpdatePass === true) {\n      // We
need to make sure that we only flip the flag on successful `refreshView` only\n      // Don't do this in `finally`
block.\n      // If we did this in `finally` block then an exception could block the execution of styling\n      //
instructions which in turn would be unable to insert themselves into the styling linked\n      // list. The

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    result of this would be that if the exception would not be throw on subsequent CD\n // the styling would be
unable to process it data and reflect to the DOM.\n tView.firstUpdatePass = false;\n }\n\n // Do not reset the
dirty state when running in check no changes mode. We don't want components\n // to behave differently
depending on whether check no changes is enabled or not. For example:\n // Marking an OnPush component as
dirty from within the `ngAfterViewInit` hook in order to\n // refresh a `NgClass` binding should work. If we
would reset the dirty state in the check\n // no changes cycle, the component would be not be dirty for the next
update pass. This would\n // be different in production mode where the component dirty state is not reset.\n if
(!isInCheckNoChangesPass) {\n IView[FLAGS] &= ~(LViewFlags.Dirty | LViewFlags.FirstLViewPass);\n }\n\n
if (IView[FLAGS] & LViewFlags.RefreshTransplantedView) {\n IView[FLAGS] &=
~LViewFlags.RefreshTransplantedView;\n
    updateTransplantedViewCount(IView[PARENT] as LContainer, -1);\n }\n } finally {\n leaveView();\n
}\n\nfunction executeTemplate<T>(\n tView: TView, IView: LView<T>, templateFn:
ComponentTemplate<T>, rf: RenderFlags, context: T) {\n const prevSelectedIndex = getSelectedIndex();\n const
isUpdatePhase = rf & RenderFlags.Update;\n try {\n setSelectedIndex(-1);\n if (isUpdatePhase &&
IView.length > HEADER_OFFSET) {\n // When we're updating, inherently select 0 so we don't\n // have to
generate that instruction for most update blocks.\n selectIndexInternal(tView, IView, HEADER_OFFSET,
!ngDevMode && isInCheckNoChangesMode());\n }\n\n const preHookType =\n isUpdatePhase ?
ProfilerEvent.TemplateUpdateStart : ProfilerEvent.TemplateCreateStart;\n profiler(preHookType, context as
unknown as {});\n templateFn(rf, context);\n } finally {\n setSelectedIndex(prevSelectedIndex);\n\n const
postHookType =\n isUpdatePhase ? ProfilerEvent.TemplateUpdateEnd : ProfilerEvent.TemplateCreateEnd;\n
profiler(postHookType, context as unknown as {});\n }\n}\n\n/////////////////////////////////////////\n\n
Element\n/////////////////////////////////////////\n\nexport function executeContentQueries(tView: TView, tNode: TNode, IView:
LView) {\n if (isContentQueryHost(tNode)) {\n const start = tNode.directiveStart;\n const end =
tNode.directiveEnd;\n for (let directiveIndex = start; directiveIndex < end; directiveIndex++) {\n const def =
tView.data[directiveIndex] as DirectiveDef<any>;\n if (def.contentQueries) {\n
def.contentQueries(RenderFlags.Create, IView[directiveIndex], directiveIndex);\n }\n }\n }\n}\n\n/**\n *
Creates directive instances.\n */\nexport function createDirectivesInstances(tView: TView, IView: LView, tNode:
TDirectiveHostNode) {\n if (!getBindingsEnabled()) return;\n instantiateAllDirectives(tView, IView, tNode,
getNativeByTNode(tNode, IView));\n if ((tNode.flags
    & TNodeFlags.hasHostBindings) === TNodeFlags.hasHostBindings) {\n invokeDirectivesHostBindings(tView,
IView, tNode);\n }\n}\n\n/**\n * Takes a list of local names and indices and pushes the resolved local variable
values\n * to LView in the same order as they are loaded in the template with load().\n */\nexport function
saveResolvedLocalsInData(\n viewData: LView, tNode: TDirectiveHostNode,\n localRefExtractor:
LocalRefExtractor = getNativeByTNode): void {\n const localNames = tNode.localNames;\n if (localNames !==
null) {\n let localIndex = tNode.index + 1;\n for (let i = 0; i < localNames.length; i += 2) {\n const index =
localNames[i + 1] as number;\n const value = index === -1 ?\n localRefExtractor(\n tNode as
TElementNode | TContainerNode | TElementContainerNode, viewData) :\n viewData[index];\n viewData[localIndex++] = value;\n }\n }\n}\n\n/**\n * Gets TView from a template function or creates a new
TView\n * if
    it doesn't already exist.\n */\n @param def ComponentDef\n * @returns TView\n */\nexport function
getOrCreateComponentTView(def: ComponentDef<any>): TView {\n const tView = def.tView;\n\n // Create a
TView if there isn't one, or recreate it if the first create pass didn't\n // complete successfully since we can't know
for sure whether it's in a usable shape.\n if (tView === null || tView.incompleteFirstPass) {\n // Declaration node
here is null since this function is called when we dynamically create a\n // component and hence there is no
declaration.\n const declTNode = null;\n return def.tView = createTView(\n TViewType.Component,\n declTNode, def.template, def.decls, def.vars, def.directiveDefs,\n def.pipeDefs, def.viewQuery,\n def.schemas, def.consts);\n }\n\n return tView;\n}\n\n/**\n * Creates a TView instance\n */\n @param type

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Type of `TView`. \n * @param declTNode Declaration location of this `TView`. \n * @param templateFn Template
function \n * @param decls The number of nodes, local refs, and pipes in this template \n * @param directives
Registry of directives for this view \n * @param pipes Registry of pipes for this view \n * @param viewQuery View
queries for this view \n * @param schemas Schemas for this view \n * @param consts Constants for this view \n
*/ \n export function createTView(\n   type: TViewType, declTNode: TNode|null, templateFn:
ComponentTemplate<any>|null, decls: number, \n   vars: number, directives: DirectiveDefListOrFactory|null, pipes:
PipeDefListOrFactory|null, \n   viewQuery: ViewQueriesFunction<any>|null, schemas: SchemaMetadata[]|null, \n
constsOrFactory: TConstantsOrFactory|null): TView {\n   ngDevMode && ngDevMode.tView++; \n   const
bindingStartIndex = HEADER_OFFSET + decls; \n   // This length does not yet contain host bindings from child
directives because at this point, \n   // we don't know which directives are active on this template. As soon as a
directive is matched \n   // that has a host
binding, we will update the blueprint with that def's hostVars count. \n   const initialViewLength = bindingStartIndex
+ vars; \n   const blueprint = createViewBlueprint(bindingStartIndex, initialViewLength); \n   const consts = typeof
constsOrFactory === 'function' ? constsOrFactory() : constsOrFactory; \n   const tView = blueprint[TVIEW as any] =
ngDevMode ? \n     new TViewConstructor(\n       type, // type: TViewType, \n       blueprint, // blueprint:
LView, \n       templateFn, // template: ComponentTemplate<{}>|null, \n       null, // queries: TQueries|null \n
viewQuery, // viewQuery: ViewQueriesFunction<{}>|null, \n       declTNode, // declTNode: TNode|null, \n
cloneToTViewData(blueprint).fill(null, bindingStartIndex), // data: TData, \n       bindingStartIndex,
// bindingStartIndex: number, \n       initialViewLength, //
expandoStartIndex: number, \n
null, // hostBindingOpCodes: HostBindingOpCodes, \n       true, //
firstCreatePass: boolean, \n       true, // firstUpdatePass: boolean, \n       false, //
// staticViewQueries: boolean, \n       false, // staticContentQueries: boolean, \n       null, //
// preOrderHooks: HookData|null, \n       null, // preOrderCheckHooks:
HookData|null, \n       null, // contentHooks: HookData|null, \n       null, //
contentCheckHooks: HookData|null, \n       null, // viewHooks: HookData|null, \n       null, //
// viewCheckHooks: HookData|null, \n       null, // destroyHooks:
DestroyHookData|null, \n       null, //
// cleanup: any[]|null, \n       null, // contentQueries: number[]|null, \n       null, //
// components: number[]|null, \n       typeof directives === 'function' ? // \n       directives() :
// \n       directives, // directiveRegistry: DirectiveDefList|null, \n       typeof pipes === 'function'
? pipes() : pipes, // pipeRegistry: PipeDefList|null, \n       null, // firstChild:
TNode|null, \n       schemas, // schemas: SchemaMetadata[]|null, \n       consts, //
// consts: TConstants|null \n       false, // incompleteFirstPass: boolean \n
decls, // ngDevMode only: decls \n       vars, // ngDevMode
only:
vars \n     ): \n     {\n       type: type, \n       blueprint: blueprint, \n       template: templateFn, \n       queries:
null, \n       viewQuery: viewQuery, \n       declTNode: declTNode, \n       data: blueprint.slice().fill(null,
bindingStartIndex), \n       bindingStartIndex: bindingStartIndex, \n       expandoStartIndex: initialViewLength, \n
hostBindingOpCodes: null, \n       firstCreatePass: true, \n       firstUpdatePass: true, \n       staticViewQueries:
false, \n       staticContentQueries: false, \n       preOrderHooks: null, \n       preOrderCheckHooks: null, \n
contentHooks: null, \n       contentCheckHooks: null, \n       viewHooks: null, \n       viewCheckHooks: null, \n
destroyHooks: null, \n       cleanup: null, \n       contentQueries: null, \n       components: null, \n
directiveRegistry: typeof directives === 'function' ? directives() : directives, \n       pipeRegistry: typeof pipes ===
'function' ? pipes() : pipes, \n       firstChild:
null, \n       schemas: schemas, \n       consts: consts, \n       incompleteFirstPass: false \n     }; \n   if (ngDevMode) {\n
// For performance reasons it is important that the tView retains the same shape during runtime. \n   // (To make
sure that all of the code is monomorphic.) For this reason we seal the object to \n   // prevent class transitions. \n

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Object.seal(tView);\n }\n return tView;\n}\n\nfunction createViewBlueprint(bindingStartIndex: number,\ninitialViewLength: number): LView {\n  const blueprint = ngDevMode ? new LViewBlueprint() : [];\n  for (let i =\n0; i < initialViewLength; i++) {\n    blueprint.push(i < bindingStartIndex ? null : NO_CHANGE);\n  }\n  return\nblueprint as LView;\n}\n\nfunction createError(text: string, token: any) {\n  return new Error(`Renderer: ${text}\n[${stringifyForError(token)}]`);\n}\n\n/**\n * Locates the host native element, used for bootstrapping existing\nnodes into rendering pipeline.\n * @param rendererFactory Factory\nfunction to create renderer instance.\n * @param elementOrSelector Render element or CSS selector to locate the\nelement.\n * @param encapsulation View Encapsulation defined for component that requests host element.\n */\nexport function locateHostElement(\n  renderer: Renderer, elementOrSelector: RElement|string,\n  encapsulation: ViewEncapsulation): RElement {\n  // When using native Shadow DOM, do not clear host element to\nallow native slot projection\n  const preserveContent = encapsulation === ViewEncapsulation.ShadowDom;\n  return renderer.selectRootElement(elementOrSelector, preserveContent);\n}\n\n/**\n * Saves context for this\ncleanup function in LView.cleanupInstances.\n * @param context On the first template pass, saves in TView.\n * - Cleanup\nfunction\n * - Index of context we just saved in LView.cleanupInstances\n * This function can also be used to\nstore instance specific cleanup fns. In that case the `context` is `null` and the function is store in `LView` (rather\nthan it\n`TView`).\n */\nexport function storeCleanupWithContext(\n  tView: TView, lView: LView, context: any,\ncleanupFn: Function): void {\n  const lCleanup = getOrCreateLViewCleanup(lView);\n  if (context === null) {\n    // If context is null that this is instance specific callback. These callbacks can only be\n    // inserted after template\nshared instances. For this reason in ngDevMode we freeze the TView.\n    if (ngDevMode) {\n      Object.freeze(getOrCreateTViewCleanup(tView));\n    }\n    lCleanup.push(cleanupFn);\n  } else {\n    lCleanup.push(context);\n    if (tView.firstCreatePass) {\n      getOrCreateTViewCleanup(tView).push(cleanupFn,\nlCleanup.length - 1);\n    }\n  }\n}\n\n/**\n * Constructs a TNode object from the arguments.\n * @param tView\n`TView` to which this `TNode` belongs (used only in `ngDevMode`)\n * @param tParent Parent `TNode`\n * @param type The type of the node\n * @param index The index of the TNode in TView.data, adjusted for\nHEADER_OFFSET\n * @param tagName\nThe tag name of the node\n * @param attrs The attributes defined on this node\n * @param tViews Any TViews\nattached to this node\n * @returns the TNode object\n */\nexport function createTNode(\n  tView: TView, tParent:\nTElementNode|TContainerNode|null, type: TNodeType.Container,\n  index: number, tagName: string|null, attrs:\nTAttributes|null): TContainerNode;\nexport function createTNode(\n  tView: TView, tParent:\nTElementNode|TContainerNode|null, type: TNodeType.Element|TNodeType.Text,\n  index: number, tagName:\nstring|null, attrs: TAttributes|null): TElementNode;\nexport function createTNode(\n  tView: TView, tParent:\nTElementNode|TContainerNode|null, type: TNodeType.ElementContainer,\n  index: number, tagName: string|null,\nattrs: TAttributes|null): TElementContainerNode;\nexport function createTNode(\n  tView: TView, tParent:\nTElementNode|TContainerNode|null, type: TNodeType.Icu, index: number,\n  tagName: string|null, attrs:\nTAttributes|null): TIcuContainerNode;\nexport\nfunction createTNode(\n  tView: TView, tParent: TElementNode|TContainerNode|null, type:\nTNodeType.Projection,\n  index: number, tagName: string|null, attrs: TAttributes|null): TProjectionNode;\nexport\nfunction createTNode(\n  tView: TView, tParent: TElementNode|TContainerNode|null, type: TNodeType, index:\nnumber,\n  tagName: string|null, attrs: TAttributes|null): TNode;\nexport function createTNode(\n  tView: TView,\ntParent: TElementNode|TContainerNode|null, type: TNodeType, index: number,\n  value: string|null, attrs:\nTAttributes|null): TNode {\n  ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See\n`createContainerRef` in\n      `view_engine_compatibility` for additional context.\n  assertGreaterThanOrEqual(index, HEADER_OFFSET, `TNodes can\\'t be in the LView header.`);\n  ngDevMode\n&& assertNotSame(attrs, undefined, `\\'undefined\\' is not valid value for \\'attrs\\'`);\n  ngDevMode &&\nngDevMode.tNode++;\n\n  ngDevMode && tParent && assertTNodeForTView(tParent, tView);\n  let injectorIndex = tParent ?\ntParent.injectorIndex : -1;\n  const tNode = ngDevMode ?\n    new TNodeDebug(\n      tView, // tView_

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TView\n    type,      // type: TNodeType\n    index,      // index: number\n    null,      //
insertBeforeIndex: null|-1|number|number[]\n    injectorIndex, // injectorIndex: number\n    -1,      //
directiveStart: number\n    -1,      // directiveEnd: number\n    -1,      // directiveStylingLast:
number\n    null,      // propertyBindings: number[]|null\n    0,      // flags: TNodeFlags\n    0,
// providerIndexes: TNodeProviderIndexes\n    value,      // value: string|null\n    attrs,      // attrs:
(string|AttributeMarker|(string|SelectorFlags)[]|[]|null\n    null,      // mergedAttrs\n    null,      //
localNames:
(string|number)[]|null\n    undefined, // initialInputs: (string[]|null)[]|null|undefined\n    null,      //
inputs: PropertyAliases|null\n    null,      // outputs: PropertyAliases|null\n    null,      // tViews:
ITView|ITView[]|null\n    null,      // next: ITNode|null\n    null,      // projectionNext: ITNode|null\n    null,      // child: ITNode|null\n    tParent,      // parent: TElementNode|TContainerNode|null\n    null,
// projection: number|(ITNode|RNode)[]|null\n    null,      // styles: string|null\n    null,      //
stylesWithoutHost: string|null\n    undefined, // residualStyles: string|null\n    null,      // classes:
string|null\n    null,      // classesWithoutHost: string|null\n    undefined, // residualClasses: string|null\n    null,
0 as any, // classBindings: TStylingRange;\n    0 as any,
// styleBindings: TStylingRange;\n    ):\n    {\n    type,\n    index,\n    insertBeforeIndex: null,\n
injectorIndex,\n    directiveStart: -1,\n    directiveEnd: -1,\n    directiveStylingLast: -1,\n
propertyBindings: null,\n    flags: 0,\n    providerIndexes: 0,\n    value: value,\n    attrs: attrs,\n
mergedAttrs: null,\n    localNames: null,\n    initialInputs: undefined,\n    inputs: null,\n    outputs: null,\n
tViews: null,\n    next: null,\n    projectionNext: null,\n    child: null,\n    parent: tParent,\n
projection: null,\n    styles: null,\n    stylesWithoutHost: null,\n    residualStyles: undefined,\n    classes:
null,\n    classesWithoutHost: null,\n    residualClasses: undefined,\n    classBindings: 0 as any,\n
styleBindings: 0 as any,\n    };\n    if (ngDevMode) {\n    // For performance reasons it is important that the
tNode retains the same shape during runtime.\n    // (To make sure that all of the code is monomorphic.) For this
reason we seal the object to\n    // prevent class transitions.\n    Object.seal(tNode);\n    }\n    return
tNode;\n    }\n\nfunction generatePropertyAliases(\n    inputAliasMap: {[publicName: string]: string},
directiveDefIdx: number,\n    propStore: PropertyAliases|null): PropertyAliases|null {\n    for (let publicName in
inputAliasMap) {\n    if (inputAliasMap.hasOwnProperty(publicName)) {\n    propStore = propStore === null ? {}
: propStore;\n    const internalName = inputAliasMap[publicName];\n    if
(propStore.hasOwnProperty(publicName)) {\n    propStore[publicName].push(directiveDefIdx, internalName);\n
    } else {\n    (propStore[publicName] = [directiveDefIdx, internalName]);\n    }\n    }\n    }\n    return
propStore;\n    }\n\n/**\n * Initializes data structures required to work with directive inputs and outputs.\n *
Initialization is done for all directives
matched on a given TNode.\n */\nexport function initializeInputAndOutputAliases(tView: TView, tNode: TNode):
void {\n    ngDevMode && assertFirstCreatePass(tView);\n    const start = tNode.directiveStart;\n    const end =
tNode.directiveEnd;\n    const tViewData = tView.data;\n    const tNodeAttrs = tNode.attrs;\n    const
inputsFromAttrs: InitialInputData = ngDevMode ? new TNodeInitialInputs() : [];\n    let inputsStore:
PropertyAliases|null = null;\n    let outputsStore: PropertyAliases|null = null;\n    for (let i = start; i < end; i++) {\n
const directiveDef = tViewData[i] as DirectiveDef<any>;\n    const directiveInputs = directiveDef.inputs;\n    // Do
not use unbound attributes as inputs to structural directives, since structural\n    // directive inputs can only be set
using microsyntax (e.g. `<div *dir="exp">`).\n    // TODO(FW-1930): microsyntax expressions may also contain
unbound/static attributes, which\n    // should be set for inline templates.\n    const initialInputs = (tNodeAttrs
!|= null && !isInlineTemplate(tNode)) ?\n    generateInitialInputs(directiveInputs, tNodeAttrs) :\n    null;\n    inputsFromAttrs.push(initialInputs);\n    inputsStore = generatePropertyAliases(directiveInputs, i, inputsStore);\n
outputsStore = generatePropertyAliases(directiveDef.outputs, i, outputsStore);\n    }\n    if (inputsStore !== null) {\n
if (inputsStore.hasOwnProperty('class')) {\n    tNode.flags |= TNodeFlags.hasClassInput;\n    }\n    if
(inputsStore.hasOwnProperty('style')) {\n    tNode.flags |= TNodeFlags.hasStyleInput;\n    }\n    }\n    tNode.initialInputs = inputsFromAttrs;\n    tNode.inputs = inputsStore;\n    tNode.outputs = outputsStore;\n    }\n\n/**\n *

```



Mapping between attributes names that don't correspond to their element property names.

\* Performance note: this function is written as a series of if checks (instead of, say, a property object lookup) for performance reasons - the series of `if` checks seems to be the fastest way of mapping property names. Do NOT change without benchmarking.

\* Note: this mapping has to be kept in sync with the equally named mapping in the template type-checking machinery of ngtscc.

```

function mapPropName(name: string): string {
  if (name === 'class') return 'className';
  if (name === 'for') return 'htmlFor';
  if (name === 'formaction') return 'formAction';
  if (name === 'innerHTML') return 'innerHTML';
  if (name === 'readonly') return 'readOnly';
  if (name === 'tabindex') return 'tabIndex';
  return name;
}

export function elementPropertyInternal<T>(
  tView: TView, tNode: TNode, IView: LView, propName: string, value: T,
  renderer: Renderer, sanitizer: SanitizerFn|null|undefined, nativeOnly: boolean): void {
  ngDevMode && assertNotSame(value, NO_CHANGE as any, 'Incoming value should never be NO_CHANGE.');
```

```

  const element = getNativeByTNode(tNode, IView) as RElement | RComment;
  let inputData = tNode.inputs;
  let dataValue: PropertyAliasValue|undefined;

  if (!nativeOnly && inputData != null && (dataValue = inputData[propName])) {
    setInputsForProperty(tView, IView, dataValue, propName, value);
    if (isComponentHost(tNode)) markDirtyIfOnPush(IView, tNode.index);
    if (ngDevMode) {
      setNgReflectProperties(IView, element, tNode.type, dataValue, value);
    }
  } else if (tNode.type & TNodeType.AnyRNode) {
    propName = mapPropName(propName);
    if (ngDevMode) {
      validateAgainstEventProperties(propName);
    }
    if (!isPropertyValid(element, propName, tNode.value, tView.schemas)) {
      handleUnknownPropertyError(propName, tNode.value, tNode.type, IView);
    }
    ngDevMode.renderer.setProperty++;
  }

  // It is assumed that the sanitizer is only added when the compiler
  // determines that the property is risky, so sanitization can be done without further checks.
  value = sanitizer != null ? sanitizer(value, tNode.value || "", propName) as any : value;
  renderer.setProperty(element as RElement, propName, value);
} else if (tNode.type & TNodeType.AnyContainer) {
  // If the node is a container and the property didn't match any of the inputs or schemas we should throw.
  if (ngDevMode && !matchingSchemas(tView.schemas, tNode.value)) {
    handleUnknownPropertyError(propName, tNode.value, tNode.type, IView);
  }
}

// ** If node is an OnPush component, marks its LView dirty.
export function markDirtyIfOnPush(IView: LView, viewIndex: number): void {
  ngDevMode && assertLView(IView);
  const childComponentLView = getComponentLViewByIndex(viewIndex, IView);
  if (!(childComponentLView[FLAGS] & LViewFlags.CheckAlways)) {
    childComponentLView[FLAGS] |= LViewFlags.Dirty;
  }
}

function setNgReflectProperty(
  IView: LView, element: RElement|RComment, type: TNodeType, attrName: string, value: any) {
  const renderer = IView[RENDERER];
  attrName = normalizeDebugBindingName(attrName);
  const debugValue = normalizeDebugBindingValue(value);
  if (type & TNodeType.AnyRNode) {
    if (value == null) {
      renderer.removeAttribute((element as RElement), attrName);
    } else {
      renderer.setAttribute((element as RElement), attrName, debugValue);
    }
  } else {
    const textContent = escapeCommentText(`bindings=${JSON.stringify({[attrName]: debugValue}, null, 2)}`);
    renderer.setValue((element as RComment), textContent);
  }
}

export function setNgReflectProperties(
  IView: LView, element: RElement|RComment, type: TNodeType, dataValue: PropertyAliasValue, value: any) {
  if (type & (TNodeType.AnyRNode | TNodeType.Container)) {
    /**
     * dataValue is an array containing runtime input or output names for the directives:
     * i+0: directive instance index
     * i+1: privateName
     * e.g. [0, 'change', 'change-minified']
     * we want to set the reflected property with the privateName:
     dataValue[i+1]
     */
    for (let i = 0; i < dataValue.length; i += 2) {
      setNgReflectProperty(IView, element, type, dataValue[i + 1] as string, value);
    }
  }
}

// ** Instantiate a root component.
export function instantiateRootComponent<T>(
  tView: TView, IView: LView, def: ComponentDef<T>): T {
  const rootTNode = getCurrentTNode();
  if (tView.firstCreatePass) {
    if (def.providersResolver) def.providersResolver(def);
    const directiveIndex = allocExpando(tView, IView, 1, null);
    ngDevMode && assertEqual(directiveIndex, rootTNode.directiveStart, 'Because this is a root component the allocated expando should

```

```

match the TNode component.);\n  configureViewWithDirective(tView, rootTNode, IView, directiveIndex, def);\n  initializeInputAndOutputAliases(tView, rootTNode);\n  }\n  const directive = \n    getNodeInjectable(IView, tView,\n    rootTNode.directiveStart, rootTNode as TElementNode);\n  attachPatchData(directive, IView);\n  const native =\n    getNativeByTNode(rootTNode,\n    IView);\n  if (native) {\n    attachPatchData(native, IView);\n  }\n  return directive;\n}\n\n/**\n * Resolve the\n * matched directives on a node.\n */\nexport function resolveDirectives(\n  tView: TView, IView: LView, tNode:\n  TElementNode|TContainerNode|TElementContainerNode,\n  localRefs: string[]|null): boolean {\n  // Please make\n  // sure to have explicit type for `exportsMap`. Inferred type triggers bug in\n  // tsickle.\n  ngDevMode &&\n  assertFirstCreatePass(tView);\n  let hasDirectives = false;\n  if (getBindingsEnabled()) {\n    const directiveDefs:\n    DirectiveDef<any>[]|null = findDirectiveDefMatches(tView, IView, tNode);\n    const exportsMap: ({[key: string]:\n    number}|null) = localRefs === null ? null : {": -1"};\n    if (directiveDefs !== null) {\n      hasDirectives = true;\n      initTNodeFlags(tNode, tView.data.length, directiveDefs.length);\n      // When the same token is provided by several\n      // directives on the same node, some rules apply in\n      // the\n      // viewEngine.\n      // - viewProviders have priority over providers\n      // - the last directive in\n      NgModule.declarations has priority over the previous one\n      // So to match these rules, the order in which\n      // providers are added in the arrays is very\n      // important.\n      for (let i = 0; i < directiveDefs.length; i++) {\n        const def = directiveDefs[i];\n        if (def.providersResolver) def.providersResolver(def);\n      }\n      let\n      preOrderHooksFound = false;\n      let preOrderCheckHooksFound = false;\n      let directiveIdx =\n      allocExpando(tView, IView, directiveDefs.length, null);\n      ngDevMode &&\n      assertSame(\n      directiveIdx, tNode.directiveStart,\n      "TNode.directiveStart should point to just allocated space");\n      for\n      (let i = 0; i < directiveDefs.length; i++) {\n        const def = directiveDefs[i];\n        // Merge the attrs in the order of\n        // matches. This assumes that the first directive is the\n        // component itself,\n        // so that the component has the least priority.\n        tNode.mergedAttrs = mergeHostAttrs(tNode.mergedAttrs,\n        def.hostAttrs);\n        configureViewWithDirective(tView, tNode, IView, directiveIdx, def);\n        saveNameToExportMap(directiveIdx, def, exportsMap);\n        if (def.contentQueries !== null) tNode.flags |=\n        TNodeFlags.hasContentQuery;\n        if (def.hostBindings !== null || def.hostAttrs !== null || def.hostVars !== 0)\n        tNode.flags |= TNodeFlags.hasHostBindings;\n        const lifeCycleHooks: OnChanges&OnInit&DoCheck =\n        def.type.prototype;\n        // Only push a node index into the preOrderHooks array if this is the first\n        // pre-\n        // order hook found on this node.\n        if (!preOrderHooksFound &&\n        (lifeCycleHooks.ngOnChanges ||\n        lifeCycleHooks.ngOnInit || lifeCycleHooks.ngDoCheck)) {\n          // We will push the actual hook function into this\n          // array later during dir instantiation.\n          // We cannot do it now because we must ensure\n          // hooks are registered in the same\n          // order that directives are created (i.e. injection order).\n          (tView.preOrderHooks || (tView.preOrderHooks = [])).push(tNode.index);\n          preOrderHooksFound = true;\n        }\n        if (!preOrderCheckHooksFound && (lifeCycleHooks.ngOnChanges || lifeCycleHooks.ngDoCheck)) {\n          (tView.preOrderCheckHooks || (tView.preOrderCheckHooks = [])).push(tNode.index);\n          preOrderCheckHooksFound = true;\n        }\n        directiveIdx++;\n      }\n      initializeInputAndOutputAliases(tView, tNode);\n    }\n    if (exportsMap) cacheMatchingLocalNames(tNode,\n    localRefs, exportsMap);\n  }\n  // Merge the template attrs last so that they have the highest priority.\n  tNode.mergedAttrs = mergeHostAttrs(tNode.mergedAttrs, tNode.attrs);\n  return hasDirectives;\n}\n\n/**\n * Add\n * `hostBindings` to the `TView.hostBindingOpCodes`.\n */\nexport function @param tView `TView` to which the `hostBindings`\nshould be added.\n * @param tNode\n`TNode` the element which contains the directive\n * @param IView `LView` current `LView`\n * @param\ndirectiveIdx Directive index in view.\n * @param directiveVarsIdx Where will the directive's vars be stored\n * @param\ndef `ComponentDef`/`DirectiveDef`, which contains the `hostVars`/`hostBindings` to add.\n */\nexport function registerHostBindingOpCodes(\n  tView: TView, tNode: TNode, IView: LView, directiveIdx: number,\n  directiveVarsIdx: number,\n  def: ComponentDef<any>|DirectiveDef<any>): void {\n  ngDevMode &&\n  assertFirstCreatePass(tView);\n  const hostBindings = def.hostBindings;\n  if (hostBindings) {\n    let\n    hostBindingOpCodes = tView.hostBindingOpCodes;\n    if (hostBindingOpCodes === null) {\n

```



```

element in the\n      // `matches` array, see how we store components/directives in `matches` below.\n
throwMultipleComponentError(tNode, matches[0].type, def.type);\n      }\n      }\n
markAsComponentHost(tView, tNode);\n      // The component is always stored first with directives after.\n
matches.unshift(def);\n
    } else {\n      matches.push(def);\n      }\n      }\n      }\n      return matches;\n    }\n\n/**\n * Marks a given
TNode as a component's host. This consists of:\n * - setting appropriate TNode flags;\n * - storing index of
component's host element so it will be queued for view refresh during CD.\n */\nexport function
markAsComponentHost(tView: TView, hostTNode: TNode): void {\n  ngDevMode &&
assertFirstCreatePass(tView);\n  hostTNode.flags |= TNodeFlags.isComponentHost;\n  (tView.components ||
(tView.components = ngDevMode ? new TViewComponents() : []))\n    .push(hostTNode.index);\n}\n\n/**
Caches local names and their matching directive indices for query and template lookups. */\nfunction
cacheMatchingLocalNames(\n  tNode: TNode, localRefs: string[]|null, exportsMap: {[key: string]: number}): void
{\n  if (localRefs) {\n    const localNames: (string|number)[] = tNode.localNames = ngDevMode ? new
TNodeLocalNames() : [];\n    // Local names must be stored in tNode
in the same order that localRefs are defined\n    // in the template to ensure the data is loaded in the same slots as
their refs\n    // in the template (for template queries).\n    for (let i = 0; i < localRefs.length; i += 2) {\n      const
index = exportsMap[localRefs[i + 1]];\n      if (index == null)\n        throw new RuntimeError(\n
RuntimeErrorCode.EXPORT_NOT_FOUND,\n          ngDevMode && `Export of name '${localRefs[i + 1]}' not
found!`);\n      localNames.push(localRefs[i], index);\n    }\n  }\n}\n\n/**\n * Builds up an export map as directives
are created, so local refs can be quickly mapped\n * to their directive instances.\n */\nfunction
saveNameToExportMap(\n  directiveIdx: number, def: DirectiveDef<any>|ComponentDef<any>,\n  exportsMap:
{[key: string]: number}|null) {\n  if (exportsMap) {\n    if (def.exportAs) {\n      for (let i = 0; i <
def.exportAs.length; i++) {\n        exportsMap[def.exportAs[i]] = directiveIdx;\n      }\n    }\n    if
(isComponentDef(def))
exportsMap[""] = directiveIdx;\n  }\n}\n\n/**\n * Initializes the flags on the current node, setting all indices to the
initial index,\n * the directive count to 0, and adding the isComponent flag.\n * @param index the initial index\n
*/\nexport function initTNodeFlags(tNode: TNode, index: number, numberOfDirectives: number) {\n  ngDevMode
&&\n  assertNotEqual(\n    numberOfDirectives, tNode.directiveEnd - tNode.directiveStart,\n    `Reached
the max number of directives`);\n  tNode.flags |= TNodeFlags.isDirectiveHost;\n  // When the first directive is
created on a node, save the index\n  tNode.directiveStart = index;\n  tNode.directiveEnd = index +
numberOfDirectives;\n  tNode.providerIndexes = index;\n}\n\n/**\n * Setup directive for instantiation.\n * We
need to create a `NodeInjectorFactory` which is then inserted in both the `Blueprint` as well\n * as `LView`.
`TView` gets the `DirectiveDef`.\n * @param tView `TView`\n * @param tNode `TNode`\n *
@param IView `LView`\n * @param directiveIndex Index where the directive will be stored in the Expando.\n *
@param def `DirectiveDef`\n */\nfunction configureViewWithDirective<T>(\n  tView: TView, tNode: TNode,
IView: LView, directiveIndex: number, def: DirectiveDef<T>): void {\n  ngDevMode &&\n  assertGreaterThanOrEqual(directiveIndex, HEADER_OFFSET, 'Must be in Expando section');\n
tView.data[directiveIndex] = def;\n  const directiveFactory =\n    def.factory || ((def as {factory: Function}).factory
= getFactoryDef(def.type, true));\n  // Even though `directiveFactory` will already be using `directiveInject` in its
generated code,\n  // we also want to support `inject()` directly from the directive constructor context so we set\n  //
`directiveInject` as the inject implementation here too.\n  const nodeInjectorFactory =\n    new
NodeInjectorFactory(directiveFactory, isComponentDef(def), directiveInject);\n  tView.blueprint[directiveIndex] =
nodeInjectorFactory;\n  IView[directiveIndex]
= nodeInjectorFactory;\n\n  registerHostBindingOpCodes(\n    tView, tNode, IView, directiveIndex,\n    allocExpando(tView, IView, def.hostVars, NO_CHANGE),\n    def);\n}\n\nfunction
addComponentLogic<T>(IView: LView, hostTNode: TElementNode, def: ComponentDef<T>): void {\n  const
native = getNativeByTNode(hostTNode, IView) as RElement;\n  const tView =
getOrCreateComponentTView(def);\n  // Only component views should be added to the view tree directly.

```

```

Embedded views are\n // accessed through their containers because they may be removed / re-added later.\n const
rendererFactory = IView[RENDERER_FACTORY];\n const componentView = addToViewTree(\n IView,\n createLView(\n IView, tView, null, def.onPush ? LViewFlags.Dirty : LViewFlags.CheckAlways, native,\n hostTNode as TElementNode, rendererFactory, rendererFactory.createRenderer(native, def),\n null, null,
null));\n // Component view will always be created before any injected
LContainers,\n // so this is a regular element, wrap it with the component view\n IView[hostTNode.index] =
componentView;\n}\n\nexport function elementAttributeInternal(\n tNode: TNode, IView: LView, name: string,
value: any, sanitizer: SanitizerFn|null|undefined,\n namespace: string|null|undefined) {\n if (ngDevMode) {\n
assertNotSame(value, NO_CHANGE as any, 'Incoming value should never be NO_CHANGE.);\n
validateAgainstEventAttributes(name);\n assertTNodeType(\n tNode, TNodeType.Element,\n `Attempted
to set attribute \\`$${name}\\` on a container node. ` +\n `Host bindings are not valid on ng-container or ng-
template.`);\n }\n const element = getNativeByTNode(tNode, IView) as RElement;\n
setElementAttribute(IView[RENDERER], element, namespace, tNode.value, name, value, sanitizer);\n}\n\nexport
function setElementAttribute(\n renderer: Renderer, element: RElement, namespace: string|null|undefined,
tagName: string|null,\n name: string,
value: any, sanitizer: SanitizerFn|null|undefined) {\n if (value == null) {\n ngDevMode &&
ngDevMode.rendererRemoveAttribute++;\n renderer.removeAttribute(element, name, namespace);\n } else {\n
ngDevMode && ngDevMode.rendererSetAttribute++;\n const strValue =\n sanitizer == null ?
renderStringify(value) : sanitizer(value, tagName || "", name);\n\n renderer.setAttribute(element, name, strValue
as string, namespace);\n }\n}\n\n/**\n * Sets initial input properties on directive instances from attribute data\n *
@param IView Current LView that is being processed.\n * @param directiveIndex Index of the directive in
directives array\n * @param instance Instance of the directive on which to set the initial inputs\n * @param def The
directive def that contains the list of inputs\n * @param tNode The static data for this node\n */\nfunction
setInputsFromAttrs<T>(\n IView: LView, directiveIndex: number, instance: T, def: DirectiveDef<T>, tNode:
TNode,\n
initialInputData: InitialInputData): void {\n const initialInputs: InitialInputs|null =
initialInputData![directiveIndex];\n if (initialInputs !== null) {\n const setInput = def.setInput;\n for (let i = 0; i
< initialInputs.length;) {\n const publicName = initialInputs[i++];\n const privateName = initialInputs[i++];\n
const value = initialInputs[i++];\n if (setInput !== null) {\n def.setInput!(instance, value, publicName,
privateName);\n } else {\n (instance as any)[privateName] = value;\n }\n if (ngDevMode) {\n
const nativeElement = getNativeByTNode(tNode, IView) as RElement;\n setNgReflectProperty(IView,
nativeElement, tNode.type, privateName, value);\n }\n }\n}\n}\n\n/**\n * Generates initialInputData for a
node and stores it in the template's static storage\n * so subsequent template invocations don't have to recalculate
it.\n * initialInputData is an array containing values that need to be set as
input properties\n * for directives on this node, but only once on creation. We need this array to support\n * the case
where you set an @Input property of a directive using attribute-like syntax.\n * e.g. if you have a `name` @Input,
you can set it once like this:\n *\n * <my-component name="Bess"></my-component>\n *\n * @param inputs The
list of inputs from the directive def\n * @param attrs The static attrs on this node\n */\nfunction
generateInitialInputs(inputs: {[key: string]: string}, attrs: TAttributes): InitialInputs|\n null {\n let inputsToStore:
InitialInputs|null = null;\n let i = 0;\n while (i < attrs.length) {\n const attrName = attrs[i];\n if (attrName ===
AttributeMarker.NamespaceURI) {\n // We do not allow inputs on namespaced attributes.\n i += 4;\n
continue;\n } else if (attrName === AttributeMarker.ProjectAs) {\n // Skip over the `ngProjectAs` value.\n i
+= 2;\n continue;\n }\n\n // If we hit any other attribute markers,
we're done anyway. None of those are valid inputs.\n if (typeof attrName === 'number') break;\n\n if
(inputs.hasOwnProperty(attrName as string)) {\n if (inputsToStore === null) inputsToStore = [];\n
inputsToStore.push(attrName as string, inputs[attrName as string], attrs[i + 1] as string);\n }\n\n i += 2;\n }\n
return inputsToStore;\n}\n\n////////////////////////////////////\n\n// ViewContainer & View\n////////////////////////////////////\n\n// Not sure why I
need to do `any` here but TS complains later.\nconst LContainerArray: any = class LContainer extends Array

```

```

{};\n\n/**\n * Creates a LContainer, either from a container instruction, or for a ViewContainerRef.\n * @param\n hostNative The host element for the LContainer\n * @param hostTNode The host TNode for the LContainer\n * @param currentView The parent view of the LContainer\n * @param native The native comment element\n * @param isForViewContainerRef Optional a flag indicating the ViewContainerRef case\n * @returns\n LContainer\n */\nexport function createLContainer(\n  hostNative: RElement|RComment|LView, currentView:\n  LView, native: RComment,\n  tNode: TNode): LContainer {\n  ngDevMode && assertLView(currentView);\n  // https://jsperf.com/array-literal-vs-new-array-really\n  const lContainer: LContainer = new (ngDevMode ?\n  LContainerArray : Array)(\n    hostNative, // host native\n    true, // Boolean `true` in this position signifies\n    that this is an `LContainer`\n    false, // has transplanted views\n    currentView, // parent\n    null, //\n    next\n    0, // transplanted views to refresh count\n    tNode, // t_host\n    native, // native,\n    null, // view refs\n    null, // moved views\n  );\n  ngDevMode &&\n  assertEquals(\n  lContainer.length, CONTAINER_HEADER_OFFSET,\n    'Should allocate correct number of slots for\n  LContainer header.);\n  ngDevMode && attachLContainerDebug(lContainer);\n\n  return lContainer;\n}\n\n/**\n * Goes over embedded views (ones created through ViewContainerRef APIs) and\n  refreshes\n * them by executing an associated template function.\n */\nfunction refreshEmbeddedViews(lView:\n  LView) {\n  for (let lContainer = getFirstLContainer(lView); lContainer !== null;\n    lContainer =\n    getNextLContainer(lContainer)) {\n    for (let i = CONTAINER_HEADER_OFFSET; i < lContainer.length; i++)\n    {\n      const embeddedLView = lContainer[i];\n      const embeddedTView = embeddedLView[TVIEW];\n      ngDevMode && assertDefined(embeddedTView, 'TView must be allocated');\n      if\n      (viewAttachedToChangeDetector(embeddedLView)) {\n        refreshView(embeddedTView, embeddedLView,\n        embeddedTView.template, embeddedLView[CONTEXT]);\n      }\n    }\n  }\n}\n\n/**\n * Mark transplanted views\n  as needing to be refreshed at their insertion points.\n * @param lView The `LView` that may have transplanted\n  views.\n */\nfunction markTransplantedViewsForRefresh(lView: LView)\n{\n  for (let lContainer = getFirstLContainer(lView); lContainer !== null;\n    lContainer =\n    getNextLContainer(lContainer)) {\n    if (!lContainer[HAS_TRANSPLANTED_VIEWS]) continue;\n\n    const\n    movedViews = lContainer[MOVED_VIEWS];\n    ngDevMode && assertDefined(movedViews, 'Transplanted\n    View flags set but missing MOVED_VIEWS');\n    for (let i = 0; i < movedViews.length; i++) {\n      const\n      movedLView = movedViews[i];\n      const insertionLContainer = movedLView[PARENT] as LContainer;\n      ngDevMode && assertLContainer(insertionLContainer);\n      // We don't want to increment the counter if the\n      moved LView was already marked for\n      // refresh.\n      if ((movedLView[FLAGS] &\n      LViewFlags.RefreshTransplantedView) === 0) {\n        updateTransplantedViewCount(insertionLContainer, 1);\n      }\n      // Note, it is possible that the `movedViews` is tracking views that are transplanted *and*\n      // those that\n      aren't (declaration component === insertion component). In the latter\n      case,\n      // it's fine to add the flag, as we will clear it immediately in\n      // `refreshEmbeddedViews` for the view\n      currently being refreshed.\n      movedLView[FLAGS] |= LViewFlags.RefreshTransplantedView;\n    }\n  }\n}\n\n/**\n * Refreshes components by entering the component view and processing its bindings,\n  queries, etc.\n * @param componentHostIdx Element index in LView[] (adjusted for HEADER_OFFSET)\n */\nfunction refreshComponent(hostLView: LView, componentHostIdx: number): void {\n  ngDevMode &&\n  assertEquals(isCreationMode(hostLView), false, 'Should be run in update mode');\n  const componentView =\n  getComponentLViewByIndex(componentHostIdx, hostLView);\n  // Only attached components that are\n  CheckAlways or OnPush and dirty should be refreshed\n  if (viewAttachedToChangeDetector(componentView)) {\n    const tView = componentView[TVIEW];\n    if (componentView[FLAGS] & (LViewFlags.CheckAlways |  
LViewFlags.Dirty)) {\n      refreshView(tView, componentView,\n      tView.template, componentView[CONTEXT]);\n    } else if\n    (componentView[TRANSPLANTED_VIEWS_TO_REFRESH] > 0) {\n      // Only attached components that are\n      CheckAlways or OnPush and dirty should be refreshed\n      refreshContainsDirtyView(componentView);\n    }\n  }\n}\n\n/**\n * Refreshes all transplanted views marked with `LViewFlags.RefreshTransplantedView`\n  that are\n * children or descendants of the given lView.\n * @param lView The lView which contains descendant

```







```

IView: LView): Renderer {\n // TODO(FW-2043): the `currentDef` is null when host bindings are invoked while
creating root\n // component (see packages/core/src/render3/component.ts). This is not consistent with the process\n
// of creating inner components, when current directive index is available in the state. In order\n // to avoid relying
on current def being `null` (thus special-casing root component creation), the\n // process of creating root
component should be unified with the process of creating inner\n // components.\n if (currentDef === null ||
isComponentDef(currentDef)) {\n   IView = unwrapLView(IView[tNode.index]);\n } \n return
IView[RENDERER];\n}\n\n/** Handles an error thrown in an LView. */\nexport function handleError(IView:
LView, error: any): void {\n  const injector = IView[INJECTOR];\n  const errorHandler = injector ?
injector.get(ErrorHandler, null) : null;\n  errorHandler && errorHandler.handleError(error);\n}\n\n/**\n * Set the
inputs of directives
at the current node to corresponding value.\n * \n * @param tView The current TView\n * @param IView the
`LView` which contains the directives.\n * @param inputs mapping between the public `"input"` name and
privately-known,\n * possibly minified, property names to write to.\n * @param value Value to set.\n */\nexport
function setInputsForProperty(\n  tView: TView, IView: LView, inputs: PropertyAliasValue, publicName: string,
value: any): void {\n  for (let i = 0; i < inputs.length; i++) {\n    const index = inputs[i] as number;\n    const
privateName = inputs[i] as string;\n    const instance = IView[index];\n    ngDevMode &&
assertIndexInRange(IView, index);\n    const def = tView.data[index] as DirectiveDef<any>;\n    if (def.setInput !==
null) {\n      def.setInput!(instance, value, publicName, privateName);\n    } else {\n      instance[privateName] =
value;\n    }\n  }\n}\n\n/**\n * Updates a text binding at a given index in a given LView.\n */\nexport function
textBindingInternal(IView:
LView, index: number, value: string): void {\n  ngDevMode && assertString(value, 'Value should be a string');\n
ngDevMode && assertNotSame(value, NO_CHANGE as any, 'value should not be NO_CHANGE');\n
ngDevMode && assertIndexInRange(IView, index);\n  const element = getNativeByIndex(index, IView) as any as
RText;\n  ngDevMode && assertDefined(element, 'native element should exist');\n
updateTextNode(IView[RENDERER], element, value);\n}\n\n", /**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {concatStringsWithSpace} from
'./../util/stringify';\nimport {assertFirstCreatePass} from './assert';\nimport {AttributeMarker, TAttributes, TNode}
from './interfaces/node';\nimport {getTView} from './state';\n\n/**\n * Compute the static styling (class/style) from
`TAttributes`.\n * \n * This function should be called
during `firstCreatePass` only.\n * \n * @param tNode The `TNode` into which the styling information should be
loaded.\n * @param attrs `TAttributes` containing the styling information.\n * @param writeToHost Where should
the resulting static styles be written?\n * - `false` Write to `TNode.stylesWithoutHost` /
`TNode.classesWithoutHost`\n * - `true` Write to `TNode.styles` / `TNode.classes`\n */\nexport function
computeStaticStyling(\n  tNode: TNode, attrs: TAttributes|null, writeToHost: boolean): void {\n  ngDevMode
&&\n  assertFirstCreatePass(getTView(), 'Expecting to be called in first template pass only');\n  let styles:
string|null = writeToHost ? tNode.styles : null;\n  let classes: string|null = writeToHost ? tNode.classes : null;\n
let mode: AttributeMarker|0 = 0;\n  if (attrs !== null) {\n    for (let i = 0; i < attrs.length; i++) {\n      const value =
attrs[i];\n      if (typeof value === 'number') {\n        mode = value;\n      } else if (mode === AttributeMarker.Classes)
{\n        classes = concatStringsWithSpace(classes, value as string);\n      } else if (mode === AttributeMarker.Styles)
{\n        const style = value as string;\n        const styleValue = attrs[i] as string;\n        styles =
concatStringsWithSpace(styles, style + ':' + styleValue + ');\n      }\n    }\n  }\n  writeToHost ? tNode.styles =
styles : tNode.stylesWithoutHost = styles;\n  writeToHost ? tNode.classes = classes : tNode.classesWithoutHost =
classes;\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport
{assertParentView} from './assert';\nimport {IcuContainerIterate} from
'/i18n/i18n_tree_shaking';\nimport {CONTAINER_HEADER_OFFSET} from './interfaces/container';\nimport
{TIcuContainerNode, TNode, TNodeType} from './interfaces/node';\nimport {RNode} from

```

```

'/interfaces/renderer_dom';\nimport
{isLContainer} from './interfaces/type_checks';\nimport {DECLARATION_COMPONENT_VIEW, LView,
T_HOST, TVIEW, TView} from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport
{getProjectionNodes} from './node_manipulation';\nimport {getLViewParent} from
'/util/view_traversal_utils';\nimport {unwrapRNode} from './util/view_utils';\n\n\nexport function
collectNativeNodes(\n  tView: TView, IView: LView, tNode: TNode|null, result: any[],\n  isProjection: boolean =
false): any[] {\n  while (tNode !== null) {\n    ngDevMode &&\n      assertTNodeType(\n        tNode,\n        TNodeType.AnyRNode | TNodeType.AnyContainer | TNodeType.Projection | TNodeType.Icu);\n\n    const lNode
= IView[tNode.index];\n    if (lNode !== null) {\n      result.push(unwrapRNode(lNode));\n    }\n\n    // A given
lNode can represent either a native node or a LContainer (when it is a host of a\n    // ViewContainerRef). When we
find a LContainer we need to descend into it to
    collect root nodes\n    // from the views in this container.\n    if (isLContainer(lNode)) {\n      for (let i =
CONTAINER_HEADER_OFFSET; i < lNode.length; i++) {\n        const lViewInAContainer = lNode[i];\n
const lViewFirstChildTNode = lViewInAContainer[TVIEW].firstChild;\n        if (lViewFirstChildTNode !== null)
{\n          collectNativeNodes(\n            lViewInAContainer[TVIEW], lViewInAContainer, lViewFirstChildTNode,
result);\n        }\n      }\n\n      const tNodeType = tNode.type;\n      if (tNodeType &
TNodeType.ElementContainer) {\n        collectNativeNodes(tView, IView, tNode.child, result);\n      } else if
(tNodeType & TNodeType.Icu) {\n        const nextRNode = icuContainerIterate(tNode as TIcuContainerNode,
IView);\n        let rNode: RNode|null;\n        while (rNode = nextRNode()) {\n          result.push(rNode);\n        }\n
      } else if (tNodeType & TNodeType.Projection) {\n        const nodesInSlot = getProjectionNodes(IView, tNode);\n
if
(Array.isArray(nodesInSlot))
        {\n          result.push(...nodesInSlot);\n        } else {\n          const parentView =
getLViewParent(IView[DECLARATION_COMPONENT_VIEW]);\n          ngDevMode &&
assertParentView(parentView);\n          collectNativeNodes(parentView[TVIEW], parentView, nodesInSlot, result,
true);\n        }\n      }\n      tNode = isProjection ? tNode.projectionNext : tNode.next;\n    }\n\n    return
result;\n  }\n\n  /**\n   * @license\n   * Copyright Google LLC All Rights Reserved.\n   * Use of this source code is governed by an MIT-
style license that can be\n   * found in the LICENSE file at https://angular.io/license\n   */\n\nimport
{ChangeDetectorRef as viewEngine_ChangeDetectorRef} from './change_detection/change_detector_ref';\nimport
{RuntimeError, RuntimeErrorCode} from './errors';\nimport {EmbeddedViewRef as
viewEngine_EmbeddedViewRef, InternalViewRef as viewEngine_InternalViewRef, ViewRefTracker} from
'/linker/view_ref';\nimport {removeFromArray} from './util/array_utils';\nimport {assertEqual} from
'/util/assert';\n\nimport {collectNativeNodes} from './collect_native_nodes';\nimport {checkNoChangesInternal,
detectChangesInternal, markViewDirty, storeCleanupWithContext} from './instructions/shared';\nimport
{CONTAINER_HEADER_OFFSET, VIEW_REFS} from './interfaces/container';\nimport {isLContainer} from
'/interfaces/type_checks';\nimport {CONTEXT, FLAGS, LView, LViewFlags, PARENT, TVIEW} from
'/interfaces/view';\nimport {destroyLView, detachView, renderDetachView} from './node_manipulation';\n\n\n//
Needed due to tsickle downleveling where multiple `implements` with classes creates\n// multiple @extends in
Closure annotations, which is illegal. This workaround fixes\n// the multiple @extends by making the annotation
@implements instead\nexport interface viewEngine_ChangeDetectorRef_interface extends
viewEngine_ChangeDetectorRef {\n}\nexport class ViewRef<T> implements viewEngine_EmbeddedViewRef<T>,
viewEngine_InternalViewRef,\n                                viewEngine_ChangeDetectorRef_interface
{\n  private _appRef: ViewRefTracker|null = null;\n  private _attachedToViewContainer = false;\n\n  get
rootNodes(): any[] {\n    const lView = this._lView;\n    const tView = IView[TVIEW];\n    return
collectNativeNodes(tView, IView, tView.firstChild, []);\n  }\n\n  constructor(\n    /**\n     * This represents
`LView` associated with the component when ViewRef is a ChangeDetectorRef.\n     * When ViewRef is
created for a dynamic component, this also represents the `LView` for the\n     * component.\n     * For a
`regular` ViewRef created for an embedded view, this is the `LView` for the embedded\n     * view.\n     *\n
     * @internal\n     */\n    public _lView: LView,\n\n    /**\n     * This represents the `LView` associated with the

```

point where `ChangeDetectorRef` was requested. This may be different from `\_IView` if the `\_cdRefInjectingView` is an embedded view.

```

private _cdRefInjectingView?: LView {
  get context(): T { return this._IView[CONTEXT] as unknown as T; }
  set context(value: T) { this._IView[CONTEXT] = value as unknown as {}; }
  get destroyed(): boolean { return (this._IView[FLAGS] & LViewFlags.Destroyed) === LViewFlags.Destroyed; }
  destroy(): void {
    if (this._appRef) this._appRef.detachView(this);
    else if (this._attachedToViewContainer) {
      const parent = this._IView[PARENT];
      if (isLContainer(parent)) {
        const viewRefs = parent[VIEW_REFS] as ViewRef<unknown>[] | null;
        const index = viewRefs ? viewRefs.indexOf(this) : -1;
        if (index > -1) {
          ngDevMode && assertEqual(index, parent.indexOf(this._IView) - CONTAINER_HEADER_OFFSET, 'An attached view should be in the same position within its container as its ViewRef in the VIEW_REFS array. ');
          detachView(parent, index);
        }
        removeFromArray(viewRefs!, index);
      }
      this._attachedToViewContainer = false;
    }
    destroyLView(this._IView[TVIEW], this._IView);
  }
  onDestroy(callback: Function) { storeCleanupWithContext(this._IView[TVIEW], this._IView, null, callback); }
  /** Marks a view and all of its ancestors dirty. This can be used to ensure an {@link ChangeDetectionStrategy#OnPush OnPush} component is checked when it needs to be re-rendered but the two normal triggers haven't marked it dirty (i.e. inputs haven't changed and events haven't fired in the view).
  * <!-- TODO: Add a link to a chapter on OnPush components -->
  * @usageNotes
  * ### Example
  * ```typescript
  * @Component({
  *   selector: 'app-root',
  *   template: `Number of ticks: {{numberOfTicks}}`
  *   changeDetection: ChangeDetectionStrategy.OnPush,
  * })
  * class AppComponent {
  *   numberOfTicks = 0;
  *   constructor(private ref: ChangeDetectorRef) {
  *     setInterval(() => {
  *       this.numberOfTicks++;
  *       // the following is required, otherwise the view will not be updated
  *       this.ref.markForCheck();
  *     }, 1000);
  *   }
  *   markForCheck(): void {
  *     markViewDirty(this._cdRefInjectingView || this._IView);
  *   }
  * }
  *
  * Detaches the view from the change detection tree. Detached views will not be checked during change detection runs until they are re-attached, even if they are dirty. `detach` can be used in combination with {@link ChangeDetectorRef#detectChanges detectChanges} to implement local change detection checks.
  * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->
  * <!-- TODO: Add a live demo once ref.detectChanges is merged into master -->
  * @usageNotes
  * ### Example
  *
  * The following example defines a component with a large list of readonly data. Imagine the data changes constantly, many times per second. For performance reasons, we want to check and update the list every five seconds. We can do that by detaching the component's change detector and doing a local check every five seconds.
  * ```typescript
  * class DataProvider {
  *   // in a real application the returned data will be different every time
  *   get data() { return [1,2,3,4,5]; }
  * }
  * @Component({
  *   selector: 'giant-list',
  *   template: `<li *ngFor="let d of dataProvider.data">Data {{d}}</li>`,
  * })
  * class GiantList {
  *   constructor(private ref: ChangeDetectorRef, private dataProvider: DataProvider) {
  *     ref.detach();
  *     setInterval(() => {
  *       this.ref.detectChanges();
  *     }, 5000);
  *   }
  * }
  * @Component({
  *   selector: 'app',
  *   providers: [DataProvider],
  *   template: `<giant-list></giant-list>`,
  * })
  * class App {
  * }
  *
  * detach(): void {
  *   this._IView[FLAGS] &= ~LViewFlags.Attached;
  * }
  *
  * Re-attaches a view to the change detection tree. This can be used to re-attach views that were previously detached from the tree using {@link ChangeDetectorRef#detach detach}. Views are attached to the tree by default.
  * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->
  * @usageNotes
  * ### Example
  *
  * The following example creates a component displaying `live` data. The component will detach its change detector from the main change detector tree when the component's live property is set to false.
  * ```typescript
  * class DataProvider {
  *   data = 1;
  *   constructor() {
  *     setInterval(() => {
  *       this.data = this.data *

```

```

2;\n * }, 500);\n * }\n * }\n * \n
 * @Component({\n * selector: 'live-data',\n * inputs: ['live'],\n * template: 'Data: {{dataProvider.data}}'\n
 * })\n * class LiveData {\n * constructor(private ref: ChangeDetectorRef, private dataProvider: DataProvider)\n
 * {\n * \n * set live(value) {\n * if (value) {\n * this.ref.reattach();\n * } else {\n * \n
 * this.ref.detach();\n * }\n * }\n * }\n * }\n * @Component({\n * selector: 'app-root',\n * providers:\n
 * [DataProvider],\n * template: `\n * Live Update: <input type="checkbox" [(ngModel)]="live">\n * \n
 * <live-data [live]="live"><live-data>\n * `,\n * })\n * class AppComponent {\n * live = true;\n * }\n * \n
 * ``\n * /\n reattach(): void {\n this._IView[FLAGS] |= LViewFlags.Attached;\n }\n * /\n * Checks the view\n
 * and its children.\n * \n * This can also be used in combination with { @link ChangeDetectorRef#detach detach} to\n
 * implement\n * local change detection checks.\n
 * \n * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n * <!-- TODO: Add a live demo\n
 * once ref.detectChanges is merged into master -->\n * \n * @usageNotes\n * ### Example\n * \n * The\n
 * following example defines a component with a large list of readonly data.\n * Imagine, the data changes constantly,\n
 * many times per second. For performance reasons,\n * we want to check and update the list every five seconds.\n
 * \n * We can do that by detaching the component's change detector and doing a local change detection\n * check\n
 * every five seconds.\n * \n * See { @link ChangeDetectorRef#detach detach} for more information.\n * /\n
 * detectChanges(): void {\n detectChangesInternal(this._IView[TVIEW], this._IView, this.context as unknown as\n
 * {});\n }\n * /\n * Checks the change detector and its children, and throws if any changes are detected.\n * \n
 * This is used in development mode to verify that running change detection doesn't\n
 * introduce other changes.\n * /\n checkNoChanges(): void {\n if (ngDevMode) {\n \n
 * checkNoChangesInternal(this._IView[TVIEW], this._IView, this.context as unknown as {});\n }\n }\n *\n
 * attachToViewContainerRef() {\n if (this._appRef) {\n throw new RuntimeError(\n \n
 * RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n ngDevMode && 'This view is already attached\n \n
 * directly to the ApplicationRef!');\n }\n this._attachedToViewContainer = true;\n }\n *\n
 * detachFromAppRef() {\n this._appRef = null;\n renderDetachView(this._IView[TVIEW], this._IView);\n }\n *\n
 * attachToAppRef(appRef: ViewRefTracker) {\n if (this._attachedToViewContainer) {\n throw new RuntimeError(\n \n
 * RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n ngDevMode && 'This view is already attached to a\n \n
 * ViewContainer!');\n }\n this._appRef = appRef;\n }\n }\n *\n
 * @internal *\n * export class RootViewRef<T>\n * extends ViewRef<T> {\n * constructor(public _view: LView) {\n * super(_view);\n
 * }\n *\n
 * override detectChanges(): void {\n const IView = this._view;\n const tView = IView[TVIEW];\n const\n
 * context = IView[CONTEXT];\n detectChangesInternal(tView, IView, context, false);\n }\n *\n
 * override\n * checkNoChanges(): void {\n if (ngDevMode) {\n const IView = this._view;\n const tView =\n
 * IView[TVIEW];\n const context = IView[CONTEXT];\n checkNoChangesInternal(tView, IView, context,\n
 * false);\n }\n }\n *\n
 * override get context(): T {\n return null!;\n }\n }\n * \n
 * @license\n * Copyright Google\n * LLC All Rights Reserved.\n * \n
 * Use of this source code is governed by an MIT-style license that can be\n * found\n
 * in the LICENSE file at https://angular.io/license\n * \n
 * \n
 * import { ChangeDetectorRef } from\n
 * './change_detection/change_detector_ref';\n import { Injector } from './di/injector';\n import { InjectFlags } from\n
 * './di/interface/injector';\n import { ProviderToken } from './di/provider_token';\n import { EnvironmentInjector } from\n
 * './di/r3_injector';\n import\n
 * { RuntimeError, RuntimeErrorCode } from './errors';\n import { Type } from './interface/type';\n import\n
 * { ComponentFactory as AbstractComponentFactory, ComponentRef as AbstractComponentRef } from\n
 * './linker/component_factory';\n import { ComponentFactoryResolver as AbstractComponentFactoryResolver } from\n
 * './linker/component_factory_resolver';\n import { createElementRef, ElementRef } from\n
 * './linker/element_ref';\n import { NgModuleRef } from './linker/ng_module_factory';\n import { RendererFactory2 }\n
 * from './render/api';\n import { Sanitizer } from './sanitization/sanitizer';\n import { assertDefined, assertIndexInRange }\n
 * from './util/assert';\n import { VERSION } from './version';\n import\n
 * { NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR } from './view/provider_flags';\n import\n
 * { assertComponentType } from './assert';\n import { getComponentDef } from './definition';\n import

```

```

{diPublicInInjector, getOrCreateNodeInjectorForNode, NodeInjector} from './di';\nimport
{throwProviderNotFoundError} from './errors_di';\nimport
{registerPostOrderHooks} from './hooks';\nimport {reportUnknownPropertyError} from
 './instructions/element_validation';\nimport {addToViewTree, createLView, createTView,
getOrCreateComponentTView, getOrCreateTNode, initTNodeFlags, instantiateRootComponent,
invokeHostBindingsInCreationMode, locateHostElement, markAsComponentHost, markDirtyIfOnPush,
registerHostBindingOpCodes, renderView, setInputsForProperty} from './instructions/shared';\nimport
{ComponentDef, RenderFlags} from './interfaces/definition';\nimport {PropertyAliasValue, TContainerNode,
TElementContainerNode, TElementNode, TNode, TNodeType} from './interfaces/node';\nimport {Renderer,
RendererFactory} from './interfaces/renderer';\nimport {RElement, RNode} from
 './interfaces/renderer_dom';\nimport {CONTEXT, HEADER_OFFSET, LView, LViewFlags, TVIEW, TViewType}
from './interfaces/view';\nimport {MATH_ML_NAMESPACE, SVG_NAMESPACE} from './namespaces';\nimport
{createElementNode, writeDirectClass, writeDirectStyle}
from './node_manipulation';\nimport {extractAttrsAndClassesFromSelector, stringifyCSSSelectorList} from
 './node_selector_matcher';\nimport {enterView, getCurrentTNode, getLView, leaveView, setSelectedIndex} from
 './state';\nimport {computeStaticStyling} from './styling/static_styling';\nimport {setUpAttributes} from
 './util/attrs_utils';\nimport {stringifyForError} from './util/stringify_utils';\nimport {getTNode} from
 './util/view_utils';\nimport {RootViewRef, ViewRef} from './view_ref';\n\nexport class ComponentFactoryResolver
extends AbstractComponentFactoryResolver {\n  /**\n   * @param ngModule The NgModuleRef to which all
resolved factories are bound.\n   * ^\n   constructor(private ngModule?: NgModuleRef<any>) {\n   super();\n   }\n\n   override resolveComponentFactory<T>(component: Type<T>): AbstractComponentFactory<T> {\n   ngDevMode
&& assertComponentType(component);\n   const componentDef = getComponentDef(component)!;\n   return new
ComponentFactory(componentDef, this.ngModule);\n   }\n\n   function toRefArray(map: {[key: string]: string}): {propName: string; templateName: string;}[] {\n   const
array: {propName: string; templateName: string;}[] = [];\n   for (let nonMinified in map) {\n   if
(map.hasOwnProperty(nonMinified)) {\n   const minified = map[nonMinified];\n   array.push({propName:
minified, templateName: nonMinified});\n   }\n   }\n   return array;\n   }\n\n   function getNamespace(elementName:
string): string|null {\n   const name = elementName.toLowerCase();\n   return name === 'svg' ? SVG_NAMESPACE
: (name === 'math' ? MATH_ML_NAMESPACE : null);\n   }\n\n   /**\n   * Injector that looks up a value using a
specific injector, before falling back to the module\n   * injector. Used primarily when creating components or
embedded views dynamically.\n   * ^\n   class ChainedInjector implements Injector {\n   constructor(private injector:
Injector, private parentInjector: Injector) {\n   }\n\n   get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?:
InjectFlags): T\n\n   {\n   const value = this.injector.get<T>(typeof NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR>(\n
token, NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR, flags);\n\n   if (value !==
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR ||\n   notFoundValue ===
(NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR as unknown as T)) {\n   // Return the value from the
root element injector when\n   // - it provides it\n   // (value !==
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR)\n   // - the module injector should not be checked\n
// (notFoundValue === NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR)\n   return value as T;\n   }\n\n   return this.parentInjector.get(token, notFoundValue, flags);\n   }\n\n   /**\n   * ComponentFactory interface
implementation.\n   * ^\n   export class ComponentFactory<T> extends AbstractComponentFactory<T> {\n   override
selector: string;\n   override componentType: Type<any>;\n   override ngContentSelectors: string[];\n   isBoundToModule: boolean;\n\n   override get inputs(): {propName: string;
templateName: string;}[] {\n   return toRefArray(this.componentDef.inputs);\n   }\n\n   override get outputs():
{propName: string; templateName: string;}[] {\n   return toRefArray(this.componentDef.outputs);\n   }\n\n   /**\n   *
@param componentDef The component definition.\n   * @param ngModule The NgModuleRef to which the factory
is bound.\n   * ^\n   constructor(private componentDef: ComponentDef<any>, private ngModule?:

```

```

NgModuleRef<any>) {\n  super();\n  this.componentType = componentDef.type;\n  this.selector =
stringifyCSSSelectorList(componentDef.selectors);\n  this.ngContentSelectors =\ncomponentDef.ngContentSelectors ? componentDef.ngContentSelectors : [];\n  this.isBoundToModule =
!!ngModule;\n  }\n\n  override create(\n    injector: Injector, projectableNodes?: any[] | undefined,\n    rootSelectorOrNode?: any,\n    environmentInjector?: NgModuleRef<any> | EnvironmentInjector | undefined):
AbstractComponentRef<T> {\n    environmentInjector = environmentInjector
  || this.ngModule;\n\n    let realEnvironmentInjector = environmentInjector instanceof EnvironmentInjector ?\nenvironmentInjector : \n    environmentInjector?.injector;\n\n    if (realEnvironmentInjector &&
this.componentDef.getStandaloneInjector !== null) {\n      realEnvironmentInjector =
this.componentDef.getStandaloneInjector(realEnvironmentInjector) ||\n      realEnvironmentInjector;\n    }\n\n    const rootViewInjector =\n      realEnvironmentInjector ? new ChainedInjector(injector, realEnvironmentInjector) :
injector;\n\n    const rendererFactory = rootViewInjector.get(RendererFactory2, null);\n    if (rendererFactory ===
null) {\n      throw new RuntimeError(\n        RuntimeErrorCode.RENDERER_NOT_FOUND,\n        ngDevMode
&&\n        'Angular was not able to inject a renderer (RendererFactory2). ' +\n        'Likely this is due to a
broken DI hierarchy. ' +\n        'Make sure that any injector used to create this component has
a correct parent.);\n    }\n\n    const sanitizer = rootViewInjector.get(Sanitizer, null);\n\n    const hostRenderer =
rendererFactory.createRenderer(null, this.componentDef);\n    // Determine a tag name used for creating host
elements when this component is created\n    // dynamically. Default to 'div' if this component did not specify any
tag name in its selector.\n    const elementName = this.componentDef.selectors[0][0] as string || 'div';\n    const
hostRNode = rootSelectorOrNode ?\n      locateHostElement(hostRenderer, rootSelectorOrNode,\nthis.componentDef.encapsulation) : \n      createElementNode(hostRenderer, elementName,\ngetNamespace(elementName));\n\n    const rootFlags = this.componentDef.onPush ? LViewFlags.Dirty |
LViewFlags.IsRoot : \n      LViewFlags.CheckAlways | LViewFlags.IsRoot;\n\n    //
Create the root view. Uses empty TView and ContentTemplate.\n    const rootView =
createTView(TViewType.Root, null, null, 1, 0, null,\n      null, null, null, null);\n    const rootLView = createLView(\n      null, rootView, null, rootFlags, null, null,\n      rendererFactory, hostRenderer, sanitizer,\n      rootViewInjector, null);\n\n    // rootView is the parent when
bootstrapping\n    // TODO(misko): it looks like we are entering view here but we don't really need to as\n    //
`renderView` does that. However as the code is written it is needed because\n    // `createRootComponentView` and
`createRootComponent` both read global state. Fixing those\n    // issues would allow us to drop this.\n    enterView(rootLView);\n\n    let component: T;\n    let tElementNode: TElementNode;\n\n    try {\n      const
componentView = createRootComponentView(\n        hostRNode, this.componentDef, rootLView,\n      rendererFactory, hostRenderer);\n      if (hostRNode) {\n        if (rootSelectorOrNode) {\n
setUpAttributes(hostRenderer, hostRNode, ['ng-version', VERSION.full]);\n        } else {\n          // If host element is
created
          as a part of this function call (i.e. `rootSelectorOrNode`\n          // is not defined), also apply attributes and classes
extracted from component selector.\n          // Extract attributes and classes from the first selector only to match VE
behavior.\n          const {attrs, classes} =\nextractAttrsAndClassesFromSelector(this.componentDef.selectors[0]);\n          if (attrs) {\n
setUpAttributes(hostRenderer, hostRNode, attrs);\n          }\n          if (classes && classes.length > 0) {\n
writeDirectClass(hostRenderer, hostRNode, classes.join(' '));\n          }\n          }\n          tElementNode =
getTNode(rootTView, HEADER_OFFSET) as TElementNode;\n          if (projectableNodes !== undefined) {\n
const projection: (TNode | RNode[] | null)[] = tElementNode.projection = [];\n          for (let i = 0; i <
this.ngContentSelectors.length; i++) {\n            const nodesForSlot = projectableNodes[i];\n            // Projectable nodes
can be passed
            as array of arrays or an array of iterables (ngUpgrade\n            // case). Here we do normalize passed data structure to
be an array of arrays to avoid\n            // complex checks down the line.\n            // We also normalize the length of the
passed in projectable nodes (to match the number of\n            // <ng-container> slots defined by a component).\n

```

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projection.push(nodesforSlot != null ? Array.from(nodesforSlot) : null);
    }
    }
    // TODO: should LifecycleHooksFeature and other host features be generated by the compiler and
    // executed here?
    // Angular 5 reference: https://stackblitz.com/edit/lifecycle-hooks-vcref
    component =
    createRootComponent(componentView, this.componentDef, rootLView, [LifecycleHooksFeature]);
    renderView(rootTView, rootLView, null);
  } finally {
    leaveView();
  }
  return new
  ComponentRef(
    this.componentType, component, createElementRef(tElementNode, rootLView),
    rootLView,
    tElementNode);
}
}
const componentFactoryResolver: ComponentFactoryResolver = new
ComponentFactoryResolver();
/**
 * Creates a ComponentFactoryResolver and stores it on the injector. Or, if
the
 * ComponentFactoryResolver
 * already exists, retrieves the existing ComponentFactoryResolver.
 *
 * @returns The ComponentFactoryResolver instance to use
 *
 * @export function injectComponentFactoryResolver():
AbstractComponentFactoryResolver {
  return componentFactoryResolver;
}
/**
 * Represents an instance of
a Component created via a { @link ComponentFactory }.
 *
 * `ComponentRef` provides access to the Component
Instance as well other objects related to this
 * Component Instance and allows you to destroy the Component
Instance via the { @link #destroy }
 * method.
 *
 * @export class ComponentRef<T> extends
AbstractComponentRef<T> {
  override instance: T;
  override hostView: ViewRef<T>;
  override
changeDetectorRef: ChangeDetectorRef;

  override componentType: Type<T>;
  constructor(
    componentType: Type<T>, instance: T, public
location: ElementRef, private _rootLView: LView,
    private _tNode:
TElementNode|TContainerNode|TElementContainerNode) {
    super();
    this.instance = instance;
    this.hostView = this.changeDetectorRef = new RootViewRef<T>(_rootLView);
    this.componentType =
componentType;
  }
  override setInput(name: string, value: unknown): void {
    const inputData =
this._tNode.inputs;
    let dataValue: PropertyAliasValue|undefined;
    if (inputData !== null && (dataValue =
inputData[name])) {
      const lView = this._rootLView;
      setInputsForProperty(lView[TVIEW], lView,
dataValue, name, value);
      markDirtyIfOnPush(lView, this._tNode.index);
    } else {
      if (ngDevMode) {
        const cmpNameForError = stringifyForError(this.componentType);
        let message =
`Can't set value
of the '${name}' input on the '${cmpNameForError}' component.
`;
        message += `Make sure that the '${
name}' property is annotated with @Input() or a mapped
@Input('${name}') exists.`;
        reportUnknownPropertyError(message);
      }
    }
  }
  override get
injector(): Injector {
    return new NodeInjector(this._tNode, this._rootLView);
  }
  override destroy(): void {
    this.hostView.destroy();
  }
  override onDestroy(callback: () => void): void {
    this.hostView.onDestroy(callback);
  }
}
/** Represents a HostFeature function.
 *
 * @type HostFeature =
(<T>(component: T, componentDef: ComponentDef<T>) => void);
// TODO: A hack to not pull in the
NullInjector from @angular/core.
export const NULL_INJECTOR: Injector = {
  get: (token: any,
notFoundValue?: any) => {
    throw ProviderNotFoundError(token, 'NullInjector');
  }
};
/**
 * Creates the
root component view and the root component node.
 *
 * @param rNode Render host element.
 * @param def
ComponentDef
 * @param rootView
The parent view where the host node is stored
 * @param rendererFactory Factory to be used for creating child
renderers.
 * @param hostRenderer The current renderer
 * @param sanitizer The sanitizer, if provided
 *
 * @returns Component view created
 *
 * @export function createRootComponentView(
  rNode: RElement|null,
def: ComponentDef<any>, rootView: LView, rendererFactory: RendererFactory,
  hostRenderer: Renderer,
sanitizer?: Sanitizer|null): LView {
  const tView = rootView[TVIEW];
  const index = HEADER_OFFSET;
  ngDevMode && assertIndexInRange(rootView, index);
  rootView[index] = rNode;
  // '#host' is added here as
we don't know the real host DOM name (we don't want to read it) and at
// the same time we want to
communicate the debug `TNode` that this is a special `TNode`
// representing a host element.
  const tNode:
TElementNode = getOrCreateTNode(tView, index, TNodeType.Element, '#host', null);
  const mergedAttrs =
tNode.mergedAttrs = def.hostAttrs;

  if (mergedAttrs !== null) {
    computeStaticStyling(tNode, mergedAttrs, true);
  }
  if (rNode !== null) {
    setUpAttributes(hostRenderer, rNode, mergedAttrs);
  }
  if (tNode.classes !== null) {

```





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superDef: DirectiveDef<any>|ComponentDef<any>|undefined
= undefined;\n  if (isComponentDef(definition)) {\n    // Don't use getComponentDef/getDirectiveDef. This logic
relies on inheritance.\n    superDef = superType.cmp || superType.dir;\n  } else {\n    if (superType.cmp) {\n
throw new RuntimeError(\n      RuntimeErrorCode.INVALID_INHERITANCE,\n      ngDevMode &&\n
    `Directives cannot inherit Components. Directive ${\n        stringifyForError(definition.type)} is
attempting to extend component ${\n        stringifyForError(superType)}`);\n    }\n    // Don't use
getComponentDef/getDirectiveDef. This logic relies on inheritance.\n    superDef = superType.dir;\n  }\n  if
(superDef) {\n    if (shouldInheritFields) {\n      inheritanceChain.push(superDef);\n      // Some fields in the
definition may be empty, if there were no values to put in them that\n      // would've justified object creation.
Unwrap them if necessary.\n
      const writeableDef = definition as WritableDef;\n      writeableDef.inputs =
maybeUnwrapEmpty(definition.inputs);\n      writeableDef.declaredInputs =
maybeUnwrapEmpty(definition.declaredInputs);\n      writeableDef.outputs =
maybeUnwrapEmpty(definition.outputs);\n      // Merge hostBindings\n      const superHostBindings =
superDef.hostBindings;\n      superHostBindings && inheritHostBindings(definition, superHostBindings);\n
// Merge queries\n      const superViewQuery = superDef.viewQuery;\n      const superContentQueries =
superDef.contentQueries;\n      superViewQuery && inheritViewQuery(definition, superViewQuery);\n
superContentQueries && inheritContentQueries(definition, superContentQueries);\n      // Merge inputs and
outputs\n      fillProperties(definition.inputs, superDef.inputs);\n      fillProperties(definition.declaredInputs,
superDef.declaredInputs);\n      fillProperties(definition.outputs, superDef.outputs);\n
      // Merge animations metadata.\n      // If `superDef` is a Component, the `data` field is present (defaults to an
empty object).\n      if (isComponentDef(superDef) && superDef.data.animation) {\n        // If super def is a
Component, the `definition` is also a Component, since Directives can\n        // not inherit Components (we throw
an error above and cannot reach this code).\n        const defData = (definition as ComponentDef<any>).data;\n
defData.animation = (defData.animation || []).concat(superDef.data.animation);\n      }\n      // Run parent
features\n      const features = superDef.features;\n      if (features) {\n        for (let i = 0; i < features.length; i++) {\n
          const feature = features[i];\n          if (feature && feature.ngInherit) {\n            (feature as
DirectiveDefFeature)(definition);\n          }\n          // If `InheritDefinitionFeature` is a part of the current `superDef` ,
it means that this\n          //
          def already has all the necessary information inherited from its super class(es), so we\n          // can stop merging
fields from super classes. However we need to iterate through the\n          // prototype chain to look for classes that
might contain other "features" (like\n          // NgOnChanges), which we should invoke for the original `definition`.
We set the\n          // `shouldInheritFields` flag to indicate that, essentially skipping fields inheritance\n          // logic
and only invoking functions from the "features" list.\n          if (feature === InheritDefinitionFeature) {\n
            shouldInheritFields = false;\n          }\n          }\n          }\n          }\n          superType = Object.getPrototypeOf(superType);\n
        }\n        mergeHostAttrsAcrossInheritance(inheritanceChain);\n      }\n      // Merge the `hostAttrs` and `hostVars` from
the inherited parent to the base class.\n      // @param inheritanceChain A list of `WritableDefs` starting at the top
most type and listing\n      // sub-types
      in order. For each type take the `hostAttrs` and `hostVars` and merge it with the child\n      // type.\n      // function
mergeHostAttrsAcrossInheritance(inheritanceChain: WritableDef[]) {\n        let hostVars: number = 0;\n        let hostAttrs:
TAttributes|null = null;\n        // We process the inheritance order from the base to the leaves here.\n        for (let i =
inheritanceChain.length - 1; i >= 0; i--) {\n          const def = inheritanceChain[i];\n          // For each `hostVars`, we need to
add the superclass amount.\n          def.hostVars = (hostVars += def.hostVars);\n          // for each `hostAttrs` we need to
merge it with superclass.\n          def.hostAttrs =\n            mergeHostAttrs(def.hostAttrs, hostAttrs =
mergeHostAttrs(hostAttrs, def.hostAttrs));\n        }\n      }\n      // function maybeUnwrapEmpty<T>(value: T[]): T[];\n      // function
maybeUnwrapEmpty<T>(value: T): T;\n      // function maybeUnwrapEmpty(value: any): any {\n        if (value ===
EMPTY_OBJ) {\n          return {};\n        } else if (value === EMPTY_ARRAY) {\n          return [];\n        } else {\n          return
value;\n        }\n      }\n

```

```

}
function inheritViewQuery(definition: WritableDef, superViewQuery: ViewQueriesFunction<any>) {
  const prevViewQuery = definition.viewQuery;
  if (prevViewQuery) {
    definition.viewQuery = (rf, ctx) => {
      superViewQuery(rf, ctx);
      prevViewQuery(rf, ctx);
    };
  } else {
    definition.viewQuery = superViewQuery;
  }
}
function inheritContentQueries(definition: WritableDef, superContentQueries: ContentQueriesFunction<any>) {
  const prevContentQueries = definition.contentQueries;
  if (prevContentQueries) {
    definition.contentQueries = (rf, ctx, directiveIndex) => {
      superContentQueries(rf, ctx, directiveIndex);
      prevContentQueries(rf, ctx, directiveIndex);
    };
  } else {
    definition.contentQueries = superContentQueries;
  }
}
function inheritHostBindings(definition: WritableDef, superHostBindings: HostBindingsFunction<any>) {
  const prevHostBindings = definition.hostBindings;
  if (prevHostBindings) {
    definition.hostBindings = (rf: RenderFlags, ctx: any) => {
      superHostBindings(rf, ctx);
      prevHostBindings(rf, ctx);
    };
  } else {
    definition.hostBindings = superHostBindings;
  }
}
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
import { ComponentDef, DirectiveDef } from './interfaces/definition';
import { isComponentDef } from './interfaces/type_checks';
import { getSuperType } from './inherit_definition_feature';
/**
 * Fields which exist on either directive or component definitions, and need to be copied from parent to child classes by the `CopyDefinitionFeature`.
 *
 * const COPY_DIRECTIVE_FIELDS: (keyof DirectiveDef<unknown>>[] = [
  // The child class should use the providers of its parent.
  'providersResolver',
  // Not listed here are any fields which are handled by the `InheritDefinitionFeature`, such as inputs, outputs, and host binding functions.
  // Fields which exist only on component definitions, and need to be copied from parent to child classes by the `CopyDefinitionFeature`.
  // The type here allows any field of `ComponentDef` which is not also a property of `DirectiveDef`, since those should go in `COPY_DIRECTIVE_FIELDS` above.
  const COPY_COMPONENT_FIELDS: Exclude<keyof ComponentDef<unknown>, keyof DirectiveDef<unknown>>[] = [
  // The child class should use the template function of its parent, including all template semantics.
  'template',
  'decls',
  'consts',
  'vars',
  'onPush',
  'ngContentSelectors',
  // The child class should use the CSS styles of its parent, including all styling semantics.
  'styles',
  'encapsulation',
  // The child class should be checked by the runtime in the same way as its parent.
  'schemas',
  // Copies the fields not handled by the `InheritDefinitionFeature` from the supertype of a definition.
  // This exists primarily to support ngcc migration of an existing View Engine pattern, where an entire decorator is inherited from a parent to a child class. When ngcc detects this case, it generates a skeleton definition on the child class, and applies this feature.
  // The `CopyDefinitionFeature` then copies any needed fields from the parent class' definition, including things like the component template function.
  // @param definition The definition of a child class which inherits from a parent class with its own definition.
  // @codeGenApi
  export function CopyDefinitionFeature(definition: DirectiveDef<any>|ComponentDef<any>): void {
    let superType = getSuperType(definition.type!);
    let superDef: DirectiveDef<any>|ComponentDef<any>|undefined = undefined;
    if (isComponentDef(definition)) {
      // Don't use getComponentDef/getDirectiveDef. This logic relies on inheritance.
      superDef = superType.cmp!;
    } else {
      // Don't use getComponentDef/getDirectiveDef. This logic relies on inheritance.
      superDef = superType.dir!;
    }
    // Needed because `definition` fields are readonly.
    const defAny = (definition as any);
    // Copy over any fields that apply to either directives or components.
    for (const field of COPY_DIRECTIVE_FIELDS) {
      defAny[field] = superDef[field];
    }
    if (isComponentDef(superDef)) {
      // Copy over any component-specific fields.
      for (const field of COPY_COMPONENT_FIELDS) {
        defAny[field] = superDef[field];
      }
    }
  }
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
import { global as _global } from './global';
// When Symbol.iterator doesn't exist, retrieves the key used in es6-shim
declare const Symbol: any;
let

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_symbolIterator: any = null;\nexport function getSymbolIterator(): string|symbol {\n if (!_symbolIterator) {\n
const Symbol = _global['Symbol'];\n if (Symbol && Symbol.iterator) {\n _symbolIterator = Symbol.iterator;\n
} else {\n // es6-shim specific logic\n const keys = Object.getOwnPropertyNames(Map.prototype);\n for
(let i = 0; i < keys.length; ++i) {\n const key = keys[i];\n if (key !== 'entries' && key !== 'size' &&\n
(Map as any).prototype[key] === Map.prototype['entries']) {\n _symbolIterator = key;\n } }\n }\n
}\n return _symbolIterator;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {getSymbolIterator} from './symbol';\n\n\nexport function isIterable(obj:
any): obj is Iterable<any> {\n return obj !== null && typeof
obj === 'object' && (obj as any)[getSymbolIterator()] !== undefined;\n}\n\n\nexport function isListLikeIterable(obj:
any): boolean {\n if (!isJsObject(obj)) return false;\n return Array.isArray(obj) ||\n (!obj instanceof Map) &&
// JS Map are iterables but return entries as [k, v]\n getSymbolIterator() in obj); // JS Iterable have a
Symbol.iterator prop\n}\n\n\nexport function areIterablesEqual(\n a: any, b: any, comparator: (a: any, b: any) =>
boolean): boolean {\n const iterator1 = a[getSymbolIterator]()();\n const iterator2 = b[getSymbolIterator]()();\n
while (true) {\n const item1 = iterator1.next();\n const item2 = iterator2.next();\n if (item1.done &&
item2.done) return true;\n if (item1.done || item2.done) return false;\n if (!comparator(item1.value, item2.value))
return false;\n }\n}\n\n\nexport function iterateListLike(obj: any, fn: (p: any) => any) {\n if (Array.isArray(obj)) {\n
for (let i = 0; i < obj.length; i++) {\n fn(obj[i]);\n
}\n } else {\n const iterator = obj[getSymbolIterator]()();\n let item: any;\n while (!(item =
iterator.next()).done) {\n fn(item.value);\n }\n }\n}\n\n\nexport function isJsObject(o: any): boolean {\n return
o !== null && (typeof o === 'function' || typeof o === 'object');\n}\n\n",/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\nimport {areIterablesEqual, isListLikeIterable} from
'./iterable';\n\n\nexport function devModeEqual(a: any, b: any): boolean {\n const isListLikeIterableA =
isListLikeIterable(a);\n const isListLikeIterableB = isListLikeIterable(b);\n if (isListLikeIterableA &&
isListLikeIterableB) {\n return areIterablesEqual(a, b, devModeEqual);\n } else {\n const isAObject = a &&
(typeof a === 'object' || typeof a === 'function');\n const isBObject = b && (typeof b === 'object'
|| typeof b === 'function');\n if (!isListLikeIterableA && isAObject && !isListLikeIterableB && isBObject) {\n
return true;\n } else {\n return Object.is(a, b);\n }\n }\n}\n\n",/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\nimport {assertIndexInRange, assertLessThan, assertNotSame}
from './util/assert';\nimport {devModeEqual} from './util/comparison';\n\n\nimport
{getExpressionChangedErrorDetails, throwErrorIfNoChangesMode} from './errors';\nimport {LView} from
'./interfaces/view';\nimport {isInCheckNoChangesMode} from './state';\nimport {NO_CHANGE} from
'./tokens';\n\n\n// TODO(misko): consider inlining\n/** Updates binding and returns the value. *\nexport function
updateBinding(IView: LView, bindingIndex: number, value: any): any {\n return IView[bindingIndex] =
value;\n}\n\n\n/** Gets the current binding
value. *\nexport function getBinding(IView: LView, bindingIndex: number): any {\n ngDevMode &&
assertIndexInRange(IView, bindingIndex);\n ngDevMode &&\n assertNotSame(IView[bindingIndex],
NO_CHANGE, 'Stored value should never be NO_CHANGE.);\n return IView[bindingIndex];\n}\n\n\n/** *\n
Updates binding if changed, then returns whether it was updated.\n *\n * This function also checks the
`CheckNoChangesMode` and throws if changes are made.\n *\n * Some changes (Objects/iterables) during
`CheckNoChangesMode` are exempt to comply with VE\n *\n behavior.\n *\n * @param IView current `LView`\n *\n
@param bindingIndex The binding in the `LView` to check\n *\n * @param value New value to check against
`IView[bindingIndex]`\n *\n * @returns `true` if the bindings has changed. (Throws if binding has changed during\n *\n
`CheckNoChangesMode`)\n *\n\nexport function bindingUpdated(IView: LView, bindingIndex: number, value:
any): boolean {\n ngDevMode && assertNotSame(value, NO_CHANGE, 'Incoming

```

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value should never be NO_CHANGE.);\n ngDevMode &&\n    assertLessThan(bindingIndex, IView.length, `Slot
should have been initialized to NO_CHANGE`);\n const oldValue = IView[bindingIndex];\n\n if
(Object.is(oldValue, value)) {\n    return false;\n } else {\n    if (ngDevMode && isInCheckNoChangesMode()) {\n
    // View engine didn't report undefined values as changed on the first checkNoChanges pass\n    // (before the
change detection was run).\n    const oldValueToCompare = oldValue !== NO_CHANGE ? oldValue :
undefined;\n    if (!devModeEqual(oldValueToCompare, value)) {\n    const details =\n
getExpressionChangedErrorDetails(IView, bindingIndex, oldValueToCompare, value);\n
throwErrorIfNoChangesMode(\n        oldValue === NO_CHANGE, details.oldValue, details.newValue,
details.propName);\n    } \n    // There was a change, but the `devModeEqual` decided that the change is exempt
from an error.\n    // For this reason we exit as if no
change. The early exit is needed to prevent the changed\n    // value to be written into `LView` (If we would write
the new value that we would not see it\n    // as change on next CD.)\n    return false;\n } \n
IView[bindingIndex] = value;\n    return true;\n } \n} \n\n/** Updates 2 bindings if changed, then returns whether
either was updated. */\nexport function bindingUpdated2(IView: LView, bindingIndex: number, exp1: any, exp2:
any): boolean {\n    const different = bindingUpdated(IView, bindingIndex, exp1);\n    return bindingUpdated(IView,
bindingIndex + 1, exp2) || different;\n} \n\n/** Updates 3 bindings if changed, then returns whether any was updated.
*/\nexport function bindingUpdated3(\n    IView: LView, bindingIndex: number, exp1: any, exp2: any, exp3: any):
boolean {\n    const different = bindingUpdated2(IView, bindingIndex, exp1, exp2);\n    return bindingUpdated(IView,
bindingIndex + 2, exp3) || different;\n} \n\n/** Updates 4 bindings if changed, then returns whether
any was updated. */\nexport function bindingUpdated4(\n    IView: LView, bindingIndex: number, exp1: any, exp2:
any, exp3: any, exp4: any): boolean {\n    const different = bindingUpdated2(IView, bindingIndex, exp1, exp2);\n
return bindingUpdated2(IView, bindingIndex + 2, exp3, exp4) || different;\n} \n\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\nimport {bindingUpdated} from '../bindings';\nimport
{SanitizerFn} from './interfaces/sanitization';\nimport {getLView, getSelectedTNode, getTView,
nextBindingIndex} from './state';\nimport {elementAttributeInternal, storePropertyBindingMetadata} from
'./shared';\n\n\n/**\n * Updates the value of or removes a bound attribute on an Element.\n * \n * Used in the case
of `[attr.title]="value"\n * \n * @param name name The name of the attribute.\n * @param value value The
attribute
is removed when value is `null` or `undefined`.\n * \n * Otherwise the attribute value is set to the stringified
value.\n * @param sanitizer An optional function used to sanitize the value.\n * @param namespace Optional
namespace to use when setting the attribute.\n * \n * @codeGenApi\n */\nexport function attribute(\n    name: string,
value: any, sanitizer?: SanitizerFn|null,\n    namespace?: string): typeof attribute {\n    const IView = getLView();\n
const bindingIndex = nextBindingIndex();\n    if (bindingUpdated(IView, bindingIndex, value)) {\n    const tView =
getTView();\n    const tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, name, value,
sanitizer, namespace);\n    ngDevMode && storePropertyBindingMetadata(tView.data, tNode, 'attr.' + name,
bindingIndex);\n    } \n    return attribute;\n} \n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {assertEqual, assertLessThan} from
'../util/assert';\nimport {bindingUpdated, bindingUpdated2, bindingUpdated3, bindingUpdated4} from
'../bindings';\nimport {LView} from './interfaces/view';\nimport {getBindingIndex, incrementBindingIndex,
nextBindingIndex, setBindingIndex} from './state';\nimport {NO_CHANGE} from './tokens';\nimport
{renderStringify} from './util/stringify_utils';\n\n\n/**\n * Create interpolation bindings with a variable number of
expressions.\n * \n * If there are 1 to 8 expressions `interpolation1()` to `interpolation8()` should be used instead.\n
*\n * Those are faster because there is no need to create an array of expressions and iterate over it.\n * \n * `values`\n * -
has static text at even indexes,\n * - has evaluated expressions at odd indexes.\n * \n * Returns the concatenated
string when any of the arguments changes, `NO_CHANGE` otherwise.\n */\nexport function interpolationV(IView:
LView,

```

```

values: any[]): string|NO_CHANGE {\n ngDevMode && assertLessThan(2, values.length, 'should have at least 3
values');\n ngDevMode && assertEquals(values.length % 2, 1, 'should have an odd number of values');\n let
isBindingUpdated = false;\n let bindingIndex = getBindingIndex();\n\n for (let i = 1; i < values.length; i += 2) {\n
// Check if bindings (odd indexes) have changed\n isBindingUpdated = bindingUpdated(IView, bindingIndex++,
values[i]) || isBindingUpdated;\n } \n setBindingIndex(bindingIndex);\n\n if (!isBindingUpdated) {\n return
NO_CHANGE;\n }\n\n // Build the updated content\n let content = values[0];\n for (let i = 1; i < values.length; i
+= 2) {\n content += renderStringify(values[i]) + values[i + 1];\n }\n\n return content;\n}\n\n/**\n * Creates an
interpolation binding with 1 expression.\n * @param prefix static value used for concatenation only.\n *
@param v0 value checked for change.\n * @param suffix static value used for concatenation
only.\n */\nexport function interpolation1(IView: LView, prefix: string, v0: any, suffix: string): string|\n
NO_CHANGE {\n const different = bindingUpdated(IView, nextBindingIndex(), v0);\n return different ? prefix +
renderStringify(v0) + suffix : NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 2 expressions.\n
*/\nexport function interpolation2(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, suffix: string):
string|\nNO_CHANGE {\n const bindingIndex = getBindingIndex();\n const different = bindingUpdated2(IView,
bindingIndex, v0, v1);\n incrementBindingIndex(2);\n\n return different ? prefix + renderStringify(v0) + i0 +
renderStringify(v1) + suffix : NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 3 expressions.\n
*/\nexport function interpolation3(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n
suffix: string): string|\nNO_CHANGE {\n const bindingIndex = getBindingIndex();\n const different
= bindingUpdated3(IView, bindingIndex, v0, v1, v2);\n incrementBindingIndex(3);\n\n return different ?\n
prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 + renderStringify(v2) + suffix :\n
NO_CHANGE;\n}\n\n/**\n * Create an interpolation binding with 4 expressions.\n */\nexport function
interpolation4(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3:
any, suffix: string): string|\nNO_CHANGE {\n const bindingIndex = getBindingIndex();\n const different =
bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n incrementBindingIndex(4);\n\n return different ? prefix +
renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n renderStringify(v2) + i2 + renderStringify(v3) + suffix
:\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 5 expressions.\n */\nexport
function interpolation5(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any, i2: string,\n v3: any, i3: string, v4: any, suffix: string): string|\nNO_CHANGE {\n const bindingIndex =
getBindingIndex();\n let different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n different =
bindingUpdated(IView, bindingIndex + 4, v4) || different;\n incrementBindingIndex(5);\n\n return different ? prefix
+ renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n renderStringify(v2) + i2 + renderStringify(v3) + i3 +
renderStringify(v4) + suffix :\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 6
expressions.\n */\nexport function interpolation6(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1:
string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): string|\nNO_CHANGE {\n
const bindingIndex = getBindingIndex();\n let different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n
different = bindingUpdated2(IView, bindingIndex + 4, v4, v5)
|| different;\n incrementBindingIndex(6);\n\n return different ?\n prefix + renderStringify(v0) + i0 +
renderStringify(v1) + i1 + renderStringify(v2) + i2 +\n renderStringify(v3) + i3 + renderStringify(v4) + i4 +
renderStringify(v5) + suffix :\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 7
expressions.\n */\nexport function interpolation7(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1:
string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string):
string|\n NO_CHANGE {\n const bindingIndex = getBindingIndex();\n let different = bindingUpdated4(IView,
bindingIndex, v0, v1, v2, v3);\n different = bindingUpdated3(IView, bindingIndex + 4, v4, v5, v6) || different;\n
incrementBindingIndex(7);\n\n return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n
renderStringify(v2) + i2 + renderStringify(v3) + i3 + renderStringify(v4)
+ i4 +\n renderStringify(v5) + i5 + renderStringify(v6) + suffix :\n NO_CHANGE;\n}\n\n/**\n *
Creates an interpolation binding with 8 expressions.\n */\nexport function interpolation8(\n IView: LView, prefix:
string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5:

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string, v6: any, i6: string, v7: any,\n  suffix: string): string|NO_CHANGE {\n  const bindingIndex =
getBindingIndex();\n  let different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n  different =
bindingUpdated4(IView, bindingIndex + 4, v4, v5, v6, v7) || different;\n  incrementBindingIndex(8);\n\n  return
different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n    renderStringify(v2) + i2 +
renderStringify(v3) + i3 + renderStringify(v4) + i4 +\n    renderStringify(v5) + i5 + renderStringify(v6) + i6 +
renderStringify(v7) + suffix :\n    NO_CHANGE;\n}\n\n", "/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {SanitizerFn}
from './interfaces/sanitization';\nimport {getBindingIndex, getLView, getSelectedTNode, getTView} from
'./state';\nimport {NO_CHANGE} from './tokens';\nimport {interpolation1, interpolation2, interpolation3,
interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from
'./interpolation';\nimport {elementAttributeInternal, storePropertyBindingMetadata} from './shared';\n\n\n/**\n * \n
* Update an interpolated attribute on an element with single bound value surrounded by text.\n * \n * Used when the
value passed to a property has 1 interpolated value in it:\n * \n * ```html\n * <div
attr.title=\"prefix{{v0}}suffix\"></div>\n * ```\n * \n * Its compiled representation is:\n * \n * ```ts\n *
attributeInterpolate1('title', 'prefix',
v0, 'suffix');\n * ```\n * \n * @param attrName The name of the attribute to update\n * @param prefix Static value
used for concatenation only.\n * @param v0 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be
chained.\n * @codeGenApi\n */\n\nexport function attributeInterpolate1(\n  attrName: string, prefix: string, v0: any,
suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string): typeof attributeInterpolate1 {\n  const IView =
getLView();\n  const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n  if (interpolatedValue !==
NO_CHANGE) {\n    const tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, attrName,
interpolatedValue, sanitizer, namespace);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n
getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 1, prefix, suffix);\n  }\n\n  return attributeInterpolate1;\n}\n\n\n/**\n * \n
* Update an interpolated attribute on an element with 2 bound values
surrounded by text.\n * \n * Used when the value passed to a property has 2 interpolated values in it:\n * \n *
```html\n * <div attr.title=\"prefix{{v0}}-{{v1}}suffix\"></div>\n * ```\n * \n * Its compiled representation is:\n * \n *
```ts\n * attributeInterpolate2('title', 'prefix', v0, '-', v1, 'suffix');\n * ```\n * \n * @param attrName The name of the
attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for
change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n *
@returns itself, so that it may be chained.\n * @codeGenApi\n */\n\nexport function attributeInterpolate2(\n
attrName: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n
sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate2 {\n  const IView = getLView();\n  const
interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n
const tNode = getSelectedTNode();\n    elementAttributeInternal(tNode, IView, attrName, interpolatedValue,
sanitizer, namespace);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n
getTView().data, tNode,
'attr.' + attrName, getBindingIndex() - 2, prefix, i0, suffix);\n  }\n\n  return attributeInterpolate2;\n}\n\n\n/**\n * \n
* Update an interpolated attribute on an element with 3 bound values surrounded by text.\n * \n * Used when the value
passed to a property has 3 interpolated values in it:\n * \n * ```html\n * <div attr.title=\"prefix{{v0}}-{{v1}}-
{{v2}}suffix\"></div>\n * ```\n * \n * Its compiled representation is:\n * \n * ```ts\n * attributeInterpolate3(\n
'title', 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ```\n * \n * @param
attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1
Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer
function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\n\nexport function

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attributeInterpolate3(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n  suffix:
string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate3 {\n  const IView = getLView();\n
const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  if (interpolatedValue !==
NO_CHANGE) {\n  const tNode = getSelectedTNode();\n  elementAttributeInternal(tNode, IView, attrName,
interpolatedValue, sanitizer, namespace);\n  ngDevMode &&\n    storePropertyBindingMetadata(\n
getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 3, prefix, i0, i1,\n    suffix);\n  }\n  return
attributeInterpolate3;\n}\n\n/**\n * \n * Update an interpolated attribute on an element with 4 bound values
surrounded by text.\n * \n * Used when the value passed to a property has 4 interpolated values in it:\n * \n *
```html\n * <div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n * ```\n * \n * Its compiled
representation is:\n * \n * ```ts\n * attributeInterpolate4(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ```\n
*\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation
only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n *
@param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n *
@param v3 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param
sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
*/\n\nexport function attributeInterpolate4(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string,
v2: any, i2: string,\n  v3: any, suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string): typeof
attributeInterpolate4 {\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0,
i0, v1, i1, v2, i2, v3, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n  const tNode =
getSelectedTNode();\n  elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer,
namespace);\n  ngDevMode &&\n    storePropertyBindingMetadata(\n      getTView().data, tNode, 'attr.' +
attrName,
getBindingIndex() - 4, prefix, i0, i1, i2,\n      suffix);\n  }\n  return attributeInterpolate4;\n}\n\n/**\n * \n *
Update an interpolated attribute on an element with 5 bound values surrounded by text.\n * \n * Used when the value
passed to a property has 5 interpolated values in it:\n * \n * ```html\n * <div attr.title="prefix{{v0}}-{{v1}}-
{{v2}}-{{v3}}-{{v4}}suffix"></div>\n * ```\n * \n * Its compiled representation is:\n * \n * ```ts\n *
attributeInterpolate5(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ```\n
*\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation
only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n *
@param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n *
@param i2 Static value used for concatenation only.\n * @param v3 Value checked
for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n *
@param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n *
@returns itself, so that it may be chained.\n * @codeGenApi\n
*/\n\nexport function attributeInterpolate5(\n  attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4:
any, suffix: string, sanitizer?: SanitizerFn,\n  namespace?: string): typeof attributeInterpolate5 {\n  const IView =
getLView();\n  const interpolatedValue =\n    interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4,
suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n  const tNode = getSelectedTNode();\n
elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n  ngDevMode &&\n
storePropertyBindingMetadata(\n      getTView().data, tNode, 'attr.' + attrName,
getBindingIndex() - 5, prefix, i0, i1, i2,\n      i3, suffix);\n  }\n  return attributeInterpolate5;\n}\n\n/**\n * \n *
Update an interpolated attribute on an element with 6 bound values surrounded by text.\n * \n * Used when the value
passed to a property has 6 interpolated values in it:\n * \n * ```html\n * <div attr.title="prefix{{v0}}-{{v1}}-
{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix"></div>\n * ```\n * \n * Its compiled representation is:\n * \n * ```ts\n *
attributeInterpolate6(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n * ```\n
*\n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation
only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n *
@param v1

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Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function attributeInterpolate6({\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string, sanitizer?: SanitizerFn,\n namespace?: string}): typeof attributeInterpolate6 {\n const IView = getLView();\n const interpolatedValue = interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode,\n 'attr.' + attrName, getBindingIndex() - 6, prefix, i0, i1, i2, i3, i4, suffix);\n }\n return attributeInterpolate6;\n}\n\n/\*\*\n \* Update an interpolated attribute on an element with 7 bound values surrounded by text.\n \* Used when the value passed to a property has 7 interpolated values in it.\n \*\n \* Its compiled representation is:\n \* `ts\n \* attributeInterpolate7({\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix'};\n \* )\n \* @param attrName The name of the attribute to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function attributeInterpolate7({\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n sanitizer?: SanitizerFn, namespace?: string}): typeof attributeInterpolate7 {\n const IView = getLView();\n const interpolatedValue = interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 7, prefix, i0, i1, i2, i3, i4, i5, suffix);\n }\n return attributeInterpolate7;\n}\n\n/\*\*\n \* Update an interpolated attribute on an element with 8 bound values surrounded by text.\n \* Used when the value passed to a property has 8 interpolated values in it.\n \*\n \* Its compiled representation is:\n \* `ts\n \* attributeInterpolate8({\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix'};\n \* )\n \* @param attrName The name of the attribute to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function attributeInterpolate8({\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, i7: string, suffix: string,\n sanitizer?: SanitizerFn, namespace?: string}): typeof attributeInterpolate8 {\n const IView = getLView();\n const interpolatedValue = interpolation8(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 8, prefix, i0, i1, i2, i3, i4, i5, i6, i7, suffix);\n }\n return attributeInterpolate8;\n}



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@returns itself, so that it may be chained.\n * @codeGenApi\n * \nexport function attributeInterpolate8(\n
attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4:
any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, sanitizer?: SanitizerFn, namespace?:
string): typeof attributeInterpolate8 {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n
IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n if (interpolatedValue !==
NO_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName,
interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n
getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 8, prefix, i0, i1, i2,\n i3, i4, i5, i6, suffix);\n
}\n return attributeInterpolate8;\n}\n\n/**\n * Update
an interpolated attribute on an element with 9 or more bound values surrounded by text.\n *\n * Used when the
number of interpolated values exceeds 8.\n *\n * ```html\n * <div\n * title=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n *\n *
```ts\n * attributeInterpolateV(\n * 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n *
'suffix']);\n * ```\n *\n * @param attrName The name of the attribute to update.\n * @param values The collection of
values and the strings in-between those values, beginning with\n * a string prefix and ending with a string suffix.\n *
(e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n * @param sanitizer An optional sanitizer
function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * \nexport function
attributeInterpolateV(\n attrName: string, values: any[],
sanitizer?: SanitizerFn,\n namespace?: string): typeof attributeInterpolateV {\n const IView = getLView();\n
const interpolated = interpolationV(IView, values);\n if (interpolated !== NO_CHANGE) {\n const tNode =
getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolated, sanitizer, namespace);\n
if (ngDevMode) {\n const interpolationInBetween = [values[0]]; // prefix\n for (let i = 2; i < values.length; i
+= 2) {\n interpolationInBetween.push(values[i]);\n }\n storePropertyBindingMetadata(\n
getTView().data, tNode, 'attr.' + attrName,\n getBindingIndex() - interpolationInBetween.length + 1,
...interpolationInBetween);\n }\n }\n return attributeInterpolateV;\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\nimport {getComponentViewByInstance}
from './context_discovery';\nimport {TVIEW} from './interfaces/view';\nimport {detectChangesInternal} from
'./shared';\n\n/**\n * Synchronously perform change detection on a component (and possibly its sub-components).\n
*\n * This function triggers change detection in a synchronous way on a component.\n *\n * @param component
The component which the change detection should be performed on.\n *\nexport function
detectChanges(component: {}): void {\n const view = getComponentViewByInstance(component);\n
detectChangesInternal(view[TVIEW], view, component);\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nimport {assertFirstCreatePass} from './assert';\nimport
{attachPatchData} from './context_discovery';\nimport {registerPostOrderHooks} from './hooks';\nimport
{ComponentTemplate} from './interfaces/definition';\nimport
{LocalRefExtractor, TAttributes, TContainerNode, TNodeType} from './interfaces/node';\nimport
{isDirectiveHost} from './interfaces/type_checks';\nimport {HEADER_OFFSET, LView, RENDERER, TView,
TViewType} from './interfaces/view';\nimport {appendChild} from './node_manipulation';\nimport {getLView,
getTView, setCurrentTNode} from './state';\nimport {getConstant} from './util/view_utils';\nimport
{addToViewTree, createDirectivesInstances, createLContainer, createTView, getOrCreateTNode, resolveDirectives,
saveResolvedLocalsInData} from './shared';\n\n\nfunction templateFirstCreatePass(\n index: number, tView:
TView, IView: LView, templateFn: ComponentTemplate<any>|null,\n decls: number, vars: number, tagName?:
string|null, attrsIndex?: number|null,\n localRefsIndex?: number|null): TContainerNode {\n ngDevMode &&
assertFirstCreatePass(tView);\n ngDevMode && ngDevMode.firstCreatePass++;\n const tViewConsts =
tView.consts;\n // TODO(pk): refactor

```

```

getOrCreateTNode to have the "create" only version
const tNode = getOrCreateTNode(
  tView, index,
  TNodeType.Container, tagName || null,
  getConstant<TAttributes>(tViewConsts, attrsIndex));
resolveDirectives(tView, IView, tNode, getConstant<string[]>(tViewConsts, localRefsIndex));
registerPostOrderHooks(tView, tNode);
const embeddedTView = tNode.tViews = createTView(
  TViewType.Embedded, tNode, templateFn, decls, vars, tView.directiveRegistry,
  tView.pipeRegistry, null,
  tView.schemas, tViewConsts);
if (tView.queries !== null) {
  tView.queries.template(tView, tNode);
  embeddedTView.queries = tView.queries.embeddedTView(tNode);
}
return tNode;
}

/**
 * Creates an LContainer for an ng-template (dynamically-inserted view), e.g.
 * <ng-template #foo>
 * <div></div>
 * </ng-template>
 * @param index The index of the container in the data array
 * @param templateFn Inline template
 * @param decls The number of nodes, local refs, and pipes for this template
 * @param vars The number of bindings for this template
 * @param tagName The name of the container element, if applicable
 * @param attrsIndex Index of template attributes in the `const` array.
 * @param localRefs Index of the local references in the `const` array.
 * @param localRefExtractor A function which extracts local-refs values from the template.
 * Defaults to the current element associated with the local-ref.
 */
@codeGenApi
export function template(
  index: number,
  templateFn: ComponentTemplate<any> | null,
  decls: number,
  vars: number,
  tagName?: string | null,
  attrsIndex?: number | null,
  localRefsIndex?: number | null,
  localRefExtractor?: LocalRefExtractor) {
  const IView = getLView();
  const tView = getTView();
  const adjustedIndex = index + HEADER_OFFSET;
  const tNode = tView.firstCreatePass ? templateFirstCreatePass(
    adjustedIndex, tView, IView, templateFn, decls, vars,
    tagName, attrsIndex, localRefsIndex) :
    tView.data[adjustedIndex] as TContainerNode;
  setCurrentTNode(tNode, false);
  const comment = IView[RENDERER].createComment(ngDevMode ? 'container' : '');
  appendChild(tView, IView, comment, tNode);
  attachPatchData(comment, IView);
  addToViewTree(IView, IView[adjustedIndex] = createLContainer(
    comment, IView, comment, tNode));
  if (isDirectiveHost(tNode)) {
    createDirectivesInstances(tView, IView, tNode);
  }
  if (localRefsIndex !== null) {
    saveResolvedLocalsInData(IView, tNode, localRefExtractor);
  }
}

/**
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 * in the LICENSE file at https://angular.io/license
 */
import { HEADER_OFFSET, LView, TView } from './interfaces/view';
import { getContextLView } from './state';
import { load } from './util/view_utils';

/**
 * Store a value in the `data` at a given `index`.
 */
export function store<T>(tView: TView, IView: LView, index: number, value: T): void {
  // We don't store any static data for local variables, so the first time we see the template, we should store as null to avoid a sparse array
  if (index >= tView.data.length) {
    tView.data[index] = null;
    tView.blueprint[index] = null;
  }
  IView[index] = value;
}

/**
 * Retrieves a local reference from the current contextViewData.
 * If the reference to retrieve is in a parent view, this instruction is used in conjunction with a nextContext() call, which walks up the tree and updates the contextViewData instance.
 * @param index The index of the local ref in contextViewData.
 */
@codeGenApi
export function reference<T>(index: number) {
  const contextLView = getContextLView();
  return load<T>(contextLView, HEADER_OFFSET + index);
}

/**
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 */
import { bindingUpdated } from './bindings';
import { TNode } from './interfaces/node';
import { SanitizerFn } from './interfaces/sanitization';
import { LView, RENDERER, TView } from './interfaces/view';
import { getLView, getSelectedTNode, getTView, nextBindingIndex } from './state';
import { elementPropertyInternal, setInputsForProperty, storePropertyBindingMetadata } from './shared';

/**
 * Update a property on a selected element.
 * Operates on the element selected by index via the { @link select } instruction.
 * If the property name also exists as an input property on one of the element's directives, the component property will be set instead of the element property. This check must be conducted at runtime so child components that add new

```

`@Inputs` don't have to be re-compiled  
 \* @param propName Name of property. Because it is going to DOM, this is not subject to  
 \* renaming as part of minification.  
 \* @param value New value to write.  
 \* @param sanitizer An optional function used to sanitize the value.  
 \* @returns This function returns itself so that it may be chained  
 \* (e.g. `property('name', ctx.name)(title, ctx.title)`)  
 \* @codeGenApi  
 \* @export function  
 property<T>(\n propName: string, value: T, sanitizer?: SanitizerFn|null): typeof property {\n const IView =  
 getLView();\n const bindingIndex = nextBindingIndex();\n if (bindingUpdated(IView, bindingIndex, value)) {\n  
 const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView,  
 tNode, IView, propName, value, IView[RENDERER], sanitizer, false);\n ngDevMode &&  
 storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n }\n return property;\n}\n\n/\*\*  
 \* Given

<div style="..." my-dir>` and `MyDir` with `@Input('style')` we need to write to  
 \* directive input.  
 \* @export  
 function setDirectiveInputsWhichShadowsStyling(\n tView: TView, tNode: TNode, IView: LView, value: any,  
 isClassBased: boolean) {\n const inputs = tNode.inputs!;\n const property = isClassBased ? 'class' : 'style';\n // We  
 support both 'class' and `className` hence the fallback.\n setInputsForProperty(tView, IView, inputs[property],  
 property, value);\n}\n\n"/\*\*  
 \* @license  
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 \* Use of this source  
 code is governed by an MIT-style license that can be  
 \* found in the LICENSE file at <https://angular.io/license>  
 \*/  
 \* @import {assertDefined, assertEqual, assertIndexInRange} from '../util/assert';  
 \* @import {assertFirstCreatePass,  
 \* assertHasParent} from './assert';  
 \* @import {attachPatchData} from './context\_discovery';  
 \* @import {registerPostOrderHooks} from './hooks';  
 \* @import {hasClassInput, hasStyleInput, TAttributes,  
 \* TElementNode, TNodeFlags, TNodeType} from './interfaces/node';  
 \* @import {RElement} from  
 './interfaces/renderer\_dom';  
 \* @import {isContentQueryHost, isDirectiveHost} from  
 './interfaces/type\_checks';  
 \* @import {HEADER\_OFFSET, LView, RENDERER, TView} from  
 './interfaces/view';  
 \* @import {assertTNodeType} from './node\_assert';  
 \* @import {appendChild, createElementNode,  
 \* writeDirectClass, writeDirectStyle} from './node\_manipulation';  
 \* @import {decreaseElementDepthCount,  
 \* getBindingIndex, getCurrentTNode, getElementDepthCount, getLView, getNamespace, getTView,  
 \* increaseElementDepthCount, isCurrentTNodeParent, setCurrentTNode, setCurrentTNodeAsNotParent} from  
 './state';  
 \* @import {computeStaticStyling} from './styling/static\_styling';  
 \* @import {setUpAttributes} from  
 './util/attrs\_utils';  
 \* @import {getConstant} from './util/view\_utils';  
 \* @import {validateElementIsKnown} from  
 './element\_validation';  
 \* @import {setDirectiveInputsWhichShadowsStyling} from './property';  
 \* @import  
 {createDirectivesInstances,  
 \* executeContentQueries, getOrCreateTNode, resolveDirectives, saveResolvedLocalsInData} from  
 './shared';  
 \* @function elementStartFirstCreatePass(\n index: number, tView: TView, IView: LView, native:  
 \* RElement, name: string,\n attrsIndex?: number|null, localRefsIndex?: number): TElementNode {\n ngDevMode  
 && assertFirstCreatePass(tView);\n ngDevMode && ngDevMode.firstCreatePass++;\n\n const tViewConsts =  
 tView.consts;\n const attrs = getConstant<TAttributes>(tViewConsts, attrsIndex);\n const tNode =  
 getOrCreateTNode(tView, index, TNodeType.Element, name, attrs);\n\n const hasDirectives =\n  
 resolveDirectives(tView, IView, tNode, getConstant<string[]>(tViewConsts, localRefsIndex));\n if (ngDevMode)  
 {\n validateElementIsKnown(native, IView, tNode.value, tView.schemas, hasDirectives);\n }\n\n if (tNode.attrs  
 !== null) {\n computeStaticStyling(tNode, tNode.attrs, false);\n }\n\n if (tNode.mergedAttrs !== null) {\n  
 computeStaticStyling(tNode, tNode.mergedAttrs,  
 true);\n }\n\n if (tView.queries !== null) {\n tView.queries.elementStart(tView, tNode);\n }\n\n return  
 tNode;\n}\n\n/\*\*  
 \* Create DOM element. The instruction must later be followed by `elementEnd()` call.  
 \* @param index Index of the element in the LView array  
 \* @param name Name of the DOM Node  
 \* @param  
 attrsIndex Index of the element's attributes in the `const` array.  
 \* @param localRefsIndex Index of the element's  
 local references in the `const` array.  
 \* @returns This function returns itself so that it may be chained.  
 \* @Attributes and localRefs are passed as an array of strings where elements with an even index  
 \* hold an attribute name and elements with an odd index hold an attribute value, ex.: ['id', 'warning5', 'class', 'alert']  
 \* @codeGenApi  
 \* @export function elementStart(\n index: number, name: string, attrsIndex?: number|null,\n

```

localRefsIndex?: number): typeof elementStart {\n  const IView = getLView();\n  const tView =\n    getTView();\n  const adjustedIndex = HEADER_OFFSET + index;\n\n  ngDevMode &&\n    assertEqual(\n      getBindingIndex(), tView.bindingStartIndex,\n      'elements should be created before any bindings');\n  ngDevMode && assertIndexInRange(IView, adjustedIndex);\n\n  const renderer = IView[RENDERER];\n  const native = IView[adjustedIndex] = createElementNode(renderer, name, getNamespace());\n  const tNode =\n    tView.firstCreatePass ?\n      elementStartFirstCreatePass(\n        adjustedIndex, tView, IView, native, name,\n        attrsIndex, localRefsIndex) :\n      tView.data[adjustedIndex] as TElementNode;\n  setCurrentTNode(tNode,\n    true);\n\n  const mergedAttrs = tNode.mergedAttrs;\n  if (mergedAttrs !== null) {\n    setUpAttributes(renderer,\n      native, mergedAttrs);\n  }\n  const classes = tNode.classes;\n  if (classes !== null) {\n    writeDirectClass(renderer,\n      native, classes);\n  }\n  const styles = tNode.styles;\n  if (styles !== null) {\n    writeDirectStyle(renderer, native,\n      styles);\n  }\n\n  if ((tNode.flags & TNodeFlags.isDetached) !== TNodeFlags.isDetached) {\n    // In the i18n case, the\n    translation may have removed this element, so only add it if it is not\n    // detached. See `TNodeType.Placeholder`\n    and `LFrame.inI18n` for more context.\n    appendChild(tView, IView, native, tNode);\n  }\n\n  // any immediate\n  children of a component or template container must be pre-emptively\n  // monkey-patched with the component\n  view data so that the element can be inspected\n  // later on using any element discovery utility methods (see\n  `element_discovery.ts`)\n  if (getElementDepthCount() === 0) {\n    attachPatchData(native, IView);\n  }\n  increaseElementDepthCount();\n\n  if (isDirectiveHost(tNode)) {\n    createDirectivesInstances(tView, IView,\n      tNode);\n    executeContentQueries(tView, tNode, IView);\n  }\n  if (localRefsIndex !== null) {\n    saveResolvedLocalsInData(IView, tNode);\n  }\n  return elementStart;\n}\n\n/**\n * Mark the end of the element.\n *\n *

```

```

@returns This function returns itself so that it may be chained.\n *\n * @codeGenApi\n * ^\nexport function\n  elementEnd(): typeof elementEnd {\n  let currentTNode = getCurrentTNode();\n  ngDevMode &&\n    assertDefined(currentTNode, 'No parent node to close.);\n  if (isCurrentTNodeParent()) {\n    setCurrentTNodeAsNotParent();\n  } else {\n    ngDevMode && assertHasParent(getCurrentTNode());\n    currentTNode = currentTNode.parent!;\n    setCurrentTNode(currentTNode, false);\n  }\n\n  const tNode =\n    currentTNode;\n  ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode);\n\n  decreaseElementDepthCount();\n\n  const tView = getTView();\n  if (tView.firstCreatePass) {\n    registerPostOrderHooks(tView, currentTNode);\n    if (isContentQueryHost(currentTNode)) {\n      tView.queries!.elementEnd(currentTNode);\n    }\n  }\n\n  if (tNode.classesWithoutHost !== null &&\n    hasClassInput(tNode)) {\n    setDirectiveInputsWhichShadowsStyling(tView, tNode, getLView(),\n      tNode.classesWithoutHost, true);\n  }\n\n  if (tNode.stylesWithoutHost !== null && hasStyleInput(tNode)) {\n    setDirectiveInputsWhichShadowsStyling(tView, tNode, getLView(), tNode.stylesWithoutHost, false);\n  }\n\n  return\n    elementEnd;\n}\n\n/**\n * Creates an empty element using { @link elementStart } and { @link elementEnd }\n *\n * @param index Index of the element in the data array\n * @param name Name of the DOM Node\n * @param\n  attrsIndex Index of the element's attributes in the `consts` array.\n * @param localRefsIndex Index of the element's\n  local references in the `consts` array.\n * @returns This function returns itself so that it may be chained.\n *\n * @codeGenApi\n * ^\nexport function element(\n  index: number, name: string, attrsIndex?: number|null,\n  localRefsIndex?: number): typeof element {\n  elementStart(index, name, attrsIndex, localRefsIndex);\n  elementEnd();\n  return element;\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed

```

```

by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport\n  {assertEqual, assertIndexInRange} from './../util/assert';\nimport {assertHasParent} from './assert';\nimport\n  {attachPatchData} from './context_discovery';\nimport {registerPostOrderHooks} from './hooks';\nimport\n  {TAttributes, TElementContainerNode, TNodeType}\n  from './interfaces/node';\nimport {isContentQueryHost,\n  isDirectiveHost} from './interfaces/type_checks';\nimport {HEADER_OFFSET, LView, RENDERER, TView}\n  from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {appendChild} from

```

```

'./node_manipulation';\nimport {getBindingIndex, getCurrentTNode, getLView, getTView, isCurrentTNodeParent,
setCurrentTNode, setCurrentTNodeAsNotParent} from './state';\nimport {computeStaticStyling} from
'./styling/static_styling';\nimport {getConstant} from './util/view_utils';\n\nimport {createDirectivesInstances,
executeContentQueries, getOrCreateTNode,
resolveDirectives, saveResolvedLocalsInData} from './shared';\n\nfunction
elementContainerStartFirstCreatePass(\n  index: number, tView: TView, IView: LView, attrsIndex?:
number|null,\n  localRefsIndex?: number): TElementContainerNode {\n  ngDevMode &&
ngDevMode.firstCreatePass++;\n  const tViewConsts = tView.consts;\n  const attrs =
getConstant<TAttributes>(tViewConsts, attrsIndex);\n  const tNode = getOrCreateTNode(tView, index,
TNodeType.ElementContainer, 'ng-container', attrs);\n  // While ng-container doesn't necessarily support styling,
we use the style context to identify\n  // and execute directives on the ng-container.\n  if (attrs !== null) {\n    computeStaticStyling(tNode, attrs, true);\n  }\n  const localRefs = getConstant<string[]>(tViewConsts,
localRefsIndex);\n  resolveDirectives(tView, IView, tNode, localRefs);\n  if (tView.queries !== null) {\n    tView.queries.elementStart(tView, tNode);\n  }\n  return tNode;\n}\n\n/**\n * Creates a logical container
for other nodes (<ng-container>) backed by a comment node in the DOM.\n * The instruction must later be
followed by `elementContainerEnd()` call.\n * @param index Index of the element in the LView array\n *
@param attrsIndex Index of the container attributes in the `consts` array.\n * @param localRefsIndex Index of the
container's local references in the `consts` array.\n * @returns This function returns itself so that it may be
chained.\n * Even if this instruction accepts a set of attributes no actual attribute values are propagated to\n * the
DOM (as a comment node can't have attributes). Attributes are here only for directive\n * matching purposes and
setting initial inputs of directives.\n */\n * @codeGenApi\n */\nexport function elementContainerStart(\n  index:
number, attrsIndex?: number|null,\n  localRefsIndex?: number): typeof elementContainerStart {\n  const IView =
getLView();\n  const tView = getTView();\n  const adjustedIndex = index + HEADER_OFFSET;\n  ngDevMode
&& assertIndexInRange(IView, adjustedIndex);\n  ngDevMode &&\n  assertEqual(\n    getBindingIndex(),
tView.bindingStartIndex,\n    'element containers should be created before any bindings');\n  const tNode =
tView.firstCreatePass ?\n    elementContainerStartFirstCreatePass(\n      adjustedIndex, tView, IView, attrsIndex,
localRefsIndex) :\n    tView.data[adjustedIndex] as TElementContainerNode;\n  setCurrentTNode(tNode, true);\n  ngDevMode
&& ngDevMode.rendererCreateComment++;\n  const native = IView[adjustedIndex] =\n    IView[RENDERER].createComment(ngDevMode ? 'ng-container' : '');\n  appendChild(tView, IView, native,
tNode);\n  attachPatchData(native, IView);\n  if (isDirectiveHost(tNode)) {\n    createDirectivesInstances(tView,
IView, tNode);\n    executeContentQueries(tView, tNode, IView);\n  }\n  if (localRefsIndex !== null) {\n    saveResolvedLocalsInData(IView, tNode);\n  }\n  return elementContainerStart;\n}\n\n/**\n * Mark the end
of the <ng-container>.\n * @returns This function returns itself so that it may be chained.\n */\n * @codeGenApi\n
*/\nexport function elementContainerEnd(): typeof elementContainerEnd {\n  let currentTNode =
getCurrentTNode();\n  const tView = getTView();\n  if (isCurrentTNodeParent()) {\n    setCurrentTNodeAsNotParent();\n  } else {\n    ngDevMode && assertHasParent(currentTNode);\n    currentTNode
= currentTNode.parent!;\n    setCurrentTNode(currentTNode, false);\n  }\n  ngDevMode &&
assertTNodeType(currentTNode, TNodeType.ElementContainer);\n  if (tView.firstCreatePass) {\n    registerPostOrderHooks(tView, currentTNode);\n    if (isContentQueryHost(currentTNode)) {\n      tView.queries!.elementEnd(currentTNode);\n    }\n  }\n  return elementContainerEnd;\n}\n\n/**\n * Creates an
empty logical container using { @link elementContainerStart }\n * and { @link elementContainerEnd }\n * @param index Index of the element in the LView array\n * @param attrsIndex Index of the container
attributes in the `consts` array.\n * @param localRefsIndex Index of the container's local references in the `consts`
array.\n * @returns This function returns itself so that it may be chained.\n */\n * @codeGenApi\n */\nexport
function elementContainer(\n  index: number, attrsIndex?: number|null, localRefsIndex?: number): typeof
elementContainer {\n  elementContainerStart(index, attrsIndex, localRefsIndex);\n  elementContainerEnd();\n  return elementContainer;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at

```

```

https://angular.io/license\n */\nimport {OpaqueViewState} from './interfaces/view';\nimport {getLView} from
 './state';\n\n/**\n * Returns the current OpaqueViewState instance.\n *\n * Used in conjunction with the
 restoreView() instruction to save a snapshot\n * of the current view and restore it when listeners are invoked. This
 allows\n * walking the declaration view tree in listeners to get vars from parent views.\n *\n * @codeGenApi\n
 */\nexport function getCurrentView(): OpaqueViewState {\n  return getLView() as any as
 OpaqueViewState;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
 source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
 https://angular.io/license\n */\n\nimport {Observable, Subscribable} from 'rxjs';\n\n/**\n * Determine if the
 argument is shaped like a Promise\n *\nexport function isPromise<T = any>(obj: any): obj is Promise<T> {\n //
 allow any Promise/A+ compliant thenable.\n // It's up to the caller to ensure that obj.then conforms to the spec\n
return !!obj && typeof obj.then === 'function';\n}\n\n/**\n * Determine if the argument is a Subscribable\n
*/\nexport function isSubscribable(obj: any|Subscribable<any>): obj is Subscribable<any> {\n  return !!obj &&
 typeof obj.subscribe === 'function';\n}\n\n/**\n
 * Determine if the argument is an Observable\n *\n * Strictly this tests that the `obj` is `Subscribable`, since
 `Observable`\n * types need additional methods, such as `lift()`. But it is adequate for our\n * needs since within the
 Angular framework code we only ever need to use the\n * `subscribe()` method, and RxJS has mechanisms to wrap
 `Subscribable` objects\n * into `Observable` as needed.\n *\nexport const isObservable =\n  isSubscribable as
 ((obj: any|Observable<any>) => obj is Observable<any>);\n\n"/**\n * @license\n * Copyright Google LLC All
 Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
 LICENSE file at https://angular.io/license\n */\n\nimport {assertIndexInRange} from './../util/assert';\nimport
 {isObservable} from './../util/lang';\nimport {PropertyAliasValue, TNode, TNodeFlags, TNodeType} from
 './interfaces/node';\nimport {GlobalTargetResolver, Renderer} from './interfaces/renderer';\nimport
 {RElement} from './interfaces/renderer_dom';\nimport {isDirectiveHost} from './interfaces/type_checks';\nimport
 {CLEANUP, CONTEXT, LView, RENDERER, TView} from './interfaces/view';\nimport {assertTNodeType}
 from './node_assert';\nimport {profiler, ProfilerEvent} from './profiler';\nimport {getCurrentDirectiveDef,
 getCurrentTNode, getLView, getTView} from './state';\nimport {getComponentLViewByIndex,
 getNativeByTNode, unwrapRNode} from './util/view_utils';\nimport {getOrCreateLViewCleanup,
 getOrCreateTViewCleanup, handleError, loadComponentRenderer, markViewDirty} from './shared';\n\n\n/**\n
 * Adds an event listener to the current node.\n *\n * If an output exists on one of the node's directives, it also
 subscribes to the output\n * and saves the subscription for later cleanup.\n *\n * @param eventName Name of the
 event\n * @param listenerFn The function to be called when event emits\n * @param useCapture Whether or not to
 use capture in event listener\n * @param eventTargetResolver
 Function that returns global target information in case this listener\n * should be attached to a global object like
 window, document or body\n *\n * @codeGenApi\n */\nexport function listener(\n  eventName: string, listenerFn:
 (e?: any) => any, useCapture?: boolean,\n  eventTargetResolver?: GlobalTargetResolver): typeof listener {\n  const
 lView = getLView<{}|null>();\n  const tView = getTView();\n  const tNode = getCurrentTNode(!);\n
  listenerInternal(\n    tView, lView, lView[RENDERER], tNode, eventName, listenerFn, !!useCapture,\n
    eventTargetResolver);\n  return listener;\n}\n\n/**\n * Registers a synthetic host listener (e.g. `(@foo.start)`) on a
 component or directive.\n *\n * This instruction is for compatibility purposes and is designed to ensure that a\n *
 synthetic host listener (e.g. `@HostListener('@foo.start')`) properly gets rendered\n * in the component's renderer.
 Normally all host listeners are evaluated with the\n * parent component's renderer,
 but, in the case of animation @triggers, they need\n * to be evaluated with the sub component's renderer (because
 that's where the\n * animation triggers are defined).\n *\n * Do not use this instruction as a replacement for
 `listener`. This instruction\n * only exists to ensure compatibility with the ViewEngine's host binding behavior.\n
*\n * @param eventName Name of the event\n * @param listenerFn The function to be called when event emits\n *\n
 * @param useCapture Whether or not to use capture in event listener\n * @param eventTargetResolver Function that
 returns global target information in case this listener\n * should be attached to a global object like window,
 document or body\n *\n * @codeGenApi\n */\nexport function syntheticHostListener(\n  eventName: string,

```

```

listenerFn: (e?: any) => any): typeof syntheticHostListener {\n  const tNode = getCurrentTNode();\n  const IView =
getLView<{}|null>();\n  const tView = getTView();\n  const currentDef = getCurrentDirectiveDef(tView.data);\n
  const renderer = loadComponentRenderer(currentDef, tNode, IView);\n  listenerInternal(tView, IView, renderer,
tNode, eventName, listenerFn, false);\n  return syntheticHostListener;\n}\n\n/**\n * A utility function that checks if
a given element has already an event handler registered for an\n * event with a specified name. The TView.cleanup
data structure is used to find out which events\n * are registered for a given element.\n */\nfunction
findExistingListener(\n  tView: TView, IView: LView, eventName: string, tNodeIdx: number): ((e?: any) =>
any)|null {\n  const tCleanup = tView.cleanup;\n  if (tCleanup != null) {\n    for (let i = 0; i < tCleanup.length - 1; i
+= 2) {\n      const cleanupEventName = tCleanup[i];\n      if (cleanupEventName === eventName && tCleanup[i +
1] === tNodeIdx) {\n        // We have found a matching event name on the same node but it might not have been\n
        // registered yet, so we must explicitly verify entries in the LView cleanup
data\n        // structures.\n        const ICleanup = IView[CLEANUP]!;\n        const listenerIdxInLCleanup =
tCleanup[i + 2];\n        return ICleanup.length > listenerIdxInLCleanup ? ICleanup[listenerIdxInLCleanup] : null;\n
      }\n      // TView.cleanup can have a mix of 4-elements entries (for event handler cleanups) or\n      // 2-element
entries (for directive and queries destroy hooks). As such we can encounter\n      // blocks of 4 or 2 items in the
tView.cleanup and this is why we iterate over 2 elements\n      // first and jump another 2 elements if we detect
listeners cleanup (4 elements). Also check\n      // documentation of TView.cleanup for more details of this data
structure layout.\n      if (typeof cleanupEventName === 'string') {\n        i += 2;\n      }\n    }\n  }\n  return
null;\n}\n\nfunction listenerInternal(\n  tView: TView, IView: LView<{}|null>, renderer: Renderer, tNode: TNode,
eventName: string,\n  listenerFn: (e?: any) => any, useCapture: boolean,\n
  eventTargetResolver?: GlobalTargetResolver): void {\n  const isTNodeDirectiveHost = isDirectiveHost(tNode);\n
  const firstCreatePass = tView.firstCreatePass;\n  const tCleanup: false|any[] = firstCreatePass &&
getOrCreateTViewCleanup(tView);\n  const context = IView[CONTEXT];\n  // When the listener instruction was
generated and is executed we know that there is either a\n  // native listener or a directive output on this element. As
such we we know that we will have to\n  // register a listener and store its cleanup function on LView.\n  const
ICleanup = getOrCreateLViewCleanup(IView);\n  ngDevMode && assertTNodeType(tNode,
TNodeType.AnyRNode | TNodeType.AnyContainer);\n  let processOutputs = true;\n  // Adding a native event
listener is applicable when:\n  // - The corresponding TNode represents a DOM element.\n  // - The event target has
a resolver (usually resulting in a global object,\n  // such as `window` or `document`).\n  if ((tNode.type &
TNodeType.AnyRNode) ||
eventTargetResolver) {\n    const native = getNativeByTNode(tNode, IView) as RElement;\n    const target =
eventTargetResolver ? eventTargetResolver(native) : native;\n    const ICleanupIndex = ICleanup.length;\n    const
idxOrTargetGetter = eventTargetResolver ?\n      (_IView: LView) =>
eventTargetResolver(unwrapRNode(_IView[tNode.index])) :\n      tNode.index;\n    // In order to match current
behavior, native DOM event listeners must be added for all\n    // events (including outputs).\n    // There might be
cases where multiple directives on the same element try to register an event\n    // handler function for the same
event. In this situation we want to avoid registration of\n    // several native listeners as each registration would be
intercepted by NgZone and\n    // trigger change detection. This would mean that a single user action would result in
several\n    // change detections being invoked. To avoid this situation we want to have only one call to\n    // native
handler registration (for the same element and same type of event).\n    // In order to have just one native
event handler in presence of multiple handler functions,\n    // we just register a first handler function as a native
event listener and then chain\n    // (coalesce) other handler functions on top of the first native handler function.\n
let existingListener = null;\n    // Please note that the coalescing described here doesn't happen for events specifying
an\n    // alternative target (ex. (document:click)) - this is to keep backward compatibility with the\n    // view
engine.\n    // Also, we don't have to search for existing listeners is there are no directives\n    // matching on a given
node as we can't register multiple event handlers for the same event in\n    // a template (this would mean having
duplicate attributes).\n    if (!eventTargetResolver && isTNodeDirectiveHost) {\n      existingListener =
findExistingListener(tView, IView, eventName, tNode.index);\n

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    }
    if (existingListener !== null) {
      // Attach a new listener to coalesced listeners list, maintaining the order
      // in which listeners are registered. For performance reasons, we keep a reference to the last
      // listener in that list (in `__ngLastListenerFn` field), so we can avoid going through the entire set each time we need to
      // add a new listener.
      const lastListenerFn = (<any>existingListener).__ngLastListenerFn__ || existingListener;
      lastListenerFn.__ngNextListenerFn__ = listenerFn;
      (<any>existingListener).__ngLastListenerFn__ = listenerFn;
      processOutputs = false;
    } else {
      listenerFn = wrapListener(tNode, IView, context, listenerFn, false /** preventDefault */);
      const cleanupFn = renderer.listen(target as RElement, eventName, listenerFn);
      ngDevMode && ngDevMode.rendererAddEventListener++;
      ICleanup.push(listenerFn, cleanupFn);
      tCleanup && tCleanup.push(eventName, idxOrTargetGetter, ICleanupIndex, ICleanupIndex + 1);
    }
  } else {
    // Even if there is no native listener to add, we still need to wrap the listener so that OnPush ancestors are marked dirty when an event occurs.
    listenerFn = wrapListener(tNode, IView, context, listenerFn, false /** preventDefault */);
  }
  // subscribe to directive outputs
  const outputs = tNode.outputs;
  let props: PropertyAliasValue|undefined;
  if (processOutputs && outputs !== null && (props = outputs[eventName])) {
    const propsLength = props.length;
    if (propsLength) {
      for (let i = 0; i < propsLength; i += 2) {
        const index = props[i] as number;
        ngDevMode && assertIndexInRange(IView, index);
        const minifiedName = props[i + 1];
        const directiveInstance = IView[index];
        const output = directiveInstance[minifiedName];
        if (ngDevMode && !isObservable(output)) {
          throw new Error(`@Output ${minifiedName} not initialized in '${directiveInstance.constructor.name}'.`);
        }
        const subscription = output.subscribe(listenerFn);
        const idx = ICleanup.length;
        ICleanup.push(listenerFn, subscription);
        tCleanup && tCleanup.push(eventName, tNode.index, idx, -(idx + 1));
      }
    }
  }
}

function executeListenerWithErrorHandling(IView: LView, context: {}|null, listenerFn: (e?: any) => any, e: any): boolean {
  try {
    profiler(ProfilerEvent.OutputStart, context, listenerFn);
    // Only explicitly returning false from a listener should preventDefault
    return listenerFn(e) !== false;
  } catch (error) {
    handleError(IView, error);
    return false;
  } finally {
    profiler(ProfilerEvent.OutputEnd, context, listenerFn);
  }
}

/**
 * Wraps an event listener with a function that marks ancestors dirty and prevents default behavior,
 * if applicable.
 *
 * @param tNode The TNode associated with this listener
 * @param IView The LView that contains this listener
 * @param listenerFn The listener function to call
 * @param wrapWithPreventDefault Whether or not to prevent default behavior
 * (the procedural renderer does this already, so in those cases, we should skip)
 */
function wrapListener(tNode: TNode, IView: LView<{}|null>, context: {}|null, listenerFn: (e?: any) => any, wrapWithPreventDefault: boolean): EventListener {
  // Note: we are performing most of the work in the listener function itself // to optimize listener registration.
  return function wrapListenerIn_markDirtyAndPreventDefault(e: any) {
    // Ivy uses `Function` as a special token that allows us to unwrap the function // so that it can be invoked programmatically by `DebugNode.triggerEventHandler`.
    if (e === Function) {
      return listenerFn;
    }
    // In order to be backwards compatible with View Engine, events on component host nodes // must also mark the component view itself dirty (i.e. the view that it owns).
    const startView = tNode.flags & TNodeFlags.isComponentHost ? getComponentLViewByIndex(tNode.index, IView) : IView;
    markViewDirty(startView);
    let result = executeListenerWithErrorHandling(IView, context, listenerFn, e);
    // A just-invoked listener function might have coalesced listeners so we need to check for // their presence and invoke as needed.
    let nextListenerFn = (<any>wrapListenerIn_markDirtyAndPreventDefault).__ngNextListenerFn__;
    while (nextListenerFn) {
      // We should prevent default if any of the listeners explicitly return false
      result = executeListenerWithErrorHandling(IView, context, nextListenerFn, e) && result;
      nextListenerFn = (<any>nextListenerFn).__ngNextListenerFn__;
    }
    if (wrapWithPreventDefault && result === false) {
      e.preventDefault();
      // Necessary for legacy browsers that don't support preventDefault (e.g. IE)
      e.returnValue = false;
    }
    return result;
  };
}

return result;
}

}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 *
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at

```



```

https://angular.io/license\n *\n\nexport {namespaceHTML, namespaceMathML, namespaceSVG} from
'./state';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\nimport {nextContextImpl} from './state';\n\n/*\n * Retrieves a context at the level specified and saves it as the
global, contextViewData.\n * Will get the next level up if level is not specified.\n *\n * This is used to save contexts
of parent views so they can be bound in embedded views, or\n * in conjunction with reference() to bind a ref from a
parent view.\n *\n * @param level The relative level of the view from which to grab context
compared to contextVewData\n * @returns context\n *\n * @codeGenApi\n *\nexport function nextContext<T =
any>(level: number = 1): T {\n  return nextContextImpl(level);\n}\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n *\nimport {newArray} from './util/array_utils';\nimport
{TAttributes, TElementNode, TNode, TNodeFlags, TNodeType} from './interfaces/node';\nimport
{ProjectionSlots} from './interfaces/projection';\nimport {DECLARATION_COMPONENT_VIEW,
HEADER_OFFSET, T_HOST} from './interfaces/view';\nimport {applyProjection} from
'./node_manipulation';\nimport {getProjectAsAttrValue, isNodeMatchingSelectorList, isSelectorInSelectorList}
from './node_selector_matcher';\nimport {getLView, getTView, setCurrentTNodeAsNotParent} from
'./state';\nimport {getOrCreateTNode} from './shared';\n\n\n/*\n * Checks a given node
against matching projection slots and returns the\n * determined slot index. Returns \"null\" if no slot matched the
given node.\n *\n * This function takes into account the parsed ngProjectAs selector from the\n * node's attributes. If
present, it will check whether the ngProjectAs selector\n * matches any of the projection slot selectors.\n *\nexport
function matchingProjectionSlotIndex(tNode: TNode, projectionSlots: ProjectionSlots): number|\n  null {\n  let
wildcardNgContentIndex = null;\n  const ngProjectAsAttrVal = getProjectAsAttrValue(tNode);\n  for (let i = 0; i <
projectionSlots.length; i++) {\n    const slotValue = projectionSlots[i];\n    // The last wildcard projection slot should
match all nodes which aren't matching\n    // any selector. This is necessary to be backwards compatible with view
engine.\n    if (slotValue === '*') {\n      wildcardNgContentIndex = i;\n      continue;\n    }\n    // If we ran into an
`ngProjectAs` attribute, we should match its parsed selector\n
    // to the list of selectors, otherwise we fall back to matching against the node.\n    if (ngProjectAsAttrVal === null
?\n      isNodeMatchingSelectorList(tNode, slotValue, /* isProjectionMode */ true) :\n
isSelectorInSelectorList(ngProjectAsAttrVal, slotValue)) {\n      return i; // first matching selector\n    }\n  }\n  return wildcardNgContentIndex;\n}\n\n\n/*\n * Instruction to distribute projectable nodes
among <ng-content> occurrences in a given template.\n * It takes all the selectors from the entire component's
template and decides where\n * each projected node belongs (it re-distributes nodes among \"buckets\" where each
\"bucket\" is\n * backed by a selector).\n *\n * This function requires CSS selectors to be provided in 2 forms:
parsed (by a compiler) and text,\n * un-parsed form.\n *\n * The parsed form is needed for efficient matching of a
node against a given CSS selector.\n * The un-parsed, textual form is needed for
support of the ngProjectAs attribute.\n *\n * Having a CSS selector in 2 different formats is not ideal, but
alternatives have even more\n * drawbacks:\n * - having only a textual form would require runtime parsing of CSS
selectors;\n * - we can't have only a parsed as we can't re-construct textual form from it (as entered by a\n * template
author).\n *\n * @param projectionSlots? A collection of projection slots. A projection slot can be based\n * on
a parsed CSS selectors or set to the wildcard selector (\"*\") in order to match\n * all nodes which do not match
any selector. If not specified, a single wildcard\n * selector projection slot will be defined.\n *\n *
@codeGenApi\n *\nexport function projectionDef(projectionSlots?: ProjectionSlots): void {\n  const
componentNode = getLView()[DECLARATION_COMPONENT_VIEW][T_HOST] as TElementNode;\n\n  if
(!componentNode.projection) {\n    // If no explicit projection slots are defined, fall back to a single\n    //
projection slot with the wildcard selector.\n    const numProjectionSlots = projectionSlots ? projectionSlots.length :
1;\n    const projectionHeads: (TNode|null)[] = componentNode.projection =\n      newArray(numProjectionSlots,
null! as TNode);\n    const tails: (TNode|null)[] = projectionHeads.slice();\n\n    let componentChild: TNode|null =
componentNode.child;\n\n    while (componentChild !== null) {\n      const slotIndex =\n        projectionSlots ?

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getBindingIndex() - 1, prefix, suffix);\n } \n return propertyInterpolate1;\n}\n\n/**\n * \n * Update an interpolated
property on an element with 2 bound values surrounded by text.\n * \n * Used when the value passed to a property
has 2 interpolated values in it:\n * \n * ``html\n * <div title="prefix{{v0}}-{{v1}}suffix"></div>\n * ``\n * \n * Its
compiled representation is:\n * \n * ``ts\n * propertyInterpolate2('title',
'prefix', v0, '-', v1, 'suffix');\n * ``\n * \n * If the property name also exists as an input property on one of the
element's directives,\n * the component property will be set instead of the element property. This check must\n * be
conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param
propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1
Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An
optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\n\nexport function
propertyInterpolate2(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n  sanitizer?:
SanitizerFn): typeof propertyInterpolate2 {\n  const IView = getLView();\n  const
interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n  if (interpolatedValue !== NO_CHANGE)
{\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView,
tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n      tView.data, tNode, propName, getBindingIndex() - 2, prefix, i0, suffix);\n
  }\n  return propertyInterpolate2;\n}\n\n/**\n * \n * Update an interpolated property on an element with 3 bound
values surrounded by text.\n * \n * Used when the value passed to a property has 3 interpolated values in it:\n * \n *
``html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}suffix"></div>\n * ``\n * \n * Its compiled representation
is:\n * \n * ``ts\n * propertyInterpolate3(\n * 'title', 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ``\n * \n * If the property
name also exists as an input property on one of the element's directives,\n
* the component property will be set instead of the element property. This check must\n * be conducted at runtime
so child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param propName The name of
the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked
for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param suffix
Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so
that it may be chained.\n * @codeGenApi\n */\n\nexport function propertyInterpolate3(\n  propName: string, prefix:
string, v0: any, i0: string, v1: any, i1: string, v2: any,\n  suffix: string, sanitizer?: SanitizerFn): typeof
propertyInterpolate3 {\n  const IView = getLView();\n  const interpolatedValue = interpolation3(IView,
prefix, v0, i0, v1, i1, v2, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n
const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName,
interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n      tView.data, tNode, propName, getBindingIndex() - 3, prefix, i0, i1,
suffix);\n  }\n  return propertyInterpolate3;\n}\n\n/**\n * \n * Update an interpolated property on an element with 4
bound values surrounded by text.\n * \n * Used when the value passed to a property has 4 interpolated values in it:\n
* \n * ``html\n * <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n * ``\n * \n * Its compiled
representation is:\n * \n * ``ts\n * propertyInterpolate4(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ``\n * \n * If the property
name also exists as an input property on one of the element's directives,\n
* the component property will be set instead of the element property. This check must\n * be conducted at runtime
so child components that add new `@Inputs` don't have to be re-compiled.\n * \n * @param propName The name of
the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked
for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2
Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param suffix Static value
used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may
be chained.\n * @codeGenApi\n */\n\nexport function propertyInterpolate4(\n  propName: string, prefix: string, v0:

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any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, suffix: string, sanitizer?:

SanitizerFn): typeof propertyInterpolate4 {\n const IView = getLView();\n const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 4, prefix, i0, i1, i2, suffix);\n }\n return propertyInterpolate4;\n}\n\n/\*\*\n \* Update an interpolated property on an element with 5 bound values surrounded by text.\n \* Used when the value passed to a property has 5 interpolated values in it:\n \* ``html` <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix`></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts` propertyInterpolate5(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n \* ``\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function propertyInterpolate5(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, suffix: string,\n sanitizer?: SanitizerFn): typeof propertyInterpolate5 {\n const IView = getLView();\n const interpolatedValue = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 5, prefix, i0, i1, i2, i3, suffix);\n }\n return propertyInterpolate5;\n}\n\n/\*\*\n \* Update an interpolated property on an element with 6 bound values surrounded by text.\n \* Used when the value passed to a property has 6 interpolated values in it:\n \* ``html` <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix`></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts` propertyInterpolate6(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n \* ``\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function propertyInterpolate6(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string,\n sanitizer?: SanitizerFn): typeof propertyInterpolate6 {\n const IView = getLView();\n const interpolatedValue = interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName,

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getBindingIndex() - 6, prefix, i0, i1, i2, i3, i4, suffix);\n }\n return propertyInterpolate6;\n}\n\n/**\n * Update an interpolated property on an element with 7 bound values surrounded by text.\n * Used when the value passed to a property has 7 interpolated values in it:\n * <html>\n * <div title=\`prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}\`suffix\`></div>\n * </html>\n * Its compiled representation is:\n * <ts>\n * propertyInterpolate7(\n *   'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * </ts>\n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must
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* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
```

```
*/\nexport function propertyInterpolate7(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n  sanitizer?: SanitizerFn): typeof propertyInterpolate7 {\n  const IView = getLView();\n  const interpolatedValue = interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n
```

```
    elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        tView.data, tNode, propName, getBindingIndex() - 7, prefix, i0, i1, i2, i3, i4, i5,\n        suffix);\n  }\n  return propertyInterpolate7;\n}\n\n/**\n * Update an interpolated property on an element with 8 bound values
```

```
surrounded by text.\n * Used when the value passed to a property has 8 interpolated values in it:\n * <html>\n * <div title=\`prefix{v0}-{v1}-{v2}-{v3}-{v4}-{v5}-{v6}-{v7}\`suffix\`></div>\n * </html>\n * Its compiled representation is:\n * <ts>\n * propertyInterpolate8(\n *   'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * </ts>\n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must
```

```
* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
```

```
only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6 Value checked for change.\n * @param i6 Static value used for concatenation only.\n * @param v7 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
```

```
*/\nexport function propertyInterpolate8(\n  propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n  suffix: string, sanitizer?: SanitizerFn):
```

```
typeof propertyInterpolate8 {\n  const IView = getLView();\n  const interpolatedValue = interpolation8(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer,
```

```

false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName,
getBindingIndex() - 8, prefix, i0, i1, i2, i3, i4, i5, i6,\n suffix);\n }\n return propertyInterpolate8;\n}\n\n/*\n * Update an interpolated property on an element with 9 or more bound values surrounded by text.\n *\n * Used when the number of interpolated values exceeds 8.\n *\n * ```html\n * <div\n * title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"\n * ></div>\n * ```\n *\n * Its compiled representation
is:\n *\n * ```ts\n * propertyInterpolateV(\n * 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n * 'suffix']);\n * ```\n *\n * If the property name also exists as an input property on one of the element's directives,\n * the component property will be set instead of the element property. This check must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *\n * @param propName The name of the property to update.\n * @param values The collection of values and the strings in between those values, beginning with a\n * string prefix and ending with a string suffix.\n * (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function propertyInterpolateV(\n propName: string, values: any[], sanitizer?: SanitizerFn): typeof propertyInterpolateV
{\n const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n if (interpolatedValue !== NO_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n if (ngDevMode) {\n const interpolationInBetween = [values[0]]; // prefix\n for (let i = 2; i < values.length; i += 2) {\n interpolationInBetween.push(values[i]);\n }\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - interpolationInBetween.length + 1,\n ...interpolationInBetween);\n }\n }\n return propertyInterpolateV;\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {KeyValueArray, keyValueArrayIndexOf} from './util/array_utils';\nimport {assertEqual, assertIndexInRange, assertNotEqual} from './util/assert';\nimport {assertFirstUpdatePass} from './assert';\nimport {TNode} from './interfaces/node';\nimport {getTStylingRangeNext, getTStylingRangePrev, setTStylingRangeNext, setTStylingRangeNextDuplicate, setTStylingRangePrev, setTStylingRangePrevDuplicate, toTStylingRange, TStylingKey, TStylingKeyPrimitive, TStylingRange} from './interfaces/styling';\nimport {TData} from './interfaces/view';\nimport {getTView} from './state';\n\n/*\n * NOTE: The word `styling` is used interchangeably as style or class styling.\n *\n * This file contains code to link styling instructions together so that they can be replayed in\n * priority order. The file exists because Ivy styling instruction execution order does not match\n * that of the priority order. The purpose of this code is to create a linked list so that the\n * instructions can be traversed in priority order when computing the styles.\n *\n * Assume we are dealing with the following code:\n *\n * ```\n * @Component({\n * template: `<my-cmp [style]=\" {color: '#001'} \"\" [style.color]=\" #002 \"\" dir-style-color-1\n * dir-style-color-2> `)\n * class ExampleComponent {\n * static ngComp = ...\n * // Compiler ensures that `styleProp` is after `styleMap`\n * styleMap({color: '#001'});\n * styleProp('color', '#002');\n * }\n * @Directive({\n * selector: '[dir-style-color-1]'\n * })\n * class Style1Directive {\n * @HostBinding('style') style = {color: '#005'};\n * @HostBinding('style.color') color = '#006';\n * static ngDir = ...\n * // Compiler ensures that `styleProp` is after `styleMap`\n * styleMap({color: '#005'});\n * styleProp('color', '#006');\n * }\n * @Directive({\n * selector: '[dir-style-color-2]'\n * })\n * class Style2Directive {\n * @HostBinding('style') style = {color: '#007'};\n * @HostBinding('style.color') color = '#008';\n * static ngDir = ...\n * // Compiler ensures that `styleProp` is after `styleMap`\n * styleMap({color: '#007'});\n * styleProp('color', '#008');\n * }\n * @Directive({\n * selector: `my-cmp`\n * })\n * class MyComponent {\n * @HostBinding('style') style = {color: '#003'};\n * @HostBinding('style.color') color = '#004';\n * static ngComp = ...\n * // Compiler ensures that `styleProp` is after `styleMap`\n * styleMap({color: '#003'});\n * styleProp('color', '#004');\n * }\n * ```

```

```

}\n * ``\n *\n * The Order of instruction execution is:\n *\n * NOTE: the comment binding location is for
illustrative purposes only.\n *\n * ``\n * // Template: (ExampleComponent)\n *   styleMap({color: '#001'}); //
Binding index: 10\n *   styleProp('color',
'#002'); // Binding index: 12\n * // MyComponent\n *   styleMap({color: '#003'}); // Binding index: 20\n *
styleProp('color', '#004'); // Binding index: 22\n * // Style1Directive\n *   styleMap({color: '#005'}); // Binding
index: 24\n *   styleProp('color', '#006'); // Binding index: 26\n * // Style2Directive\n *   styleMap({color:
'#007'}); // Binding index: 28\n *   styleProp('color', '#008'); // Binding index: 30\n * ``\n *\n * The correct
priority order of concatenation is:\n *\n * ``\n * // MyComponent\n *   styleMap({color: '#003'}); // Binding
index: 20\n *   styleProp('color', '#004'); // Binding index: 22\n * // Style1Directive\n *   styleMap({color:
'#005'}); // Binding index: 24\n *   styleProp('color', '#006'); // Binding index: 26\n * // Style2Directive\n *
styleMap({color: '#007'}); // Binding index: 28\n *   styleProp('color', '#008'); // Binding index: 30\n * //
Template: (ExampleComponent)\n
*   styleMap({color: '#001'}); // Binding index: 10\n *   styleProp('color', '#002'); // Binding index: 12\n * ``\n
*\n * What color should be rendered?\n *\n * Once the items are correctly sorted in the list, the answer is simply the
last item in the\n * concatenation list which is `#002`.\n *\n * To do so we keep a linked list of all of the bindings
which pertain to this element.\n * Notice that the bindings are inserted in the order of execution, but the
`TVView.data` allows\n * us to traverse them in the order of priority.\n *\n * |Idx|`TVView.data`|`LView`      |
Notes\n * |---|-----|-----|-----\n * |...|          |          |\n * |10|`null`   |`{color: '#001'}`|\n * |`styleMap('color', {color: '#001'})`\n * |11|`30|12` |...          |\n * |12|`color`  |`'#002`     |`styleProp('color',
'#002')`\n * |13|`10|0`  |...          |\n * |14|`...`    |`|`          |\n * |15|`20|`null` |`{color:
'#003'}`|`styleMap('color', {color: '#003'})`\n * |16|`0|22` |...          |\n * |17|`color`  |`'#004`     |`|`          |\n * |18|`styleProp('color', '#004')`\n * |19|`20|24` |...          |\n * |20|`null`   |`{color: '#005'}`|`styleMap('color',
{color: '#005'})`\n * |21|`22|26` |...          |\n * |22|`color`  |`'#006`     |`styleProp('color', '#006')`\n * |23|`27
|24|28` |...          |\n * |24|`null`   |`{color: '#007'}`|`styleMap('color', {color: '#007'})`\n * |25|`26|30` |...
|\n * |26|`color`  |`'#008`     |`styleProp('color', '#008')`\n * |27|`28|10` |...          |\n
*\n * The above
data structure allows us to re-concatenate the styling no matter which data binding\n * changes.\n *\n * NOTE: in
addition to keeping track of next/previous index the `TVView.data` also stores prev/next\n * duplicate bit. The
duplicate bit if true says there either is a binding with the same name or\n * there
is a map (which may contain the name). This information is useful in knowing if other\n * styles with higher
priority need to be searched for overwrites.\n *\n * NOTE: See `should support example in 'tnode_linked_list.ts'
documentation` in\n * `tnode_linked_list_spec.ts` for working example.\n */\n
__unused_const_as_closure_does_not_like_standalone_comment_blocks__: undefined;\n\n\n * Insert new
`tStyleValue` at `TData` and link existing style bindings such that we maintain linked\n * list of styles and compute
the duplicate flag.\n *\n * Note: this function is executed during `firstUpdatePass` only to populate the
`TVView.data`.\n *\n * The function works by keeping track of `tStylingRange` which contains two pointers pointing
to\n * the head/tail of the template portion of the styles.\n * - if `isHost === false` (we are template) then insertion
is at tail of `TStylingRange`\n * - if `isHost === true` (we are host binding) then insertion is at head of
`TStylingRange`\n *\n
@param tData The `TData` to insert into.\n * @param tNode `TNode` associated with the styling element.\n *
@param tStylingKey See `TStylingKey`.\n * @param index location of where `tStyleValue` should be stored (and
linked into list).\n * @param isHostBinding `true` if the insertion is for a `hostBinding`. (insertion is in front of\n *
template.)\n * @param isClassBinding True if the associated `tStylingKey` as a `class` styling.\n *
`tNode.classBindings` should be used (or `tNode.styleBindings` otherwise.)\n */\n
export function
insertTStylingBinding(\n  tData: TData, tNode: TNode, tStylingKeyWithStatic: TStylingKey, index: number,\n
isHostBinding: boolean, isClassBinding: boolean): void {\n  ngDevMode && assertFirstUpdatePass(getTVView());\n
let tBindings = isClassBinding ? tNode.classBindings : tNode.styleBindings;\n  let tmpIHead =
getTStylingRangePrev(tBindings);\n  let tmpITail = getTStylingRangeNext(tBindings);\n  tData[index] =
tStylingKeyWithStatic;\n

```

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let isKeyDuplicateOfStatic = false;\n let tStylingKey: TStylingKeyPrimitive;\n if
(Array.isArray(tStylingKeyWithStatic)) {\n // We are case when the `TStylingKey` contains static fields as well.\n
const staticKeyValueArray = tStylingKeyWithStatic as KeyValueArray<any>;\n tStylingKey =
staticKeyValueArray[1]; // unwrap.\n // We need to check if our key is present in the static so that we can mark it
as duplicate.\n if (tStylingKey === null ||\n keyValueArrayIndexOf(staticKeyValueArray, tStylingKey as
string) > 0) {\n // tStylingKey is present in the statics, need to mark it as duplicate.\n isKeyDuplicateOfStatic
= true;\n }\n } else {\n tStylingKey = tStylingKeyWithStatic;\n }\n if (isHostBinding) {\n // We are inserting
host bindings\n\n // If we don't have template bindings then `tail` is 0.\n const hasTemplateBindings = tmpTail
!== 0;\n // This is important to know because that means that the `head` can't point
to the first\n // template bindings (there are none.) Instead the head points to the tail of the template.\n if
(hasTemplateBindings) {\n // template head's `prev` will point to last host binding or to 0 if no host bindings
yet\n const previousNode = getTStylingRangePrev(tData[tmpHead + 1] as TStylingRange);\n tData[index +
1] = toTStylingRange(previousNode, tmpHead);\n // if a host binding has already been registered, we need to
update the next of that host\n // binding to point to this one\n if (previousNode !== 0) {\n // We need to
update the template-tail value to point to us.\n tData[previousNode + 1] =\n
setTStylingRangeNext(tData[previousNode + 1] as TStylingRange, index);\n }\n // The `previous` of the
template binding head should point to this host binding\n tData[tmpHead + 1] =
setTStylingRangePrev(tData[tmpHead + 1] as TStylingRange, index);\n } else {\n tData[index + 1] =
toTStylingRange(tmpHead,
0);\n // if a host binding has already been registered, we need to update the next of that host\n // binding to
point to this one\n if (tmpHead !== 0) {\n // We need to update the template-tail value to point to us.\n
tData[tmpHead + 1] = setTStylingRangeNext(tData[tmpHead + 1] as TStylingRange, index);\n }\n // if we
don't have template, the head points to template-tail, and needs to be advanced.\n tmpHead = index;\n }\n }
else {\n // We are inserting in template section.\n // We need to set this binding's `previous` to the current
template tail\n tData[index + 1] = toTStylingRange(tmpTail, 0);\n ngDevMode &&\n assertEquals(\n
tmpHead !== 0 && tmpTail === 0, false,\n 'Adding template bindings after hostBindings is not
allowed.);\n if (tmpHead === 0) {\n tmpHead = index;\n } else {\n // We need to update the previous
value `next` to point to this binding\n
tData[tmpTail + 1] = setTStylingRangeNext(tData[tmpTail + 1] as TStylingRange, index);\n }\n tmpTail =
index;\n }\n\n // Now we need to update / compute the duplicates.\n // Starting with our location search towards
head (least priority)\n if (isKeyDuplicateOfStatic) {\n tData[index + 1] =
setTStylingRangePrevDuplicate(tData[index + 1] as TStylingRange);\n }\n markDuplicates(tData, tStylingKey,
index, true, isClassBinding);\n markDuplicates(tData, tStylingKey, index, false, isClassBinding);\n
markDuplicateOfResidualStyling(tNode, tStylingKey, tData, index, isClassBinding);\n\n tBindings =
toTStylingRange(tmpHead, tmpTail);\n if (isClassBinding) {\n tNode.classBindings = tBindings;\n } else {\n
tNode.styleBindings = tBindings;\n }\n}\n\n/**\n * Look into the residual styling to see if the current `tStylingKey`
is duplicate of residual.\n *\n * @param tNode `TNode` where the residual is stored.\n *\n * @param tStylingKey
`TStylingKey` to store.\n *\n * @param
tData `TData` associated with the current `LView`.\n *\n * @param index location of where `tStyleValue` should be
stored (and linked into list).\n *\n * @param isClassBinding True if the associated `tStylingKey` as a `class` styling.\n *\n
`tNode.classBindings` should be used (or `tNode.styleBindings` otherwise.)\n */\nfunction
markDuplicateOfResidualStyling(\n tNode: TNode, tStylingKey: TStylingKey, tData: TData, index: number,
isClassBinding: boolean) {\n const residual = isClassBinding ? tNode.residualClasses : tNode.residualStyles;\n if
(residual != null /* or undefined */ && typeof tStylingKey === 'string' &&\n
keyValueArrayIndexOf(residual,
tStylingKey) >= 0) {\n // We have duplicate in the residual so mark ourselves as duplicate.\n tData[index + 1] =
setTStylingRangeNextDuplicate(tData[index + 1] as TStylingRange);\n }\n}\n\n/**\n * Marks `TStyleValue`s as
duplicates if another style binding in the list has the same\n *\n * `TStyleValue`.\n *\n */

```



NOTE: this function is intended to be called twice once with `isPrevDir` set to `true` and once with it set to `false` to search both the previous as well as next items in the list.

No duplicate case

```
[style.color] [style.width.px] <<- index [style.height.px]
[style.width.px] to the existing [style.color] produces no duplicates because `width` is not found in any other part of the linked list. Duplicate case [style.color] [style.width.em] [style.width.px] <<- index In the above case adding [style.width.px] will produce a duplicate with [style.width.em] because `width` is found in the chain. Map case 1 [style.width.px] [style.color] [style] <<- index In the above case adding [style] will produce a duplicate with any other bindings because [style] is a Map and as such is fully dynamic and could produce `color` or `width`. Map case 2 [style] [style.width.px] [style.color] <<- index In the above case adding [style.color] will produce a duplicate because there is already a [style] binding which is a Map and as such is fully dynamic and could produce `color` or `width`. NOTE: Once [style] (Map) is added into the system all things are mapped as duplicates. NOTE: We use `style` as example, but same logic is applied to `class`es as well. @param tData TData where the linked list is stored. @param tStylingKey TStylingKeyPrimitive which contains the value to compare to other keys in the linked list. @param index Starting location in the linked list to search from @param isPrevDir Direction - `true` for previous (lower priority); - `false` for next (higher priority).
```

```
\nfunction markDuplicates(\n  tData: TData, tStylingKey: TStylingKeyPrimitive, index: number, isPrevDir: boolean, isClassBinding: boolean) {\n  const tStylingAtIndex = tData[index + 1] as TStylingRange;\n  const isMap = tStylingKey === null;\n  let cursor =\n    isPrevDir ?\n    getTStylingRangePrev(tStylingAtIndex) : getTStylingRangeNext(tStylingAtIndex);\n  let foundDuplicate = false;\n  // We keep iterating as long as we have a cursor\n  // AND either:\n  // - we found what we are looking for, OR\n  // - we are a map in which case we have to continue searching even after we find what we were\n  // looking for since we are a wild card and everything needs to be flipped to duplicate.\n  while (cursor !== 0 && (foundDuplicate === false || isMap)) {\n    ngDevMode && assertIndexInRange(tData, cursor);\n    const tStylingValueAtCursor = tData[cursor] as TStylingKey;\n    const tStyleRangeAtCursor = tData[cursor + 1] as TStylingRange;\n    if (isStylingMatch(tStylingValueAtCursor, tStylingKey)) {\n      foundDuplicate = true;\n      tData[cursor + 1] = isPrevDir ? setTStylingRangeNextDuplicate(tStyleRangeAtCursor) :\n        setTStylingRangePrevDuplicate(tStyleRangeAtCursor);\n    }\n    cursor = isPrevDir ?\n    getTStylingRangePrev(tStyleRangeAtCursor) :\n    getTStylingRangeNext(tStyleRangeAtCursor);\n  }\n  if (foundDuplicate) {\n    // if we found a duplicate, than mark ourselves.\n    tData[index + 1] = isPrevDir ?\n    setTStylingRangePrevDuplicate(tStylingAtIndex) :\n    setTStylingRangeNextDuplicate(tStylingAtIndex);\n  }\n}\n\n/**\n * Determines if two `TStylingKey`s are a match.\n * When computing whether a binding contains a duplicate, we need to compare if the instruction\n * `TStylingKey` has a match.\n * Here are examples of `TStylingKey`s which match given `TStylingKeyCursor`\n * is:\n * - `color`\n * - `color` // Match another color\n * - `null` // That means that `tStylingKey` is a `classMap`/`styleMap` instruction\n * - `['', 'color', 'other', true]` // wrapped `color` so match\n * - `['', null, 'other', true]` // wrapped `null` so match\n * - `['', 'width', 'color', 'value']` // wrapped static value contains a match on `color`\n * - `null` // `tStylingKeyCursor` always match as it is `classMap`/`styleMap` instruction\n * @param tStylingKeyCursor\n * @param tStylingKey\n */\nfunction isStylingMatch(tStylingKeyCursor: TStylingKey, tStylingKey: TStylingKeyPrimitive) {\n  ngDevMode &&\n  assertNotEqual(\n    Array.isArray(tStylingKey), true, 'Expected that `tStylingKey` has been unwrapped');\n  if (\n    tStylingKeyCursor === null || // If the cursor is `null` it means that we have map at that\n    // location so we must assume that we have a match.\n    tStylingKey === null || // If `tStylingKey` is `null` then it is a map therefor assume that it\n    // contains a match.\n    (Array.isArray(tStylingKeyCursor) ? tStylingKeyCursor[1] :\n    tStylingKeyCursor) ===\n    tStylingKey // If the keys match explicitly than we are a match.\n  ) {\n    return true;\n  } else if (Array.isArray(tStylingKeyCursor) && typeof tStylingKey === 'string') {\n    // if we did not find a
```

```

match, but `tStylingKeyCursor` is `KeyValueArray` that means cursor has
// statics and we need to check those
as well.
return keyValueArrayIndexOf(tStylingKeyCursor, tStylingKey) >= 0; // see if we are matching
the key
}
return false;
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of
this source code is governed by an MIT-style license that can be
found in the LICENSE file at
https://angular.io/license
*/
import {assertEqual, throwError} from '../util/assert';
import {CharCode} from
 '../util/char_code';
/**
 * Stores the locations of key/value indexes while parsing styling.
 * In case of
`cssText` parsing the indexes are like so:
`key1: value1;
key2: value2; key3: value3`
| | | | |
+----- textEnd
| | | +----- valueEnd
| | +----- value
+----- keyEnd
+----- key
In case of `className` parsing the indexes are
like so:
`key1 key2 key3`
| | |
+----- textEnd
| | |
+----- keyEnd
+----- key
NOTE: `value` and `valueEnd` are used only for styles, not
classes.
*/
interface ParserState {
textEnd: number;
key: number;
keyEnd: number;
value: number;
valueEnd: number;
}
// Global state of the parser. (This makes parser non-reentrant, but that is not an
issue)
const parserState: ParserState = {
textEnd: 0,
key: 0,
keyEnd:
0,
value: 0,
valueEnd: 0,
};
/**
 * Retrieves the last parsed `key` of style.
 * @param text the text to
substring the key from.
*/
export function getLastParsedKey(text: string): string {
return
text.substr(parserState.key, parserState.keyEnd);
}
/**
 * Retrieves the last parsed `value` of style.
 * @param text the text to
substring the key from.
*/
export function getLastParsedValue(text: string): string {
return
text.substr(parserState.value, parserState.valueEnd);
}
/**
 * Initializes `className` string for
parsing and parses the first token.
 * This function is intended to be used in this format:
for (let i =
parseClassName(text); i >= 0; i = parseClassNameNext(text, i)) {
const key = getLastParsedKey();
...
}
 * @param text `className` to parse
 * @returns index where the next invocation of
`parseClassNameNext`
should resume.
*/
export function parseClassName(text: string): number {
resetParserState(text);
return parseClassNameNext(text, consumeWhitespace(text, 0, parserState.textEnd));
}
/**
 * Parses next
`className` token.
 * This function is intended to be used in this format:
for (let i =
parseClassName(text); i >= 0; i = parseClassNameNext(text, i)) {
const key = getLastParsedKey();
...
}
 * @param text `className` to parse
 * @param index where the parsing should resume.
 * @returns index where the next invocation of
`parseClassNameNext`
should resume.
*/
export function parseClassNameNext(text: string, index: number): number {
const end = parserState.textEnd;
if (end ===
index) {
return -1;
}
index = parserState.keyEnd = consumeClassToken(text, parserState.key = index,
end);
return consumeWhitespace(text, index, end);
}
/**
 * Initializes `cssText` string for parsing and parses
the first key/values.
 * This function is intended to be used in this format:
for (let
i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {
const key = getLastParsedKey();
const value =
getLastParsedValue();
...
}
 * @param text `cssText` to parse
 * @returns index where the next
invocation of
`parseStyleNext`
should resume.
*/
export function parseStyle(text: string): number {
resetParserState(text);
return parseStyleNext(text, consumeWhitespace(text, 0, parserState.textEnd));
}
/**
 * Parses the next `cssText` key/values.
 * This function is intended to be used in this format:
for (let
i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {
const key = getLastParsedKey();
const value =
getLastParsedValue();
...
}
 * @param text `cssText` to parse
 * @param index where the parsing
should resume.
 * @returns index where the next invocation of
`parseStyleNext`
should resume.
*/
export function parseStyleNext(text: string, startIndex: number): number {
const end
= parserState.textEnd;
let index = parserState.key = consumeWhitespace(text, startIndex, end);
if (end ===
index) {
// we reached an end so just quit
return -1;
}
index = parserState.keyEnd =
consumeStyleKey(text, index, end);
index = consumeSeparator(text, index, end, CharCode.COLON);
index =
parserState.value = consumeWhitespace(text, index, end);
index = parserState.valueEnd =
consumeStyleValue(text, index, end);
return consumeSeparator(text, index, end,

```

```

CharCode.SEMI_COLON);\n}\n\n/**\n * Reset the global state of the styling parser.\n * @param text The styling
text to parse.\n */\nexport function resetParserState(text: string): void {\n  parserState.key = 0;\n  parserState.keyEnd
= 0;\n  parserState.value = 0;\n  parserState.valueEnd = 0;\n  parserState.textEnd = text.length;\n}\n\n/**\n *
Returns index of next non-whitespace character.\n *\n * @param text Text to scan\n * @param startIndex Starting
index of character where the scan should start.\n
* @param endIndex Ending index of character where the scan should end.\n * @returns Index of next non-
whitespace character (May be the same as `start` if no whitespace at\n *      that location.)\n */\nexport function
consumeWhitespace(text: string, startIndex: number, endIndex: number): number {\n  while (startIndex < endIndex
&& text.charCodeAt(startIndex) <= CharCode.SPACE) {\n    startIndex++;\n  }\n  return startIndex;\n}\n\n/**\n *
Returns index of last char in class token.\n *\n * @param text Text to scan\n * @param startIndex Starting index of
character where the scan should start.\n * @param endIndex Ending index of character where the scan should end.\n
* @returns Index after last char in class token.\n */\nexport function consumeClassToken(text: string, startIndex:
number, endIndex: number): number {\n  while (startIndex < endIndex && text.charCodeAt(startIndex) >
CharCode.SPACE) {\n    startIndex++;\n  }\n  return startIndex;\n}\n\n/**\n * Consumes all of the characters
belonging to style key and token.\n *\n * @param text Text to scan\n * @param startIndex Starting index of
character where the scan should start.\n * @param endIndex Ending index of character where the scan should end.\n
* @returns Index after last style key character.\n */\nexport function consumeStyleKey(text: string, startIndex:
number, endIndex: number): number {\n  let ch: number;\n  while (startIndex < endIndex &&\n    ((ch =
text.charCodeAt(startIndex)) === CharCode.DASH || ch === CharCode.UNDERSCORE ||\n    ((ch &
CharCode.UPPER_CASE) >= CharCode.A && (ch & CharCode.UPPER_CASE) <= CharCode.Z) ||\n    (ch >=
CharCode.ZERO && ch <= CharCode.NINE))) {\n    startIndex++;\n  }\n  return startIndex;\n}\n\n/**\n *
Consumes all whitespace and the separator `:` after the style key.\n *\n * @param text Text to scan\n * @param
startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character
where the scan should end.\n
* @returns Index after separator and surrounding whitespace.\n */\nexport function consumeSeparator(\n  text:
string, startIndex: number, endIndex: number, separator: number): number {\n  startIndex =
consumeWhitespace(text, startIndex, endIndex);\n  if (startIndex < endIndex) {\n    if (ngDevMode &&
text.charCodeAt(startIndex) !== separator) {\n      malformedStyleError(text, String.fromCharCode(separator),
startIndex);\n    }\n    startIndex++;\n  }\n  return startIndex;\n}\n\n/**\n * Consumes style value honoring `url()`
and `\"\"` text.\n *\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan
should start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index after
last style value character.\n */\nexport function consumeStyleValue(text: string, startIndex: number, endIndex:
number): number {\n  let ch1 = -1; // 1st previous character\n  let ch2 = -1; // 2nd previous character\n  let ch3 = -1;\n  //
3rd previous character\n  let i = startIndex;\n  let lastChIndex = i;\n  while (i < endIndex) {\n    const ch: number =
text.charCodeAt(i++);\n    if (ch === CharCode.SEMI_COLON) {\n      return lastChIndex;\n    } else if (ch ===
CharCode.DOUBLE_QUOTE || ch === CharCode.SINGLE_QUOTE) {\n      lastChIndex = i =
consumeQuotedText(text, ch, i, endIndex);\n    } else if (\n      startIndex ===\n      i - 4 && // We have seen
only 4 characters so far \"URL(\" (Ignore \"foo_URL()\")\n      ch3 === CharCode.U &&\n      ch2 ===
CharCode.R && ch1 === CharCode.L && ch === CharCode.OPEN_PAREN) {\n      lastChIndex = i =
consumeQuotedText(text, CharCode.CLOSE_PAREN, i, endIndex);\n    } else if (ch > CharCode.SPACE) {\n      //
if we have a non-whitespace character then capture its location\n      lastChIndex = i;\n    }\n    ch3 = ch2;\n    ch2 =
ch1;\n    ch1 = ch & CharCode.UPPER_CASE;\n  }\n  return lastChIndex;\n}\n\n/**\n * Consumes all of the quoted
characters.\n *\n * @param
text Text to scan\n * @param quoteCharCode CharCode of either `\"` or `` quote or `)` for `url(...)`.\n * @param
startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character
where the scan should end.\n * @returns Index after quoted characters.\n */\nexport function
consumeQuotedText(\n  text: string, quoteCharCode: number, startIndex: number, endIndex: number): number {\n

```

```

let ch1 = -1; // 1st previous character
let index = startIndex;
while (index < endIndex) {
  const ch = text.charCodeAt(index++);
  if (ch === quoteCharCode && ch1 !== CharCode.BACK_SLASH) {
    return index;
  }
  if (ch === CharCode.BACK_SLASH && ch1 === CharCode.BACK_SLASH) {
    // two back slashes cancel each other out. For example `\"\"` should properly end the
    // quotation. (It should not assume that the last `\"` is escaped.)
    ch1 = 0;
  } else {
    ch1 = ch;
  }
}
throw ngDevMode ? malformedStyleError(text, String.fromCharCode(quoteCharCode), endIndex) : new Error();
}

function malformedStyleError(text: string, expecting: string, index: number): never {
  ngDevMode && assertEquals(typeof text === 'string', true, 'String expected here');
  throw throwError(`Malformed style at location ${index} in string ` + text.substring(0, index) + `[>>' + text.substring(index, index + 1) + '<<]' + text.slice(index + 1) + ``. Expecting '{${expecting}}'.`);
}

/*
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import { SafeValue, unwrapSafeValue } from '../sanitization/bypass';
import { KeyValueArray, keyValueArrayGet, keyValueArraySet } from '../util/array_utils';
import { assertDefined, assertEquals, assertLessThan, assertNotEqual, throwError } from '../util/assert';
import { EMPTY_ARRAY } from '../util/empty';
import { concatStringsWithSpace, stringify } from '../util/stringify';
import { assertFirstUpdatePass } from './assert';
import { bindingUpdated } from './bindings';
import { DirectiveDef } from './interfaces/definition';
import { AttributeMarker, TAttributes, TNode, TNodeFlags, TNodeType } from './interfaces/node';
import { Renderer } from './interfaces/renderer';
import { RElement } from './interfaces/renderer_dom';
import { getTStylingRangeNext, getTStylingRangeNextDuplicate, getTStylingRangePrev, getTStylingRangePrevDuplicate, TStylingKey, TStylingRange } from './interfaces/styling';
import { LView, RENDERER, TData, TView } from './interfaces/view';
import { applyStyling } from './node_manipulation';
import { getCurrentDirectiveDef, getLView, getSelectedIndex, getTVView, incrementBindingIndex } from './state';
import { insertTStylingBinding } from './styling/style_binding_list';
import { getLastParsedKey, getLastParsedValue, parseClassName, parseClassNameNext, parseStyle, parseStyleNext } from './styling/styling_parser';
import { NO_CHANGE } from './tokens';
import { getNativeByIndex } from './util/view_utils';
import { setDirectiveInputsWhichShadowsStyling } from './property';

/**
 * Update a style binding on an element with the provided value.
 * If the style value is falsy then it will be removed from the element
 * (or assigned a different value depending if there are any styles placed
 * on the element with `styleMap` or any static styles that are present from when the element was
 * created with `styling`).
 * Note that the styling element is updated as part of `stylingApply`.
 * @param A valid CSS property.
 * @param value New value to write ( `null` or an empty string to remove).
 * @param suffix Optional suffix. Used with scalar values to add unit such as `px`.
 * Note that this will apply the provided style value to the host element if this function is called
 * within a host binding function.
 * @codeGenApi
 */
export function styleProp(prop: string, value: string|number|SafeValue|undefined|null, suffix?: string|null): typeof styleProp {
  checkStylingProperty(prop, value, suffix, false);
  return styleProp;
}

/**
 * Update a class binding on an element with the provided value.
 * This instruction is meant to handle the `[class.foo]="exp"` case and, therefore, the class binding
 * itself must already be allocated using `styling` within the creation block.
 * @param prop A valid CSS class (only one).
 * @param value A true/false value which will turn the class on or off.
 * Note that this will apply the provided class value to the host element if this function
 * is called within a host binding function.
 * @codeGenApi
 */
export function classProp(className: string, value: boolean|undefined|null): typeof classProp {
  checkStylingProperty(className, value, null, true);
  return classProp;
}

/**
 * Update style bindings using an object literal on an element.
 * This instruction is meant to apply styling via the `[style]="exp"` template bindings.
 * When styles are applied to the element they will then be updated with respect to
 * any styles/classes set via `styleProp`. If any styles are set to falsy
 * then they will be removed from the element.
 * Note that the styling instruction will not be applied until `stylingApply` is called.
 */

```

@param styles A key/value style map of the styles that will be applied to the given element. Any missing styles (that have already been applied to the element beforehand) will be removed (unset) from the element's styling. Note that this will apply the provided styleMap value to the host element if this function is called within a host binding.

```
@codeGenApi\nexport function styleMap(styles: {[styleName: string]: any}|string|undefined|null): void {\n  checkStylingMap(styleKeyVertexArraySet, styleStringParser, styles, false);\n}\n\n/**\n * Parse text as style and add values to KeyVertexArray.\n * This code is pulled out to a separate function so that it can be tree shaken away if it is not\n * needed. It is only referenced from `styleMap`.\n * @param keyVertexArray KeyVertexArray to add parsed values to.\n * @param text text to parse.\n */\nexport function styleStringParser(keyVertexArray: KeyVertexArray<any>, text: string): void {\n  for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n    styleKeyVertexArraySet(keyVertexArray, getLastParsedKey(text), getLastParsedValue(text));\n  }\n}\n\n/**\n * Update class bindings using an object literal or class-string on an element.\n * This instruction is meant to apply styling via the `[class]="exp"` template bindings.\n * When classes are applied to the element they will then be updated with respect to any styles/classes set via `classProp`. If any classes are set to falsy then they will be removed from the element.\n * Note that the styling instruction will not be applied until `stylingApply` is called.\n * Note that this will the provided classMap value to the host element if this function is called within a host binding.\n * @param classes A key/value map or string of CSS classes that will be added to the given element. Any missing classes (that have already been applied to the element beforehand) will be removed (unset) from the element's list of CSS classes.\n * @codeGenApi\n */\nexport function classMap(classes: {[className: string]: boolean|undefined|null}|string|undefined|null): void {\n  checkStylingMap(keyVertexArraySet, classStringParser, classes, true);\n}\n\n/**\n * Parse text as class and add values to KeyVertexArray.\n * This code is pulled out to a separate function so that it can be tree shaken away if it is not\n * needed. It is only referenced from `classMap`.\n * @param keyVertexArray KeyVertexArray to add parsed values to.\n * @param text text to parse.\n */\nexport function classStringParser(keyVertexArray: KeyVertexArray<any>, text: string): void {\n  for (let i = parseClassName(text); i >= 0; i = parseClassNameNext(text, i)) {\n    keyVertexArraySet(keyVertexArray, getLastParsedKey(text), true);\n  }\n}\n\n/**\n * Common code between `classProp` and `styleProp`.\n * @param prop property name.\n * @param value binding value.\n * @param suffix suffix for the property (e.g. `em` or `px`)\n * @param isClassBased `true` if `class` change (`false` if `style`)\n */\nexport function checkStylingProperty(\n  prop: string, value: any|NO_CHANGE, suffix: string|undefined|null, isClassBased: boolean): void {\n  const IView = getLView();\n  const tView = getTView();\n  // Styling instructions use 2 slots per binding.\n  // 1. one for the value / TStylingKey\n  // 2. one for the intermittent-value / TStylingRange\n  const bindingIndex = incrementBindingIndex(2);\n  if (tView.firstUpdatePass) {\n    stylingFirstUpdatePass(tView, prop, bindingIndex, isClassBased);\n  }\n  if (value !== NO_CHANGE && bindingUpdated(IView, bindingIndex, value)) {\n    const tNode = tView.data[getSelectedIndex()] as TNode;\n    updateStyling(tView, tNode, IView, IView[RENDERER], prop, IView[bindingIndex + 1] = normalizeSuffix(value, suffix), isClassBased, bindingIndex);\n  }\n}\n\n/**\n * Common code between `classMap` and `styleMap`.\n * @param keyVertexArraySet (See `keyVertexArraySet` in `util/array_utils`) Gets passed in as a function so that `style` can be processed. This is done for tree shaking purposes.\n * @param stringParser Parser used to parse `value` if `string`. (Passed in as `style` and `class` have different parsers.)\n * @param value bound value from application\n * @param isClassBased `true` if `class` change (`false` if `style`)\n */\nexport function checkStylingMap(\n  keyVertexArraySet: (keyVertexArray: KeyVertexArray<any>, key: string, value: any) => void, stringParser: (styleKeyVertexArray: KeyVertexArray<any>, text: string) => void, value: any|NO_CHANGE, isClassBased: boolean): void {\n  const tView = getTView();\n  const bindingIndex = incrementBindingIndex(2);\n  if (tView.firstUpdatePass) {\n    stylingFirstUpdatePass(tView, null, bindingIndex, isClassBased);\n  }\n  const IView = getLView();\n  if (value !== NO_CHANGE && bindingUpdated(IView, bindingIndex, value)) {\n    // `getSelectedIndex()` should be here
```

```

(rather than in instruction) so that it is guarded by the\n // if so as not to read unnecessarily.\n const tNode =
tView.data[getSelectedIndex()] as TNode;\n if (hasStylingInputShadow(tNode, isClassBased) &&
!isInHostBindings(tView, bindingIndex)) {\n if (ngDevMode) {\n // verify that if we are shadowing then
`TData` is appropriately marked so that we skip\n // processing this binding in styling resolution.\n
const tStylingKey = tView.data[bindingIndex];\n assertEquals(\n Array.isArray(tStylingKey) ?
tStylingKey[1] : tStylingKey, false,\n 'Styling linked list shadow input should be marked as `false`');\n
}\n // VE does not concatenate the static portion like we are doing here.\n // Instead VE just ignores the static
completely if dynamic binding is present.\n // Because of locality we have already set the static portion because
we don't know if there\n // is a dynamic portion until later. If we would ignore the static portion it would look
like\n // the binding has removed it. This would confuse `[ngStyle]^[ngClass]` to do the wrong\n // thing as it
would think that the static portion was removed. For this reason we\n // concatenate it so that
`[ngStyle]^[ngClass]` can continue to work on changed.\n let staticPrefix = isClassBased ?
tNode.classesWithoutHost : tNode.stylesWithoutHost;\n ngDevMode
&& isClassBased === false && staticPrefix !== null &&\n assertEquals(\n staticPrefix.endsWith(';'),
true, 'Expecting static portion to end with `;`');\n if (staticPrefix !== null) {\n // We want to make sure that
falsy values of `value` become empty strings.\n value = concatStringsWithSpace(staticPrefix, value ? value :
');\n }\n // Given `

` such that `my-dir` has `@Input('style')`.\n // This takes over the
`[style]` binding. (Same for `[class]`)\n setDirectiveInputsWhichShadowsStyling(tView, tNode, IView, value,
isClassBased);\n } else {\n updateStylingMap(\n tView, tNode, IView, IView[RENDERER],
IView[bindingIndex + 1],\n IView[bindingIndex + 1] = toStylingKeyValueArray(keyValueArraySet,
stringParser, value),\n isClassBased, bindingIndex);\n }\n }\n\n\n * Determines when the binding is in
`hostBindings` section\n * @param tView Current `TVIEW`\n * @param
bindingIndex index of binding which we would like if it is in `hostBindings`\n * ^\nfunction
isInHostBindings(tView: TVIEW, bindingIndex: number): boolean {\n // All host bindings are placed after the
expando section.\n return bindingIndex >= tView.expandoStartIndex;\n}\n\n\n * Collects the necessary
information to insert the binding into a linked list of style bindings\n * using `insertTStylingBinding`.\n * @param
tView `TVIEW` where the binding linked list will be stored.\n * @param tStylingKey Property/key of the
binding.\n * @param bindingIndex Index of binding associated with the `prop`\n * @param isClassBased `true` if
`class` change (`false` if `style`)\n * ^\nfunction stylingFirstUpdatePass(\n tView: TVIEW, tStylingKey:
TStylingKey, bindingIndex: number, isClassBased: boolean): void {\n ngDevMode &&
assertFirstUpdatePass(tView);\n const tData = tView.data;\n if (tData[bindingIndex + 1] === null) {\n // The
above check is necessary because we don't clear first
update pass until first successful\n // (no exception) template execution. This prevents the styling instruction from
double adding\n // itself to the list.\n // `getSelectedIndex()` should be here (rather than in instruction) so that it is
guarded by the\n // if so as not to read unnecessarily.\n const tNode = tData[getSelectedIndex()] as TNode;\n
ngDevMode && assertDefined(tNode, 'TNode expected');\n const isHostBindings = isInHostBindings(tView,
bindingIndex);\n if (hasStylingInputShadow(tNode, isClassBased) && tStylingKey === null &&
!isHostBindings) {\n // `tStylingKey === null` implies that we are either `[style]` or `[class]` binding.\n // If
there is a directive which uses `@Input('style')` or `@Input('class')` than\n // we need to neutralize this binding
since that directive is shadowing it.\n // We turn this into a noop by setting the key to `false`\n tStylingKey =
false;\n }\n tStylingKey = wrapInStaticStylingKey(tData,
tNode, tStylingKey, isClassBased);\n insertTStylingBinding(tData, tNode, tStylingKey, bindingIndex,
isHostBindings, isClassBased);\n }\n}\n\n\n * Adds static styling information to the binding if applicable.\n *
The linked list of styles not only stores the list and keys, but also stores static styling\n * information on some of
the keys. This function determines if the key should contain the styling\n * information and computes it.\n * See
`TStylingStatic` for more details.\n * @param tData `TData` where the linked list is stored.\n * @param tNode
`TNode` for which the styling is being computed.\n * @param stylingKey `TStylingKeyPrimitive` which may need
to be wrapped into `TStylingKey`\n * @param isClassBased `true` if `class` (`false` if `style`)\n * ^\nexport function


```

```

wrapInStaticStylingKey(\n  tData: TData, tNode: TNode, stylingKey: TStylingKey, isClassBased: boolean):
TStylingKey {\n  const hostDirectiveDef = getCurrentDirectiveDef(tData);\n  let residual =
isClassBased ? tNode.residualClasses : tNode.residualStyles;\n  if (hostDirectiveDef === null) {\n    // We are in
template node.\n    // If template node already had styling instruction then it has already collected the static\n    //
styling and there is no need to collect them again. We know that we are the first styling\n    // instruction because the
`TNode.*Bindings` points to 0 (nothing has been inserted yet).\n    const isFirstStylingInstructionInTemplate =\n(isClassBased ? tNode.classBindings : tNode.styleBindings) as any as number === 0;\n    if
(isFirstStylingInstructionInTemplate) {\n      // It would be nice to be able to get the statics from `mergeAttrs`,
however, at this point\n      // they are already merged and it would not be possible to figure which property belongs
where\n      // in the priority.\n      stylingKey = collectStylingFromDirectives(null, tData, tNode, stylingKey,
isClassBased);\n      stylingKey = collectStylingFromTAttrs(stylingKey, tNode.attrs,
isClassBased);\n      // We know that if we have styling binding in template we can't have residual.\n      residual =
null;\n    }\n  } else {\n    // We are in host binding node and there was no binding instruction in template node.\n    //
This means that we need to compute the residual.\n    const directiveStylingLast = tNode.directiveStylingLast;\n    const
isFirstStylingInstructionInHostBinding =\n      directiveStylingLast === -1 || tData[directiveStylingLast] !==
hostDirectiveDef;\n    if (isFirstStylingInstructionInHostBinding) {\n      stylingKey =\n      collectStylingFromDirectives(hostDirectiveDef, tData, tNode, stylingKey, isClassBased);\n      if (residual === null)
{\n        // - If `null` than either:\n        //   - Template styling instruction already ran and it has consumed the static\n
        //   styling into its `TStylingKey` and so there is no need to update residual. Instead\n        //   we need to
update the `TStylingKey` associated with the
first template node\n        //   instruction. OR\n        //   - Some other styling instruction ran and determined that
there are no residuals\n        let templateStylingKey = getTemplateHeadTStylingKey(tData, tNode, isClassBased);\n
        if (templateStylingKey !== undefined && Array.isArray(templateStylingKey)) {\n          // Only recompute if
`templateStylingKey` had static values. (If no static value found\n          // then there is nothing to do since this
operation can only produce less static keys, not\n          // more.)\n          templateStylingKey =
collectStylingFromDirectives(\n            null, tData, tNode, templateStylingKey[1] /* unwrap previous statics */,\n
            isClassBased);\n          templateStylingKey =\n            collectStylingFromTAttrs(templateStylingKey,
tNode.attrs, isClassBased);\n          setTemplateHeadTStylingKey(tData, tNode, isClassBased,
templateStylingKey);\n        }\n      } else {\n        // We only need to recompute residual
if it is not `null`.\n        // - If existing residual (implies there was no template styling). This means that some of\n
// the statics may have moved from the residual to the `stylingKey` and so we have to\n        // recompute.\n
// - If `undefined` this is the first time we are running.\n        residual = collectResidual(tData, tNode,
isClassBased);\n      }\n    }\n  }\n  if (residual !== undefined) {\n    isClassBased ? (tNode.residualClasses =
residual) : (tNode.residualStyles = residual);\n  }\n  return stylingKey;\n}\n\n/**\n * Retrieve the `TStylingKey` for
the template styling instruction.\n * This is needed since `hostBinding` styling instructions are inserted after the
template\n * instruction. While the template instruction needs to update the residual in `TNode` the\n *
`hostBinding` instructions need to update the `TStylingKey` of the template instruction because\n * the template
instruction is downstream from the `hostBindings` instructions.\n
*\n * @param tData `TData` where the linked list is stored.\n * @param tNode `TNode` for which the styling is
being computed.\n * @param isClassBased `true` if `class` (`false` if `style`)\n * @return `TStylingKey` if found or
`undefined` if not found.\n */\nfunction getTemplateHeadTStylingKey(tData: TData, tNode: TNode, isClassBased:
boolean): TStylingKey|\n  undefined {\n  const bindings = isClassBased ? tNode.classBindings :
tNode.styleBindings;\n  if (getTStylingRangeNext(bindings) === 0) {\n    // There does not seem to be a styling
instruction in the `template`.\n    return undefined;\n  }\n  return tData[getTStylingRangePrev(bindings)] as
TStylingKey;\n}\n\n/**\n * Update the `TStylingKey` of the first template instruction in `TNode`.\n * Logically
`hostBindings` styling instructions are of lower priority than that of the template.\n * However, they execute after
the template styling instructions. This means that they get inserted\n * in front of the template styling

```

```

instructions.\n *\n * If we have a template styling instruction and a new `hostBindings` styling instruction is\n *
executed it means that it may need to steal static fields from the template instruction. This\n * method allows us to
update the first template instruction `TStylingKey` with a new value.\n *\n * Assume:\n * ``\n * <div my-dir
style=\"color: red\" [style.color]=\"tmplExp\"></div>\n *\n * @Directive({\n *   host: {\n *     'style': 'width:
100px',\n *     '[style.color]': 'dirExp',\n *   }\n * })\n * class MyDir {\n *   ``\n *\n * when
`[style.color]=\"tmplExp\"` executes it creates this data structure.\n * ``\n *\n * ['color', 'color', 'red', 'width',
'100px'],\n * ``\n *\n * The reason for this is that the template instruction does not know if there are styling\n *
instructions and must assume that there are none and must collect all of the static styling.\n * (both\n * `color` and
'width`)\n *\n * When `[style.color]: 'dirExp',` executes we need to insert a new
data into the linked list.\n * ``\n *\n * ['color', 'width', '100px'], // newly inserted\n * ['color', 'color', 'red', 'width',
'100px'], // this is wrong\n * ``\n *\n * Notice that the template statics is now wrong as it incorrectly contains
`width` so we need to\n * update it like so:\n * ``\n *\n * ['color', 'width', '100px'],\n * ['color', 'color', 'red'], //
UPDATE\n * ``\n *\n * @param tData `TData` where the linked list is stored.\n * @param tNode `TNode` for
which the styling is being computed.\n * @param isClassBased `true` if `class` (`false` if `style`)\n * @param
tStylingKey New `TStylingKey` which is replacing the old one.\n */\nfunction setTemplateHeadTStylingKey(\n
tData: TData, tNode: TNode, isClassBased: boolean, tStylingKey: TStylingKey): void {\n  const bindings =
isClassBased ? tNode.classBindings : tNode.styleBindings;\n  ngDevMode &&\n    assertNotEqual(\n
getTStylingRangeNext(bindings), 0,\n    'Expecting to have at least one
template styling binding.);\n  tData[getTStylingRangePrev(bindings)] = tStylingKey;\n}\n\n/**\n * Collect all
static values after the current `TNode.directiveStylingLast` index.\n *\n * Collect the remaining styling information
which has not yet been collected by an existing\n * styling instruction.\n *\n * @param tData `TData` where the
`DirectiveDefs` are stored.\n * @param tNode `TNode` which contains the directive range.\n * @param
isClassBased `true` if `class` (`false` if `style`)\n */\nfunction collectResidual(tData: TData, tNode: TNode,
isClassBased: boolean): KeyValueArray<any>|\n  null {\n  let residual: KeyValueArray<any>|null|undefined =
undefined;\n  const directiveEnd = tNode.directiveEnd;\n  ngDevMode &&\n    assertNotEqual(\n
tNode.directiveStylingLast, -1,\n    'By the time this function gets called at least one hostBindings-node styling
instruction must have executed.);\n  // We add `1 + tNode.directiveStart` because we need to skip the current
directive (as we are\n  // collecting things after the last `hostBindings` directive which had a styling instruction.)\n
for (let i = 1 + tNode.directiveStylingLast; i < directiveEnd; i++) {\n    const attrs = (tData[i] as
DirectiveDef<any>).hostAttrs;\n    residual = collectStylingFromTAttrs(residual, attrs, isClassBased) as
KeyValueArray<any>|\n    null;\n  }\n  return collectStylingFromTAttrs(residual, tNode.attrs, isClassBased) as
KeyValueArray<any>|\n  null;\n}\n\n/**\n * Collect the static styling information with lower priority than
`hostDirectiveDef`.\n *\n * (This is opposite of residual styling.)\n *\n * @param hostDirectiveDef `DirectiveDef`
for which we want to collect lower priority static\n * styling. (Or `null` if template styling)\n *\n * @param tData
`TData` where the linked list is stored.\n * @param tNode `TNode` for which the styling is being computed.\n *
@param stylingKey Existing `TStylingKey` to update or wrap.\n * @param isClassBased `true` if `class` (`false` if
`style`)\n */\nfunction collectStylingFromDirectives(\n  hostDirectiveDef: DirectiveDef<any>|null, tData: TData,
tNode: TNode, stylingKey: TStylingKey,\n  isClassBased: boolean): TStylingKey {\n  // We need to loop because
there can be directives which have `hostAttrs` but don't have\n  // `hostBindings` so this loop catches up to the
current directive..\n  let currentDirective: DirectiveDef<any>|null = null;\n  const directiveEnd =
tNode.directiveEnd;\n  let directiveStylingLast = tNode.directiveStylingLast;\n  if (directiveStylingLast === -1) {\n
directiveStylingLast = tNode.directiveStart;\n  } else {\n    directiveStylingLast++;\n  }\n  while
(directiveStylingLast < directiveEnd) {\n    currentDirective = tData[directiveStylingLast] as DirectiveDef<any>;\n
ngDevMode && assertDefined(currentDirective, 'expected to be defined');\n    stylingKey =
collectStylingFromTAttrs(stylingKey, currentDirective.hostAttrs, isClassBased);\n    if (currentDirective ===
hostDirectiveDef) break;\n
directiveStylingLast++;\n  }\n  if (hostDirectiveDef !== null) {\n    // we only advance the styling cursor if we are
collecting data from host bindings.\n    // Template executes before host bindings and so if we would update the

```



```

index,\n // host bindings would not get their statics.\n tNode.directiveStylingLast = directiveStylingLast;\n }\n\n return stylingKey;\n}\n\n/**\n * Convert `TAttrs` into `TStylingStatic`.\n *\n * @param stylingKey existing `TStylingKey` to update or wrap.\n *\n * @param attrs `TAttributes` to process.\n *\n * @param isClassBased `true` if `class` (`false` if `style`)\n */\nfunction collectStylingFromTAttrs(\n  stylingKey: TStylingKey|undefined, attrs: TAttributes|null,\n  isClassBased: boolean): TStylingKey {\n  const desiredMarker = isClassBased ? AttributeMarker.Classes : AttributeMarker.Styles;\n  let currentMarker = AttributeMarker.ImplicitAttributes;\n  if (attrs !== null) {\n    for (let i = 0; i < attrs.length; i++) {\n      const item = attrs[i] as number | string;\n      if (typeof item === 'number') {\n        currentMarker = item;\n      } else {\n        if (currentMarker === desiredMarker) {\n          if (!Array.isArray(stylingKey)) {\n            stylingKey = stylingKey === undefined ? [] : [], stylingKey as any;\n          }\n          keyValueArraySet(\n            stylingKey as KeyValueArray<any>, item, isClassBased ? true : attrs[++i]);\n          }\n        }\n      }\n    }\n  }\n  return stylingKey === undefined ? null : stylingKey;\n}\n\n/**\n * Convert user input to `KeyValueArray`.\n *\n * This function takes user input which could be `string`, Object literal, or iterable and converts it into a consistent representation. The output of this is `KeyValueArray` (which is an array where even indexes contain keys and odd indexes contain values for those keys).\n *\n * The advantage of converting to `KeyValueArray` is that we can perform diff in an input independent way. (ie we can compare `foo bar` to `[bar, 'baz']` and determine a set of changes which need to be applied)\n *\n * The fact that `KeyValueArray` is sorted is very important because it allows us to compute the difference in linear fashion without the need to allocate any additional data.\n *\n * For example if we kept this as a `Map` we would have to iterate over previous `Map` to determine which values need to be deleted, over the new `Map` to determine additions, and we would have to keep additional `Map` to keep track of duplicates or items which have not yet been visited.\n *\n * @param keyValueArraySet (See `keyValueArraySet` in `util/array_utils`) Gets passed in as a function so that `style` can be processed. This is done for tree shaking purposes.\n *\n * @param stringParser The parser is passed in so that it will be tree shakable. See `styleStringParser` and `classStringParser`\n *\n * @param value The value to parse/convert to `KeyValueArray`\n */\nexport function toStylingKeyValueArray(\n  keyValueArraySet: (keyValueArray: KeyValueArray<any>, key: string, value: any) => void,\n  stringParser: (styleKeyValueArray: KeyValueArray<any>, text: string) => void,\n  value: string|string[]|{|key: string}: any}|SafeValue|null|undefined): KeyValueArray<any> {\n  if (value == null || value === undefined || value === '') return EMPTY_ARRAY as any;\n  const styleKeyValueArray: KeyValueArray<any> = [] as any;\n  const unwrappedValue = unwrapSafeValue(value) as string | string[] | {|key: string}: any};\n  if (Array.isArray(unwrappedValue)) {\n    for (let i = 0; i < unwrappedValue.length; i++) {\n      keyValueArraySet(styleKeyValueArray, unwrappedValue[i], true);\n    }\n  } else if (typeof unwrappedValue === 'object') {\n    for (const key in unwrappedValue) {\n      if (unwrappedValue.hasOwnProperty(key)) {\n        keyValueArraySet(styleKeyValueArray, key, unwrappedValue[key]);\n      }\n    }\n  } else if (typeof unwrappedValue === 'string') {\n    stringParser(styleKeyValueArray, unwrappedValue);\n  } else {\n    ngDevMode &&\n    throwError('Unsupported styling type ' + typeof unwrappedValue + ': ' + unwrappedValue);\n  }\n  return styleKeyValueArray;\n}\n\n/**\n * Set a `value` for a `key`.\n *\n * See: `keyValueArraySet` for details\n *\n * @param keyValueArray KeyValueArray to add to.\n *\n * @param key Style key to add.\n *\n * @param value The value to set.\n */\nexport function styleKeyValueArraySet(keyValueArray: KeyValueArray<any>, key: string, value: any) {\n  keyValueArraySet(keyValueArray, key, unwrapSafeValue(value));\n}\n\n/**\n * Update map based styling.\n *\n * Map based styling could be anything which contains more than one binding. For example `string`, or object literal. Dealing with all of these types would complicate the logic so instead this function expects that the complex input is first converted into normalized `KeyValueArray`. The advantage of normalization is that we get the values sorted, which makes it very cheap to compute deltas between the previous and current value.\n *\n * @param tView Associated `TView.data` contains the linked list of binding priorities.\n *\n * @param tNode `TNode` where the binding is located.\n *\n * @param lView `LView` contains the values associated with other styling binding at this

```

```

`TNode`. \n * @param renderer Renderer to use if any updates. \n * @param oldKeyValueArray Previous value
represented as `KeyValueArray` \n * @param newKeyValueArray Current value represented as `KeyValueArray` \n
* @param isClassBased `true` if `class` (`false` if `style`) \n * @param bindingIndex Binding index of the binding. \n
*/ \n function updateStylingMap(\n  tView: TView, tNode: TNode, IView: LView, renderer: Renderer, \n
oldKeyValueArray: KeyValueArray<any>, newKeyValueArray: KeyValueArray<any>, \n  isClassBased: boolean,
bindingIndex: number) { \n  if (oldKeyValueArray as KeyValueArray<any> | NO_CHANGE === NO_CHANGE)
{ \n    // On first execution the
oldKeyValueArray is NO_CHANGE => treat it as empty KeyValueArray. \n    oldKeyValueArray =
EMPTY_ARRAY as any; \n  } \n  let oldIndex = 0; \n  let newIndex = 0; \n  let oldKey: string | null = 0 <
oldKeyValueArray.length ? oldKeyValueArray[0] : null; \n  let newKey: string | null = 0 < newKeyValueArray.length
? newKeyValueArray[0] : null; \n  while (oldKey !== null || newKey !== null) { \n    ngDevMode &&
assertLessThan(oldIndex, 999, 'Are we stuck in infinite loop?'); \n    ngDevMode && assertLessThan(newIndex,
999, 'Are we stuck in infinite loop?'); \n    const oldValue = \n      oldIndex < oldKeyValueArray.length ?
oldKeyValueArray[oldIndex + 1] : undefined; \n    const newValue = \n      newIndex < newKeyValueArray.length ?
newKeyValueArray[newIndex + 1] : undefined; \n    let setKey: string | null = null; \n    let setValue: any =
undefined; \n    if (oldKey === newKey) { \n      // UPDATE: Keys are equal => new value is overwriting old value. \n
oldIndex += 2; \n      newIndex += 2; \n      if (oldValue
!== newValue) { \n        setKey = newKey; \n        setValue = newValue; \n      } \n    } else if (newKey === null ||
oldKey !== null && oldKey < newKey!) { \n      // DELETE: oldKey key is missing or we did not find the oldKey in
the newValue \n      // (because the keyValueArray is sorted and `newKey` is found later alphabetically). \n      //
`"background" < "color"` so we need to delete `"background"` because it is not found in the \n      // new array. \n
oldIndex += 2; \n      setKey = oldKey; \n    } else { \n      // CREATE: newKey's is earlier alphabetically than
oldKey's (or no oldKey) => we have new key. \n      // `"color" > "background"` so we need to add `color` because
it is in new array but not in \n      // old array. \n      ngDevMode && assertDefined(newKey, 'Expecting to have a
valid key'); \n      newIndex += 2; \n      setKey = newKey; \n      setValue = newValue; \n    } \n    if (setKey !== null)
{ \n      updateStyling(tView, tNode, IView, renderer, setKey,
setValue, isClassBased, bindingIndex); \n    } \n    oldKey = oldIndex < oldKeyValueArray.length ?
oldKeyValueArray[oldIndex] : null; \n    newKey = newIndex < newKeyValueArray.length ?
newKeyValueArray[newIndex] : null; \n  } \n} \n \n /** \n * Update a simple (property name) styling. \n * \n * This
function takes `prop` and updates the DOM to that value. The function takes the binding \n * value as well as binding
priority into consideration to determine which value should be written \n * to DOM. (For example it may be
determined that there is a higher priority overwrite which blocks \n * the DOM write, or if the value goes to
`undefined` a lower priority overwrite may be consulted.) \n * \n * @param tView Associated `TView.data` contains
the linked list of binding priorities. \n * @param tNode `TNode` where the binding is located. \n * @param IView
`LView` contains the values associated with other styling binding at this `TNode`. \n * @param renderer Renderer to
use if any updates. \n * @param prop Either
style property name or a class name. \n * @param value Either style value for `prop` or `true` / `false` if `prop` is
class. \n * @param isClassBased `true` if `class` (`false` if `style`) \n * @param bindingIndex Binding index of the
binding. \n */ \n function updateStyling(\n  tView: TView, tNode: TNode, IView: LView, renderer: Renderer, prop:
string, \n  value: string | undefined | null | boolean, isClassBased: boolean, bindingIndex: number) { \n  if (!(tNode.type
& TNodeType.AnyRNode)) { \n    // It is possible to have styling on non-elements (such as ng-container). \n    // This
is rare, but it does happen. In such a case, just ignore the binding. \n    return; \n  } \n  const tData = tView.data; \n
const tRange = tData[bindingIndex + 1] as TStylingRange; \n  const higherPriorityValue =
getTStylingRangeNextDuplicate(tRange) ? \n    findStylingValue(tData, tNode, IView, prop,
getTStylingRangeNext(tRange), isClassBased) : \n    undefined; \n  if (!isStylingValuePresent(higherPriorityValue))
{ \n    // We don't have a next duplicate, or we did not find a duplicate value. \n    if (!isStylingValuePresent(value)) { \n
// We should delete current value or restore to lower priority value. \n    if

```

```

(getTStylingRangePrevDuplicate(tRange)) {\n    // We have a possible prev duplicate, let's retrieve it.\n    value
= findStylingValue(tData, null, IView, prop, bindingIndex, isClassBased);\n    }\n    }\n    const rNode =
getNativeByIndex(getSelectedIndex(), IView) as RElement;\n    applyStyling(renderer, isClassBased, rNode, prop,
value);\n    }\n}\n\n/**\n * Search for styling value with higher priority which is overwriting current value, or a\n *
value of lower priority to which we should fall back if the value is `undefined`.\n * \n * When value is being applied
at a location, related values need to be consulted.\n * - If there is a higher priority binding, we should be using that
one instead.\n * For example `

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```

Normalizes and/or adds a suffix to the value. If value is `null`/`undefined` no suffix is added

```

@param value
@param suffix
function normalizeSuffix(value: any, suffix: string|undefined|null):
string|null|undefined|boolean {
  if (value == null /** || value === undefined */) {
    // do nothing
  } else if
  (typeof suffix === 'string') {
    value = value + suffix;
  } else if (typeof value === 'object')
  {
    value = stringify(unwrapSafeValue(value));
  }
  return value;
}

```

Tests if the `TNode` has input shadow. An input shadow is when a directive steals (shadows) the input by using `@Input('style')` or `@Input('class')` as input.

```

@param tNode `TNode` which we would like to see if it has shadow.
@param isClassBased `true` if `class` `false` if `style`
function hasStylingInputShadow(tNode:
TNode, isClassBased: boolean) {
  return (tNode.flags & (isClassBased ? TNodeFlags.hasClassInput :
TNodeFlags.hasStyleInput)) !== 0;
}

```

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```

import {assertEqual, assertIndexInRange} from '../util/assert';
import {TElementNode, TNodeType} from '../interfaces/node';
import {HEADER_OFFSET, RENDERER, T_HOST} from '../interfaces/view';
import {appendChild, createTextNode} from '../node_manipulation';
import {getBindingIndex, getLView, getTView, setCurrentTNode} from '../state';
import {getOrCreateTNode} from './shared';

```

Create static text node

```

@param index Index of the node in the data array
@param value Static string value to write.
@codeGenApi
function text(index: number, value: string = "): void {
  const IView = getLView();
  const tView = getTView();
  const adjustedIndex = index + HEADER_OFFSET;
  ngDevMode &&
  assertEquals(getBindingIndex(), tView.bindingStartIndex,
    'text nodes should be created before any bindings');
  ngDevMode && assertIndexInRange(IView, adjustedIndex);
  const tNode = tView.firstCreatePass ?
  getOrCreateTNode(tView, adjustedIndex, TNodeType.Text, value, null) :
  tView.data[adjustedIndex] as TElementNode;
  const textNative = IView[adjustedIndex] = createTextNode(IView[RENDERER],
  value);
  appendChild(tView, IView, textNative, tNode);
  // Text nodes are self closing.
  setCurrentTNode(tNode, false);
}

```

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```

import {getLView, getSelectedIndex} from '../state';
import {NO_CHANGE} from './tokens';
import {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6,
interpolation7, interpolation8, interpolationV} from './interpolation';
import {textBindingInternal} from './shared';

```

Update text content with a lone bound value

```

Used when a text node has 1 interpolated value in it, an no additional text
surrounds that interpolated value:
`<div>{v0}</div>`
Its compiled representation is:
`ts`
textInterpolate(v0);
returns itself,
so that it may be chained.
@see textInterpolateV
@codeGenApi
function textInterpolate(v0:
any): typeof textInterpolate {
  textInterpolate1(" ", v0, "");
  return textInterpolate;
}

```

Update text content with single bound value surrounded by other text

```

Used when a text node has 1 interpolated value in it:
`<div>prefix{v0}suffix</div>`
Its compiled representation is:
`ts`
textInterpolate1('prefix', v0, 'suffix');
returns itself, so that it may be chained.
@see textInterpolateV
@codeGenApi
function textInterpolate1(prefix: string, v0: any, suffix: string):
typeof textInterpolate1 {
  const IView = getLView();
  const interpolated = interpolation1(IView, prefix, v0,
  suffix);
  if (interpolated !== NO_CHANGE) {
    textBindingInternal(IView, getSelectedIndex(), interpolated as
  string);
  }
  return textInterpolate1;
}

```

Update text content with 2 bound values surrounded by other text

```

Used when a text node has 2 interpolated values in it:
`<div>prefix{v0}-{v1}suffix</div>`
Its compiled representation is:
`ts`
textInterpolate2('prefix', v0, '-', v1, 'suffix');
returns itself, so that it may be chained.
@see textInterpolateV
@codeGenApi
function textInterpolate2(prefix: string, v0:
any, i0: string, v1: any, suffix: string):
typeof textInterpolate2 {
  const IView = getLView();
  const interpolated =
  interpolation2(IView, prefix, v0, i0, v1, suffix);
  if (interpolated !== NO_CHANGE) {

```

```

textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n }
\n return textInterpolate2;\n}\n\n/**
 * Update text content with 3 bound values surrounded by other text.\n * Used when a text node has 3
interpolated values in it:\n * ```html\n * <div>prefix{{ v0 }}-{{ v1 }}-{{ v2 }}suffix</div>\n
 * ```\n * Its compiled representation is:\n * ```ts\n * textInterpolate3(\n * 'prefix', v0, '-', v1, '-', v2, 'suffix');\n
 * ```\n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n * ^\nexport
function textInterpolate3(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n  suffix: string): typeof
textInterpolate3 {\n  const IView = getLView();\n  const interpolated = interpolation3(IView, prefix, v0, i0, v1, i1,
v2, suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated
as string);\n  }\n  return textInterpolate3;\n}\n\n/**
 * Update text content with 4 bound values surrounded by
other text.\n * Used when a text node has 4 interpolated values in it:\n * ```html\n * <div>prefix{{ v0 }}-
{{ v1 }}-{{ v2 }}-{{ v3 }}suffix</div>\n * ```\n * Its compiled representation is:\n * ```ts\n *
textInterpolate4(\n * 'prefix', v0, '-', v1, '-', v2,
 '-', v3, 'suffix');\n * ```\n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n
 * ^\nexport function textInterpolate4(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3:
any,\n  suffix: string): typeof textInterpolate4 {\n  const IView = getLView();\n  const interpolated =
interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n  if (interpolated !== NO_CHANGE) {\n
    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return textInterpolate4;\n}\n\n/**
 * Update text content with 5 bound values surrounded by other text.\n * Used when a text node has 5
interpolated values in it:\n * ```html\n * <div>prefix{{ v0 }}-{{ v1 }}-{{ v2 }}-{{ v3 }}-{{ v4 }}suffix</div>\n *
 ```\n * Its compiled representation is:\n * ```ts\n * textInterpolate5(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, 'suffix');\n * ```\n * @returns itself, so that it may be chained.\n
 * @see textInterpolateV\n * @codeGenApi\n * ^\nexport function textInterpolate5(\n  prefix: string, v0: any, i0:
string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, suffix: string): typeof textInterpolate5
{\n  const IView = getLView();\n  const interpolated = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4,
suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as
string);\n  }\n  return textInterpolate5;\n}\n\n/**
 * Update text content with 6 bound values surrounded by
other text.\n * Used when a text node has 6 interpolated values in it:\n * ```html\n * <div>prefix{{ v0 }}-
{{ v1 }}-{{ v2 }}-{{ v3 }}-{{ v4 }}-{{ v5 }}suffix</div>\n * ```\n * Its compiled representation is:\n * ```ts\n *
textInterpolate6(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n * ```\n * @param i4 Static value
used for concatenation only.\n *
 * @param v5 Value checked for change. @returns itself, so that it may be chained.\n * @see textInterpolateV\n *
 * @codeGenApi\n * ^\nexport function textInterpolate6(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2:
any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): typeof textInterpolate6 {\n  const
IView = getLView();\n  const interpolated =\n    interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4,
v5, suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated
as string);\n  }\n  return textInterpolate6;\n}\n\n/**
 * Update text content with 7 bound values surrounded by
other text.\n * Used when a text node has 7 interpolated values in it:\n * ```html\n * <div>prefix{{ v0 }}-
{{ v1 }}-{{ v2 }}-{{ v3 }}-{{ v4 }}-{{ v5 }}-{{ v6 }}suffix</div>\n * ```\n * Its compiled representation is:\n * ```ts\n
 * textInterpolate7(\n * 'prefix', v0, '-', v1, '-',
v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ```\n * @returns itself, so that it may be chained.\n * @see
textInterpolateV\n * @codeGenApi\n * ^\nexport function textInterpolate7(\n  prefix: string, v0: any, i0: string, v1:
any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any,\n  suffix:
string): typeof textInterpolate7 {\n  const IView = getLView();\n  const interpolated =\n    interpolation7(IView,
prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n  if (interpolated !== NO_CHANGE) {\n
    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return textInterpolate7;\n}\n\n/**
 * Update text content with 8 bound values surrounded by other text.\n * Used when a text node has 8
interpolated values in it:\n * ```html\n * <div>prefix{{ v0 }}-{{ v1 }}-{{ v2 }}-{{ v3 }}-{{ v4 }}-{{ v5 }}-{{ v6 }}-
{{ v7 }}suffix</div>\n * ```\n * Its compiled representation is:\n *

```

```

* ``ts\n * textInterpolate8(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * ``\n *
@returns itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n * ^\nexport function
textInterpolate8(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  i3: string,
v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n  suffix: string): typeof textInterpolate8 {\n
const IView = getLView();\n const interpolated = interpolation8(\n  IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4,
i4, v5, i5, v6, i6, v7, suffix);\n if (interpolated !== NO_CHANGE) {\n  textBindingInternal(IView,
getSelectedIndex(), interpolated as string);\n }\n return textInterpolate8;\n}\n\n/*\n * Update text content with 9
or more bound values other surrounded by text.\n *\n * Used when the number of interpolated values exceeds 8.\n
*\n * ``html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-
{{v9}}suffix</div>\n
*\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n * textInterpolateV(\n * ['prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, '-', v5, '-', v6, '-', v7, '-', v9,\n * 'suffix'];\n *\n * ``\n *\n * @param values The collection of values and the
strings in between those values, beginning with\n * a string prefix and ending with a string suffix.\n * (e.g. `[prefix',
value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n *\n * @returns itself, so that it may be chained.\n *
@codeGenApi\n * ^\nexport function textInterpolateV(values: any[]): typeof textInterpolateV {\n const IView =
getLView();\n const interpolated = interpolationV(IView, values);\n if (interpolated !== NO_CHANGE) {\n
textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n }\n return textInterpolateV;\n}\n\n/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {keyValueArraySet} from '../util/array_utils';\nimport {getLView} from '../state';\nimport
{interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7,
interpolation8, interpolationV} from './interpolation';\nimport {checkStylingMap, classStringParser} from
 './styling';\n\n\n/*\n *\n * Update an interpolated class on an element with single bound value surrounded by
text.\n *\n * Used when the value passed to a property has 1 interpolated value in it:\n *\n * ``html\n * <div
class="prefix{{v0}}suffix"></div>\n *\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *
classMapInterpolate1('prefix', v0, 'suffix');\n *\n * ``\n *\n * @param prefix Static value used for concatenation only.\n
*\n * @param v0 Value checked for change.\n *\n * @param suffix Static value used for concatenation only.\n *\n
@codeGenApi\n
^\nexport function classMapInterpolate1(prefix: string, v0: any, suffix: string): void {\n const IView =
getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n
checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n\n/*\n *\n * Update an
interpolated class on an element with 2 bound values surrounded by text.\n *\n * Used when the value passed to a
property has 2 interpolated values in it:\n *\n * ``html\n * <div class="prefix{{v0}}-{{v1}}suffix"></div>\n *\n
``\n *\n * Its compiled representation is:\n *\n * ``ts\n * classMapInterpolate2('prefix', v0, '-', v1, 'suffix');\n *\n
``\n *\n * @param prefix Static value used for concatenation only.\n *\n * @param v0 Value checked for change.\n *\n
@param i0 Static value used for concatenation only.\n *\n * @param v1 Value checked for change.\n *\n * @param suffix
Static value used for concatenation only.\n *\n @codeGenApi\n ^\nexport function classMapInterpolate2(\n  prefix:
string,
v0: any, i0: string, v1: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =
interpolation2(IView, prefix, v0, i0, v1, suffix);\n checkStylingMap(keyValueArraySet, classStringParser,
interpolatedValue, true);\n}\n\n\n/*\n *\n * Update an interpolated class on an element with 3 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 3 interpolated values in it:\n *\n *
``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}suffix"></div>\n *\n * ``\n *\n * Its compiled representation
is:\n *\n * ``ts\n * classMapInterpolate3(\n * 'prefix', v0, '-', v1, '-', v2, 'suffix');\n *\n * ``\n *\n * @param prefix Static
value used for concatenation only.\n *\n * @param v0 Value checked for change.\n *\n * @param i0 Static value used for
concatenation only.\n *\n * @param v1 Value checked for change.\n *\n * @param i1 Static value used for concatenation
only.\n *\n * @param v2 Value checked for change.\n *\n * @param suffix Static value used for concatenation

```

```

only.\n * @codeGenApi\n *^\nexport function classMapInterpolate3(\n  prefix: string, v0: any, i0: string, v1: any,
i1: string, v2: any, suffix: string): void {\n  const IView = getLView();\n  const interpolatedValue =
interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser,
interpolatedValue, true);\n}\n\n/**\n *\n * Update an interpolated class on an element with 4 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 4 interpolated values in it:\n *\n * ``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n * ``\n *\n * Its compiled
representation is:\n *\n * ``ts\n * classMapInterpolate4(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ``\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0
Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static
value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for
concatenation only.\n * @param v3 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @codeGenApi\n *^\nexport function classMapInterpolate4(\n  prefix: string, v0: any, i0:
string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  suffix: string): void {\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n
checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n *\n * Update an
interpolated class on an element with 5 bound values surrounded by text.\n *\n * Used when the value passed to a
property has 5 interpolated values in it:\n *\n * ``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}suffix"></div>\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n * classMapInterpolate5(\n *
'prefix',
v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ``\n *\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1
Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked
for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n *
@param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param suffix
Static value used for concatenation only.\n * @codeGenApi\n *^\nexport function classMapInterpolate5(\n  prefix:
string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  i3: string, v4: any, suffix: string): void
{\n  const IView = getLView();\n  const interpolatedValue =\n    interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2,
v3, i3, v4, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser,
interpolatedValue, true);\n}\n\n/**\n *\n * Update an interpolated class on an element with 6 bound values
surrounded by text.\n *\n * Used when the value passed to a property has 6 interpolated values in it:\n *\n *
``html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix"></div>\n * ``\n *\n * Its
compiled representation is:\n *\n * ``ts\n * classMapInterpolate6(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-',
v5, 'suffix');\n * ``\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked
for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n *
@param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2
Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value
used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static
value used for concatenation only.\n * @param v5 Value checked for change.\n * @param suffix Static value used
for concatenation only.\n * @codeGenApi\n *^\nexport function classMapInterpolate6(\n  prefix: string, v0: any,
i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  i3: string, v4: any, i4: string, v5: any, suffix: string):
void {\n  const IView = getLView();\n  const interpolatedValue =\n    interpolation6(IView, prefix, v0, i0, v1, i1,
v2, i2, v3, i3, v4, i4, v5, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue,
true);\n}\n\n/**\n *\n * Update an interpolated class on an element with 7 bound values surrounded by text.\n *\n *
Used when the value passed to a property has 7 interpolated values in it:\n *\n * ``html\n * <div
class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix"></div>\n * ``\n *\n * Its compiled
representation is:\n *\n * ``ts\n * classMapInterpolate7(\n * 'prefix', v0, '-', v1, '-',
v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ``\n *\n * @param prefix Static value used for concatenation only.\n *
@param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1

```

Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function classMapInterpolate7(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/\*\*\n \* Update an interpolated class on an element with 8 bound values surrounded by text.\n \* Used when the value passed to a property has 8 interpolated values in it.\n \* `html`  

```
<div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>
```

  

```
classMapInterpolate8(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');
```

  

```
@param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6 Value checked for change.\n * @param i6 Static value used for concatenation only.\n * @param v7 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n * ^\nexport function classMapInterpolate8(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n * Update an interpolated class on an element with 9 or more bound values surrounded by text.\n * Used when the number of interpolated values exceeds 8.\n * `html`  


```
<div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"></div>
```

  


```
classMapInterpolateV(\n * ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9, 'suffix');
```

  


```
@param values The collection of values and the strings in-between those values, beginning with a string prefix and ending with a string suffix.\n * (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n * @codeGenApi\n * ^\nexport function classMapInterpolateV(values: any[]): void {\n const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license\n */\nimport {getLView} from './state';\nimport {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from './interpolation';\nimport {styleMap} from './styling';\n\n/**\n * Update an interpolated style on an element with single bound value surrounded by text.\n * Used when the value passed to a property has 1 interpolated value in it.\n * `html`  


```
<div style="key: {{v0}}suffix"></div>
```

  


```
styleMapInterpolate1('key: ', v0, 'suffix');
```

  


```
@param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n * ^\nexport function styleMapInterpolate1(prefix: string, v0: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n styleMap(interpolatedValue);\n}\n\n/**\n * Update an interpolated style on an element with 2 bound values
```


```


```



surrounded by text.\n \* Used when the value passed to a property has 2 interpolated values in it:\n \*  

```

`html`
<div style="key: {{v0}}; key1: {{v1}}suffix"></div>

```

\n \* Its compiled representation is:\n \*

```

`ts`
styleMapInterpolate2('key: ', v0, ' ', key1: ', v1, 'suffix');

```

\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate2(\n prefix: string, v0: any, i0: string, v1: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n styleMap(interpolatedValue);\n}\n\n\*\*\n \* Update an interpolated style on an element with 3 bound values surrounded by text.\n \* Used when the value passed to a property has 3 interpolated values in it:\n \*

```

`html`
<div style="key: {{v0}}; key2: {{v1}}; key2: {{v2}}suffix"></div>

```

\n \* Its compiled representation is:\n \*

```

`ts`
styleMapInterpolate3('key: ', v0, ' ', key1: ', v1, ' ', key2: ', v2, 'suffix');

```

\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate3(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n styleMap(interpolatedValue);\n}\n\n\*\*\n \* Update an interpolated style on an element with 4 bound values surrounded by text.\n \* Used when the value passed to a property has 4 interpolated values in it:\n \*

```

`html`
<div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}suffix"></div>

```

\n \* Its compiled representation is:\n \*

```

`ts`
styleMapInterpolate4('key: ', v0, ' ', key1: ', v1, ' ', key2: ', v2, ' ', key3: ', v3, 'suffix');

```

\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate4(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n styleMap(interpolatedValue);\n}\n\n\*\*\n \* Update an interpolated style on an element with 5 bound values surrounded by text.\n \* Used when the value passed to a property has 5 interpolated values in it:\n \*

```

`html`
<div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}suffix"></div>

```

\n \* Its compiled representation is:\n \*

```

`ts`
styleMapInterpolate5('key: ', v0, ' ', key1: ', v1, ' ', key2: ', v2, ' ', key3: ', v3, ' ', key4: ', v4, 'suffix');

```

\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate5(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n styleMap(interpolatedValue);\n}\n\n\*\*\n \* Update an interpolated style on an element with 6 bound values surrounded by text.\n \* Used when the value passed to a property has 6 interpolated values in it:\n \*

```

`html`
<div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}}suffix"></div>

```

\n \* Its compiled representation is:\n \*

```

`ts`
styleMapInterpolate6('key: ', v0, ' ', key1: ', v1, ' ', key2: ', v2, ' ', key3: ', v3, ' ', key4: ', v4, ' ', key5: ', v5, 'suffix');

```

\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \*

@param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2  
 Static value used for concatenation only.\n \* @param v3 Value checked  
 for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \*  
 @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param suffix  
 Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolate6(\n prefix:  
 string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n i3: string, v4: any, i4: string, v5: any,  
 suffix: string): void {\n const IView = getLView();\n const interpolatedValue =\n interpolation6(IView, prefix,  
 v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* Update an  
 interpolated style on an element with 7 bound values surrounded by text.\n \* Used when the value passed to a  
 property has 7 interpolated values in it:\n \* ``html\n \* <div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}};  
 key3: {{v3}}; key4: {{v4}}; key5: {{v5}};\n \* key6: {{v6}}suffix"></div>\n \*  
 \* ``\n \* Its compiled representation is:\n \* ``ts\n \* styleMapInterpolate7(\n \* 'key: ', v0, ', key1: ', v1, ',  
 key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5,\n \* ' ; key6: ', v6, 'suffix');\n \* ``\n \* @param prefix Static  
 value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for  
 concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation  
 only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \*  
 @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4  
 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked  
 for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \*  
 @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \* ^\nexport function styleMapInterpolate7(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2:  
 string, v3: any,\n i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n const IView =  
 getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5,  
 i5, v6, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* Update an interpolated style on an element with 8  
 bound values surrounded by text.\n \* Used when the value passed to a property has 8 interpolated values in it:\n \*  
 \* ``html\n \* <div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5:  
 {{v5}};\n \* key6: {{v6}}; key7: {{v7}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``\n \* ``ts\n \* styleMapInterpolate8(\n \* 'key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5,\n \* ' ; key6: ', v6, ',  
 key7: ', v7, 'suffix');\n \* ``\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value  
 checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for  
 change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \*  
 @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3  
 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value  
 used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for  
 concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation  
 only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \*  
 @codeGenApi\n \* ^\nexport function styleMapInterpolate8(\n prefix: string, v0: any, i0: string, v1: any, i1: string,  
 v2: any,  
 i2: string, v3: any,\n i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix:  
 string): void {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0,  
 v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n styleMap(interpolatedValue);\n}\n\n/\*\*\n \* Update an  
 interpolated style on an element with 9 or more bound values surrounded by text.\n \* Used when the number of  
 interpolated values exceeds 8.\n \* ``html\n \* <div\n \* class="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3:  
 {{v3}}; key4: {{v4}}; key5: {{v5}};\n \* key6: {{v6}}; key7: {{v7}}; key8: {{v8}}; key9:  
 {{v9}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* styleMapInterpolateV(\n \*  
 ['key: ', v0, ', key1: ', v1, ', key2: ', v2, ', key3: ', v3, ', key4: ', v4, ', key5: ', v5,\n \* ' ; key6: ', v6, ', key7: ', v7, ',  
 key8: ', v8, ', key9: ', v9, 'suffix'];\n \* ``\n \*

\* @param values The collection of values and the strings in-between those values, beginning with a string prefix and ending with a string suffix. (e.g. `[prefix', value0, '; key2: ', value1, '; key2: ', value2, ..., value99, 'suffix']`)

\* @codeGenApi\n \* ^\nexport function styleMapInterpolateV(values: any[]): void {\n const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n styleMap(interpolatedValue);\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license\n \*/\nimport {getLView,} from './state';\nimport {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from './interpolation';\nimport {checkStylingProperty} from './styling';\n\n/\*\*\n \*\n \* Update an interpolated style property on an element with single bound value surrounded by text.\n \*\n \* Used when the value passed to a property has 1 interpolated value in it:\n \*\n \* ```html\n \* <div style.color=\n \* "prefix{{v0}}suffix\n \* "></div>\n \* ```\n \*\n \* Its compiled representation is:\n \*\n \* ```ts\n \* stylePropInterpolate1(0, 'prefix', v0, 'suffix');\n \* ```\n \*\n \* @param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \*\n \* @codeGenApi\n \* ^\nexport function stylePropInterpolate1(\n prop: string, prefix: string, v0: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate1 {\n const IView = getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate1;\n}\n\n/\*\*\n \*\n \* Update an interpolated style property on an element with 2 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 2 interpolated values in it:\n \*\n \* ```html\n \* <div style.color=\n \* "prefix{{v0}}-{{v1}}suffix\n \* "></div>\n \* ```\n \*\n \* Its compiled representation is:\n \*\n \* ```ts\n \* stylePropInterpolate2(0, 'prefix', v0, '-', v1, 'suffix');\n \* ```\n \*\n \* @param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \*\n \* @codeGenApi\n \* ^\nexport function stylePropInterpolate2(\n prop: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate2 {\n const IView = getLView();\n const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate2;\n}\n\n/\*\*\n \*\n \* Update an interpolated style property on an element with 3 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 3 interpolated values in it:\n \*\n \* ```html\n \* <div style.color=\n \* "prefix{{v0}}-{{v1}}-{{v2}}suffix\n \* "></div>\n \* ```\n \*\n \* Its compiled representation is:\n \*\n \* ```ts\n \* stylePropInterpolate3(0, 'prefix', v0, '-', v1, '-', v2, 'suffix');\n \* ```\n \*\n \* @param styleIndex Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \*\n \* @codeGenApi\n \* ^\nexport function stylePropInterpolate3(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate3 {\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate3;\n}\n\n/\*\*\n \*\n \* Update an interpolated style property on an element with 4 bound values

surrounded by text.  
 \* Used when the value passed to a property has 4 interpolated values in it:  
 \* `html`<div style.color=${prefix}{v0}-${v1}-${v2}-${v3}suffix`></div>`  
 \* Its compiled representation is:  
 \* `stylePropInterpolate4(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');`  
 \* `@param styleIndex` Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling``.  
 \* `@param prefix` Static value used for concatenation only.  
 \* `@param v0` Value checked for change.  
 \* `@param i0` Static value used for concatenation only.  
 \* `@param v1` Value checked for change.  
 \* `@param i1` Static value used for concatenation only.  
 \* `@param v2` Value checked for change.  
 \* `@param i2` Static value used for concatenation only.  
 \* `@param v3` Value checked for change.  
 \* `@param suffix` Static value used for concatenation only.  
 \* `@param valueSuffix` Optional suffix. Used with scalar values to add unit such as `px``.  
 \* @returns itself, so that it may be chained.  
 \* `@codeGenApi`export function stylePropInterpolate4(`prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate4`  
 {  
 const IView = getLView();  
 const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);  
 checkStylingProperty(prop, interpolatedValue, valueSuffix, false);  
 return stylePropInterpolate4;`  
 }``  
 \* Update an interpolated style property on an element with 5 bound values surrounded by text.  
 \* Used when the value passed to a property has 5 interpolated values in it:  
 \* `html`<div style.color=${prefix}{v0}-${v1}-${v2}-${v3}-${v4}suffix`></div>`  
 \* Its compiled representation is:  
 \* `stylePropInterpolate5(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');`  
 \* `@param styleIndex` Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling``.  
 \* `@param prefix` Static value used for concatenation only.  
 \* `@param v0` Value checked for change.  
 \* `@param i0` Static value used for concatenation only.  
 \* `@param v1` Value checked for change.  
 \* `@param i1` Static value used for concatenation only.  
 \* `@param v2` Value checked for change.  
 \* `@param i2` Static value used for concatenation only.  
 \* `@param v3` Value checked for change.  
 \* `@param i3` Static value used for concatenation only.  
 \* `@param v4` Value checked for change.  
 \* `@param suffix` Static value used for concatenation only.  
 \* `@param valueSuffix` Optional suffix. Used with scalar values to add unit such as `px``.  
 \* @returns itself, so that it may be chained.  
 \* `@codeGenApi`export function stylePropInterpolate5(`prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate5`  
 {  
 const IView = getLView();  
 const interpolatedValue = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);  
 checkStylingProperty(prop, interpolatedValue, valueSuffix, false);  
 return stylePropInterpolate5;`  
 }``  
 \* Update an interpolated style property on an element with 6 bound values surrounded by text.  
 \* Used when the value passed to a property has 6 interpolated values in it:  
 \* `html`<div style.color=${prefix}{v0}-${v1}-${v2}-${v3}-${v4}-${v5}suffix`></div>`  
 \* Its compiled representation is:  
 \* `stylePropInterpolate6(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');`  
 \* `@param styleIndex` Index of style to update. This index value refers to the index of the style in the style bindings array that was passed into `styling``.  
 \* `@param prefix` Static value used for concatenation only.  
 \* `@param v0` Value checked for change.  
 \* `@param i0` Static value used for concatenation only.  
 \* `@param v1` Value checked for change.  
 \* `@param i1` Static value used for concatenation only.  
 \* `@param v2` Value checked for change.  
 \* `@param i2` Static value used for concatenation only.  
 \* `@param v3` Value checked for change.  
 \* `@param i3` Static value used for concatenation only.  
 \* `@param v4` Value checked for change.  
 \* `@param i4` Static value used for concatenation only.  
 \* `@param v5` Value checked for change.  
 \* `@param suffix` Static value used for concatenation only.  
 \* `@param valueSuffix` Optional suffix. Used with scalar values to add unit such as `px``.  
 \* @returns itself, so that it may be chained.  
 \* `@codeGenApi`export function stylePropInterpolate6(`prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate6`  
 {  
 const IView = getLView();  
 const interpolatedValue = interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);  
 checkStylingProperty(prop, interpolatedValue, valueSuffix,`

```

false);\n return stylePropInterpolate6;\n}\n\n/**\n *\n * Update an interpolated style property on an element with 7
bound values surrounded by text.\n *\n * Used when the value passed to a property has 7 interpolated values in it:\n
*\n * ```html\n * <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix\"></div>\n
*\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * stylePropInterpolate7(\n *   0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ```\n *\n * @param styleIndex Index of style to update. This index value refers to the\n *   index of the style in the style
bindings array that was passed into\n *   `styling`.\n * @param prefix Static value used for concatenation only.\n
* @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1
Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked
for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n
* @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4
Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value
used for concatenation only.\n * @param v6 Value checked for change.\n *\n * @param suffix Static value used for concatenation only.\n * @param valueSuffix Optional suffix. Used with scalar
values to add unit such as `px`.\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * ^\nexport
function stylePropInterpolate7(\n  prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2:
string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n  valueSuffix?:
string|null): typeof stylePropInterpolate7 {\n  const IView = getLView();\n  const interpolatedValue =\n  interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n  checkStylingProperty(prop,
interpolatedValue, valueSuffix, false);\n  return stylePropInterpolate7;\n}\n\n/**\n *\n * Update an interpolated style
property on an element with 8 bound values surrounded by text.\n *\n * Used when the value passed to a property
has 8 interpolated values in it:\n *\n * ```html\n * <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-
{{v5}}-{{v6}}-{{v7}}suffix\"></div>\n
*\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * stylePropInterpolate8(0, 'prefix', v0, '-', v1, '-', v2, '-', v3,
'-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * ```\n *\n * @param styleIndex Index of style to update. This index value
refers to the\n *   index of the style in the style bindings array that was passed into\n *   `styling`.\n * @param
prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static
value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for
concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation
only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param
v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked
for change.\n * @param i5 Static value used for concatenation only.\n * @param v6
Value checked for change.\n * @param i6 Static value used for concatenation only.\n * @param v7 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @param valueSuffix Optional suffix.
Used with scalar values to add unit such as `px`.\n * @returns itself, so that it may be chained.\n * @codeGenApi\n
* ^\nexport function stylePropInterpolate8(\n  prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2:
any, i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n  suffix:
string, valueSuffix?: string|null): typeof stylePropInterpolate8 {\n  const IView = getLView();\n  const
interpolatedValue = interpolation8(\n    IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7,
suffix);\n  checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n
\n  return stylePropInterpolate8;\n}\n\n/**\n *\n * Update an interpolated style property on an element with 9 or more
bound values surrounded by\n * text.\n *\n * Used when the number of interpolated values exceeds 8.\n *\n *
```html\n * <div\n *   style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-
{{v9}}suffix\">\n * </div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * stylePropInterpolateV(\n *
0, ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n *   'suffix']);\n * ```\n *\n * @param
styleIndex Index of style to update. This index value refers to the\n *   index of the style in the style bindings
array that was passed into\n *   `styling`.\n * @param values The collection of values and the strings in-between
those values, beginning with\n *   a string prefix and ending with a string suffix.\n *   (e.g. `[ 'prefix', value0, '-', value1,

```

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'-', value2, ..., value99, 'suffix'])\n * @param
valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n * @returns itself, so that it may be
chained.\n * @codeGenApi\n * ^\nexport function stylePropInterpolateV(\n prop: string, values: any[],
valueSuffix?: string|null): typeof stylePropInterpolateV {\n const IView = getLView();\n const interpolatedValue =
interpolationV(IView, values);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return
stylePropInterpolateV;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * ^\nimport {bindingUpdated} from '../bindings';\nimport {SanitizerFn} from
'./interfaces/sanitization';\nimport {RENDERER} from './interfaces/view';\nimport {getCurrentDirectiveDef,
getLView, getSelectedTNode, getTView, nextBindingIndex} from './state';\nimport {NO_CHANGE} from
'./tokens';\n\nimport {elementPropertyInternal,
loadComponentRenderer, storePropertyBindingMetadata} from './shared';\n\n/**\n * Update a property on a host
element. Only applies to native node properties, not inputs.\n * \n * Operates on the element selected by index via the
{@link select} instruction.\n * \n * @param propName Name of property. Because it is going to DOM, this is not
subject to\n * renaming as part of minification.\n * \n * @param value New value to write.\n * \n * @param sanitizer An
optional function used to sanitize the value.\n * \n * @returns This function returns itself so that it may be chained\n *
(e.g. `property('name', ctx.name)('title', ctx.title)`)\n * \n * @codeGenApi\n * ^\nexport function hostProperty<T>(\n
propName: string, value: T, sanitizer?: SanitizerFn|null): typeof hostProperty {\n const IView = getLView();\n
const bindingIndex = nextBindingIndex();\n if (bindingUpdated(IView, bindingIndex, value)) {\n const tView =
getTView();\n const tNode = getSelectedTNode();\n
elementPropertyInternal(tView, tNode, IView, propName, value, IView[RENDERER], sanitizer, true);\n
ngDevMode && storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n }\n return
hostProperty;\n}\n\n\n/**\n * Updates a synthetic host binding (e.g. `[@foo]`) on a component or directive.\n * \n *
This instruction is for compatibility purposes and is designed to ensure that a\n * synthetic host binding (e.g.
`@HostBinding('@foo')`) properly gets rendered in\n * the component's renderer. Normally all host bindings are
evaluated with the parent\n * component's renderer, but, in the case of animation @triggers, they need to be\n *
evaluated with the sub component's renderer (because that's where the animation\n * triggers are defined).\n * \n *
Do not use this instruction as a replacement for `elementProperty`. This instruction\n * only exists to ensure
compatibility with the ViewEngine's host binding behavior.\n * \n * @param index The index of the element to
update
in the data array\n * @param propName Name of property. Because it is going to DOM, this is not subject to\n *
renaming as part of minification.\n * \n * @param value New value to write.\n * \n * @param sanitizer An optional function
used to sanitize the value.\n * \n * @codeGenApi\n * ^\nexport function syntheticHostProperty<T>(\n propName:
string, value: T|NO_CHANGE,\n sanitizer?: SanitizerFn|null): typeof syntheticHostProperty {\n const IView =
getLView();\n const bindingIndex = nextBindingIndex();\n if (bindingUpdated(IView, bindingIndex, value)) {\n
const tView = getTView();\n const tNode = getSelectedTNode();\n const currentDef =
getCurrentDirectiveDef(tView.data);\n const renderer = loadComponentRenderer(currentDef, tNode, IView);\n
elementPropertyInternal(tView, tNode, IView, propName, value, renderer, sanitizer, true);\n
ngDevMode &&
storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n }\n return
syntheticHostProperty;\n}\n\n", "/*\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\nimport {global}
from './global';\n\ndeclare global {\n const ngI18nClosureMode: boolean;\n}\n\n/**\n * NOTE: changes to the
`ngI18nClosureMode` name must be synced with `compiler-cli/src/tooling.ts`.\n * \n * ^\nif (typeof ngI18nClosureMode
=== 'undefined') {\n // These property accesses can be ignored because ngI18nClosureMode will be set to false\n //
when optimizing code and the whole if statement will be dropped.\n // Make sure to refer to ngI18nClosureMode as
['ngI18nClosureMode'] for closure.\n // NOTE: we need to have it in IIFE so that the tree-shaker is happy.\n
(function() {\n // tslint:disable-next-line:no-toplevel-property-access\n global['ngI18nClosureMode'] =\n //

```

```

TODO(FW-1250): validate that this actually, you know, works.\n    // tslint:disable-next-line:no-toplevel-
property-access\n
    typeof goog !== 'undefined' && typeof goog.getMessage === 'function';\n }());\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n// THIS CODE IS GENERATED -
DO NOT MODIFY.\n\nconst u = undefined;\n\nfunction plural(val: number): number {\nconst n = val, i =
Math.floor(Math.abs(val)), v = val.toString().replace(/^[^.*\?/, ").length;\n\nif (i === 1 && v === 0)\n    return
1;\nreturn 5;\n}\n\n\nexport default
[["en"],[["a","p"],[["AM","PM"],u],[["AM","PM"],u,u],[["S","M","T","W","T","F","S"],[["Sun","
Mon","Tue","Wed","Thu","Fri","Sat"],[["Sunday","Monday","Tuesday","Wednesday","Thursday","F
riday","Saturday"],[["Su","Mo","Tu","We","Th","Fr","Sa"]],u,[["J","F","M","A","M","J","J","
A","S","O","N","D"],[["Jan","Feb","Mar","Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","
Dec"],[["January","February","March","April","May","June","July","August","September","October"
,"November","December"]],u,[["B","A"],[["BC","AD"],[["Before
Christ","Anno Domini"]],0,[6,0],[["M/d/yy","MMM d, y","MMMM d, y","EEEE, MMMM d, y"],[["h:mm
a","h:mm:ss a","h:mm:ss a z","h:mm:ss a zzzz"],[["{1}, {0}","u","{1} at {0}","u],[[".",",",";","%",'+','-
',"E","x","%o","","NaN",":",""],[["#,"##0.###","#,"##0%","#,"##0.00","#E0"],"USD","$","US
Dollar",{,"ltr", plural];\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport {global} from
'./util/global';\n\nimport localeEn from './locale_en';\n\n/**\n * This const is used to store the locale data registered with `registerLocaleData`\n *\n\nlet LOCALE_DATA:
{[localeId: string]: any} = {};\n\n/**\n * Register locale data to be used internally by Angular. See the\n * [i18n
guide](guide/i18n-common-format-data-locale) to know how to import additional locale\n * data.\n *\n * The
signature `registerLocaleData(data: any, extraData?: any)` is deprecated since v5.1\n *\n\nexport function
registerLocaleData(data: any, localeId?: string|any, extraData?: any): void {\n    if (typeof localeId !== 'string') {\n
extraData = localeId;\n    localeId = data[LocaleDataIndex.LocaleId];\n    }\n\n    localeId =
localeId.toLowerCase().replace(/_/g, '-');\n\n    LOCALE_DATA[localeId] = data;\n\n    if (extraData) {\n
LOCALE_DATA[localeId][LocaleDataIndex.ExtraData] = extraData;\n    }\n\n\n/**\n * Finds the locale data for a
given locale.\n *\n * @param locale The locale code.\n *\n * @returns The locale data.\n *\n * @see [Internationalization
(i18n) Guide](https://angular.io/guide/i18n-overview)\n\n\nexport function findLocaleData(locale: string): any {\n    const normalizedLocale = normalizeLocale(locale);\n\n    let match = getLocaleData(normalizedLocale);\n    if (match) {\n        return match;\n    }\n\n    // let's try to find a parent
locale\n    const parentLocale = normalizedLocale.split('-')[0];\n    match = getLocaleData(parentLocale);\n    if (match)
{\n        return match;\n    }\n\n    if (parentLocale === 'en') {\n        return localeEn;\n    }\n\n    throw new RuntimeError(\n
RuntimeErrorCode.MISSING_LOCALE_DATA,\n        ngDevMode && `Missing locale data for the locale
`${locale}`.);\n\n\n/**\n * Retrieves the default currency code for the given locale.\n *\n * The default is defined
as the first currency which is still in use.\n *\n * @param locale The code of the locale whose currency code we
want.\n *\n * @returns The code of the default currency for the given locale.\n *\n\nexport function
getLocaleCurrencyCode(locale: string): string|null
{\n    const data = findLocaleData(locale);\n    return data[LocaleDataIndex.CurrencyCode] || null;\n\n\n/**\n *
Retrieves the plural function used by ICU expressions to determine the plural case to use\n * for a given locale.\n
*\n * @param locale A locale code for the locale format rules to use.\n *\n * @returns The plural function for the locale.\n
*\n * @see `NgPlural`\n *\n * @see [Internationalization (i18n) Guide](https://angular.io/guide/i18n-overview)\n\n\nexport
function getLocalePluralCase(locale: string): (value: number) => number {\n    const data = findLocaleData(locale);\n
return data[LocaleDataIndex.PluralCase];\n\n\n\n\n/**\n * Helper function to get the given `normalizedLocale`\n
from `LOCALE_DATA`\n *\n * or from the global `ng.common.locale`.\n *\n\nexport function
getLocaleData(normalizedLocale: string): any {\n    if (!(normalizedLocale in LOCALE_DATA)) {\n

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LOCALE_DATA[normalizedLocale] = global.ng && global.ng.common && global.ng.common.locales &&\n
global.ng.common.locales[normalizedLocale];\n
}\n return LOCALE_DATA[normalizedLocale];\n}\n\n/**\n * Helper function to remove all the locale data from\n
`LOCALE_DATA`. \n */\nexport function unregisterAllLocaleData() {\n LOCALE_DATA = {};\n}\n\n/**\n * Index of each type of locale data from the locale data array\n */\nexport enum LocaleDataIndex {\n LocaleId = 0,\n DayPeriodsFormat,\n DayPeriodsStandalone,\n DaysFormat,\n DaysStandalone,\n MonthsFormat,\n MonthsStandalone,\n Eras,\n FirstDayOfWeek,\n WeekendRange,\n DateFormat,\n TimeFormat,\n DateTimeFormat,\n NumberSymbols,\n NumberFormats,\n CurrencyCode,\n CurrencySymbol,\n CurrencyName,\n Currencies,\n Directionality,\n PluralCase,\n ExtraData\n}\n\n/**\n * Index of each type of locale data from the extra locale data array\n */\nexport const enum ExtraLocaleDataIndex {\n ExtraDayPeriodFormats = 0,\n ExtraDayPeriodStandalone,\n ExtraDayPeriodsRules\n}\n\n/**\n * Index of each value in currency data (used to describe CURRENCIES_EN in currencies.ts)\n */\nexport const enum CurrencyIndex {\n Symbol = 0,\n SymbolNarrow,\n NbOfDigits\n}\n\n/**\n * Returns the canonical form of a locale name - lowercase with `_` replaced with `.`.\n */\nfunction normalizeLocale(locale: string): string {\n return locale.toLowerCase().replace(/_/g, '.');\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {getLocalePluralCase} from './locale_data_api';\nconst pluralMapping = ['zero', 'one', 'two', 'few', 'many'];\n\n/**\n * Returns the plural case based on the locale\n */\nexport function getPluralCase(value: string, locale: string): string {\n const plural = getLocalePluralCase(locale)(parseInt(value, 10));\n const result = pluralMapping[plural];\n return (result !== undefined) ? result : 'other';\n}\n\n/**\n * The locale id that the application is using by default (for translations and ICU expressions).\n */\nexport const DEFAULT_LOCALE_ID = 'en-US';\n\n/**\n * USD currency code that the application uses by default for CurrencyPipe when no\n * DEFAULT_CURRENCY_CODE is provided.\n */\nexport const USD_CURRENCY_CODE = 'USD';\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {SanitizerFn} from './sanitization';\n\n/**\n * Stores a list of nodes which need to be removed.\n * \n * Numbers are indexes into the `LView`\n * - index > 0: `removeRNode(IView[0])`\n * - index < 0: `removeICU(~IView[0])`\n */\nexport interface I18nRemoveOpCodes extends Array<number> {\n __brand__: 'I18nRemoveOpCodes';\n}\n\n/**\n * `I18nMutateOpCode` defines OpCodes for `I18nMutateOpCodes` array.\n * \n * OpCodes are efficient operations which can be applied to the DOM to update it. (For example to\n * update to a new ICU case requires that we clean up previous elements and create new ones.)\n * \n * OpCodes contain three parts:\n * 1) Parent node index offset. (p)\n * 2) Reference node index offset. (r)\n * 3) The instruction to execute. (i)\n * \n * pppp pppp pppp pppp rrrr rrrr rrrr rrii\n * 3322 2222 2222 1111 1111 1111 0000 0000\n * 1098 7654 3210 9876 5432 1098 7654 3210\n * \n * \n * var parent = IView[opCode >>> SHIFT_PARENT];\n * var refNode = IView[((opCode & MASK_REF) >>> SHIFT_REF)];\n * var instruction = opCode & MASK_OPCODE;\n * \n * See: `I18nCreateOpCodes` for example of usage.\n */\nexport const enum IcuCreateOpCode {\n /**\n * Stores shift amount for bits 17-3 that contain reference index.\n */\n SHIFT_REF = 1,\n /**\n * Stores shift amount for bits 31-17 that contain parent index.\n */\n SHIFT_PARENT = 17,\n /**\n * Mask for OpCode\n */\n MASK_INSTRUCTION = 0b1,\n /**\n * Mask for the Reference node (bits 16-3)\n */\n MASK_REF = 0b1111111111111111110,\n // 111111100000000000 // 65432109876543210\n /**\n * Instruction to append the current node to `PARENT`\n */\n AppendChild = 0b0,\n /**\n * Instruction to set the attribute of a node.\n */\n Attr = 0b1,\n}\n\n/**\n * Array storing OpCode for dynamically creating `i18n` blocks.\n * \n * Example:\n * \n * <I18nCreateOpCode>[\n * // For adding text nodes\n * // -----  
\n * // Equivalent to:\n * // IView[1].appendChild(IView[0] = document.createTextNode('xyz'));\n * 'xyz', 0, 1 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n * \n * // For adding element nodes\n * // -----  
\n * ]\n * // Equivalent to:\n * // IView[1].appendChild(IView[0] = document.createElement('div'));\n */

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ELEMENT_MARKER, 'div', 0, 1 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n *\n * // For adding
comment nodes\n * // -----\n * // Equivalent to:\n * // IView[1].appendChild(IView[0]
= document.createComment("));\n * ICU_MARKER, ", 0, 1 << SHIFT_PARENT | 0 << SHIFT_REF |
AppendChild,\n *\n * // For moving existing nodes to a different location\n * // -----
-----\n * // Equivalent to:\n * // const node = IView[1];\n * // IView[2].appendChild(node);\n * 1 <<
SHIFT_REF | Select, 2 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n *\n * // For removing existing
nodes\n * // -----\n * // const node = IView[1];\n * //
removeChild(tView.data(1), node, IView);\n * 1 << SHIFT_REF | Remove,\n *\n * // For writing attributes\n *
// -----\n * // const node = IView[1];\n * // node.setAttribute('attr',
'value');\n * 1 << SHIFT_REF | Attr, 'attr', 'value\n *'];\n * ```\n * ^\nexport interface IcuCreateOpCodes extends
Array<number|string|ELEMENT_MARKER|ICU_MARKER|null>,\n
    I18nDebug {\n    __brand__: 'I18nCreateOpCodes';\n}\n\nexport const enum I18nUpdateOpCode {\n
/**\n * Stores shift amount for bits 17-2 that contain reference index.\n * ^\n SHIFT_REF = 2,\n /**\n * Mask
for OpCode\n * ^\n MASK_OPCODE = 0b11,\n\n /**\n * Instruction to update a text node.\n * ^\n Text =
0b00,\n /**\n * Instruction to update a attribute of a node.\n * ^\n Attr = 0b01,\n /**\n * Instruction to switch
the current ICU case.\n * ^\n IcuSwitch = 0b10,\n /**\n * Instruction to update the current ICU case.\n * ^\n
IcuUpdate = 0b11,\n}\n\n/**\n * Marks that the next string is an element name.\n *\n * See `I18nMutateOpCodes`
documentation.\n * ^\nexport const ELEMENT_MARKER: ELEMENT_MARKER = {\n    marker:
'element'\n};\n\nexport interface ELEMENT_MARKER {\n    marker: 'element';\n}\n\n/**\n * Marks that the next
string is comment text need for ICU.\n *\n * See `I18nMutateOpCodes` documentation.\n * ^\nexport const
ICU_MARKER: ICU_MARKER = {\n
    marker: 'ICU'\n};\n\nexport interface ICU_MARKER {\n    marker: 'ICU';\n}\n\nexport interface I18nDebug {\n
/**\n * Human readable representation of the OpCode arrays.\n *\n * NOTE: This property only exists if
`ngDevMode` is set to `true` and it is not present in\n * production. Its presence is purely to help debug issue in
development, and should not be relied\n * on in production application.\n * ^\n debug?: string[];\n}\n\n/**\n *
Array storing OpCode for dynamically creating `i18n` translation DOM elements.\n *\n * This array creates a
sequence of `Text` and `Comment` (as ICU anchor) DOM elements. It consists\n * of a pair of `number` and `string`
pairs which encode the operations for the creation of the\n * translated block.\n *\n * The number is shifted and
encoded according to `I18nCreateOpCode`\n *\n * Pseudocode:\n * ```\n * const i18nCreateOpCodes = [\n * 10 <<
I18nCreateOpCode.SHIFT, `Text Node add to DOM`,\n * 11 << I18nCreateOpCode.SHIFT |
I18nCreateOpCode.COMMENT,
    `Comment Node add to DOM`,\n * 12 << I18nCreateOpCode.SHIFT | I18nCreateOpCode.APPEND_LATER,
    `Text Node added later`\n * ];\n *\n * for(var i=0; i<i18nCreateOpCodes.length; i++) {\n * const opcode =
i18nCreateOpCodes[i++];\n * const index = opcode >> I18nCreateOpCode.SHIFT;\n * const text =
i18nCreateOpCodes[i];\n * let node: Text|Comment;\n * if (opcode & I18nCreateOpCode.COMMENT ===
I18nCreateOpCode.COMMENT) {\n * node = IView[~index] = document.createComment(text);\n * } else {\n *
node = IView[index] = document.createText(text);\n * }\n * if (opcode &
I18nCreateOpCode.APPEND_EAGERLY !== I18nCreateOpCode.APPEND_EAGERLY) {\n *
parentNode.appendChild(node);\n * }\n * }\n * ```\n * ^\nexport interface I18nCreateOpCodes extends
Array<number|string>,\n    I18nDebug {\n    __brand__: 'I18nCreateOpCodes';\n}\n\n/**\n * See `I18nCreateOpCodes`\n
*\n * ^\nexport enum I18nCreateOpCode {\n    /**\n * Number of bits to shift index so that it can be combined
with the `APPEND_EAGERLY` and\n * `COMMENT`.\n * ^\n SHIFT = 2,\n\n /**\n * Should the node be
appended to parent immediately after creation.\n * ^\n APPEND_EAGERLY = 0b01,\n\n /**\n * If set the node
should be comment (rather than a text) node.\n * ^\n COMMENT = 0b10,\n}\n\n\n/**\n * Stores DOM operations
which need to be applied to update DOM render tree due to changes in\n * expressions.\n *\n * The basic idea is that
`i18nExp` OpCodes capture expression changes and update a change\n * mask bit. (Bit 1 for expression 1, bit 2 for
expression 2 etc..., bit 32 for expression 32 and\n * higher.) The OpCodes then compare its own change mask
against the expression change mask to\n * determine if the OpCodes should execute.\n *\n * NOTE: 32nd bit is

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{DEFAULT_LOCALE_ID} from './../i18n/localization';\nimport
{assertDefined} from './../util/assert';\n\n/**\n * The locale id that the application is currently using (for
translations and ICU expressions).\n * This is the ivy version of `LOCALE_ID` that was defined as an injection
token for the view engine\n * but is now defined as a global value.\n */\nlet LOCALE_ID =
DEFAULT_LOCALE_ID;\n\n/**\n * Sets the locale id that will be used for translations and ICU expressions.\n *
This is the ivy version of `LOCALE_ID` that was defined as an injection token for the view engine\n * but is now
defined as a global value.\n */\n * @param localeId\n */\nexport function setLocaleId(localeId: string) {\n
assertDefined(localeId, `Expected localeId to be defined`);\n if (typeof localeId === 'string') {\n  LOCALE_ID =
localeId.toLowerCase().replace(/_/g, '-');\n } }\n\n/**\n * Gets the locale id that will be used for translations and
ICU expressions.\n * This is the ivy version of `LOCALE_ID` that was defined as an injection token
for the view engine\n * but is now defined as a global value.\n */\nexport function getLocaleId(): string {\n return
LOCALE_ID;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertDomNode, assertIndexInRange} from './util/assert';\nimport {TNode, TNodeFlags,
TNodeType} from './interfaces/node';\nimport {Renderer} from './interfaces/renderer';\nimport {RElement, RNode}
from './interfaces/renderer_dom';\nimport {LView} from './interfaces/view';\nimport
{getInsertInFrontOfRNodeWithNoI18n, nativeInsertBefore} from './node_manipulation';\nimport {unwrapRNode}
from './util/view_utils';\n\n/**\n * Find a node in front of which `currentTNode` should be inserted (takes i18n into
account).\n */\n * This method determines the `RNode` in front of which we should insert the `currentRNode`. This\n
* takes `TNode.insertBeforeIndex`
into account.\n */\n * @param parentTNode parent `TNode`\n * @param currentTNode current `TNode` (The node
which we would like to insert into the DOM)\n * @param IView current `LView`\n */\nexport function
getInsertInFrontOfRNodeWithI18n(n parentTNode: TNode, currentTNode: TNode, IView: LView): RNode|null
{\n  const tNodeInsertBeforeIndex = currentTNode.insertBeforeIndex;\n  const insertBeforeIndex =\n
Array.isArray(tNodeInsertBeforeIndex) ? tNodeInsertBeforeIndex[0] : tNodeInsertBeforeIndex;\n  if
(insertBeforeIndex === null) {\n    return getInsertInFrontOfRNodeWithNoI18n(parentTNode, currentTNode,
IView);\n  } else {\n    ngDevMode && assertIndexInRange(IView, insertBeforeIndex);\n    return
unwrapRNode(IView[insertBeforeIndex]);\n  } }\n\n/**\n * Process `TNode.insertBeforeIndex` by adding i18n
text nodes.\n */\n * See `TNode.insertBeforeIndex`\n */\nexport function processI18nInsertBefore(\n  renderer:
Renderer, childTNode: TNode, IView: LView, childRNode:
RNode|RNode[],\n  parentRElement: RElement|null): void {\n  const tNodeInsertBeforeIndex =
childTNode.insertBeforeIndex;\n  if (Array.isArray(tNodeInsertBeforeIndex)) {\n    // An array indicates that there
are i18n nodes that need to be added as children of this\n    // `childRNode`. These i18n nodes were created before
this `childRNode` was available and so\n    // only now can be added. The first element of the array is the normal
index where we should\n    // insert the `childRNode`. Additional elements are the extra nodes to be added as
children of\n    // `childRNode`.\n    ngDevMode && assertDomNode(childRNode);\n    let i18nParent:
RElement|null = childRNode as RElement;\n    let anchorRNode: RNode|null = null;\n    if (!(childTNode.type &
TNodeType.AnyRNode)) {\n      anchorRNode = i18nParent;\n      i18nParent = parentRElement;\n    }\n    if
(i18nParent !== null && (childTNode.flags & TNodeFlags.isComponentHost) === 0) {\n      for (let i = 1; i <
tNodeInsertBeforeIndex.length;\n      i++) {\n        // No need to `unwrapRNode` because all of the indexes point to i18n text nodes.\n        // see
`assertDomNode` below.\n        const i18nChild = IView[tNodeInsertBeforeIndex[i]];\n
nativeInsertBefore(renderer, i18nParent, i18nChild, anchorRNode, false);\n      } }\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertEqual} from './../util/assert';\nimport {TNode, TNodeType} from './interfaces/node';\nimport {setI18nHandling} from
 './../node_manipulation';\nimport {getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore} from
 './node_manipulation_i18n';\n\n/**\n * Add `tNode` to `previousTNodes` list and update relevant `TNode`s in

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`previousTNodes` list\n * `tNode.insertBeforeIndex`.\n *\n * Things to keep in mind:\n * 1. All i18n text nodes are
encoded as `TNodeType.Element`
and are created eagerly by the\n * `i18nStart` instruction.\n * 2. All `TNodeType.Placeholder` `TNodes` are
elements which will be created later by\n * `elementStart` instruction.\n * 3. `elementStart` instruction will create
`TNode`s in the ascending `TNode.index` order. (So a\n * smaller index `TNode` is guaranteed to be created
before a larger one)\n *\n * We use the above three invariants to determine `TNode.insertBeforeIndex`.\n *\n * In an
ideal world `TNode.insertBeforeIndex` would always be `TNode.next.index`. However,\n * this will not work
because `TNode.next.index` may be larger than `TNode.index` which means that\n * the next node is not yet created
and therefore we can't insert in front of it.\n *\n * Rule1: `TNode.insertBeforeIndex = null` if `TNode.next === null`
(Initial condition, as we don't\n * know if there will be further `TNode`s inserted after.)\n * Rule2: If
`previousTNode` is created after the `tNode` being inserted, then\n *
`previousTNode.insertBeforeNode = tNode.index` (So when a new `tNode` is added we check\n * previous
to see if we can update its `insertBeforeTNode`)\n *\n * See `TNode.insertBeforeIndex` for more context.\n *\n *
@param previousTNodes A list of previous TNodes so that we can easily traverse `TNode`s in\n * reverse order.
(If `TNode` would have `previous` this would not be necessary.)\n * @param newTNode A TNode to add to the
`previousTNodes` list.\n */\nexport function addTNodeAndUpdateInsertBeforeIndex(previousTNodes: TNode[],
newTNode: TNode) {\n // Start with Rule1\n ngDevMode &&\n assertEqual(newTNode.insertBeforeIndex,
null, 'We expect that insertBeforeIndex is not set');\n previousTNodes.push(newTNode);\n if
(previousTNodes.length > 1) {\n for (let i = previousTNodes.length - 2; i >= 0; i--) {\n const existingTNode =
previousTNodes[i];\n // Text nodes are created eagerly and so they don't need their `indexBeforeIndex`
updated.\n // It
is safe to ignore them.\n if (!isI18nText(existingTNode)) {\n if (isNewTNodeCreatedBefore(existingTNode,
newTNode) &&\n getInsertBeforeIndex(existingTNode) === null) {\n // If it was created before us in
time, (and it does not yet have `insertBeforeIndex`)\n // then add the `insertBeforeIndex`.\n
setInsertBeforeIndex(existingTNode, newTNode.index);\n }\n }\n }\n }\n }\n\nfunction isI18nText(tNode:
TNode): boolean {\n return !(tNode.type & TNodeType.Placeholder);\n }\n\nfunction
isNewTNodeCreatedBefore(existingTNode: TNode, newTNode: TNode): boolean {\n return
isI18nText(newTNode) || existingTNode.index > newTNode.index;\n }\n\nfunction getInsertBeforeIndex(tNode:
TNode): number|null {\n const index = tNode.insertBeforeIndex;\n return Array.isArray(index) ? index[0] :
index;\n }\n\nfunction setInsertBeforeIndex(tNode: TNode, value: number): void {\n const index =
tNode.insertBeforeIndex;\n if (Array.isArray(index)) {\n
// Array is stored if we have to insert child nodes. See `TNode.insertBeforeIndex`\n index[0] = value;\n } else
{\n setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);\n tNode.insertBeforeIndex
= value;\n }\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport {assertEqual, assertGreaterThan, assertGreaterThanOrEqual, throwError} from '../util/assert';\nimport
{assertTicu, assertTNode} from './assert';\nimport {createTNodeAtIndex} from './instructions/shared';\nimport
{IcuCreateOpCode, Ticu} from './interfaces/i18n';\nimport {TicuContainerNode, TNode, TNodeType} from
'./interfaces/node';\nimport {LView, TView} from './interfaces/view';\nimport {assertTNodeType} from
'./node_assert';\nimport {setI18nHandling} from './node_manipulation';\nimport
{getInsertInFrontOfRNodeWithI18n,
processI18nInsertBefore} from './node_manipulation_i18n';\nimport {addTNodeAndUpdateInsertBeforeIndex}
from './i18n_insert_before_index';\n\n/**\n * Retrieve `Ticu` at a given `index`.\n *\n * The `Ticu` can be stored
either directly (if it is nested ICU) OR\n * it is stored inside tho `TicuContainer` if it is top level ICU.\n *\n * The
reason for this is that the top level ICU need a `TNode` so that they are part of the render\n * tree, but nested ICU's
have no TNode, because we don't know ahead of time if the nested ICU is\n * expressed (parent ICU may have
selected a case which does not contain it.)\n *\n * @param tView Current `TView`.\n * @param index Index where
the value should be read from.\n */\nexport function getTicu(tView: TView, index: number): Ticu|null {\n const

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value = tView.data[index] as null | TIcu | TIcuContainerNode | string;\n if (value === null || typeof value ===
'string') return null;\n if (ngDevMode &&\n    !(value.hasOwnProperty('tViews') ||
value.hasOwnProperty('currentCaseLViewIndex'))
  {\n    throwError('We expect to get \\`null\\`\\`TIcu\\`\\`TIcuContainer\\`, but got: ' + value);\n  }\n // Here the
`value.hasOwnProperty('currentCaseLViewIndex')` is a polymorphic read as it can be\n // either TIcu or
TIcuContainerNode. This is not ideal, but we still think it is OK because it\n // will be just two cases which fits into
the browser inline cache (inline cache can take up to\n // 4)\n const tIcu =
value.hasOwnProperty('currentCaseLViewIndex') ? value as TIcu : \n                (value
as TIcuContainerNode).value;\n ngDevMode && assertTIcu(tIcu);\n return tIcu;\n}\n\n/**\n * Store `TIcu` at a
give `index`.\n *\n * The `TIcu` can be stored either directly (if it is nested ICU) OR\n * it is stored inside tho
`TIcuContainer` if it is top level ICU.\n *\n * The reason for this is that the top level ICU need a `TNode` so that
they are part of the render\n * tree, but nested ICU's
  have no TNode, because we don't know ahead of time if the nested ICU is\n * expressed (parent ICU may have
selected a case which does not contain it.)\n *\n * @param tView Current `TView`.\n * @param index Index where
the value should be stored at in `tView.data`\n * @param tIcu The TIcu to store.\n */\nexport function
setTIcu(tView: TView, index: number, tIcu: TIcu): void {\n  const tNode = tView.data[index] as null |
TIcuContainerNode;\n  ngDevMode &&\n    assertEquals(\n      tNode === null ||
tNode.hasOwnProperty('tViews'), true,\n      'We expect to get \\`null\\`\\`TIcuContainer\\`);\n  if (tNode === null)
{\n    tView.data[index] = tIcu;\n  } else {\n    ngDevMode && assertTNodeType(tNode, TNodeType.Icu);\n
tNode.value = tIcu;\n  }\n}\n\n/**\n * Set `TNode.insertBeforeIndex` taking the `Array` into account.\n *\n * See
`TNode.insertBeforeIndex`\n */\nexport function setTNodeInsertBeforeIndex(tNode: TNode, index: number) {\n
  ngDevMode && assertTNode(tNode);\n
  let insertBeforeIndex = tNode.insertBeforeIndex;\n  if (insertBeforeIndex === null) {\n
    setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);\n    insertBeforeIndex =
tNode.insertBeforeIndex = \n      [null!/* may be updated to number later */, index];\n  } else {\n
    assertEquals(Array.isArray(insertBeforeIndex), true, 'Expecting array here');\n    (insertBeforeIndex as
number[]).push(index);\n  }\n}\n\n/**\n * Create `TNode.type=TNodeType.Placeholder` node.\n *\n * See
`TNodeType.Placeholder` for more information.\n */\nexport function createTNodePlaceholder(\n  tView: TView,
previousTNodes: TNode[], index: number): TNode {\n  const tNode = createTNodeAtIndex(tView, index,
TNodeType.Placeholder, null, null);\n  addTNodeAndUpdateInsertBeforeIndex(previousTNodes, tNode);\n  return
tNode;\n}\n\n/**\n * Returns current ICU case.\n *\n * ICU cases are stored as index into the `TIcu.cases`.\n * At
times it is necessary to communicate that the ICU case just switched
  and that next ICU update\n * should update all bindings regardless of the mask. In such a case the we store negative
numbers\n * for cases which have just been switched. This function removes the negative flag.\n */\nexport function
getCurrentICUCaseIndex(tIcu: TIcu, lView: LView) {\n  const currentCase: number | null =
lView[tIcu.currentCaseLViewIndex];\n  return currentCase === null ? currentCase : (currentCase < 0 ?
~currentCase : currentCase);\n}\n\nexport function getParentFromIcuCreateOpCode(mergedCode: number): number
{\n  return mergedCode >>> IcuCreateOpCode.SHIFT_PARENT;\n}\n\nexport function
getRefFromIcuCreateOpCode(mergedCode: number): number {\n  return (mergedCode &
IcuCreateOpCode.MASK_REF) >>> IcuCreateOpCode.SHIFT_REF;\n}\n\nexport function
getInstructionFromIcuCreateOpCode(mergedCode: number): number {\n  return mergedCode &
IcuCreateOpCode.MASK_INSTRUCTION;\n}\n\nexport function icuCreateOpCode(opCode: IcuCreateOpCode,
parentIdx: number, refIdx: number) {\n  ngDevMode
    && assertGreaterThanOrEqual(parentIdx, 0, 'Missing parent index');\n  ngDevMode && assertGreaterThan(refIdx,
0, 'Missing ref index');\n  return opCode | parentIdx << IcuCreateOpCode.SHIFT_PARENT | refIdx <<
IcuCreateOpCode.SHIFT_REF;\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { RuntimeError, RuntimeErrorCode } from './errors';\nimport

```

```
{getPluralCase} from './i18n/localization';\nimport {assertDefined, assertDomNode, assertEqual,
assertGreaterThan, assertIndexInRange, throwError} from './util/assert';\nimport {assertIndexInExpandoRange,
assertTicu} from './assert';\nimport {attachPatchData} from './context_discovery';\nimport
{elementPropertyInternal, setElementAttribute} from './instructions/shared';\nimport {ELEMENT_MARKER,
I18nCreateOpCode, I18nCreateOpCodes, I18nUpdateOpCode, I18nUpdateOpCodes,
ICU_MARKER, IcuCreateOpCode, IcuCreateOpCodes, IcuType, TI18n, Ticu} from './interfaces/i18n';\nimport
{TNode} from './interfaces/node';\nimport {RElement, RNode, RText} from './interfaces/renderer_dom';\nimport
{SanitizerFn} from './interfaces/sanitization';\nimport {HEADER_OFFSET, LView, RENDERER, TView} from
 './interfaces/view';\nimport {createCommentNode, createElementNode, createTextNode, nativeInsertBefore,
nativeParentNode, nativeRemoveNode, updateTextNode} from './node_manipulation';\nimport {getBindingIndex}
from './state';\nimport {renderStringify} from './util/stringify_utils';\nimport {getNativeByIndex, unwrapRNode}
from './util/view_utils';\n\nimport {getLocaleId} from './i18n_locale_id';\nimport {getCurrentICUCaseIndex,
getParentFromIcuCreateOpCode, getRefFromIcuCreateOpCode, getTicu} from './i18n_util';\n\n\n/* Keep
track of which input bindings in `i18nExp` have changed.\n * This is used to efficiently update expressions in
i18n only when
```

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the corresponding input has\n * changed.\n * 1) Each bit represents which of the `i18nExp` has changed.\n * 2)
There are 32 bits allowed in JS.\n * 3) Bit 32 is special as it is shared for all changes past 32. (In other words if you
have more\n * than 32 `i18nExp` then all changes past 32nd `i18nExp` will be mapped to same bit. This means\n *
that we may end up changing more than we need to. But i18n expressions with 32 bindings is rare\n * so in practice
it should not be an issue.)\n */\n\nlet changeMask = 0b0;\n\n/* Keeps track of which bit needs to be updated in
`changeMask`\n * This value gets incremented on every call to `i18nExp`\n */\n\nlet changeMaskCounter =
0;\n\n/* Keep track of which input bindings in `i18nExp` have changed.\n * `setMaskBit` gets invoked by
each call to `i18nExp`.\n * @param hasChange did `i18nExp` detect a change.\n */\n\nexport function
setMaskBit(hasChange: boolean) {\n  if (hasChange) {\n    changeMask = changeMask | (1
<< Math.min(changeMaskCounter, 31));\n  }\n  changeMaskCounter++;\n}\n\nexport function applyI18n(tView:
TView, IView: LView, index: number) {\n  if (changeMaskCounter > 0) {\n    ngDevMode &&
assertDefined(tView, `tView should be defined`);\n    const tI18n = tView.data[index] as TI18n |
I18nUpdateOpCodes;\n    // When `index` points to an `i18nAttributes` then we have an array otherwise `TI18n`\n
const updateOpCodes: I18nUpdateOpCodes =\n      Array.isArray(tI18n) ? tI18n as I18nUpdateOpCodes : (tI18n
as TI18n).update;\n    const bindingsStartIndex = getBindingIndex() - changeMaskCounter - 1;\n
applyUpdateOpCodes(tView, IView, updateOpCodes, bindingsStartIndex, changeMask);\n  }\n  // Reset
changeMask & maskBit to default for the next update cycle\n  changeMask = 0b0;\n  changeMaskCounter =
0;\n}\n\n\n/* Apply `I18nCreateOpCodes` op-codes as stored in `TI18n.create`.\n * Creates text (and
comment) nodes which are internationalized.\n * @param IView Current IView\n
* @param createOpCodes Set of op-codes to apply\n * @param parentRNode Parent node (so that direct children
can be added eagerly) or `null` if it is\n * a root node.\n * @param insertInFrontOf DOM node that should be
used as an anchor.\n */\n\nexport function applyCreateOpCodes(\n  IView: LView, createOpCodes:
I18nCreateOpCodes, parentRNode: RElement|null,\n  insertInFrontOf: RElement|null): void {\n  const renderer =
IView[RENDERER];\n  for (let i = 0; i < createOpCodes.length; i++) {\n    const opCode = createOpCodes[i++] as
any;\n    const text = createOpCodes[i] as string;\n    const isComment = (opCode &
I18nCreateOpCode.COMMENT) === I18nCreateOpCode.COMMENT;\n    const appendNow =\n      (opCode &
I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY;\n    const index =
opCode >>> I18nCreateOpCode.SHIFT;\n    let rNode = IView[index];\n    if (rNode === null) {\n      // We only
create new DOM nodes if they don't already exist: If ICU switches case back
to a\n      // case which was already instantiated, no need to create new DOM nodes.\n      rNode = IView[index] =\n
isComment ? renderer.createComment(text) : createTextNode(renderer, text);\n    }\n    if (appendNow &&
parentRNode !== null) {\n      nativeInsertBefore(renderer, parentRNode, rNode, insertInFrontOf, false);\n    }\n
}\n}\n\n\n/* Apply `I18nMutateOpCodes` OpCodes.\n * @param tView Current `TView`\n * @param
```

```

mutableOpCodes Mutable OpCodes to process\n * @param IView Current `LView`\n * @param anchorRNode
place where the i18n node should be inserted.\n */\nexport function applyMutableOpCodes(\n  tView: TView,\n  mutableOpCodes: IcuCreateOpCodes, IView: LView, anchorRNode: RNode): void {\n  ngDevMode &&\n  assertDomNode(anchorRNode);\n  const renderer = IView[RENDERER];\n  // `rootIdx` represents the node into\n  which all inserts happen.\n  let rootIdx: number|null = null;\n  // `rootRNode` represents the real node into which we\n  insert. This can be different\n  from\n  // `IView[rootIdx]` if we have projection.\n  // - null we don't have a parent (as can be the case in when we\n  are inserting into a root of\n  // LView which has no parent.)\n  // - `RElement` The element representing the root\n  after taking projection into account.\n  let rootRNode!: RElement|null;\n  for (let i = 0; i < mutableOpCodes.length;\n  i++) {\n    const opCode = mutableOpCodes[i];\n    if (typeof opCode === 'string') {\n      const textNodeIndex =\n      mutableOpCodes[++i] as number;\n      if (IView[textNodeIndex] === null) {\n        ngDevMode &&\n        ngDevMode.rendererCreateTextNode++;\n        ngDevMode && assertIndexInRange(IView, textNodeIndex);\n        IView[textNodeIndex] = createTextNode(renderer, opCode);\n      }\n    } else if (typeof opCode === 'number') {\n      switch (opCode & IcuCreateOpCode.MASK_INSTRUCTION) {\n        case IcuCreateOpCode.AppendChild:\n          const parentIdx = getParentFromIcuCreateOpCode(opCode);\n          if (rootIdx === null) {\n            // The first operation should save the `rootIdx` because the first operation\n            // must insert into the root.\n            (Only subsequent operations can insert into a dynamic\n            // parent)\n            rootIdx = parentIdx;\n            rootRNode = nativeParentNode(renderer, anchorRNode);\n          }\n          let insertInFrontOf: RNode|null;\n          let parentRNode: RElement|null;\n          if (parentIdx === rootIdx) {\n            insertInFrontOf = anchorRNode;\n          }\n          parentRNode = rootRNode;\n          } else {\n            insertInFrontOf = null;\n            parentRNode =\n            unwrapRNode(IView[parentIdx]) as RElement;\n          }\n          // FIXME(misko): Refactor with\n          `processI18nText`\n          if (parentRNode !== null) {\n            // This can happen if the `LView` we are adding to is\n            not attached to a parent `LView`.\n            // In such a case there is no `root` we can attach to. This is fine, as we\n            still need to\n            // create the elements.\n            When the `LView` gets later added to a parent these `root` nodes\n            // get picked up and added.\n            ngDevMode && assertDomNode(parentRNode);\n            const refIdx = getRefFromIcuCreateOpCode(opCode);\n            ngDevMode && assertGreaterThan(refIdx, HEADER_OFFSET, 'Missing ref');\n            // `unwrapRNode` is\n            not needed here as all of these point to RNodes as part of the i18n\n            // which can't have components.\n            const child = IView[refIdx] as RElement;\n            ngDevMode && assertDomNode(child);\n            nativeInsertBefore(renderer, parentRNode, child, insertInFrontOf, false);\n            const tIcu = getTicu(tView,\n            refIdx);\n            if (tIcu !== null && typeof tIcu === 'object') {\n              // If we just added a comment node which\n              has ICU then that ICU may have already been\n              // rendered and therefore we need to re-add it here.\n              ngDevMode && assertTicu(tIcu);\n              const caseIndex\n              = getCurrentICUCaseIndex(tIcu, IView);\n              if (caseIndex !== null) {\n                applyMutableOpCodes(tView, tIcu.create[caseIndex], IView, IView[tIcu.anchorIdx]);\n              }\n            }\n          }\n          break;\n          case IcuCreateOpCode.Attr:\n            const elementNodeIndex = opCode >>>\n            IcuCreateOpCode.SHIFT_REF;\n            const attrName = mutableOpCodes[++i] as string;\n            const attrValue =\n            mutableOpCodes[++i] as string;\n            // This code is used for ICU expressions only, since we don't support\n            // directives/components in ICUs, we don't need to worry about inputs here\n            setElementAttribute(\n            renderer, getNativeByIndex(elementNodeIndex, IView) as RElement, null, null, attrName,\n            attrValue,\n            null);\n            break;\n            default:\n              if (ngDevMode) {\n                throw new RuntimeError(\n                RuntimeErrorCode.INVALID_I18N_STRUCTURE,\n                `Unable to determine\n                the type of mutate operation for \"\${opCode}\"`);\n              }\n            }\n          } else {\n            switch (opCode) {\n              case\n              ICU_MARKER:\n                const commentValue = mutableOpCodes[++i] as string;\n                const commentNodeIndex\n                = mutableOpCodes[++i] as number;\n                if (IView[commentNodeIndex] === null) {\n                  ngDevMode &&\n                  assertEqual(\n                  typeof commentValue, 'string',\n                  `Expected \"\${commentValue}\" to\n                  be a comment node value`);\n                  ngDevMode && ngDevMode.rendererCreateComment++;\n                  ngDevMode && assertIndexInExpandoRange(IView, commentNodeIndex);\n                  const commentRNode =

```





```

bindingsStartIndex, IView);
    }
    }
    }
    i += skipCodes;
  }
}

/**
 * Apply OpCodes associated with updating an existing ICU.
 * @param tView Current `TVIEW`
 * @param tIcu Current `TIcu`
 * @param bindingsStartIndex Location of the first `i18nApply`
 * @param IView Current `LVIEW`
 */
function applyIcuUpdateCase(tView: TVIEW, tIcu: TIcu, bindingsStartIndex: number, IView: LVIEW) {
  ngDevMode && assertIndexInRange(IView, tIcu.currentCaseLViewIndex);
  let activeCaseIndex = IView[tIcu.currentCaseLViewIndex];
  if (activeCaseIndex !== null) {
    let mask = changeMask;
    if (activeCaseIndex < 0) {
      // Clear the flag.
      // Negative number means that the ICU was freshly created and we need to force the update.
      activeCaseIndex = IView[tIcu.currentCaseLViewIndex] = ~activeCaseIndex;
      // -1 is same as all bits on, which simulates creation since it marks all bits dirty
      mask = -1;
    }
    applyUpdateOpCodes(tView, IView, tIcu.update[activeCaseIndex], bindingsStartIndex, mask);
  }
}

/**
 * Apply OpCodes associated with switching a case on ICU.
 * This involves tearing down existing case and then building up a new case.
 * @param tView Current `TVIEW`
 * @param tIcu Current `TIcu`
 * @param IView Current `LVIEW`
 * @param value Value of the case to update to.
 */
function applyIcuSwitchCase(tView: TVIEW, tIcu: TIcu, IView: LVIEW, value: string) {
  // Rebuild a new case for this ICU
  const caseIndex = getCaseIndex(tIcu, value);
  let activeCaseIndex = getCurrentICUCaseIndex(tIcu, IView);
  if (activeCaseIndex !== caseIndex) {
    applyIcuSwitchCaseRemove(tView, tIcu, IView);
    IView[tIcu.currentCaseLViewIndex] = caseIndex === null ? null : ~caseIndex;
    if (caseIndex !== null) {
      // Add the nodes for the new case
      const anchorRNode = IView[tIcu.anchorIdx];
      if (anchorRNode) {
        ngDevMode && assertDomNode(anchorRNode);
        applyMutableOpCodes(tView, tIcu.create[caseIndex], IView, anchorRNode);
      }
    }
  }
}

/**
 * Apply OpCodes associated with tearing ICU case.
 * This involves tearing down existing case and then building up a new case.
 * @param tView Current `TVIEW`
 * @param tIcu Current `TIcu`
 * @param IView Current `LVIEW`
 */
function applyIcuSwitchCaseRemove(tView: TVIEW, tIcu: TIcu, IView: LVIEW) {
  let activeCaseIndex = getCurrentICUCaseIndex(tIcu, IView);
  if (activeCaseIndex !== null) {
    const removeCodes = tIcu.remove[activeCaseIndex];
    for (let i = 0; i < removeCodes.length; i++) {
      const nodeOrIcuIndex = removeCodes[i] as number;
      if (nodeOrIcuIndex > 0) {
        // Positive numbers are `RNode`s.
        const rNode = getNativeByIndex(nodeOrIcuIndex, IView);
        rNode !== null && nativeRemoveNode(IView[RENDERER], rNode);
      } else {
        // Negative numbers are ICUs
        applyIcuSwitchCaseRemove(tView, getTIcu(tView, ~nodeOrIcuIndex!), IView);
      }
    }
  }
}

/**
 * Returns the index of the current case of an ICU expression depending on the main binding value.
 * @param icuExpression
 * @param bindingValue The value of the main binding used by this ICU expression.
 */
function getCaseIndex(icuExpression: TIcu, bindingValue: string): number | null {
  let index = icuExpression.cases.indexOf(bindingValue);
  if (index === -1) {
    switch (icuExpression.type) {
      case IcuType.plural: {
        const resolvedCase = getPluralCase(bindingValue, getLocaleId());
        index = icuExpression.cases.indexOf(resolvedCase);
        if (index === -1 && resolvedCase !== 'other') {
          index = icuExpression.cases.indexOf('other');
        }
        break;
      }
      case IcuType.select: {
        index = icuExpression.cases.indexOf('other');
        break;
      }
    }
  }
  return index === -1 ? null : index;
}

/**
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 */
import {assertDomNode, assertNumber, assertNumberInRange} from '../util/assert';
import {EMPTY_ARRAY} from '../util/empty';
import {assertTIcu, assertTNodeForLView} from './assert';
import {getCurrentICUCaseIndex} from './i18n/i18n_util';
import {I18nRemoveOpCodes, TIcu} from './interfaces/i18n';
import {TIcuContainerNode} from './interfaces/node';
import {RNode} from './interfaces/renderer_dom';
import {LVIEW, TVIEW} from './interfaces/view';

export function loadIcuContainerVisitor() {
  const _stack: any[] = [];
  let _index: number = -1;
  let _IView: LVIEW;
  let _removes: I18nRemoveOpCodes;

  /**
   * Retrieves a set of root nodes from `TIcu.remove`. Used by `TNodeType.ICUContainer` to determine which root belong to the ICU.
   */

```

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Example of usage.\n * ```\n * const nextRNode = icuContainerIteratorStart(tIcuContainerNode, IView);\n * let\n rNode: RNode|null;\n * while(rNode = nextRNode()) {\n *   console.log(rNode);\n * }\n * ```\n * \n *\n * @param tIcuContainerNode Current `TicuContainerNode`\n * @param IView `LView` where the `RNode`s should be looked up.\n * \n function\n icuContainerIteratorStart(tIcuContainerNode: TicuContainerNode, IView: LView): () =>\n   RNode | null {\n     _IView = IView;\n     while (_stack.length) _stack.pop();\n     ngDevMode &&\n     assertTNodeForLView(tIcuContainerNode, IView);\n     enterIcu(tIcuContainerNode.value, IView);\n     return\n     icuContainerIteratorNext();\n   }\n\n   function enterIcu(tIcu: Ticu, IView: LView) {\n     _index = 0;\n     const\n     currentCase = getCurrentICUCaseIndex(tIcu, IView);\n     if (currentCase !== null) {\n       ngDevMode &&\n       assertNumberInRange(currentCase, 0, tIcu.cases.length - 1);\n       _removes = tIcu.remove[currentCase];\n     } else\n     {\n       _removes = EMPTY_ARRAY as any;\n     }\n   }\n\n   function icuContainerIteratorNext(): RNode|null {\n     if (_index < _removes.length) {\n       const removeOpCode = _removes[_index++] as number;\n       ngDevMode\n       && assertNumber(removeOpCode, 'Expecting OpCode number');\n\n       if (removeOpCode > 0) {\n         const rNode = _IView[removeOpCode];\n         ngDevMode &&\n         assertDomNode(rNode);\n         return rNode;\n       } else {\n         _stack.push(_index, _removes);\n         // ICUs are\n         represented by negative indices\n         const tIcuIndex = ~removeOpCode;\n         const tIcu =\n         _IView[TVIEW].data[tIcuIndex] as Ticu;\n         ngDevMode && assertTICU(tIcu);\n         enterIcu(tIcu, _IView);\n         return icuContainerIteratorNext();\n       }\n     } else {\n       if (_stack.length === 0) {\n         return null;\n       } else\n       {\n         _removes = _stack.pop();\n         _index = _stack.pop();\n         return icuContainerIteratorNext();\n       }\n     }\n   }\n\n   return icuContainerIteratorStart;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights\n Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n LICENSE file at https://angular.io/license\n * \n\nimport {assertNumber, assertString} from\n '././util/assert';\nimport {ELEMENT_MARKER, I18nCreateOpCode, I18nCreateOpCodes, I18nRemoveOpCodes,\n I18nUpdateOpCode, I18nUpdateOpCodes, ICU_MARKER, IcuCreateOpCode, IcuCreateOpCodes} from\n './interfaces/i18n';\nimport {getInstructionFromIcuCreateOpCode, getParentFromIcuCreateOpCode,\n getRefFromIcuCreateOpCode} from './i18n_util';\n\n\n/**\n * Converts `I18nCreateOpCodes` array into a human\n readable format.\n * \n * This function is attached to the `I18nCreateOpCodes.debug` property if `ngDevMode` is\n enabled.\n * \n * This function provides a human readable view of the opcodes. This is useful when debugging the\n * application as well as writing more readable tests.\n * \n * @param this `I18nCreateOpCodes` if attached as a\n method.\n * @param opcodes `I18nCreateOpCodes` if invoked as a function.\n * \n\nexport function\n i18nCreateOpCodesToString(\n   this: I18nCreateOpCodes|void, opcodes?: I18nCreateOpCodes): string[] {\n     const\n     createOpCodes: I18nCreateOpCodes = opcodes || (Array.isArray(this)\n     ? this : [] as any);\n     let lines: string[] = [];\n     for (let i = 0; i < createOpCodes.length; i++) {\n       const opCode =\n       createOpCodes[i++] as any;\n       const text = createOpCodes[i] as string;\n       const isComment = (opCode &\n       I18nCreateOpCode.COMMENT) === I18nCreateOpCode.COMMENT;\n       const appendNow = (\n       opCode &\n       I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY;\n       const index =\n       opCode >>> I18nCreateOpCode.SHIFT;\n       lines.push(`IView[${index}] = document.${isComment ?\n       'createComment' : 'createText'}(${\n       JSON.stringify(text)});`);\n       if (appendNow) {\n         lines.push(`parent.appendChild(IView[${index}]);`);\n       }\n     }\n     return lines;\n   }\n\n\n\n/**\n * Converts\n `I18nUpdateOpCodes` array into a human readable format.\n * \n * This function is attached to the\n `I18nUpdateOpCodes.debug` property if `ngDevMode` is enabled.\n * \n * This function provides a human readable\n view of the opcodes. This is useful when debugging the\n * application as well as\n writing more readable tests.\n * \n * @param this `I18nUpdateOpCodes` if attached as a method.\n * @param\n opcodes `I18nUpdateOpCodes` if invoked as a function.\n * \n\nexport function i18nUpdateOpCodesToString(\n   this: I18nUpdateOpCodes|void, opcodes?: I18nUpdateOpCodes): string[] {\n     const parser = new\n     OpCodeParser(opcodes || (Array.isArray(this) ? this : []));\n     let lines: string[] = [];\n\n     function\n     consumeOpCode(value: number): string {\n       const ref = value >>> I18nUpdateOpCode.SHIFT_REF;\n       const\n       opCode = value & I18nUpdateOpCode.MASK_OPCODE;\n       switch (opCode) {\n         case

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I18nUpdateOpCode.Text:\n    return `(IView[${ref}] as Text).textContent = $$$`; \n    case
I18nUpdateOpCode.Attr:\n    const attrName = parser.consumeString(); \n    const sanitizationFn =
parser.consumeFunction(); \n    const value = sanitizationFn ? `(${sanitizationFn})($$$)` : `$$$`; \n    return
`(IView[${ref}] as Element).setAttribute(`${attrName}`, ${value})`; \n    case I18nUpdateOpCode.IcuSwitch:\n
    return `icuSwitchCase(${ref}, $$$)`; \n    case I18nUpdateOpCode.IcuUpdate:\n    return
`icuUpdateCase(${ref})`; \n } \n throw new Error('unexpected OpCode'); \n } \n \n while (parser.hasMore()) { \n
let mask = parser.consumeNumber(); \n let size = parser.consumeNumber(); \n const end = parser.i + size; \n
const statements: string[] = []; \n let statement = ""; \n while (parser.i < end) { \n let value =
parser.consumeNumberOrString(); \n if (typeof value === 'string') { \n statement += value; \n } else if
(value < 0) { \n // Negative numbers are ref indexes \n // Here `i` refers to current binding index. It is to
signify that the value is relative, \n // rather than absolute. \n statement += `IView[i + value + ]`; \n }
else { \n // Positive numbers are operations. \n const opCodeText = consumeOpCode(value); \n
statements.push(opCodeText.replace('$$$', `` + statement
+ ``) + '); \n statement = ""; \n } \n } \n lines.push(`if (mask & 0b${mask.toString(2)}) {
${statements.join(' ')} `); \n } \n return lines; \n } \n \n /** \n * Converts `I18nCreateOpCodes` array into a human
readable format. \n * \n * This function is attached to the `I18nCreateOpCodes.debug` if `ngDevMode` is enabled.
This \n * function provides a human readable view of the opcodes. This is useful when debugging the \n * application
as well as writing more readable tests. \n * \n * @param this `I18nCreateOpCodes` if attached as a method. \n *
@param opcodes `I18nCreateOpCodes` if invoked as a function. \n * \n export function
icuCreateOpCodesToString(\n this: IcuCreateOpCodes | void, opcodes?: IcuCreateOpCodes): string[] { \n const
parser = new OpCodeParser(opcodes || (Array.isArray(this) ? this : [])); \n let lines: string[] = []; \n \n function
consumeOpCode(opCode: number): string { \n const parent = getParentFromIcuCreateOpCode(opCode); \n const
ref = getRefFromIcuCreateOpCode(opCode); \n
switch (getInstructionFromIcuCreateOpCode(opCode)) { \n case IcuCreateOpCode.AppendChild:\n    return
`(IView[${parent}] as Element).appendChild(IView[${lastRef}])`; \n case IcuCreateOpCode.Attr:\n    return
`(IView[${ref}] as Element).setAttribute(`${parser.consumeString()}`, `"` \n
parser.consumeString()`)`; \n } \n throw new Error('Unexpected OpCode: ' +
getInstructionFromIcuCreateOpCode(opCode)); \n } \n \n let lastRef = -1; \n while (parser.hasMore()) { \n let value
= parser.consumeNumberStringOrMarker(); \n if (value === ICU_MARKER) { \n const text =
parser.consumeString(); \n lastRef = parser.consumeNumber(); \n lines.push(`IView[${lastRef}] =
document.createComment("${text}")`); \n } else if (value === ELEMENT_MARKER) { \n const text =
parser.consumeString(); \n lastRef = parser.consumeNumber(); \n lines.push(`IView[${lastRef}] =
document.createElement("${text}")`); \n } else if (typeof
value === 'string') { \n lastRef = parser.consumeNumber(); \n lines.push(`IView[${lastRef}] =
document.createTextNode("${value}")`); \n } else if (typeof value === 'number') { \n const line =
consumeOpCode(value); \n line && lines.push(line); \n } else { \n throw new Error('Unexpected value'); \n
} \n } \n \n return lines; \n } \n \n /** \n * Converts `I18nRemoveOpCodes` array into a human readable format. \n * \n *
This function is attached to the `I18nRemoveOpCodes.debug` if `ngDevMode` is enabled. This \n * function
provides a human readable view of the opcodes. This is useful when debugging the \n * application as well as writing
more readable tests. \n * \n * @param this `I18nRemoveOpCodes` if attached as a method. \n * \n * @param opcodes
`I18nRemoveOpCodes` if invoked as a function. \n * \n export function
i18nRemoveOpCodesToString(\n this:
I18nRemoveOpCodes | void, opcodes?: I18nRemoveOpCodes): string[] { \n const removeCodes = opcodes ||
(Array.isArray(this) ? this
: []); \n let lines: string[] = []; \n for (let i = 0; i < removeCodes.length; i++) { \n const nodeOrIcuIndex =
removeCodes[i] as number; \n if (nodeOrIcuIndex > 0) { \n // Positive numbers are `RNode`s. \n
lines.push(`remove(IView[${nodeOrIcuIndex}])`); \n } else { \n // Negative numbers are ICUs \n
lines.push(`removeNestedICU(${~nodeOrIcuIndex})`); \n } \n } \n \n return lines; \n } \n \n \n class OpCodeParser { \n
i: number = 0; \n codes: any[]; \n \n constructor(codes: any[]) { \n this.codes = codes; \n } \n \n hasMore() { \n

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existingTNodeStack: TNode[][] = [[]];\n if (ngDevMode) {\n   attachDebugGetter(createOpCodes,\n   i18nCreateOpCodesToString);\n   attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n } \n\n message = getTranslationForTemplate(message, subTemplateIndex);\n const msgParts =\n replaceNgsp(message).split(PH_REGEXP);\n for (let i = 0; i < msgParts.length; i++) {\n   let value =\n msgParts[i];\n   if ((i & 1) === 0) {\n     // Even indexes are text (including bindings & ICU expressions)\n     const\n parts = i18nParseTextIntoPartsAndICU(value);\n     for (let j = 0;\n j < parts.length; j++) {\n       let part = parts[j];\n       if ((j & 1) === 0) {\n         // `j` is odd therefore `part` is\n string\n         const text = part as string;\n         ngDevMode && assertString(text, 'Parsed ICU part should be\n string');\n         if (text !== '') {\n           i18nStartFirstCreatePassProcessTextNode(\n             tView, rootTNode,\n existingTNodeStack[0], createOpCodes, updateOpCodes, IView, text);\n           } else {\n             // `j` is Even\n therefor `part` is an `ICUExpression`\n             const icuExpression: IcuExpression = part as IcuExpression;\n             //\n Verify that ICU expression has the right shape. Translations might contain invalid\n             // constructions (while\n original messages were correct), so ICU parsing at runtime may\n             // not succeed (thus `icuExpression` remains\n a string).\n             // Note: we intentionally retain the error here by not using `ngDevMode`, because\n             // the\n value can change\n             based on the locale and users aren't guaranteed to hit\n             // an invalid string while they're developing.\n             if\n (typeof icuExpression !== 'object') {\n               throw new Error(`Unable to parse ICU expression in\n "${message}"\n message.`);\n             }\n             const icuContainerTNode = createTNodeAndAddOpCode(\n               tView,\n rootTNode, existingTNodeStack[0], IView, createOpCodes,\n               ngDevMode ? `ICU\n ${index}:${icuExpression.mainBinding}` : '', true);\n             const icuNodeIndex = icuContainerTNode.index;\n             ngDevMode &&\n               assertGreaterThanOrEqual(\n                 icuNodeIndex, HEADER_OFFSET, 'Index\n must be in absolute LView offset');\n             icuStart(tView, IView, updateOpCodes, parentTNodeIndex,\n icuExpression, icuNodeIndex);\n           }\n           } else {\n             // Odd indexes are placeholders (elements and sub-\n templates)\n             // At this point value is something like: `/#1:2` (originally coming from `/#1:2`)\n             const isClosing = value.charCodeAt(0) === CharCode.SLASH;\n             const type = value.charCodeAt(isClosing ?\n 1 : 0);\n             ngDevMode && assertOneOf(type, CharCode.STAR, CharCode.HASH);\n             const index =\n HEADER_OFFSET + Number.parseInt(value.substring((isClosing ? 2 : 1)));\n             if (isClosing) {\n               existingTNodeStack.shift();\n               setCurrentTNode(getCurrentParentTNode()!, false);\n             } else {\n               const\n tNode = createTNodePlaceholder(tView, existingTNodeStack[0], index);\n               existingTNodeStack.unshift([]);\n               setCurrentTNode(tNode, true);\n             }\n           }\n           tView.data[index] = <TNode>{\n             create: createOpCodes,\n             update: updateOpCodes,\n           };\n           // Allocate space in i18n Range add create OpCode instruction to create a\n text or comment node.\n           // @param tView Current `TView` needed to allocate space in i18n range.\n           // @param\n rootTNode Root `TNode` of the i18n block. This node determines if the new TNode will be\n           // added as part\n of the `i18nStart` instruction or as part of the `TNode.insertBeforeIndex`.\n           // @param existingTNodes internal state\n for `addTNodeAndUpdateInsertBeforeIndex`.\n           // @param IView Current `LView` needed to allocate space in i18n\n range.\n           // @param createOpCodes Array storing `I18nCreateOpCodes` where new opCodes will be added.\n           // @param text Text to be added when the `Text` or `Comment` node will be created.\n           // @param isICU true if a\n `Comment` node for ICU (instead of `Text`) node should be created.\n           // function createTNodeAndAddOpCode(\n tView: TView, rootTNode: TNode|null, existingTNodes: TNode[], IView: LView,\n createOpCodes:\n I18nCreateOpCodes, text: string|null, isICU: boolean): TNode {\n           const i18nNodeIdx = allocExpando(tView,\n IView, 1, null);\n           let opCode = i18nNodeIdx << I18nCreateOpCode.SHIFT;\n           let parentTNode =\n getCurrentParentTNode();\n           if (rootTNode === parentTNode) {\n             // FIXME(misko): A null `parentTNode`\n should represent when we fall of the `LView` boundary.\n             //\n             // (there is no parent), but in some circumstances (because we are inconsistent about how we set\n             //\n `previousOrParentTNode`) it could point to `rootTNode` So this is a work around.\n             parentTNode = null;\n           }\n           if\n (parentTNode === null) {\n             // If we don't have a parent that means that we can eagerly add nodes.\n             // If we have\n a parent than these nodes can't be added now (as the parent has not been created\n             // yet) and instead the\n `parentTNode` is responsible for adding it. See\n             // `TNode.insertBeforeIndex`\n             opCode |=

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I18nCreateOpCode.APPEND_EAGERLY;\n }\n if (isICU) {\n   opCode |= I18nCreateOpCode.COMMENT;\n   ensureIcuContainerVisitorLoaded(loadIcuContainerVisitor);\n }\n createOpCodes.push(opCode, text === null ? "\n // We store `{{}}` so that when looking at debug `TNodeType.template` we can see where the\n // bindings are.\n const tNode = createTNodeAtIndex(\n   tView, i18nNodeIdx, isICU ? TNodeType.Icu : TNodeType.Text,\n   text === null ? (ngDevMode ? `{{}}` : "") : text, null);\n addTNodeAndUpdateInsertBeforeIndex(existingTNodes, tNode);\n const tNodeIdx = tNode.index;\n setCurrentTNode(tNode, false /* Text nodes are self closing */);\n if (parentTNode !== null && rootTNode !== parentTNode) {\n   // We are a child of deeper node (rather than a direct child of `i18nStart` instruction.)\n   // We have to make sure to add ourselves to the parent.\n   setTNodeInsertBeforeIndex(parentTNode, tNodeIdx);\n }\n return tNode;\n}\n\n/**\n * Processes text node in i18n block.\n * \n * Text nodes can have:\n * - Create instruction in `createOpCodes` for creating the text node.\n * - Allocate spec for text node in i18n range of `LView`\n * - If contains binding:\n * - bindings => allocate space in i18n range of `LView` to store the binding value.\n * - populate `updateOpCodes` with update instructions.\n * \n * @param tView Current `TVView`\n * @param rootTNode Root `TNode` of the i18n block. This node determines if the new TNode will be added as part of the `i18nStart` instruction or as part of the `TNode.insertBeforeIndex`.\n * @param existingTNodes internal state for `addTNodeAndUpdateInsertBeforeIndex`.\n * @param createOpCodes Location where the creation OpCodes will be stored.\n * @param IView Current `LView`\n * @param text The translated text (which may contain binding)\n */\nfunction i18nStartFirstCreatePassProcessTextNode(\n  tView: TVView, rootTNode: TNode|null,\n  existingTNodes: TNode[], createOpCodes: I18nCreateOpCodes,\n  updateOpCodes: I18nUpdateOpCodes, IView: LView, text: string): void {\n  const hasBinding = text.match(BINDING_REGEX);\n  const tNode = createTNodeAndAddOpCode(\n    tView, rootTNode, existingTNodes, IView, createOpCodes, hasBinding ? null : text, false);\n  if (hasBinding) {\n    generateBindingUpdateOpCodes(updateOpCodes, text, tNode.index, null, 0, null);\n  }\n}\n\n/**\n * See `i18nAttributes` above.\n */\nexport function i18nAttributesFirstPass(tView: TVView, index: number, values: string[]) {\n  const previousElement = getCurrentTNode();\n  const previousElementIndex = previousElement.index;\n  const updateOpCodes: I18nUpdateOpCodes = [] as any;\n  if (ngDevMode) {\n    attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n  }\n  if (tView.firstCreatePass && tView.data[index] === null) {\n    for (let i = 0; i < values.length; i += 2) {\n      const attrName = values[i];\n      const message = values[i + 1];\n      if (message !== "") {\n        // Check if attribute value contains an ICU and throw an error if that's the case.\n        // ICUs in element attributes are not supported.\n        // Note: we intentionally retain the error here by not using `ngDevMode`, because\n        // the `value` can change based on the locale and users aren't guaranteed to hit\n        // an invalid string while they're developing.\n        if (ICU_REGEX.test(message)) {\n          throw new Error(\n            `ICU expressions are not supported in attributes. Message: "${message}`);\n        }\n      }\n      // i18n attributes that hit this code path are guaranteed to have bindings, because\n      // the compiler treats static i18n attributes as regular attribute bindings.\n      // Since this may not be the first i18n attribute on this element we need to pass in how\n      // many previous bindings there have already been.\n      generateBindingUpdateOpCodes(\n        updateOpCodes, message, previousElementIndex, attrName, countBindings(updateOpCodes),\n        null);\n    }\n  }\n  tView.data[index] = updateOpCodes;\n}\n\n/**\n * Generate the OpCodes to update the bindings of a string.\n * \n * @param updateOpCodes Place where the update opcodes will be stored.\n * @param str The string containing the bindings.\n * @param destinationNode Index of the destination node which will receive the binding.\n * @param attrName Name of the attribute, if the string belongs to an attribute.\n * @param sanitizeFn Sanitization function used to sanitize the string after update, if necessary.\n * @param bindingStart The IView index of the next expression that can be bound via an opCode.\n * \n * @returns The mask value for these bindings\n */\nfunction generateBindingUpdateOpCodes(\n  updateOpCodes: I18nUpdateOpCodes, str: string, destinationNode: number, attrName: string|null,\n  bindingStart: number, sanitizeFn: SanitizerFn|null): number {\n  ngDevMode &&\n  assertGreaterThanOrEqual(\n
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destinationNode, HEADER_OFFSET, 'Index must be in absolute LView offset');\n const maskIndex =
updateOpCodes.length; // Location of mask\n const sizeIndex = maskIndex + 1; // location of size for
skipping\n updateOpCodes.push(null, null); // Alloc space for mask and size\n const startIndex = maskIndex
+ 2; // location of first allocation.\n if (ngDevMode) {\n attachDebugGetter(updateOpCodes,
i18nUpdateOpCodesToString);\n
}\n const textParts = str.split(BINDING_REGEXP);\n let mask = 0;\n\n for (let j = 0; j < textParts.length; j++) {\n
const textValue = textParts[j];\n\n if (j & 1) {\n // Odd indexes are bindings\n const bindingIndex =
bindingStart + parseInt(textValue, 10);\n updateOpCodes.push(-1 - bindingIndex);\n mask = mask |
toMaskBit(bindingIndex);\n } else if (textValue !== '') {\n // Even indexes are text\n
updateOpCodes.push(textValue);\n }\n }\n\n updateOpCodes.push(destinationNode <<
I18nUpdateOpCode.SHIFT_REF |\n (attrName ? I18nUpdateOpCode.Attr : I18nUpdateOpCode.Text));\n if
(attrName) {\n updateOpCodes.push(attrName, sanitizeFn);\n }\n updateOpCodes[maskIndex] = mask;\n
updateOpCodes[sizeIndex] = updateOpCodes.length - startIndex;\n return mask;\n}\n\n/**\n * Count the number of
bindings in the given `opCodes`\n *\n * It could be possible to speed this up, by passing the number of bindings
found back from\n *\n * `generateBindingUpdateOpCodes`\n
to `i18nAttributesFirstPass()` but this would then require more\n *\n * complexity in the code and/or transient objects
to be created.\n *\n * Since this function is only called once when the template is instantiated, is trivial in the\n *\n
* first instance (since `opCodes` will be an empty array), and it is not common for elements to\n *\n * contain multiple
i18n bound attributes, it seems like this is a reasonable compromise.\n *\n * \nfunction countBindings(opCodes:
I18nUpdateOpCodes): number {\n let count = 0;\n for (let i = 0; i < opCodes.length; i++) {\n const opCode =
opCodes[i];\n // Bindings are negative numbers.\n if (typeof opCode === 'number' && opCode < 0) {\n
count++;\n }\n }\n return count;\n}\n\n/**\n * Convert binding index to mask bit.\n *\n * Each index represents a
single bit on the bit-mask. Because bit-mask only has 32 bits, we make\n *\n * the 32nd bit share all masks for all
bindings higher than 32. Since it is extremely rare to\n *\n * have
more than 32 bindings this will be hit very rarely. The downside of hitting this corner\n *\n * case is that we will
execute binding code more often than necessary. (penalty of performance)\n *\n * \nfunction toMaskBit(bindingIndex:
number): number {\n return 1 << Math.min(bindingIndex, 31);\n}\n\n\nexport function
isRootTemplateMessage(subTemplateIndex: number): subTemplateIndex is - 1 {\n return subTemplateIndex === -
1;\n}\n\n\n/**\n * Removes everything inside the sub-templates of a message.\n *\n * \nfunction
removeInnerTemplateTranslation(message: string): string {\n let match;\n let res = '';\n let index = 0;\n let
inTemplate = false;\n let tagMatched;\n\n while ((match = SUBTEMPLATE_REGEXP.exec(message)) !== null)
{\n if (!inTemplate) {\n res += message.substring(index, match.index + match[0].length);\n tagMatched =
match[1];\n inTemplate = true;\n } else {\n if (match[0] ===
`${MARKER}/${tagMatched}${MARKER}`) {\n index = match.index;\n inTemplate
= false;\n }\n }\n }\n\n ngDevMode &&\n assertEquals(\n inTemplate, false,\n `Tag mismatch:
unable to find the end of the sub-template in the translation \"${\n message}\"`);\n\n res +=
message.slice(index);\n return res;\n}\n\n\n/**\n * Extracts a part of a message and removes the rest.\n *\n * This
method is used for extracting a part of the message associated with a template. A\n *\n * translated message can span
multiple templates.\n *\n * Example:\n * ``\n * <div i18n>Translate <span *ngIf>me</span></div>\n * ``\n *\n * @param message The message to crop\n *\n * @param subTemplateIndex Index of the sub-template to extract. If
undefined it returns the\n *\n * external template and removes all sub-templates.\n *\n * \nfunction
getTranslationForTemplate(message: string, subTemplateIndex: number) {\n if
(isRootTemplateMessage(subTemplateIndex)) {\n // We want the root template message, ignore all sub-
templates\n return removeInnerTemplateTranslation(message);\n
}\n\n } else {\n // We want a specific sub-template\n const start =\n
message.indexOf(`${subTemplateIndex}${MARKER}`) + 2 + subTemplateIndex.toString().length;\n const end
= message.search(new RegExp(`${MARKER}\\\\\\\\\\\\\\\\*\\\\\\\\\\\\\\\\d+${subTemplateIndex}${MARKER}`));\n return
removeInnerTemplateTranslation(message.substring(start, end));\n }\n}\n\n\n/**\n * Generate the OpCodes for ICU

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expressions.\n *\n * @param icuExpression\n * @param index Index where the anchor is stored and an optional
`TicuContainerNode`\n * - `IView[anchorIdx]` points to a `Comment` node representing the anchor for the ICU.\n
* - `tView.data[anchorIdx]` points to the `TicuContainerNode` if ICU is root (`null` otherwise)\n *\nexport
function icuStart(\n tView: TView, IView: LView, updateOpCodes: I18nUpdateOpCodes, parentIdx: number,\n
icuExpression: IcuExpression, anchorIdx: number) {\n ngDevMode && assertDefined(icuExpression, 'ICU
expression must be defined');\n

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let bindingMask = 0;\n const tIcu: TIcu = {\n type: icuExpression.type,\n currentCaseLViewIndex:
allocExpando(tView, IView, 1, null),\n anchorIdx,\n cases: [],\n create: [],\n remove: [],\n update: []\n };\n
addUpdateIcuSwitch(updateOpCodes, icuExpression, anchorIdx);\n setTIcu(tView, anchorIdx, tIcu);\n const
values = icuExpression.values;\n for (let i = 0; i < values.length; i++) {\n // Each value is an array of strings &
other ICU expressions\n const valueArr = values[i];\n const nestedIcus: IcuExpression[] = [];\n for (let j = 0; j
< valueArr.length; j++) {\n const value = valueArr[j];\n if (typeof value !== 'string') {\n // It is an nested
ICU expression\n const icuIndex = nestedIcus.push(value as IcuExpression) - 1;\n // Replace nested ICU
expression by a comment node\n valueArr[j] = `<!--${icuIndex}-->`; \n } \n } \n bindingMask =
parseIcuCase(\n tView, tIcu, IView, updateOpCodes,
parentIdx, icuExpression.cases[i],\n valueArr.join(""), nestedIcus) |\n bindingMask;\n } \n if
(bindingMask) {\n addUpdateIcuUpdate(updateOpCodes, bindingMask, anchorIdx);\n } \n \n \n \n \n *\n * Parses text
containing an ICU expression and produces a JSON object for it.\n * Original code from closure library, modified
for Angular.\n *\n * @param pattern Text containing an ICU expression that needs to be parsed.\n *\n *\nexport
function parseICUBlock(pattern: string): IcuExpression {\n const cases = [];\n const values:
(string|IcuExpression)[][] = [];\n let icuType = IcuType.plural;\n let mainBinding = 0;\n pattern =
pattern.replace(ICU_BLOCK_REGEXP, function(str: string, binding: string, type: string) {\n if (type === 'select')
{\n icuType = IcuType.select;\n } else {\n icuType = IcuType.plural;\n } \n mainBinding =
parseInt(binding.slice(1), 10);\n return ";\n });\n \n \n \n const parts = i18nParseTextIntoPartsAndICU(pattern)
as string[];\n // Looking for (key block)+ sequence. One of the keys has to be "other".\n for (let pos = 0; pos <
parts.length;) {\n let key = parts[pos++].trim();\n if (icuType === IcuType.plural) {\n // Key can be "=x",
we just want "x"\n key = key.replace(/\\s*(?:=)(\\w+)\\s*/, '$1');\n } \n if (key.length) {\n
cases.push(key);\n } \n \n \n const blocks = i18nParseTextIntoPartsAndICU(parts[pos++]) as string[];\n if
(cases.length > values.length) {\n values.push(blocks);\n } \n } \n \n // TODO(ocombe): support ICU
expressions in attributes, see #21615\n return {type: icuType, mainBinding: mainBinding, cases,
values};\n } \n \n \n \n *\n * Breaks pattern into strings and top level {...} blocks.\n * Can be used to break a message
into text and ICU expressions, or to break an ICU expression\n * into keys and cases. Original code from closure
library, modified for Angular.\n *\n * @param pattern (sub)Pattern to be broken.\n * @returns An
`Array<string|IcuExpression>`

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where:\n * - odd positions: `string` => text between ICU expressions\n * - even positions: `ICUExpression` =>
ICU expression parsed into `ICUExpression` record.\n *\nexport function i18nParseTextIntoPartsAndICU(pattern:
string): (string|IcuExpression)[] {\n if (!pattern) {\n return [];\n } \n \n \n let prevPos = 0;\n const braceStack = [];\n
const results: (string|IcuExpression)[] = [];\n const braces = /[{ }]/g;\n // lastIndex doesn't get set to 0 so we have
to.\n braces.lastIndex = 0;\n let match;\n while (match = braces.exec(pattern)) {\n const pos = match.index;\n
if (match[0] === '}') {\n braceStack.pop();\n \n if (braceStack.length === 0) {\n // End of the block.\n
const block = pattern.substring(prevPos, pos);\n if (ICU_BLOCK_REGEXP.test(block)) {\n
results.push(parseICUBlock(block));\n } else {\n results.push(block);\n } \n \n prevPos = pos +
1;\n } \n } else
{\n if (braceStack.length === 0) {\n const substring = pattern.substring(prevPos, pos);\n
results.push(substring);\n prevPos = pos + 1;\n } \n braceStack.push('{');\n } \n } \n \n const substring =
pattern.substring(prevPos);\n results.push(substring);\n return results;\n } \n \n \n \n *\n * Parses a node, its children
and its siblings, and generates the mutate & update OpCodes.\n *\n *\nexport function parseIcuCase(\n tView:
TView, tIcu: TIcu, IView: LView, updateOpCodes: I18nUpdateOpCodes, parentIdx: number,\n caseName: string,

```



```

unsafeCaseHtml: string, nestedIcus: IcuExpression[]): number {\n  const create: IcuCreateOpCodes = [] as any;\n  const remove: I18nRemoveOpCodes = [] as any;\n  const update: I18nUpdateOpCodes = [] as any;\n  if\n  (ngDevMode) {\n    attachDebugGetter(create, icuCreateOpCodesToString);\n    attachDebugGetter(remove,\n    i18nRemoveOpCodesToString);\n    attachDebugGetter(update, i18nUpdateOpCodesToString);\n  }\n  tIcu.cases.push(caseName);\n  tIcu.create.push(create);\n  tIcu.remove.push(remove);\n  tIcu.update.push(update);\n\n  const inertBodyHelper =\n  getInertBodyHelper(getDocument());\n  const inertBodyElement =\n  inertBodyHelper.getInertBodyElement(unsafeCaseHtml);\n  ngDevMode && assertDefined(inertBodyElement,\n  'Unable to generate inert body element');\n  const inertRootNode = getTemplateContent(inertBodyElement!) as\n  Element || inertBodyElement;\n  if (inertRootNode) {\n    return walkIcuTree(\n      tView, tIcu, IView,\n      updateOpCodes, create, remove, update, inertRootNode, parentIdx,\n      nestedIcus, 0);\n  } else {\n    return 0;\n  }\n}\n\nfunction walkIcuTree(\n  tView: TView, tIcu: TIcu, IView: LView, sharedUpdateOpCodes:\n  I18nUpdateOpCodes,\n  create: IcuCreateOpCodes, remove: I18nRemoveOpCodes, update:\n  I18nUpdateOpCodes,\n  parentNode: Element, parentIdx: number, nestedIcus: IcuExpression[], depth: number):\n  number {\n  let bindingMask = 0;\n  let currentNode = parentNode.firstChild;\n  while\n  (currentNode) {\n    const newIndex = allocExpando(tView, IView, 1, null);\n    switch (currentNode.nodeType) {\n      case Node.ELEMENT_NODE:\n        const element = currentNode as Element;\n        const tagName =\n        element.tagName.toLowerCase();\n        if (VALID_ELEMENTS.hasOwnProperty(tagName)) {\n          addCreateNodeAndAppend(create, ELEMENT_MARKER, tagName, parentIdx, newIndex);\n          tView.data[newIndex] = tagName;\n          const elAttrs = element.attributes;\n          for (let i = 0; i < elAttrs.length;\n          i++) {\n            const attr = elAttrs.item(i);\n            const lowerAttrName = attr.name.toLowerCase();\n            const hasBinding = !!attr.value.match(BINDING_REGEXP);\n            // we assume the input string is safe, unless\n            it's using a binding\n            if (hasBinding) {\n              if (VALID_ATTRS.hasOwnProperty(lowerAttrName)) {\n                if (URI_ATTRS[lowerAttrName]) {\n                  generateBindingUpdateOpCodes(\n                    update, attr.value, newIndex, attr.name, 0, _sanitizeUrl);\n                } else {\n                  generateBindingUpdateOpCodes(update, attr.value, newIndex, attr.name, 0, null);\n                }\n              } else {\n                ngDevMode &&\n                console.warn(\n                  `WARNING: ignoring unsafe attribute value`\n                +\n                ` ${lowerAttrName} on element ${tagName}`\n                +\n                ` (see\n                https://g.co/ng/security#xss)`);\n              }\n            } else {\n              addCreateAttribute(create, newIndex, attr);\n            }\n          }\n          // Parse the children of this node (if any)\n          bindingMask = walkIcuTree(\n            tView, tIcu, IView, sharedUpdateOpCodes, create, remove, update,\n            currentNode as Element,\n            newIndex, nestedIcus, depth + 1) | bindingMask;\n          addRemoveNode(remove, newIndex, depth);\n        }\n      case Node.TEXT_NODE:\n        const value = currentNode.textContent || '';\n        const hasBinding =\n        value.match(BINDING_REGEXP);\n        addCreateNodeAndAppend(create, null, hasBinding ? '': value,\n        parentIdx, newIndex);\n        addRemoveNode(remove, newIndex, depth);\n        if (hasBinding) {\n          bindingMask |=\n          generateBindingUpdateOpCodes(update, value, newIndex, null, 0, null) | bindingMask;\n        }\n        break;\n      case Node.COMMENT_NODE:\n        // Check if the comment node is a placeholder for a\n        nested ICU\n        const isNestedIcu = NESTED_ICU.exec(currentNode.textContent || '');\n        if (isNestedIcu) {\n          const nestedIcuIndex = parseInt(isNestedIcu[1], 10);\n          const icuExpression: IcuExpression =\n          nestedIcus[nestedIcuIndex];\n          // Create the comment node that will anchor the ICU expression\n          addCreateNodeAndAppend(\n            create, ICU_MARKER, ngDevMode ? `nested ICU ${nestedIcuIndex}`\n            : '', parentIdx,\n            newIndex);\n          icuStart(tView, IView, sharedUpdateOpCodes, parentIdx,\n          icuExpression, newIndex);\n          addRemoveNestedIcu(remove, newIndex, depth);\n        }\n        break;\n    }\n    currentNode = currentNode.nextSibling;\n  }\n  return bindingMask;\n}\n\nfunction addRemoveNode(remove:\n  I18nRemoveOpCodes, index: number, depth: number) {\n  if (depth === 0) {\n    remove.push(index);\n  }\n}\n\nfunction addRemoveNestedIcu(remove: I18nRemoveOpCodes, index: number, depth: number) {\n  if\n  (depth === 0) {\n    remove.push(~index); // remove ICU at `index`\n    remove.push(index); // remove ICU

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comment at `index` \n } \n \n function addUpdateIcuSwitch(\n  update: I18nUpdateOpCodes, icuExpression:
IcuExpression, index: number) {\n  update.push(\n    toMaskBit(icuExpression.mainBinding), 2, -1 -
icuExpression.mainBinding, \n    index << I18nUpdateOpCode.SHIFT_REF |
I18nUpdateOpCode.IcuSwitch); \n } \n \n function addUpdateIcuUpdate(update: I18nUpdateOpCodes,
bindingMask: number, index: number) {\n  update.push(bindingMask, 1, index <<
I18nUpdateOpCode.SHIFT_REF | I18nUpdateOpCode.IcuUpdate); \n } \n \n function addCreateNodeAndAppend(\n
create: IcuCreateOpCodes, marker: null | ICU_MARKER | ELEMENT_MARKER, text: string, \n
appendToParentIdx: number, createAtIdx: number) {\n  if (marker !== null) {\n    create.push(marker); \n  } \n
create.push(\n    text, createAtIdx, \n    icuCreateOpCode(IcuCreateOpCode.AppendChild, appendToParentIdx,
createAtIdx)); \n } \n \n function addCreateAttribute(create: IcuCreateOpCodes, newIndex: number, attr: Attr) {\n
create.push(newIndex << IcuCreateOpCode.SHIFT_REF | IcuCreateOpCode.Attr, attr.name,
attr.value); \n } \n \n /** \n * @license \n * Copyright Google LLC All Rights Reserved. \n * \n * Use of this source code
is governed by an MIT-style license that can be \n * found in the LICENSE file at https://angular.io/license \n * \n * \n //
i18nPostprocess
const ROOT_TEMPLATE_ID = 0; \n const
PP_MULTI_VALUE_PLACEHOLDERS_REGEXP
= /\[(.+?)\]/; \n const PP_PLACEHOLDERS_REGEXP = /\[(.+?)\](\/\?|\*\d+:\d+)/g; \n const
PP_ICU_VARS_REGEXP = /(\{s*\})(VAR_(PLURAL|SELECT)(_\d+)?)\{s*\}/g; \n const
PP_ICU_PLACEHOLDERS_REGEXP = /{([A-Z0-9_]+)}/g; \n const PP_ICUS_REGEXP =
/I18N_EXP_(ICU(_\d+)?)\;/g; \n const PP_CLOSE_TEMPLATE_REGEXP = /\[/; \n const
PP_TEMPLATE_ID_REGEXP = /\d+:\d+:\d+\/; \n \n // Parsed placeholder structure used in postprocessing (within
`i18nPostprocess` function) \n // Contains the following fields: [templateId, isCloseTemplateTag, placeholder] \n type
PostprocessPlaceholder = [number, boolean, string]; \n \n /** \n * \n * Handles message string post-processing for
internationalization. \n * \n * Handles message string post-processing by transforming it from intermediate \n * format
(that might contain some markers that we need to replace) to the final \n * form, consumable by i18nStart instruction.
Post processing steps include: \n * \n * 1. Resolve all multi-value cases (like [*1:1#2:1#4:1]5]) \n
* 2. Replace all ICU vars (like "VAR_PLURAL") \n * 3. Replace all placeholders used inside ICUs in a form of
{PLACEHOLDER} \n * 4. Replace all ICU references with corresponding values (like ICU_EXP_ICU_1) \n * \n * in
case multiple ICUs have the same placeholder name \n * \n * @param message Raw translation string for post
processing \n * @param replacements Set of replacements that should be applied \n * \n * @returns Transformed
string that can be consumed by i18nStart instruction \n * \n * @codeGenApi \n * \n * \n ^ \n export function i18nPostprocess(\n
message: string, replacements: {[key: string]: (string|string[])} = {}): string {\n  /** \n * \n * Step 1: resolve all multi-
value placeholders like [#5|#1:1#2:1#4:1] \n * \n * Note: due to the way we process nested templates (BFS), multi-
value placeholders are typically \n * grouped by templates, for example: [#5|#6|#1:1#3:2] where #5 and #6 belong
to root \n * template, #1:1 belong to nested template
with index 1 and #1:2 - nested template with index \n * 3. However in real templates the order might be different:
i.e. #1:1 and/or #3:2 may go in \n * front of #6. The post processing step restores the right order by keeping track of
the \n * template id stack and looks for placeholders that belong to the currently active template. \n * \n * let result:
string = message; \n * if (PP_MULTI_VALUE_PLACEHOLDERS_REGEXP.test(message)) {\n  const matches:
{[key: string]: PostprocessPlaceholder[]} = {}; \n  const templateIdsStack: number[] =
[ROOT_TEMPLATE_ID]; \n  result = result.replace(PP_PLACEHOLDERS_REGEXP, (m: any, phs: string, tmpl:
string): string => {\n    const content = phs || tmpl; \n    const placeholders: PostprocessPlaceholder[] =
matches[content] || []; \n    if (!placeholders.length) {\n      content.split('').forEach((placeholder: string) => {\n
const match = placeholder.match(PP_TEMPLATE_ID_REGEXP); \n      const templateId = match ?
parseInt(match[1],
10) : ROOT_TEMPLATE_ID; \n      const isCloseTemplateTag =
PP_CLOSE_TEMPLATE_REGEXP.test(placeholder); \n      placeholders.push([templateId, isCloseTemplateTag,
placeholder]); \n    }); \n    matches[content] = placeholders; \n  } \n } \n if (!placeholders.length) {\n
throw new Error(`i18n postprocess: unmatched placeholder - ${content}`); \n } \n \n const currentTemplateId =

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templateIdsStack[templateIdsStack.length - 1];\n    let idx = 0;\n    // find placeholder index that matches current
template id\n    for (let i = 0; i < placeholders.length; i++) {\n        if (placeholders[i][0] === currentTemplateId)
{\n            idx = i;\n            break;\n        }\n    }\n    // update template id stack based on the current tag extracted\n
const [templateId, isCloseTemplateTag, placeholder] = placeholders[idx];\n    if (isCloseTemplateTag) {\n
templateIdsStack.pop();\n    } else if (currentTemplateId !== templateId) {\n
        templateIdsStack.push(templateId);\n    }\n    // remove processed tag from the list\n
placeholders.splice(idx, 1);\n    return placeholder;\n    });\n}\n\n// return current result if no replacements
specified\nif (!Object.keys(replacements).length) {\n    return result;\n}\n\n/**\n * Step 2: replace all ICU vars
(like "VAR_PLURAL")\n * result = result.replace(PP_ICU_VARS_REGEXP, (match, start, key, _type, _idx,
end): string => {\n    return replacements.hasOwnProperty(key) ? `${start}${replacements[key]}${end}` : match;\n
});\n\n/**\n * Step 3: replace all placeholders used inside ICUs in a form of {PLACEHOLDER}\n * result =
result.replace(PP_ICU_PLACEHOLDERS_REGEXP, (match, key): string => {\n    return
replacements.hasOwnProperty(key) ? replacements[key] as string : match;\n    });\n\n/**\n * Step 4: replace all
ICU references with corresponding values (like ICU_EXP_ICU_1) in case\n * multiple ICUs have the same
placeholder name\n
*/\n result = result.replace(PP_ICUS_REGEXP, (match, key): string => {\n    if
(replacements.hasOwnProperty(key)) {\n        const list = replacements[key] as string[];\n        if (!list.length) {\n
throw new Error(`i18n postprocess: unmatched ICU - ${match} with key: ${key}`);\n        }\n        return list.shift(!);\n
    }\n    return match;\n    });\n\nreturn result;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport './util/ng_dev_mode';\nimport
'./util/ng_i18n_closure_mode';\nimport {assertDefined} from './util/assert';\nimport {bindingUpdated} from
'./bindings';\nimport {applyCreateOpCodes, applyI18n, setMaskBit} from './i18n/i18n_apply';\nimport
{i18nAttributesFirstPass, i18nStartFirstCreatePass} from './i18n/i18n_parse';\nimport {i18nPostprocess} from
'./i18n/i18n_postprocess';\nimport {T18n}
from './interfaces/i18n';\nimport {TElementNode, TNodeType} from './interfaces/node';\nimport
{HEADER_OFFSET, T_HOST} from './interfaces/view';\nimport {getClosestRElement} from
'./node_manipulation';\nimport {getCurrentParentTNode, getLView, getTVView, nextBindingIndex, setInI18nBlock}
from './state';\nimport {getConstant} from './util/view_utils';\n\n/**\n * Marks a block of text as translatable.\n *
* The instructions `i18nStart` and `i18nEnd` mark the translation block in the template.\n * The translation
`message` is the value which is locale specific. The translation string may\n * contain placeholders which associate
inner elements and sub-templates within the translation.\n * The translation `message` placeholders are:\n * -
`{index}({block})`: *Binding Placeholder*: Marks a location where an expression will be\n * interpolated into.
The placeholder `index` points to the expression binding index. An optional\n * `block` that matches the sub-
template in
which it was declared.\n * - `#{index}({block})`/`/#{index}({block})`: *Element Placeholder*: Marks the
beginning\n * and end of DOM element that were embedded in the original translation block. The placeholder\n *
`index` points to the element index in the template instructions set. An optional `block` that\n * matches the sub-
template in which it was declared.\n * - `*{index}({block})`/`/*{index}({block})`: *Sub-template Placeholder*: Sub-
templates must be\n * split up and translated separately in each angular template function. The `index` points to
the\n * `template` instruction index. A `block` that matches the sub-template in which it was declared.\n *\n *
@param index A unique index of the translation in the static block.\n * @param messageIndex An index of the
translation message from the `def.consts` array.\n * @param subTemplateIndex Optional sub-template index in the
`message`.\n *\n * @codeGenApi\n */\nexport function i18nStart(\n    index: number, messageIndex:
number, subTemplateIndex: number = -1): void {\n    const tView = getTVView();\n    const lView = getLView();\n
const adjustedIndex = HEADER_OFFSET + index;\n    ngDevMode && assertDefined(tView, `tView should be
defined`);\n    const message = getConstant<string>(tView.consts, messageIndex)!;\n    const parentTNode =
getCurrentParentTNode() as TElementNode | null;\n    if (tView.firstCreatePass) {\n        i18nStartFirstCreatePass(\n

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tView, parentTNode === null ? 0 : parentTNode.index, IView, adjustedIndex, message,\n      subTemplateIndex);\n  }\n  const tI18n = tView.data[adjustedIndex] as TI18n;\n  const sameViewParentTNode = parentTNode ===\n  IView[T_HOST] ? null : parentTNode;\n  const parentRNode = getClosestRElement(tView,\n  sameViewParentTNode, IView);\n  // If `parentTNode` is an `ElementContainer` than it has `<!--ng-container--\n  >`.\n  // When we do inserts we have to make sure to insert in front of `<!--ng-container-->`.\n  const\n  insertInFrontOf = parentTNode && (parentTNode.type\n  & TNodeType.ElementContainer) ?\n  IView[parentTNode.index] :\n  null;\n  applyCreateOpCodes(IView,\n  tI18n.create, parentRNode, insertInFrontOf);\n  setInI18nBlock(true);\n}\n\n/**\n * Translates a translation\n  block marked by `i18nStart` and `i18nEnd`. It inserts the text/ICU nodes\n  * into the render tree, moves the\n  placeholder nodes and removes the deleted nodes.\n  *\n  * @codeGenApi\n  */\n  export function i18nEnd(): void {\n  setInI18nBlock(false);\n}\n\n/**\n * Use this instruction to create a translation block that doesn't contain any\n  placeholder.\n  *\n  * It calls both { @link i18nStart } and { @link i18nEnd } in one instruction.\n  *\n  * The translation\n  `message` is the value which is locale specific. The translation string may\n  * contain placeholders which associate\n  inner elements and sub-templates within the translation.\n  *\n  * The translation `message` placeholders are:\n  * -\n  `{index}(:{block})`: *Binding Placeholder*: Marks a location where an expression will\n  be\n  * interpolated into. The placeholder `index` points to the expression binding index. An optional\n  * `block`\n  that matches the sub-template in which it was declared.\n  * - `#{index}(:{block})`/`/#{index}(:{block})`: *Element\n  Placeholder*: Marks the beginning\n  * and end of DOM element that were embedded in the original translation\n  block. The placeholder\n  * `index` points to the element index in the template instructions set. An optional `block`\n  that\n  * matches the sub-template in which it was declared.\n  * - `*{index}:{block}`/`*{index}:{block}`: *Sub-\n  template Placeholder*: Sub-templates must be\n  * split up and translated separately in each angular template\n  function. The `index` points to the\n  * `template` instruction index. A `block` that matches the sub-template in\n  which\n  * it was declared.\n  *\n  * @param index A unique index of the translation in the static block.\n  *\n  * @param\n  messageIndex An index of the translation message from the `def.consts` array.\n  *\n  * @param\n  subTemplateIndex Optional sub-template index in the `message`.\n  *\n  * @codeGenApi\n  */\n  export\n  function i18n(index: number, messageIndex: number, subTemplateIndex?: number): void {\n  i18nStart(index,\n  messageIndex, subTemplateIndex);\n  i18nEnd();\n}\n\n/**\n * Marks a list of attributes as translatable.\n  *\n  * @param\n  index A unique index in the static block\n  *\n  * @param\n  values\n  *\n  * @codeGenApi\n  */\n  export\n  function\n  i18nAttributes(index: number, attrsIndex: number): void {\n  const tView = getTView();\n  ngDevMode &&\n  assertDefined(tView, `tView should be defined`);\n  const attrs = getConstant<string[]>(tView.consts,\n  attrsIndex)!;\n  i18nAttributesFirstPass(tView, index + HEADER_OFFSET, attrs);\n}\n\n/**\n * Stores the values\n  * of the bindings during each update cycle in order to determine if we need to\n  * update the translated nodes.\n  *\n  * @param\n  value The binding's value\n  *\n  * @returns\n  This function returns itself so that it may be chained\n  * (e.g.\n  `i18nExp(ctx.name)(ctx.title)`)\n  *\n  *\n  * @codeGenApi\n  */\n  export\n  function\n  i18nExp<T>(value: T): typeof i18nExp {\n  const IView =\n  getLView();\n  setMaskBit(bindingUpdated(IView, nextBindingIndex(), value));\n  return i18nExp;\n}\n\n/**\n * Updates a translation block or an i18n attribute when the bindings have changed.\n  *\n  * @param\n  index Index of\n  either { @link i18nStart } (translation block) or { @link i18nAttributes }\n  * (i18n attribute) on which it should update\n  the content.\n  *\n  * @codeGenApi\n  */\n  export\n  function\n  i18nApply(index: number) {\n  applyI18n(getTView(),\n  getLView(), index + HEADER_OFFSET);\n}\n\n/**\n * Handles message string post-processing for\n  internationalization.\n  *\n  * Handles message string post-processing by transforming it from intermediate\n  * format\n  (that might contain some markers that we need to replace) to the final\n  * form, consumable by i18nStart instruction.\n  *\n  * Post processing steps include:\n  *\n  * 1. Resolve all multi-value cases (like [*1:1#2:1#4:1]5])\n  *\n  * 2. Replace all ICU vars (like `\"VAR_PLURAL\"`)\n  *\n  * 3. Replace all placeholders used inside ICUs in a form of\n  {PLACEHOLDER}\n  *\n  * 4. Replace all ICU references with corresponding values (like ICU_EXP_ICU_1)\n  * in\n  * case multiple ICUs have the same placeholder name\n  *\n  * @param\n  message Raw translation string for post\n  processing\n  *\n  * @param\n  replacements Set of replacements that should be applied\n  *\n  * @returns\n  Transformed\n  string that can be consumed by i18nStart instruction\n  *\n  * @codeGenApi\n  */\n  export\n  function\n  i18nPostprocess(\n
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message: string, replacements: {[key: string]: (string|string[])} = {}): string {
  return i18nPostprocess(message, replacements);
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 *
 * This file re-exports all symbols contained in this directory.
 * Why is this file not `index.ts`?
 * There seems to be an inconsistent path resolution of an `index.ts` file
 * when only the parent directory is referenced. This could be due to the
 * node module resolution configuration differing from rollup
 * and/or typescript.
 * With commit
 * https://github.com/angular/angular/commit/d5e3f2c64bd13ce83e7c70788b7fc514ca4a9918
 * the `instructions.ts` file was moved to `instructions/instructions.ts`
 * and an `index.ts` file was used to re-export everything. Having
 * had file names that were importing from `instructions` directly
 * (not the from the sub file or the `index.ts` file) caused strange
 * CI issues. `index.ts` had to be renamed to `all.ts` for this to
 * work.
 * Jira Issue = FW-1184
 *
 * @ngexport * from './attribute';
 * @ngexport * from './attribute_interpolation';
 * @ngexport * from './change_detection';
 * @ngexport * from './template';
 * @ngexport * from './storage';
 * @ngexport * from './di';
 * @ngexport * from './di_attr';
 * @ngexport * from './element';
 * @ngexport * from './element_container';
 * @ngexport * from './get_current_view';
 * @ngexport * from './listener';
 * @ngexport * from './namespace';
 * @ngexport * from './next_context';
 * @ngexport * from './projection';
 * @ngexport * from './property';
 * @ngexport * from './property_interpolation';
 * @ngexport * from './advance';
 * @ngexport * from './styling';
 * @ngexport * from './text';
 * @ngexport * from './text_interpolation';
 * @ngexport * from './class_map_interpolation';
 * @ngexport * from './style_map_interpolation';
 * @ngexport * from './style_prop_interpolation';
 * @ngexport * from './host_property';
 * @ngexport * from './i18n';
 * @ngexport {getUnknownElementStrictMode, setUnknownElementStrictMode,
 * getUnknownPropertyStrictMode, setUnknownPropertyStrictMode}
 * from './element_validation';
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 *
 * @ngimport {resolveForwardRef} from './di/forward_ref';
 * @ngimport {ClassProvider, Provider} from './di/interface/provider';
 * @ngimport {isClassProvider, isTypeProvider} from './di/provider_collection';
 * @ngimport {providerToFactory} from './di/r3_injector';
 * @ngimport {assertDefined} from './util/assert';
 * @ngimport {diPublicInInjector, getNodeInjectable, getOrCreateNodeInjectorForNode}
 * from './di';
 * @ngimport {directiveInject} from './instructions/all';
 * @ngimport {DirectiveDef} from './interfaces/definition';
 * @ngimport {NodeInjectorFactory} from './interfaces/injector';
 * @ngimport {TContainerNode, TDirectiveHostNode, TElementContainerNode, TElementNode, TNodeProviderIndexes}
 * from './interfaces/node';
 * @ngimport {isComponentDef} from './interfaces/type_checks';
 * @ngimport {DestroyHookData, LView, TData, TVIEW, TView}
 * from './interfaces/view';
 * @ngimport {getCurrentTNode, getLView, getTView} from './state';
}
/**
 * Resolves the providers which are defined in the DirectiveDef.
 * When inserting the tokens and the factories in their respective arrays,
 * we can assume that this method is called first for the component (if any),
 * and then for other directives on the same node.
 * As a consequence, the providers are always processed in that order:
 * 1) The view providers of the component
 * 2) The providers of the component
 * 3) The providers of the other directives
 * This matches the structure of the injectables arrays of a view (for each node).
 * So the tokens and the factories can be pushed at the end of the arrays,
 * except in one case for multi providers.
 * @param def the directive definition
 * @param providers: Array of `providers`
 * @param viewProviders: Array of `viewProviders`
 *
 * @ngexport function providersResolver<T>(
 *   def: DirectiveDef<T>, providers: Provider[], viewProviders: Provider[]): void {
 *   const tView = getTView();
 *   if (tView.firstCreatePass) {
 *     const isComponent = isComponentDef(def);
 *
 *     // The list of view providers is processed first, and the flags are updated
 *     resolveProvider(viewProviders, tView.data, tView.blueprint, isComponent, true);
 *
 *     // Then, the list of providers is processed, and the flags are updated
 *     resolveProvider(providers, tView.data, tView.blueprint, isComponent, false);
 *   }
 * }
 *
 * Resolves a provider and publishes it to the DI system.
 *
 * @ngfunction resolveProvider(
 *   provider: Provider, tInjectables: TData, IInjectablesBlueprint: NodeInjectorFactory[],
 *   isComponent: boolean, isViewProvider: boolean): void {
 *   provider = resolveForwardRef(provider);
 *   if (Array.isArray(provider)) {
 *     // Recursively call

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`resolveProvider`\n // Recursion is OK in this case because this code will not be in hot-path once we implement\n
// cloning of the initial state.\n for (let i = 0; i < provider.length; i++) {\n resolveProvider(\n provider[i],\n tInjectables, IInjectablesBlueprint, isComponent, isViewProvider);\n }\n } else {\n const tView = getTView();\n const IView = getLView();\n
let token: any = isTypeProvider(provider) ? provider : resolveForwardRef(provider.provider);\n let\n
providerFactory: () => any = providerToFactory(provider);\n\n const tNode = getCurrentTNode()!;\n const\n
beginIndex = tNode.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n const endIndex =\n
tNode.directiveStart;\n const cptViewProvidersCount =\n tNode.providerIndexes >>\n
TNodeProviderIndexes.CptViewProvidersCountShift;\n\n if (isTypeProvider(provider) || !provider.multi) {\n //\n
Single provider case: the factory is created and pushed immediately\n const factory = new\n
NodeInjectorFactory(providerFactory, isViewProvider, directiveInject);\n const existingFactoryIndex =\n
indexOf(\n token, tInjectables, isViewProvider ? beginIndex : beginIndex + cptViewProvidersCount,\n
endIndex);\n if (existingFactoryIndex === -1) {\n diPublicInInjector(\n\n
getOrCreateNodeInjectorForNode(\n tNode as\n
TElementNode | TContainerNode | TElementContainerNode, IView),\n tView, token);\n\n
registerDestroyHooksIfSupported(tView, provider, tInjectables.length);\n tInjectables.push(token);\n\n
tNode.directiveStart++;\n tNode.directiveEnd++;\n if (isViewProvider) {\n tNode.providerIndexes +=\n
TNodeProviderIndexes.CptViewProvidersCountShifter;\n }\n IInjectablesBlueprint.push(factory);\n\n
IView.push(factory);\n } else {\n IInjectablesBlueprint[existingFactoryIndex] = factory;\n\n
IView[existingFactoryIndex] = factory;\n }\n } else {\n // Multi provider case:\n // We create a multi\n
factory which is going to aggregate all the values.\n // Since the output of such a factory depends on content or\n
view injection,\n // we create two of them, which are linked together.\n //\n // The first one (for view\n
providers) is always in the first block of the injectables array,\n //\n
and the second one (for providers) is always in the second block.\n // This is important because view providers\n
have higher priority. When a multi token\n // is being looked up, the view providers should be found first.\n //\n
Note that it is not possible to have a multi factory in the third block (directive block).\n //\n // The algorithm to\n
process multi providers is as follows:\n // 1) If the multi provider comes from the `viewProviders` of the\n
component:\n // a) If the special view providers factory doesn't exist, it is created and pushed.\n // b) Else,\n
the multi provider is added to the existing multi factory.\n // 2) If the multi provider comes from the `providers`\n
of the component or of another\n // directive:\n // a) If the multi factory doesn't exist, it is created and\n
provider pushed into it.\n // It is also linked to the multi factory for view providers, if it exists.\n // b) Else,\n
the multi provider\n
is added to the existing multi factory.\n\n const existingProvidersFactoryIndex =\n indexOf(token,\n
tInjectables, beginIndex + cptViewProvidersCount, endIndex);\n const existingViewProvidersFactoryIndex =\n
indexOf(token, tInjectables, beginIndex, beginIndex + cptViewProvidersCount);\n const\n
doesProvidersFactoryExist = existingProvidersFactoryIndex >= 0 &&\n
IInjectablesBlueprint[existingProvidersFactoryIndex];\n const doesViewProvidersFactoryExist =\n
existingViewProvidersFactoryIndex >= 0 &&\n
IInjectablesBlueprint[existingViewProvidersFactoryIndex];\n\n if (isViewProvider &&\n
!doesViewProvidersFactoryExist ||\n !isViewProvider && !doesProvidersFactoryExist) {\n // Cases 1.a\n
and 2.a\n diPublicInInjector(\n\n
getOrCreateNodeInjectorForNode(\n tNode as TElementNode | TContainerNode | TElementContainerNode, IView),\n
tView, token);\n const factory = multiFactory(\n\n
isViewProvider ? multiViewProvidersFactoryResolver : multiProvidersFactoryResolver,\n\n
IInjectablesBlueprint.length, isViewProvider, isComponent, providerFactory);\n if (!isViewProvider &&\n
doesViewProvidersFactoryExist) {\n\n
IInjectablesBlueprint[existingViewProvidersFactoryIndex].providerFactory = factory;\n }\n\n
registerDestroyHooksIfSupported(tView, provider, tInjectables.length, 0);\n tInjectables.push(token);\n\n
tNode.directiveStart++;\n tNode.directiveEnd++;\n if (isViewProvider) {\n tNode.providerIndexes +=

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TNodeProviderIndexes.CptViewProvidersCountShifter;\n    }\n    InjectableBlueprint.push(factory);\n    IView.push(factory);\n    } else {\n        // Cases 1.b and 2.b\n        const indexInFactory = multiFactoryAdd(\n            InjectableBlueprint!\n                [isViewProvider ? existingViewProvidersFactoryIndex :\n                existingProvidersFactoryIndex],\n            providerFactory, [isViewProvider && isComponent]);\n            registerDestroyHooksIfSupported(\n                tView, provider,\n                existingProvidersFactoryIndex > -1 ? existingProvidersFactoryIndex :\n                existingViewProvidersFactoryIndex,\n                indexInFactory);\n    }\n    if (!isViewProvider &&\n        isComponent && doesViewProvidersFactoryExist) {\n        InjectableBlueprint[existingViewProvidersFactoryIndex].componentProviders!++;\n    }\n    }\n}\n\n/**\n * Registers the `ngOnDestroy` hook of a provider, if the provider supports destroy hooks.\n * @param tView `TView`\n * in which to register the hook.\n * @param provider Provider whose hook should be registered.\n * @param contextIndex Index under which to find the context for the hook when it's being invoked.\n * @param indexInFactory Only required for `multi` providers. Index of the provider in the multi\n * provider factory.\n */\nfunction registerDestroyHooksIfSupported(\n    tView: TView, provider: Exclude<Provider, any[]>, contextIndex: number,\n    indexInFactory?: number) {\n    const providerIsTypeProvider = isTypeProvider(provider);\n    const providerIsClassProvider =\n        isClassProvider(provider);\n    if (providerIsTypeProvider || providerIsClassProvider) {\n        // Resolve forward\n        references as `useClass` can hold a forward reference.\n        const classToken = providerIsClassProvider ?\n            resolveForwardRef(provider.useClass) : provider;\n        const prototype = classToken.prototype;\n        const\n            ngOnDestroy = prototype.ngOnDestroy;\n        if (ngOnDestroy) {\n            const hooks = tView.destroyHooks ||\n                (tView.destroyHooks = []);\n            if (!providerIsTypeProvider && ((provider as ClassProvider)).multi) {\n                ngDevMode &&\n                    assertDefined(\n                        indexInFactory, 'indexInFactory when registering multi factory\n                        destroy hook');\n                const existingCallbacksIndex = hooks.indexOf(contextIndex);\n                if\n                    (existingCallbacksIndex\n                        === -1) {\n                    hooks.push(contextIndex, [indexInFactory, ngOnDestroy]);\n                } else {\n                    (hooks[existingCallbacksIndex + 1] as DestroyHookData).push(indexInFactory!, ngOnDestroy);\n                }\n            } else {\n                hooks.push(contextIndex, ngOnDestroy);\n            }\n        }\n    }\n}\n\n/**\n * Add a factory in a multi factory.\n * @returns Index at which the factory was inserted.\n */\nfunction multiFactoryAdd(\n    multiFactory:\n        NodeInjectorFactory, factory: () => any, isComponentProvider: boolean): number {\n    if (isComponentProvider) {\n        multiFactory.componentProviders!++;\n    }\n    return multiFactory.multi!.push(factory) - 1;\n}\n\n/**\n * Returns\n    the index of item in the array, but only in the begin to end range.\n */\nfunction indexOf(item: any, arr: any[], begin:\n    number, end: number) {\n    for (let i = begin; i < end; i++) {\n        if (arr[i] === item) return i;\n    }\n    return -\n        1;\n}\n\n/**\n * Use this with `multi` providers.\n */\nfunction multiProvidersFactoryResolver(\n    this: NodeInjectorFactory, _: undefined, tData: TData, lData: LView,\n    tNode: TDirectiveHostNode): any[] {\n    return multiResolve(this.multi!, []);\n}\n\n/**\n * Use this with `multi` viewProviders.\n * This factory knows\n    how to concatenate itself with the existing `multi` providers.\n */\nfunction\n    multiViewProvidersFactoryResolver(\n        this: NodeInjectorFactory, _: undefined, tData: TData, lView: LView,\n        tNode: TDirectiveHostNode): any[] {\n    const factories = this.multi!;\n    let result: any[];\n    if (this.providerFactory)\n        {\n            const componentCount = this.providerFactory.componentProviders!;\n            const multiProviders =\n                getNodeInjectable(lView, lView[TVIEW], this.providerFactory!.index!, tNode);\n            // Copy the section of the array\n            which contains `multi` providers` from the component\n            result = multiProviders.slice(0, componentCount);\n            //\n            Insert the `viewProvider` instances.\n            multiResolve(factories, result);\n\n            // Copy the section of the array which contains `multi` providers` from other directives\n            for (let i =\n                componentCount; i < multiProviders.length; i++) {\n                result.push(multiProviders[i]);\n            }\n        } else {\n            result =\n                [];\n            // Insert the `viewProvider` instances.\n            multiResolve(factories, result);\n        }\n    return result;\n}\n\n/**\n * Maps an array of factories into an array of values.\n */\nfunction multiResolve(factories: Array<() => any>, result:\n    any[]): any[] {\n    for (let i = 0; i < factories.length; i++) {\n        const factory = factories[i]! as () => null;\n        result.push(factory());\n    }\n    return result;\n}\n\n/**\n * Creates a multi factory.\n */\nfunction multiFactory(\n
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factoryFn: (\n      this: NodeInjectorFactory, _: undefined, tData: TData, lData: LView,\n      tNode: TDirectiveHostNode) => any,\n      index: number, isViewProvider: boolean, isComponent: boolean,\n      f: () => any): NodeInjectorFactory {\n      const factory = new NodeInjectorFactory(factoryFn, isViewProvider, directiveInject);\n      factory.multi = [];\n      factory.index = index;\n      factory.componentProviders = 0;\n      multiFactoryAdd(factory, f, isComponent && !isViewProvider);\n      return factory;\n    }\n  }"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {ProcessProvidersFunction, Provider} from '../di/interface/provider';\nimport {providersResolver} from '../di_setup';\nimport {DirectiveDef} from '../interfaces/definition';\n\n/**\n * This feature resolves the providers of a directive (or component),\n * and publish them into the DI system, making it visible to others for injection.\n * For example:\n * ```\n * class ComponentWithProviders {\n *   constructor(private greeter: GreeterDE) {}\n *   static cmp =\n *     defineComponent({\n *       type: ComponentWithProviders,\n *       selectors: [['component-with-providers']],\n *       factory: () => new ComponentWithProviders(directiveInject(GreeterDE as any)),\n *       decls: 1,\n *       vars: 1,\n *       template: function(fs: RenderFlags, ctx: ComponentWithProviders) {\n *         if (fs & RenderFlags.Create) {\n *           text(0);\n *         }\n *         if (fs & RenderFlags.Update) {\n *           textInterpolate(ctx.greeter.greet());\n *         }\n *       },\n *       features: [ProvidersFeature([GreeterDE])]\n *     });\n *   }\n * ```\n * @param definition\n * @codeGenApi\n */\nexport function ProvidersFeature<T>(providers: Provider[], viewProviders: Provider[] = []) {\n  return (definition: DirectiveDef<T>) => {\n    definition.providersResolver =\n      (def: DirectiveDef<T>, processProvidersFn?: ProcessProvidersFunction) => {\n        return providersResolver(\n          def,\n          //\n          processProvidersFn ? processProvidersFn(providers) : providers,\n          //\n          viewProviders);\n      };\n  };\n}"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {Injector} from '../di/injector';\nimport {EnvironmentInjector} from '../di/r3_injector';\nimport {Type} from '../interface/type';\nimport {ComponentFactoryResolver} from '../component_factory_resolver';\n\n/**\n * Represents an instance of an `NgModule` created by an `NgModuleFactory`.\n * Provides access to the `NgModule` instance and related objects.\n * @publicApi\n */\nexport abstract class NgModuleRef<T> {\n  /**\n   * The injector that contains all of the providers of the `NgModule`.\n   */\n  abstract get injector(): EnvironmentInjector;\n  /**\n   * The resolver that can retrieve component factories in a context of this module.\n   */\n  abstract get componentFactoryResolver(): ComponentFactoryResolver;\n  /**\n   * Note: since v13, dynamic component creation via\n   * [ViewContainerRef.createComponent](api/core/ViewContainerRef#createComponent)\n   * does **not** require resolving component factory: component class can be used directly.\n   */\n  @deprecated Angular no longer requires Component factories. Please use other APIs where\n   * Component class can be used directly.\n  abstract get componentFactoryResolver(): ComponentFactoryResolver;\n  /**\n   * The `NgModule` instance.\n   */\n  abstract get instance(): T;\n  /**\n   * Destroys the module instance and all of the data structures associated with it.\n   */\n  abstract destroy(): void;\n  /**\n   * Registers a callback to be executed when the module is destroyed.\n   */\n  abstract onDestroy(callback: () => void): void;\n}\n\nexport interface InternalNgModuleRef<T> extends NgModuleRef<T> {\n  // Note: we are using the prefix _ as NgModuleData is an NgModuleRef and therefore directly\n  // exposed to the user.\n  _bootstrapComponents: Type<any>[];\n}"/**\n * @publicApi\n * @deprecated\n * This class was mostly used as a part of ViewEngine-based JIT API and is no longer needed in Ivy\n * JIT mode. See [JIT API changes due to ViewEngine deprecation](guide/deprecations#jit-api-changes)\n * for additional context. Angular provides APIs that accept NgModule classes directly (such as\n * [PlatformRef.bootstrapModule](api/core/PlatformRef#bootstrapModule) and\n * [createNgModule](api/core/createNgModule)), consider switching to those APIs instead of\n * using factory-based ones.\n */\nexport abstract class NgModuleFactory<T> {\n  abstract get moduleType(): Type<T>;\n  abstract create(parentInjector: Injector|null): NgModuleRef<T>;\n}"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {createInjectorWithoutInjectorInstances} from

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'./di/create_injector';\nimport {Injector} from './di/injector';\nimport
{INJECTOR} from './di/injector_token';\nimport {InjectFlags} from './di/interface/injector';\nimport
{ImportedNgModuleProviders, Provider} from './di/interface/provider';\nimport {EnvironmentInjector,
getNullInjector, R3Injector} from './di/r3_injector';\nimport {Type} from './interface/type';\nimport
{ComponentFactoryResolver as viewEngine_ComponentFactoryResolver} from
'./linker/component_factory_resolver';\nimport {InternalNgModuleRef, NgModuleFactory as
viewEngine_NgModuleFactory, NgModuleRef as viewEngine_NgModuleRef} from
'./linker/ng_module_factory';\nimport {assertDefined} from './util/assert';\nimport {stringify} from
'./util/stringify';\nimport {ComponentFactoryResolver} from './component_ref';\nimport {getNgModuleDef} from
'./definition';\nimport {maybeUnwrapFn} from './util/misc_utils';\n\n/**\n * Returns a new NgModuleRef instance
based on the NgModule class and parent injector provided.\n *\n * @param ngModule NgModule class.\n *
@param parentInjector Optional
injector instance to use as a parent for the module injector. If\n *   not provided, `NullInjector` will be used
instead.\n * @returns NgModuleRef that represents an NgModule instance.\n *\n * @publicApi\n */\nexport
function createNgModule<T>(\n  ngModule: Type<T>, parentInjector?: Injector): viewEngine_NgModuleRef<T>
{\n  return new NgModuleRef<T>(ngModule, parentInjector ?? null);\n}\n\n/**\n * The `createNgModule` function
alias for backwards-compatibility.\n * Please avoid using it directly and use `createNgModule` instead.\n *\n *
@deprecated Use `createNgModule` instead.\n */\nexport const createNgModuleRef = createNgModule;\nexport
class NgModuleRef<T> extends viewEngine_NgModuleRef<T> implements InternalNgModuleRef<T> {\n  //
tslint:disable-next-line:require-internal-with-underscore\n  _bootstrapComponents: Type<any>[] = [];\n  //
tslint:disable-next-line:require-internal-with-underscore\n  _r3Injector: R3Injector;\n  override instance: T;\n
destroyCbs: (() => void)[]\n\n  = [];\n\n  // When bootstrapping a module we have a dependency graph that looks like this:\n  // ApplicationRef ->
ComponentFactoryResolver -> NgModuleRef. The problem is that if the\n  // module being resolved tries to inject
the ComponentFactoryResolver, it'll create a\n  // circular dependency which will result in a runtime error, because
the injector doesn't\n  // exist yet. We work around the issue by creating the ComponentFactoryResolver ourselves\n
// and providing it, rather than letting the injector resolve it.\n  override readonly componentFactoryResolver:
ComponentFactoryResolver =\n    new ComponentFactoryResolver(this);\n\n  constructor(ngModuleType:
Type<T>, public _parent: Injector|null) {\n    super();\n    const ngModuleDef =
getNgModuleDef(ngModuleType);\n    ngDevMode &&\n      assertDefined(\n        ngModuleDef,\n        `NgModule
'${stringify(ngModuleType)}' is not a subtype of 'NgModuleType'.`);\n    this._bootstrapComponents
= maybeUnwrapFn(ngModuleDef!.bootstrap);\n\n    this._r3Injector = createInjectorWithoutInjectorInstances(\n
      ngModuleType, _parent,\n
      [\n        {provide: viewEngine_NgModuleRef, useValue: this}, {\n          provide:
viewEngine_ComponentFactoryResolver,\n            useValue: this.componentFactoryResolver\n        }],\n
      stringify(ngModuleType), new Set(['environment'])) as
R3Injector;\n\n    // We need to resolve the injector types separately from the injector creation, because\n    // the
module might be trying to use this ref in its constructor for DI which will cause a\n    // circular error that will
eventually error out, because the injector isn't created yet.\n    this._r3Injector.resolveInjectorInitializers();\n
this.instance = this._r3Injector.get(ngModuleType);\n  }\n\n  override get injector(): EnvironmentInjector
{\n    return this._r3Injector;\n  }\n\n  override destroy(): void {\n    ngDevMode && assertDefined(this.destroyCbs,
'NgModule already destroyed');\n    const injector = this._r3Injector;\n    !injector.destroyed && injector.destroy();\n
this.destroyCbs!.forEach(fn => fn());\n    this.destroyCbs = null;\n  }\n\n  override onDestroy(callback: () => void):
void {\n    ngDevMode && assertDefined(this.destroyCbs, 'NgModule already destroyed');\n
this.destroyCbs!.push(callback);\n  }\n}\n\nexport class NgModuleFactory<T> extends
viewEngine_NgModuleFactory<T> {\n  constructor(public moduleType: Type<T>) {\n    super();\n  }\n\n  override
create(parentInjector: Injector|null): viewEngine_NgModuleRef<T> {\n    return new
NgModuleRef(this.moduleType, parentInjector);\n  }\n}\n\nexport class EnvironmentNgModuleRefAdapter extends

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viewEngine_NgModuleRef<null> {\n  override readonly injector: EnvironmentInjector;\n  override readonly
componentFactoryResolver: ComponentFactoryResolver =\n
  new ComponentFactoryResolver(this);\n  override readonly instance = null;\n\n  constructor(\n    providers:
Array<Provider|ImportedNgModuleProviders>, parent: EnvironmentInjector|null,\n    source: string|null) {\n
super();\n    const injector = new R3Injector(\n      [\n        ...providers,\n        {provide:
viewEngine_NgModuleRef, useValue: this},\n      ],\n      parent || getNullInjector(), source, new Set(['environment']));\n
this.injector = injector;\n    injector.resolveInjectorInitializers();\n  }\n\n  override destroy(): void {\n
this.injector.destroy();\n  }\n\n  override onDestroy(callback: () => void): void {\n
this.injector.onDestroy(callback);\n  }\n}\n\n/**\n * Create a new environment injector.\n * Learn more about
environment injectors in\n * [this guide](guide/standalone-components#environment-injectors).\n * @param
providers An array
of providers.\n * @param parent A parent environment injector.\n * @param debugName An optional name for this
injector instance, which will be used in error\n *   messages.\n * @publicApi\n * @developerPreview\n
*/\nexport function createEnvironmentInjector(\n  providers: Array<Provider|ImportedNgModuleProviders>,\n  parent: EnvironmentInjector,\n  debugName: string|null = null): EnvironmentInjector {\n  const adapter = new
EnvironmentNgModuleRefAdapter(providers, parent, debugName);\n  return adapter.injector;\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {inject as inject}
from './../di/injector_compatibility';\nimport {defineInjectable as defineInjectable} from
'./../di/interface/defs';\nimport {internalImportProvidersFrom} from './../di/provider_collection';\nimport
{EnvironmentInjector} from
'./../di/r3_injector';\nimport {OnDestroy} from './../interface/lifecycle_hooks';\nimport {ComponentDef} from
'./../interfaces/definition';\nimport {createEnvironmentInjector} from './ng_module_ref';\n\n/**\n * A service used by
the framework to create instances of standalone injectors. Those injectors are\n * created on demand in case of
dynamic component instantiation and contain ambient providers\n * collected from the imports graph rooted at a
given standalone component.\n */\ninterface StandaloneService implements OnDestroy {\n  cachedInjectors = new
Map<string, EnvironmentInjector|null>();\n\n  constructor(private _injector: EnvironmentInjector) {\n\n
getOrCreateStandaloneInjector(componentDef: ComponentDef<unknown>): EnvironmentInjector|null {\n    if
(!componentDef.standalone) {\n      return null;\n    }\n\n    if (!this.cachedInjectors.has(componentDef.id)) {\n
const providers = internalImportProvidersFrom(false, componentDef.type);\n    const standaloneInjector =
providers.length
> 0 ?\n      createEnvironmentInjector(\n        [providers], this._injector,\n        `Standalone[${componentDef.type.name}]`)\n      :\n      null;\n    this.cachedInjectors.set(componentDef.id,\n      standaloneInjector);\n    }\n\n    return this.cachedInjectors.get(componentDef.id)!;\n  }\n\n  ngOnDestroy() {\n
for (const injector of this.cachedInjectors.values()) {\n    if (injector !== null) {\n      injector.destroy();\n
    }\n  }\n  } finally {\n    this.cachedInjectors.clear();\n  }\n}\n\n/** @nocollapse */\nstatic prov = /**
@pureOrBreakMyCode */\ndefineInjectable({\n  token: StandaloneService,\n  providedIn: 'environment',\n  factory: () => new StandaloneService(inject(EnvironmentInjector)),\n  });\n\n"/**\n * A feature that acts as a
setup code for the {@link StandaloneService}.\n * The most important responsibility of this feature is to expose
the "getStandaloneInjector"\n * function (an entry point to a standalone
injector creation) on a component definition object. We\n * go through the features infrastructure to make sure that
the standalone injector creation logic\n * is tree-shakable and not included in applications that don't use standalone
components.\n * @codeGenApi\n */\nexport function StandaloneFeature(definition:
ComponentDef<unknown>) {\n  definition.getStandaloneInjector = (parentInjector: EnvironmentInjector) => {\n
return parentInjector.get(StandaloneService).getOrCreateStandaloneInjector(definition);\n  };}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport

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{ChangeDetectionStrategy} from '../change_detection/constants';\nimport {Injector} from
'../di/injector';\nimport {ViewEncapsulation} from '../metadata/view';\nimport {assertEqual} from
'../util/assert';\nimport {assertLView} from
'../assert';\nimport {discoverLocalRefs, GetComponentAtNodeIndex, getDirectivesAtNodeIndex, getLContext,
readPatchedLView} from './context_discovery';\nimport {GetComponentDef, getDirectiveDef} from
'./definition';\nimport {NodeInjector} from './di';\nimport {buildDebugNode} from
'./instructions/lview_debug';\nimport {DirectiveDef} from './interfaces/definition';\nimport {TElementNode,
TNode, TNodeProviderIndexes} from './interfaces/node';\nimport {isLView} from
'./interfaces/type_checks';\nimport {CLEANUP, CONTEXT, DebugNode, FLAGS, LView, LViewFlags, T_HOST,
TVIEW, TViewType} from './interfaces/view';\n\nimport {getLViewParent, getRootContext} from
'./view_traversal_utils';\nimport {getTNode, unwrapRNode} from './view_utils';\n\n\n**\n * Retrieves the
component instance associated with a given DOM element.\n *\n * @usageNotes\n * Given the following DOM
structure:\n *\n * ``html\n * <app-root>\n * <div>\n * <child-comp></child-comp>\n * </div>\n * </app-
root>\n
* ``\n *\n * Calling `GetComponent` on `<child-comp>` will return the instance of `ChildComponent`\n *
associated with this DOM element.\n *\n * Calling the function on `<app-root>` will return the `MyApp` instance.\n
*\n *\n * @param element DOM element from which the component should be retrieved.\n * @returns Component
instance associated with the element or `null` if there\n * is no component associated with it.\n *\n *
@publicApi\n * @globalApi ng\n */\nexport function GetComponent<T>(element: Element): T|null {\n
  ngDevMode && assertDomElement(element);\n  const context = getLContext(element);\n  if (context === null)
return null;\n  if (context.component === undefined) {\n    const IView = context.IView;\n    if (IView === null)
{\n      return null;\n    }\n    context.component = GetComponentAtNodeIndex(context.nodeIndex, IView);\n  }\n  return context.component as unknown as T;\n}\n\n\n**\n * If inside an embedded view (e.g. `*ngIf` or `*ngFor`),
retrieves the context
of the embedded\n * view that the element is part of. Otherwise retrieves the instance of the component whose
view\n * owns the element (in this case, the result is the same as calling `getOwningComponent`).\n *\n * @param
element Element for which to get the surrounding component instance.\n * @returns Instance of the component that
is around the element or null if the element isn't\n * inside any component.\n *\n * @publicApi\n * @globalApi
ng\n */\nexport function getContext<T extends {}>(element: Element): T|null {\n  assertDomElement(element);\n
  const context = getLContext(element!);\n  const IView = context ? context.IView : null;\n  return IView === null ?
null : IView[CONTEXT] as T;\n}\n\n\n**\n * Retrieves the component instance whose view contains the DOM
element.\n *\n * For example, if `<child-comp>` is used in the template of `<app-comp>`\n * (i.e. a `ViewChild` of
`<app-comp>`), calling `getOwningComponent` on `<child-comp>`\n * would return `<app-comp>`.\n *\n *
@param
elementOrDir DOM element, component or directive instance\n * for which to retrieve the root components.\n *\n *
@returns Component instance whose view owns the DOM element or null if the element is not\n * part of a
component view.\n *\n * @publicApi\n * @globalApi ng\n */\nexport function
getOwningComponent<T>(elementOrDir: Element|{}): T|null {\n  const context = getLContext(elementOrDir!);\n
  let IView = context ? context.IView : null;\n  if (IView === null) return null;\n  let parent: LView|null;\n  while
(IView[TVIEW].type === TViewType.Embedded && (parent = getLViewParent(IView!))) {\n    IView = parent;\n  }\n
  return IView[FLAGS] & LViewFlags.IsRoot ? null : IView[CONTEXT] as unknown as T;\n}\n\n\n**\n *
Retrieves all root components associated with a DOM element, directive or component instance.\n * Root
components are those which have been bootstrapped by Angular.\n *\n * @param elementOrDir DOM element,
component or directive instance\n * for which to retrieve the
root components.\n *\n * @returns Root components associated with the target object.\n *\n * @publicApi\n *
@globalApi ng\n */\nexport function getRootComponents(elementOrDir: Element|{}): {}[] {\n  const IView =
readPatchedLView<{}>(elementOrDir);\n  return IView !== null ? [getRootContext(IView)] : [];\n}\n\n\n**\n *
Retrieves an `Injector` associated with an element, component or directive instance.\n *\n * @param elementOrDir

```

```

DOM element, component or directive instance for which to retrieve the injector. @returns Injector
associated with the element, component or directive instance. @publicApi @globalApi ng
function getInjector(elementOrDir: Element|{}): Injector {
  const context = getLContext(elementOrDir!);
  const IView = context ? context.IView : null;
  if (IView === null) return Injector.NULL;
  const tNode = IView[TVIEW].data[context.nodeIndex] as TElementNode;
  return new NodeInjector(tNode, IView);
}

* Retrieve a set of
injection tokens at a given DOM node. @param element Element for which the injection tokens should be
retrieved. @returns any[]
function getInjectionTokens(element: Element): any[] {
  const context = getLContext(element!);
  const IView = context ? context.IView : null;
  if (IView === null) return [];
  const tView = IView[TVIEW];
  const tNode = tView.data[context.nodeIndex] as TNode;
  const providerTokens: any[] = [];
  const startIndex = tNode.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;
  const endIndex = tNode.directiveEnd;
  for (let i = startIndex; i < endIndex; i++) {
    let value = tView.data[i];
    if (isDirectiveDefHack(value)) {
      // The fact that we sometimes store Type and sometimes DirectiveDef in this
      // location is a design flaw. We should always store same type so that we can be monomorphic. The issue
      // is that for Components/Directives we store the def instead the type. The correct behavior
      // is that we should always be storing injectable type in this location.
      value = value.type;
    }
    providerTokens.push(value);
  }
  return providerTokens;
}

* Retrieves directive instances associated
with a given DOM node. Does not include component instances. @usageNotes
* Given the following
DOM structure:
<html>
<app-root>
<button my-button></button>
<my-comp></my-comp>
</app-root>
Calling `getDirectives` on `<button>` will return an array with an instance of the
`MyButton` directive that is associated with the DOM node.
Calling `getDirectives` on `<my-comp>`
will return an empty array.
@param node DOM node for which to get the directives. @returns Array of
directives associated with the node. @publicApi @globalApi ng
function getDirectives(node: Node): Directive[] {
  // Skip text nodes because we can't have directives associated with them.
  if (node instanceof Text) return [];
  const context = getLContext(node!);
  const IView = context ? context.IView : null;
  if (IView === null) return [];
  const tView = IView[TVIEW];
  const nodeIndex = context.nodeIndex;
  if (!tView?.data[nodeIndex]) return [];
  if (context.directives === undefined) {
    context.directives = getDirectivesAtNodeIndex(nodeIndex, IView, false);
  }
  // The `directives` in this case are a named array called `LComponentView`. Clone the
  // result so we don't expose an internal data structure in the user's console.
  return context.directives === null ? [] : [...context.directives];
}

* Partial metadata for a
given directive instance. This information might be useful for debugging purposes or tooling.
Currently only `inputs` and `outputs` metadata is available. @publicApi
interface DirectiveDebugMetadata {
  inputs: Record<string, string>;
  outputs: Record<string, string>;
}

* Partial metadata for a given component instance. This information might be useful for debugging purposes or
tooling. Currently the following fields are available:
- inputs
- outputs
- encapsulation
- changeDetection
@publicApi
interface ComponentDebugMetadata extends DirectiveDebugMetadata {
  encapsulation: ViewEncapsulation;
  changeDetection: ChangeDetectionStrategy;
}

* Returns the debug (partial) metadata for a particular directive or component
instance. The function accepts an instance of a directive or component and returns the corresponding
metadata. @param directiveOrComponentInstance Instance of a directive or component @returns
metadata of the passed directive or component @publicApi @globalApi ng
function getDirectiveMetadata(directiveOrComponentInstance: any): ComponentDebugMetadata|
DirectiveDebugMetadata|null {
  const {constructor} = directiveOrComponentInstance;
  if (!constructor) throw new Error('Unable to find the instance constructor');
  // In case a component inherits from a directive, we may have component and directive metadata
  // To ensure we don't get the metadata of the directive, we want to call `getComponentDef` first.
  const componentDef = getComponentDef(constructor);
  if (componentDef) return {
    inputs: componentDef.inputs,

```

```

outputs: componentDef.outputs,\n  encapsulation: componentDef.encapsulation,\n  changeDetection:
componentDef.onPush ? ChangeDetectionStrategy.OnPush :\n
ChangeDetectionStrategy.Default\n  };\n }\n const directiveDef = getDirectiveDef(constructor);\n if
(directiveDef) {\n  return {inputs: directiveDef.inputs, outputs: directiveDef.outputs};\n }\n return
null;\n}\n\n/**\n * Retrieve map of local references.\n *\n * The references are retrieved as a map of local reference
name to element or directive
instance.\n *\n * @param target DOM element, component or directive instance for which to retrieve\n * the local
references.\n */\nexport function getLocalRefs(target: {}): {[key: string]: any} {\n  const context =
getLContext(target);\n  if (context === null) return {};\n  if (context.localRefs === undefined) {\n    const IView =
context.IView;\n    if (IView === null) {\n      return {};\n    }\n    context.localRefs = discoverLocalRefs(IView,
context.nodeIndex);\n  }\n  return context.localRefs || {};\n}\n\n/**\n * Retrieves the host element of a component
or directive instance.\n *\n * The host element is the DOM element that matched the selector of the directive.\n *\n *
@param componentOrDirective Component or directive instance for which the host\n * element should be
retrieved.\n *\n * @returns Host element of the target.\n *\n * @publicApi\n * @globalApi ng\n */\nexport function
getHostElement(componentOrDirective: {}): Element {\n  return getLContext(componentOrDirective).native
as unknown as Element;\n}\n\n/**\n * Retrieves the rendered text for a given component.\n *\n * This function
retrieves the host element of a component and\n * and then returns the `textContent` for that element. This implies\n
* that the text returned will include re-projected content of\n * the component as well.\n *\n * @param component
The component to return the content text for.\n */\nexport function getRenderedText(component: any): string {\n
  const hostElement = getHostElement(component);\n  return hostElement.textContent || '';\n}\n\n/**\n * Event
listener configuration returned from `getListeners`.\n *\n * @publicApi\n */\nexport interface Listener {\n  /** Name of
the event listener. */\n  name: string;\n  /** Element that the listener is bound to. */\n  element: Element;\n  /**
Callback that is invoked when the event is triggered. */\n  callback: (value: any) => any;\n  /** Whether the listener
is using event capturing. */\n  useCapture: boolean;\n  /**\n * Type
of the listener (e.g. a native DOM event or a custom @Output).\n */\n  type: 'dom'|'output';\n}\n\n\n/**\n *
Retrieves a list of event listeners associated with a DOM element. The list does include host\n * listeners, but it does
not include event listeners defined outside of the Angular context\n * (e.g. through `addEventListener`).\n *\n *
@usageNotes\n * Given the following DOM structure:\n *\n * ```html\n * <app-root>\n * <div
(click)="doSomething()"></div>\n * </app-root>\n * ```\n *\n * Calling `getListeners` on `

` will return an
object that looks as follows:\n *\n * ```ts\n * {\n *   name: 'click',\n *   element: <div>,\n *   callback: () =>
doSomething(),\n *   useCapture: false\n * }\n * ```\n *\n * @param element Element for which the DOM listeners
should be retrieved.\n *\n * @returns Array of event listeners on the DOM element.\n *\n * @publicApi\n *
@globalApi ng\n */\nexport function getListeners(element: Element): Listener[] {\n  ngDevMode &&
assertDomElement(element);\n
  const IContext = getLContext(element);\n  const IView = IContext === null ? null : IContext.IView;\n  if (IView
=== null) return [];\n  const tView = IView[TVIEW];\n  const ICleanup = IView[CLEANUP];\n  const tCleanup =
tView.cleanup;\n  const listeners: Listener[] = [];\n  if (tCleanup && ICleanup) {\n    for (let i = 0; i <
tCleanup.length; i++) {\n      const firstParam = tCleanup[i+1];\n      const secondParam = tCleanup[i+2];\n      if (typeof
firstParam === 'string') {\n        const name: string = firstParam;\n        const listenerElement =
unwrapRNode(IView[secondParam]) as any as Element;\n        const callback: (value: any) => any =
ICleanup[tCleanup[i+3]];\n        const useCaptureOrIndx = tCleanup[i+4];\n        // if useCaptureOrIndx is boolean
then report it as is.\n        // if useCaptureOrIndx is positive number then it in unsubscribe method\n        // if
useCaptureOrIndx is negative number then it is a Subscription\n        const type =\n          (typeof
useCaptureOrIndx === 'boolean' || useCaptureOrIndx >= 0) ? 'dom' : 'output';\n        const useCapture = typeof
useCaptureOrIndx === 'boolean' ? useCaptureOrIndx : false;\n        if (element === listenerElement) {\n
          listeners.push({element, name, callback, useCapture, type});\n        }\n      }\n    }\n  }\n  listeners.sort(sortListeners);\n  return listeners;\n}\n\nfunction sortListeners(a: Listener, b: Listener) {\n  if (a.name
=== b.name) return 0;\n  return a.name < b.name ? -1 : 1;\n}\n\n\n/**\n * This function should not exist because it is


```

```

megamorphic and only mostly correct.\n *\n * See call site for more info.\n *\nfunction isDirectiveDefHack(obj:
any): obj is DirectiveDef<any> {\n  return obj.type !== undefined && obj.template !== undefined &&
obj.declaredInputs !== undefined;\n}\n\n/**\n * Returns the attached `DebugNode` instance for an element in the
DOM.\n *\n * @param element DOM element which is owned by an existing component's view.\n *\nexport
function getDebugNode(element:
Element): DebugNode|null {\n  if (ngDevMode && !(element instanceof Node)) {\n    throw new Error('Expecting
instance of DOM Element');\n  }\n\n  const IContext = getLContext(element);\n  const IView = IContext ?
IContext.IView : null;\n\n  if (IView === null) {\n    return null;\n  }\n\n  const nodeIndex = IContext.nodeIndex;\n
if (nodeIndex !== -1) {\n    const valueInLView = IView[nodeIndex];\n    // this means that value in the IView is a
component with its own\n    // data. In this situation the TNode is not accessed at the same spot.\n    const tNode =\n      isLView(valueInLView) ? (valueInLView[T_HOST] as TNode) : getTNode(IView[TVIEW], nodeIndex);\n    ngDevMode &&\n      assertEqual(tNode.index, nodeIndex, 'Expecting that TNode at index is same as index');\n    return buildDebugNode(tNode, IView);\n  }\n\n  return null;\n}\n\n/**\n * Retrieve the component `LView` from
component/element.\n *\n * NOTE: `LView` is a private and should not be leaked outside.\n
*\n * Don't export this method to `ng.*` on window.\n *\n * @param target DOM element or component instance
for which to retrieve the LView.\n *\nexport function GetComponentLView(target: any): LView {\n  const IContext
= getLContext(target);\n  const nodeIndx = IContext.nodeIndex;\n  const IView = IContext.IView!\n  ngDevMode
&& assertLView(IView);\n  const componentLView = IView[nodeIndx];\n  ngDevMode &&
assertLView(componentLView);\n  return componentLView;\n}\n\n/** Asserts that a value is a DOM Element.
*\nfunction assertDomElement(value: any) {\n  if (typeof Element !== 'undefined' && !(value instanceof Element))
{\n    throw new Error('Expecting instance of DOM Element');\n  }\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\nimport {Type} from './interface/type';\nimport
{noSideEffects} from './util/closure';\n\ninterface
TypeWithMetadata extends Type<any> {\n  decorators?: any[];\n  ctorParameters?: () => any[];\n
propDecorators?: {[field: string]: any};\n}\n\n/**\n * Adds decorator, constructor, and property metadata to a given
type via static metadata fields\n * on the type.\n *\n * These metadata fields can later be read with Angular's
`ReflectionCapabilities` API.\n *\n * Calls to `setClassMetadata` can be guarded by ngDevMode, resulting in the
metadata assignments\n * being tree-shaken away during production builds.\n *\nexport function
setClassMetadata(\n  type: Type<any>, decorators: any[]|null, ctorParameters: (() => any[])|null,\n
propDecorators: {[field: string]: any}|null): void {\n  return noSideEffects(() => {\n    const clazz = type as
TypeWithMetadata;\n\n    if (decorators !== null) {\n      if (clazz.hasOwnProperty('decorators') &&
clazz.decorators !== undefined) {\n        clazz.decorators.push(...decorators);\n      } else {\n        clazz.decorators = decorators;\n      }\n    }\n\n    if (ctorParameters !== null) {\n      // Rather than merging, clobber the existing parameters. If other projects exist which\n      // use tsickle-style
annotations and reflect over them in the same way, this could\n      // cause issues, but that is vanishingly
unlikely.\n      clazz.ctorParameters = ctorParameters;\n    }\n\n    if (propDecorators !== null) {\n      // The property decorator objects are merged as it is possible different fields have\n      // different decorator
types. Decorators on individual fields are not merged, as it's\n      // also incredibly unlikely that a field will be
decorated both with an Angular\n      // decorator and a non-Angular decorator that's also been downleveled.\n      if (clazz.hasOwnProperty('propDecorators') && clazz.propDecorators !== undefined) {\n
clazz.propDecorators
= {...clazz.propDecorators, ...propDecorators};\n      } else {\n        clazz.propDecorators =
propDecorators;\n      }\n    }\n  }) as never;\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nimport {assertIndexInRange} from './util/assert';\nimport
{bindingUpdated, bindingUpdated2, bindingUpdated3, bindingUpdated4, getBinding, updateBinding} from
'/bindings';\nimport {LView} from './interfaces/view';\nimport {getBindingRoot, getLView} from './state';\nimport

```

```
{NO_CHANGE} from './tokens';\n\n\n**\n * Bindings for pure functions are stored after regular bindings.\n *\n *
|-----decls-----|-----vars-----|          |----- hostVars (dir1) -----|\n * -----
-----\n * | nodes/refs/pipes
| bindings | fn slots | injector | dir1 | host bindings | host slots |\n * -----
-----\n *          ^          ^\n *      TView.bindingStartIndex
```

TView.expandoStartIndex\n \*\n \* Pure function instructions are given an offset from the binding root. Adding the offset to the\n \* binding root gives the first index where the bindings are stored. In component views, the binding\n \* root is the bindingStartIndex. In host bindings, the binding root is the expandoStartIndex +\n \* any directive instances + any hostVars in directives evaluated before it.\n \* See VIEW\_DATA.md for more information about host binding resolution.\n \*\n \* If the value hasn't been saved, calls the pure function to store and return the\n \* value. If it has been saved, returns the saved value.\n \* @param slotOffset the offset from binding root to the reserved slot\n \* @param pureFn Function

```
that returns a value\n * @param thisArg Optional calling context of pureFn\n * @returns value\n *\n * @codeGenApi\n *\nexport function pureFunction0<T>(slotOffset: number, pureFn: () => T, thisArg?: any): T {\n
const bindingIndex = getBindingRoot() + slotOffset;\n
const lView = getLView();\n
return lView[bindingIndex]
=== NO_CHANGE ?\n
updateBinding(lView, bindingIndex, thisArg ? pureFn.call(thisArg) : pureFn()) :\n
getBinding(lView, bindingIndex);\n
}\n\n**\n * If the value of the provided exp has changed, calls the pure function to return\n * an updated value. Or if the value has not changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn Function that returns an updated value\n * @param exp Updated expression value\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n *\nexport function pureFunction1(\n
slotOffset: number, pureFn: (v: any) => any, exp: any, thisArg?: any): any {\n
return pureFunction1Internal(getLView(), getBindingRoot(), slotOffset, pureFn, exp, thisArg);\n
}\n\n**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n *\nexport function pureFunction2(\n
slotOffset: number, pureFn: (v1: any, v2: any) => any, exp1: any, exp2: any,\n
thisArg?: any): any {\n
return pureFunction2Internal(\n
getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, thisArg);\n
}\n\n**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n *\nexport function pureFunction3(\n
slotOffset: number, pureFn: (v1: any, v2: any, v3: any) => any, exp1: any, exp2: any, exp3: any,\n
thisArg?: any): any {\n
return pureFunction3Internal(\n
getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, exp3, thisArg);\n
}\n\n**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n *\nexport function pureFunction4(\n
slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any) => any, exp1: any, exp2: any,\n
exp3: any, exp4: any, thisArg?: any): any {\n
return pureFunction4Internal(\n
getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, exp3, exp4, thisArg);\n
}\n\n**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n *\nexport function pureFunction5(\n
slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any) => any, exp1: any,\n
exp2: any, exp3: any, exp4: any, exp5:
```

```

any, thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const IView = getLView();\n  const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return bindingUpdated(IView, bindingIndex + 4, exp5) || different ?\n    updateBinding(\n      IView, bindingIndex + 5,\n      thisArg ?\n      pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5) :\n      pureFn(exp1, exp2, exp3, exp4, exp5)) :\n    getBinding(IView, bindingIndex + 5);\n}\n\n/**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n * @param exp6\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n */\nexport function\npureFunction6(\n  slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any, v6: any) => any,\n  exp1: any, exp2: any, exp3: any, exp4: any, exp5: any, exp6: any, thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const IView = getLView();\n  const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return bindingUpdated2(IView, bindingIndex + 4, exp5, exp6) || different ?\n    updateBinding(\n      IView, bindingIndex + 6,\n      thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6) :\n      pureFn(exp1, exp2, exp3, exp4, exp5, exp6)) :\n    getBinding(IView, bindingIndex + 6);\n}\n\n/**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n * @param exp6\n * @param exp7\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n */\nexport function\npureFunction7(\n  slotOffset: number,\n  pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any, v6: any, v7: any) =>\n  any, exp1: any,\n  exp2: any, exp3: any, exp4: any, exp5: any, exp6: any, exp7: any, thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const IView = getLView();\n  let different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return bindingUpdated3(IView, bindingIndex + 4, exp5, exp6, exp7) || different ?\n    updateBinding(\n      IView, bindingIndex + 7,\n      thisArg ?\n      pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6, exp7) :\n      pureFn(exp1, exp2, exp3, exp4, exp5, exp6, exp7)) :\n    getBinding(IView, bindingIndex + 7);\n}\n\n/**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n * @param exp6\n * @param exp7\n * @param exp8\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n */\nexport function\npureFunction8(\n  slotOffset: number,\n  pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any, v6: any, v7: any, v8: any) => any,\n  exp1: any, exp2: any, exp3: any, exp4: any, exp5: any, exp6: any, exp7: any, exp8: any,\n  thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const IView = getLView();\n  const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return bindingUpdated4(IView, bindingIndex + 4, exp5, exp6, exp7, exp8) || different ?\n    updateBinding(\n      IView, bindingIndex + 8,\n      thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6, exp7, exp8) :\n      pureFn(exp1, exp2, exp3, exp4, exp5, exp6, exp7, exp8)) :\n    getBinding(IView, bindingIndex + 8);\n}\n\n/**\n * pureFunction instruction that can support any number of bindings.\n *\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn A pure function that takes binding values and builds an object or array\n * containing those values.\n * @param exps An array of binding values\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n */\nexport function\npureFunctionV(\n  slotOffset: number, pureFn: (...v: any[]) => any, exps: any[], thisArg?: any): any {\n  return\n  pureFunctionVInternal(getLView(), getBindingRoot(), slotOffset, pureFn, exps, thisArg);\n}\n\n/**\n * Results of a pure function

```



invocation are stored in LView in a dedicated slot that is initialized to NO\_CHANGE. In rare situations a pure pipe might throw an exception on the very first invocation and not produce any valid results. In this case LView would keep holding the NO\_CHANGE value. The NO\_CHANGE is not something that we can use in expressions / bindings thus we convert it to `undefined`.

```

function getPureFunctionReturnValue(LView: LView, returnValueIndex: number) {
  if (ngDevMode) {
    assertIndexInRange(LView, returnValueIndex);
  }
  const lastReturnValue = LView[returnValueIndex];
  return lastReturnValue === NO_CHANGE ? undefined : lastReturnValue;
}

```

If the value of the provided exp has changed, calls the pure function to return an updated value. Or if the value has not changed, returns cached value.

```

@param LView LView in which the function is being executed.
@param bindingRoot Binding root index.
@param slotOffset the offset from binding root to the reserved slot
@param pureFn Function that returns an updated value
@param exp Updated expression value
@param thisArg Optional calling context of pureFn
@returns Updated or cached value

```

```

function pureFunction1Internal(LView: LView, bindingRoot: number, slotOffset: number, pureFn: (v: any) => any, exp: any, thisArg?: any): any {
  const bindingIndex = bindingRoot + slotOffset;
  return bindingUpdated(LView, bindingIndex, exp) ? updateBinding(LView, bindingIndex + 1, thisArg ? pureFn.call(thisArg, exp) : pureFn(exp)) : getPureFunctionReturnValue(LView, bindingIndex + 1);
}

```

If the value of any provided exp has changed, calls the pure function to return an updated value. Or if no values have changed, returns cached value.

```

@param LView LView in which the function is being executed.
@param bindingRoot Binding root index.
@param slotOffset the offset from binding root to the reserved slot
@param pureFn
@param exp1
@param exp2
@param thisArg Optional calling context of pureFn
@returns Updated or cached value

```

```

function pureFunction2Internal(LView: LView, bindingRoot: number, slotOffset: number, pureFn: (v1: any, v2: any) => any, exp1: any, exp2: any, thisArg?: any): any {
  const bindingIndex = bindingRoot + slotOffset;
  return bindingUpdated2(LView, bindingIndex, exp1, exp2) ? updateBinding(LView, bindingIndex + 2, thisArg ? pureFn.call(thisArg, exp1, exp2) : pureFn(exp1, exp2)) : getPureFunctionReturnValue(LView, bindingIndex + 2);
}

```

If the value of any provided exp has changed, calls the pure function to return an updated value. Or if no values have changed, returns cached value.

```

@param LView LView in which the function is being executed.
@param bindingRoot Binding root index.
@param slotOffset the offset from binding root to the reserved slot
@param pureFn
@param exp1
@param exp2
@param exp3
@param thisArg Optional calling context of pureFn
@returns Updated or cached value

```

```

function pureFunction3Internal(LView: LView, bindingRoot: number, slotOffset: number, pureFn: (v1: any, v2: any, v3: any) => any, exp1: any, exp2: any, exp3: any, thisArg?: any): any {
  const bindingIndex = bindingRoot + slotOffset;
  return bindingUpdated3(LView, bindingIndex, exp1, exp2, exp3) ? updateBinding(LView, bindingIndex + 3, thisArg ? pureFn.call(thisArg, exp1, exp2, exp3) : pureFn(exp1, exp2, exp3)) : getPureFunctionReturnValue(LView, bindingIndex + 3);
}

```

If the value of any provided exp has changed, calls the pure function to return an updated value. Or if no values have changed, returns cached value.

```

@param LView LView in which the function is being executed.
@param bindingRoot Binding root index.
@param slotOffset the offset from binding root to the reserved slot
@param pureFn
@param exp1
@param exp2
@param exp3
@param exp4
@param thisArg Optional calling context of pureFn
@returns Updated or cached value

```

```

function pureFunction4Internal(LView: LView, bindingRoot: number, slotOffset: number, pureFn: (v1: any, v2: any, v3: any, v4: any) => any, exp1: any, exp2: any, exp3: any, exp4: any, thisArg?: any): any {
  const bindingIndex = bindingRoot + slotOffset;
  return bindingUpdated4(LView, bindingIndex, exp1, exp2, exp3, exp4) ? updateBinding(LView, bindingIndex + 4, thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4) : pureFn(exp1, exp2, exp3, exp4)) : getPureFunctionReturnValue(LView, bindingIndex + 4);
}

```

If the value of any provided exp has changed, calls the pure function to return an updated value. Or if no values have changed, returns

```

cached value.\n *\n * @param lView LView in which the function is being executed.\n * @param bindingRoot
Binding root index.\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn A
pure function that takes binding values and builds an object or array\n * containing those values.\n * @param exps
An array of binding values\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached
value\n */\nexport function pureFunctionVInternal(\n  lView: LView, bindingRoot: number, slotOffset: number,
pureFn: (...v: any[]) => any,\n  exps: any[], thisArg?: any): any {\n  let bindingIndex = bindingRoot + slotOffset;\n  let different = false;\n  for (let i = 0; i < exps.length; i++) {\n    bindingUpdated(lView, bindingIndex++, exps[i])
&& (different = true);\n  }\n  return different ? updateBinding(lView, bindingIndex, pureFn.apply(thisArg, exps))
:\n    getPureFunctionReturnValue(lView, bindingIndex);\n}\n", "/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {PipeTransform}
from './change_detection/pipe_transform';\nimport {setInjectImplementation} from './di/inject_switch';\nimport
{RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from './interface/type';\nimport
{getFactoryDef} from './definition_factory';\nimport {setIncludeViewProviders} from './di';\nimport {store,
directiveInject} from './instructions/all';\nimport {isHostComponentStandalone} from
'/instructions/element_validation';\nimport {PipeDef, PipeDefList} from './interfaces/definition';\nimport
{CONTEXT, DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LView, TVIEW} from
'/interfaces/view';\nimport {pureFunction1Internal, pureFunction2Internal, pureFunction3Internal,
pureFunction4Internal, pureFunctionVInternal} from './pure_function';\nimport {getBindingRoot,
getLView, getTView} from './state';\nimport {load} from './util/view_utils';\n\n\n/**\n * Create a pipe.\n *\n *
@param index Pipe index where the pipe will be stored.\n * @param pipeName The name of the pipe\n * @returns
T the instance of the pipe.\n *\n * @codeGenApi\n */\nexport function pipe(index: number, pipeName: string): any
{\n  const tView = getTView();\n  let pipeDef: PipeDef<any>;\n  const adjustedIndex = index +
HEADER_OFFSET;\n  if (tView.firstCreatePass) {\n    // The `getPipeDef` throws if a pipe with a given name is
not found\n    // (so we use non-null assertion below).\n    pipeDef = getPipeDef(pipeName, tView.pipeRegistry)!;\n
tView.data[adjustedIndex] = pipeDef;\n    if (pipeDef.onDestroy) {\n      (tView.destroyHooks ||
(tView.destroyHooks = [])).push(adjustedIndex, pipeDef.onDestroy);\n    }\n  } else {\n    pipeDef =
tView.data[adjustedIndex] as PipeDef<any>;\n  }\n  const pipeFactory = pipeDef.factory || (pipeDef.factory =
getFactoryDef(pipeDef.type,
true));\n  const previousInjectImplementation = setInjectImplementation(directiveInject);\n  try {\n    // DI for pipes
is supposed to behave like directives when placed on a component\n    // host node, which means that we have to
disable access to `viewProviders`.\n    const previousIncludeViewProviders = setIncludeViewProviders(false);\n
const pipeInstance = pipeFactory();\n    setIncludeViewProviders(previousIncludeViewProviders);\n    store(tView,
getLView(), adjustedIndex, pipeInstance);\n    return pipeInstance;\n  } finally {\n    // we have to restore the injector
implementation in finally, just in case the creation of the\n    // pipe throws an error.\n    setInjectImplementation(previousInjectImplementation);\n  }\n}\n\n\n/**\n * Searches the pipe registry for a pipe with
the given name. If one is found,\n * returns the pipe. Otherwise, an error is thrown because the pipe cannot be
resolved.\n *\n * @param name Name of pipe to resolve\n * @param registry Full
list of available pipes\n * @returns Matching PipeDef\n */\nfunction getPipeDef(name: string, registry:
PipeDefList|null): PipeDef<any>|undefined {\n  if (registry) {\n    for (let i = registry.length - 1; i >= 0; i--) {\n
const pipeDef = registry[i];\n    if (name === pipeDef.name) {\n      return pipeDef;\n    }\n  }\n  if
(ngDevMode) {\n    throw new RuntimeError(RuntimeErrorCode.PIPE_NOT_FOUND,
getPipeNotFoundErrorMessage(name));\n  }\n}\n\n\n/**\n * Generates a helpful error message for the user when a
pipe is not found.\n *\n * @param name Name of the missing pipe\n * @returns The error message\n */\nfunction
getPipeNotFoundErrorMessage(name: string) {\n  const lView = getLView();\n  const declarationLView =
lView[DECLARATION_COMPONENT_VIEW] as LView<Type<unknown>>;\n  const context =
declarationLView[CONTEXT];\n  const hostIsStandalone = isHostComponentStandalone(lView);\n  const
componentInfoMessage = context ? ` in the '${context.constructor.name}' component` :

```

```

";\n const verifyMessage = `Verify that it is ${\n    hostIsStandalone ? 'included in the \''@Component.imports\''
of this component':\n    'declared or imported in this module'}`; \n const errorMessage =\n    `The pipe
'${name}' could not be found${componentInfoMessage}. ${verifyMessage}`;\n return errorMessage;\n}\n\n/**\n *
Invokes a pipe with 1 arguments.\n *\n * This instruction acts as a guard to {@link PipeTransform#transform}
invoking\n * the pipe only when an input to the pipe changes.\n *\n * @param index Pipe index where the pipe was
stored on creation.\n * @param slotOffset the offset in the reserved slot space\n * @param v1 1st argument to
{@link PipeTransform#transform}.\n *\n * @codeGenApi\n * ^\nexport function pipeBind1(index: number,
slotOffset: number, v1: any): any {\n    const adjustedIndex = index + HEADER_OFFSET;\n    const IView =
getLView();\n    const pipeInstance = load<PipeTransform>(IView, adjustedIndex);\n    return isPure(IView,
adjustedIndex)
    ?\n        pureFunction1Internal(\n            IView, getBindingRoot(), slotOffset, pipeInstance.transform, v1,
pipeInstance) :\n        pipeInstance.transform(v1);\n}\n\n/**\n * Invokes a pipe with 2 arguments.\n *\n * This
instruction acts as a guard to {@link PipeTransform#transform} invoking\n * the pipe only when an input to the
pipe changes.\n *\n * @param index Pipe index where the pipe was stored on creation.\n * @param slotOffset the
offset in the reserved slot space\n * @param v1 1st argument to {@link PipeTransform#transform}.\n * @param v2
2nd argument to {@link PipeTransform#transform}.\n *\n * @codeGenApi\n * ^\nexport function pipeBind2(index:
number, slotOffset: number, v1: any, v2: any): any {\n    const adjustedIndex = index + HEADER_OFFSET;\n    const
IView = getLView();\n    const pipeInstance = load<PipeTransform>(IView, adjustedIndex);\n    return isPure(IView,
adjustedIndex) ?\n        pureFunction2Internal(\n            IView, getBindingRoot(), slotOffset, pipeInstance.transform,
v1, v2, pipeInstance) :\n        pipeInstance.transform(v1, v2);\n}\n\n/**\n * Invokes a pipe with 3 arguments.\n *\n *
This instruction acts as a guard to {@link PipeTransform#transform} invoking\n * the pipe only when an input to
the pipe changes.\n *\n * @param index Pipe index where the pipe was stored on creation.\n * @param slotOffset
the offset in the reserved slot space\n * @param v1 1st argument to {@link PipeTransform#transform}.\n * @param
v2 2nd argument to {@link PipeTransform#transform}.\n * @param v3 3rd argument to {@link
PipeTransform#transform}.\n *\n * @codeGenApi\n * ^\nexport function pipeBind3(index: number, slotOffset:
number, v1: any, v2: any, v3: any): any {\n    const adjustedIndex = index + HEADER_OFFSET;\n    const IView =
getLView();\n    const pipeInstance = load<PipeTransform>(IView, adjustedIndex);\n    return isPure(IView,
adjustedIndex) ?\n        pureFunction3Internal(\n            IView, getBindingRoot(), slotOffset, pipeInstance.transform,
v1, v2,
v3, pipeInstance) :\n        pipeInstance.transform(v1, v2, v3);\n}\n\n/**\n * Invokes a pipe with 4 arguments.\n *\n *
This instruction acts as a guard to {@link PipeTransform#transform} invoking\n * the pipe only when an input to
the pipe changes.\n *\n * @param index Pipe index where the pipe was stored on creation.\n * @param slotOffset
the offset in the reserved slot space\n * @param v1 1st argument to {@link PipeTransform#transform}.\n * @param
v2 2nd argument to {@link PipeTransform#transform}.\n * @param v3 3rd argument to {@link
PipeTransform#transform}.\n * @param v4 4th argument to {@link PipeTransform#transform}.\n *\n * @codeGenApi\n * ^\nexport function pipeBind4(\n    index: number, slotOffset: number, v1: any, v2: any, v3: any,
v4: any): any {\n    const adjustedIndex = index + HEADER_OFFSET;\n    const IView = getLView();\n    const
pipeInstance = load<PipeTransform>(IView, adjustedIndex);\n    return isPure(IView, adjustedIndex) ?
pureFunction4Internal(\n
        IView, getBindingRoot(), slotOffset,\n
        pipeInstance.transform, v1, v2, v3,
v4, pipeInstance) :\n        pipeInstance.transform(v1, v2, v3, v4);\n}\n\n/**\n * Invokes a pipe
with variable number of arguments.\n *\n * This instruction acts as a guard to {@link PipeTransform#transform}
invoking\n * the pipe only when an input to the pipe changes.\n *\n * @param index Pipe index where the pipe was
stored on creation.\n * @param slotOffset the offset in the reserved slot space\n * @param values Array of
arguments to pass to {@link PipeTransform#transform} method.\n *\n * @codeGenApi\n * ^\nexport function
pipeBindV(index: number, slotOffset: number, values: [any, ...any[]]): any {\n    const adjustedIndex = index +
HEADER_OFFSET;\n    const IView = getLView();\n    const pipeInstance = load<PipeTransform>(IView,
adjustedIndex);\n    return isPure(IView, adjustedIndex) ?\n        pureFunctionVInternal(\n
            IView, getBindingRoot(), slotOffset,\n
            pipeInstance.transform, values,\n
pipeInstance) :\n        pipeInstance.transform(...values);\n}\n\n/**\n * Invokes a pipe with variable number
of arguments.\n *\n * This instruction acts as a guard to {@link PipeTransform#transform} invoking\n * the pipe
only when an input to the pipe changes.\n *\n * @param index Pipe index where the pipe was stored on creation.\n
* @param slotOffset the offset in the reserved slot space\n * @param values Array of arguments to pass to
{@link PipeTransform#transform} method.\n *\n * @codeGenApi\n * ^\nexport function pipeBindV(index: number,
slotOffset: number, values: [any, ...any[]]): any {\n    const adjustedIndex = index + HEADER_OFFSET;\n    const
IView = getLView();\n    const pipeInstance = load<PipeTransform>(IView, adjustedIndex);\n    return isPure(IView,
adjustedIndex) ?\n        pureFunctionVInternal(\n
            IView, getBindingRoot(), slotOffset,\n
            pipeInstance.transform, values,\n
pipeInstance) :\n        pipeInstance.transform(...values);\n}

```

```

    IView, getBindingRoot(), slotOffset, pipeInstance.transform, values, pipeInstance) :\n
pipeInstance.transform.apply(pipeInstance, values);\n}\n\nfunction isPure(IView: LView, index: number): boolean
{\n  return (<PipeDef<any>>IView[TVIEW].data[index]).pure;\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n * ^\n\n// <reference types="rxjs" />\n\nimport {PartialObserver,
Subject, Subscription} from 'rxjs';\n\n/**\n * Use in components with the `@Output` directive to emit custom
events\n * synchronously or asynchronously, and register handlers for those events\n * by subscribing to an
instance.\n * @usageNotes\n * Extends\n * [RxJS `Subject`](https://rxjs.dev/api/index/class/Subject)\n * for
Angular by adding the `emit()` method.\n * In the following example, a component defines two output
properties\n
 * that create event emitters. When the title is clicked, the emitter\n * emits an open or close event to toggle the
current visibility state.\n * ```html\n * @Component({\n *   selector: 'zippy',\n *   template: `
\n * <div
class="zippy">\n *   <div (click)="toggle()">Toggle</div>\n *   <div [hidden]="!visible">\n *     <ng-
content></ng-content>\n *   </div>\n * </div>`})\n * export class Zippy {\n *   visible: boolean = true;\n *
@Output() open: EventEmitter<any> = new EventEmitter();\n *   @Output() close: EventEmitter<any> = new
EventEmitter();\n *   toggle() {\n *     this.visible = !this.visible;\n *     if (this.visible) {\n *
this.open.emit(null);\n *     } else {\n *       this.close.emit(null);\n *     }\n *   }\n * }\n * ```\n *
Access the event object with the `$event` argument passed to the output event\n * handler:\n * ```html\n * <zippy
(open)="onOpen($event)" (close)="onClose($event)"></zippy>\n * ```\n * @see [Observables
in Angular](guide/observables-in-angular)\n * @publicApi\n * ^\n\nexport interface EventEmitter<T> extends
Subject<T> {\n /**\n * @internal\n * ^\n __isAsync: boolean;\n\n /**\n * Creates an instance of this class that
can\n * deliver events synchronously or asynchronously.\n * @param [isAsync=false] When true, deliver
events asynchronously.\n * ^\n new(isAsync?: boolean): EventEmitter<T>;\n\n /**\n * Emits an event
containing a given value.\n * @param value The value to emit.\n * ^\n emit(value?: T): void;\n\n /**\n *
Registers handlers for events emitted by this instance.\n * @param next When supplied, a custom handler for
emitted events.\n * @param error When supplied, a custom handler for an error notification from this emitter.\n *
@param complete When supplied, a custom handler for a completion notification from this\n * emitter.\n * ^\n
subscribe(next?: (value: T) => void, error?: (error: any) => void, complete?: () => void);\n
Subscription;\n /**\n * Registers handlers for events emitted by this instance.\n * @param observerOrNext
When supplied, a custom handler for emitted events, or an observer\n * object.\n * @param error When
supplied, a custom handler for an error notification from this emitter.\n * @param complete When supplied, a
custom handler for a completion notification from this\n * emitter.\n * ^\n subscribe(observerOrNext?: any,
error?: any, complete?: any): Subscription;\n}\n\nclass EventEmitter_ extends Subject<any> {\n __isAsync:
boolean; // tslint:disable-line\n\n constructor(isAsync: boolean = false) {\n  super();\n  this.__isAsync =
isAsync;\n }\n\n emit(value?: any) {\n  super.next(value);\n }\n\n override subscribe(observerOrNext?: any,
error?: any, complete?: any): Subscription {\n  let nextFn = observerOrNext;\n  let errorFn = error || (() =>
null);\n  let completeFn = complete;\n\n  if (observerOrNext && typeof observerOrNext === 'object')\n  {\n    const observer = observerOrNext as PartialObserver<unknown>;\n    nextFn =
observer.next?.bind(observer);\n    errorFn = observer.error?.bind(observer);\n    completeFn =
observer.complete?.bind(observer);\n  }\n\n  if (this.__isAsync) {\n    errorFn = _wrapInTimeout(errorFn);\n\n
if (nextFn) {\n    nextFn = _wrapInTimeout(nextFn);\n  }\n\n  if (completeFn) {\n    completeFn =
_wrapInTimeout(completeFn);\n  }\n  }\n\n  const sink = super.subscribe({next: nextFn, error: errorFn,
complete: completeFn});\n\n  if (observerOrNext instanceof Subscription) {\n    observerOrNext.add(sink);\n
}\n\n  return sink;\n }\n}\n\nfunction _wrapInTimeout(fn: (value: unknown) => any) {\n  return (value: unknown)
=> {\n    setTimeout(fn, undefined, value);\n  };}\n\n/**\n * @publicApi\n * ^\n\nexport const EventEmitter: {\n
new (isAsync?: boolean): EventEmitter<any>; new<T>(isAsync?: boolean): EventEmitter<T>;\n  readonly
prototype: EventEmitter<any>;\n}

```

```

= EventEmitter_ as any;\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport { Observable } from 'rxjs';\n\nimport { EventEmitter } from
'./event_emitter';\nimport { arrayEquals, flatten } from './util/array_utils';\nimport { getSymbolIterator } from
'./util/symbol';\n\nfunction symbolIterator<T>(this: QueryList<T>): Iterator<T> {\n  return ((this as any as
{ _results: Array<T> })._results as any)[getSymbolIterator()]();\n}\n\n/**\n * An unmodifiable list of items that
Angular keeps up to date when the state\n * of the application changes.\n *\n * The type of object that { @link
ViewChildren }, { @link ContentChildren }, and { @link QueryList }\n * provide.\n *\n * Implements an iterable
interface, therefore it can be used in both ES6\n * javascript `for (var i of items)` loops as well as in Angular
templates with\n * `*ngFor`.\n *\n * Changes can be observed by subscribing to the changes `Observable`.\n *\n * NOTE: In the
future this class will implement an `Observable` interface.\n *\n * @usageNotes\n * ### Example\n * ```typescript\n
* @Component({ ... })\n * class Container {\n *   @ViewChildren(Item) items: QueryList<Item>;\n * }\n * ```\n *\n
* @publicApi\n */\nexport class QueryList<T> implements Iterable<T> {\n  public readonly dirty = true;\n  private
_results: Array<T> = [];\n  private _changesDetected: boolean = false;\n  private _changes:
EventEmitter<QueryList<T>> | null = null;\n\n  readonly length: number = 0;\n  readonly first: T = undefined!;\n
  readonly last: T = undefined!;\n\n  /**\n   * Returns `Observable` of `QueryList` notifying the subscriber of
changes.\n   *\n   * @param emitDistinctChangesOnly Whether `QueryList.changes` should fire only
when\n   * actual change\n   * has occurred. Or if it should fire when query is recomputed. (recomputing could resolve in\n
   * the same result)\n   *\n   * constructor(private _emitDistinctChangesOnly: boolean = false) {\n   * // This function
should be declared on the prototype, but doing so there will cause the class\n   * // declaration to have side-effects and
become not tree-shakable. For this reason we do it in\n   * // the constructor.\n   * // [getSymbolIterator]():\n
  Iterator<T> { ... }\n   * const symbol = getSymbolIterator();\n   * const proto = QueryList.prototype as any;\n   * if
(!proto[symbol]) proto[symbol] = symbolIterator;\n   * }\n\n   * Returns the QueryList entry at `index`.\n   *\n   * @param
index: number: T | undefined {\n   * return this._results[index];\n   * }\n\n   * See\n   * [Array.map](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/map)\n
   *\n   * map<U>(fn: (item: T, index: number, array: T[]) => U): U[] {\n   * return this._results.map(fn);\n   * }\n\n
   * See\n   * [Array.filter](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/filter)\n
   *\n   * filter(fn: (item: T, index: number, array: T[]) => boolean): T[] {\n   * return this._results.filter(fn);\n   * }\n\n
   * See\n   * [Array.find](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/find)\n
   *\n   * find(fn: (item: T, index: number, array: T[]) => boolean): T | undefined {\n   * return this._results.find(fn);\n
   * }\n\n   * See\n   * [Array.reduce](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/reduce)\n
   *\n   * reduce<U>(fn: (prevValue: U, curValue: T, curIndex: number, array: T[]) => U, init: U): U {\n   * return this._results.reduce(fn, init);\n   * }\n\n   * See\n   * [Array.forEach](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/forEach)\n
   *\n   * forEach(fn: (item: T, index: number, array: T[]) => void): void {\n   * this._results.forEach(fn);\n   * }\n\n   * See\n   * [Array.some](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/some)\n
   *\n   * some(fn: (value: T, index: number, array: T[]) => boolean): boolean {\n   * return this._results.some(fn);\n   * }\n\n
   * Returns a copy of the internal results list as an Array.\n   *\n   * toArray(): T[] {\n   * return
this._results.slice();\n   * }\n\n   * toString(): string {\n   * return this._results.toString();\n   * }\n\n   * Updates the
stored data of the query list, and resets the `dirty` flag to `false`, so that\n   * on change detection, it will not notify
of changes to the queries, unless a new change\n   * occurs.\n   *\n   * @param resultsTree The query results to
store\n   * @param identityAccessor Optional function for extracting stable object identity from a value\n   * in the
array. This function is executed for each element of the query result list while\n   *

```

```

    comparing current query list with the new one (provided as a first argument of the `reset` function) to
    detect if the lists are different. If the function is not provided, elements are compared as is (without any pre-
    processing).
    reset(resultsTree: Array<T>any[], identityAccessor?: (value: T) => unknown): void
    // Cast to `QueryListInternal` so that we can mutate fields which are readonly for the usage of `QueryList` (but not
    for `QueryList` itself).
    const self = this as QueryListInternal<T>;
    (self as {dirty: boolean}).dirty = false;
    const newResultFlat = flatten(resultsTree);
    if (this._changesDetected !== arrayEquals(self._results,
    newResultFlat, identityAccessor)) {
    self._results = newResultFlat;
    self.length = newResultFlat.length;
    self.last = newResultFlat[this.length - 1];
    self.first = newResultFlat[0];
    }
    // Triggers a
    change event by emitting on the `changes` {@link EventEmitter}.
    notifyOnChanges(): void
    if (this._changes && (this._changesDetected ||
    !this._emitDistinctChangesOnly))
    this._changes.emit(this);
    // internal
    setDirty()
    (this as {dirty: boolean}).dirty = true;
    // internal
    destroy(): void
    (this.changes as
    EventEmitter<any>).complete();
    (this.changes as EventEmitter<any>).unsubscribe();
    // The
    implementation of `Symbol.iterator` should be declared here, but this would cause
    // tree-shaking issues with
    `QueryList`. So instead, it's added in the constructor (see comments there) and this declaration is left here to
    ensure that TypeScript considers `QueryList` to
    // implement the `Iterable` interface. This is required for template
    type-checking of `NgFor` loops
    // over `QueryList`s to work correctly, since `QueryList` must be assignable to
    `NgIterable`.
    [Symbol.iterator]!: () => Iterator<T>;
    // Internal set of APIs used by the framework. (not
    to
    be made public)
    interface QueryListInternal<T> extends QueryList<T> {
    reset(a: any[]): void;
    notifyOnChanges(): void;
    length: number;
    last: T;
    first: T;
    }
    // License
    @license
    Copyright Google
    LLC All Rights Reserved.
    Use of this source code is governed by an MIT-style license that can be
    found
    in the LICENSE file at https://angular.io/license
    import {Injector} from './di/injector';
    import {assertLContainer} from './render3/assert';
    import {createLView, renderView} from
    './render3/instructions/shared';
    import {TContainerNode, TNode, TNodeType} from
    './render3/interfaces/node';
    import {DECLARATION_LCONTAINER, LView, LViewFlags, QUERIES, TView}
    from './render3/interfaces/view';
    import {getCurrentTNode, getLView} from './render3/state';
    import {ViewRef
    as R3_ViewRef} from './render3/view_ref';
    import {assertDefined} from './util/assert';
    import {createElementRef, ElementRef} from './element_ref';
    import {EmbeddedViewRef} from
    './view_ref';
    // Represents an embedded template that can be used to instantiate embedded views.
    // To
    instantiate embedded views based on a template, use the `ViewContainerRef` method
    `createEmbeddedView`.
    // Access a `TemplateRef` instance by placing a directive on an ``
    // element (or directive prefixed with `*`). The `TemplateRef` for the embedded view
    // is injected into the
    constructor of the directive,
    // using the `TemplateRef` token.
    // You can also use a `Query` to find a
    `TemplateRef` associated with
    // a component or a directive.
    // @see `ViewContainerRef`
    // @see
    [Navigate the Component Tree with DI](guide/dependency-injection-navtree)
    // @publicApi
    export
    abstract class TemplateRef<C> {
    // The anchor element in the parent view for this embedded view.
    // The
    data-binding and injection contexts of embedded views created from this `TemplateRef`
    // inherit from the
    contexts of this location.
    // Typically new embedded views are attached to the view container of this location, but in
    // advanced
    use-cases, the view can be attached to a different container while keeping the
    // data-binding and injection
    context from the original location.
    // TODO(i): rename to anchor or location
    abstract readonly
    elementRef: ElementRef;
    // Instantiates an unattached embedded view based on this template.
    //
    // @param context The data-binding context of the embedded view, as declared
    // in the `` usage.
    // @param injector Injector to be used within the embedded view.
    // @returns The new embedded view object.
    abstract createEmbeddedView(context: C, injector?: Injector): EmbeddedViewRef<C>;
    //
    // @internal
    // @nocollapse
    // static __NG_ELEMENT_ID__: () => TemplateRef<any> | null =
    injectTemplateRef;
    }
    // TODO(alxhub): combine interface

```

and implementation.

```
Currently this is challenging since something in g3 depends on them being separate.
const R3TemplateRef =
class TemplateRef<T> extends ViewEngineTemplateRef<T> {
  constructor(
    private _declarationLView:
LView, private _declarationTContainer: TContainerNode,
    public override elementRef: ElementRef) {
    super();
  }
  override createEmbeddedView(context: T, injector?: Injector): EmbeddedViewRef<T> {
    const
embeddedTVView = this._declarationTContainer.tViews as TVView;
    const embeddedLView = createLView(
this._declarationLView, embeddedTVView, context, LViewFlags.CheckAlways, null,
embeddedTVView.declTNode, null, null, null, null, injector || null);
    const declarationLContainer =
this._declarationLView[this._declarationTContainer.index];
    ngDevMode &&
assertLContainer(declarationLContainer);
    embeddedLView[DECLARATION_LCONTAINER] =
declarationLContainer;
    const declarationViewLQueries = this._declarationLView[QUERIES];
    if (declarationViewLQueries !== null) {
      embeddedLView[QUERIES] =
declarationViewLQueries.createEmbeddedView(embeddedTVView);
    }
    return new R3_ViewRef<T>(embeddedLView);
  }
}

/**
 * Creates a
TemplateRef given a node.
 * @returns The TemplateRef instance to use
 */
export function
injectTemplateRef<T>(): TemplateRef<T> | null {
  return createTemplateRef<T>(getCurrentTNode(),
getLView());
}

/**
 * Creates a TemplateRef and stores it on the injector.
 * @param hostTNode The
node on which a TemplateRef is requested
 * @param hostLView The `LView` to which the node belongs
 * @returns The TemplateRef instance or null if we can't create a TemplateRef on a given node type
 */
export function
createTemplateRef<T>(hostTNode: TNode, hostLView: LView): TemplateRef<T> | null {
  if
(hostTNode.type & TNodeType.Container) {
    ngDevMode && assertDefined(hostTNode.tViews, 'TVView must
be allocated');
    return new R3TemplateRef(
      hostLView, hostTNode as TContainerNode, createElementRef(hostTNode,
hostLView));
  }
  return null;
}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import {Injector} from './di/injector';
import {EnvironmentInjector} from
 './di/r3_injector';
import {isType, Type} from './interface/type';
import {assertNodeInjector} from
 './render3/assert';
import {ComponentFactory as R3ComponentFactory} from './render3/component_ref';
import
 {getComponentDef} from './render3/definition';
import {getParentInjectorLocation, NodeInjector} from
 './render3/di';
import {addToViewTree, createLContainer} from './render3/instructions/shared';
import
 {CONTAINER_HEADER_OFFSET, LContainer, NATIVE, VIEW_REFS} from
 './render3/interfaces/container';
import {NodeInjectorOffset} from
 './render3/interfaces/injector';
import {TContainerNode, TDirectiveHostNode, TElementContainerNode,
TElementNode, TNodeType} from './render3/interfaces/node';
import {RComment, RElement} from
 './render3/interfaces/renderer_dom';
import {isLContainer} from './render3/interfaces/type_checks';
import
 {LView, PARENT, RENDERER, T_HOST, TVIEW} from './render3/interfaces/view';
import
 {assertTNodeType} from './render3/node_assert';
import {addViewToContainer, destroyLView, detachView,
getBeforeNodeForView, insertView, nativeInsertBefore, nativeNextSibling, nativeParentNode} from
 './render3/node_manipulation';
import {getCurrentTNode, getLView} from './render3/state';
import
 {getParentInjectorIndex, getParentInjectorView, hasParentInjector} from './render3/util/injector_utils';
import
 {getNativeByTNode, unwrapRNode, viewAttachedToContainer} from './render3/util/view_utils';
import
 {ViewRef as R3ViewRef} from './render3/view_ref';
import {addToArray, removeFromArray} from
 './util/array_utils';
import {assertDefined, assertEqual, assertGreaterThan, assertLessThan, throwError} from
 './util/assert';
import {ComponentFactory, ComponentRef} from './component_factory';
import
 {createElementRef, ElementRef} from './element_ref';
import {NgModuleRef} from
 './ng_module_factory';
import {TemplateRef} from './template_ref';
import {EmbeddedViewRef, ViewRef} from
 './view_ref';

/**
 * Represents a container where one or more views can be attached to a component.
 * Can
contain *host views* (created by instantiating a component with the `createComponent()` method), and

```

\*embedded views\*\n \* (created by instantiating a `TemplateRef` with the `createEmbeddedView()` method).\n \*\n \* A view container instance can contain other view containers,\n \* creating a [view hierarchy](guide/glossary#view-tree).\n \*\n \* @see `ComponentRef`\n \* @see `EmbeddedViewRef`\n \*\n \* @publicApi\n \* ^\nexport abstract class ViewContainerRef {\n /\*\*\n \* Anchor element that specifies the location of this container in the containing view.\n \* Each view container can have only one anchor element, and each anchor element\n \* can have only a single view container.\n \*\n \* Root elements of views attached to this container become siblings of the anchor element in\n \* the rendered view.\n \*\n \* Access the `ViewContainerRef` of an element by placing a `Directive` injected\n \* with `ViewContainerRef` on the element, or use a `ViewChild` query.\n \*\n \* <!-- TODO: rename to anchorElement -->\n \*/\n abstract get element(): ElementRef;\n /\*\*\n \* The [dependency injector](guide/glossary#injector) for this view container.\n \*/\n abstract get injector(): Injector;\n /\*\* @deprecated No replacement \*/\n abstract get parentInjector(): Injector;\n /\*\*\n \* Destroys all views in this container.\n \*/\n abstract clear(): void;\n /\*\*\n \* Retrieves a view from this container.\n \* @param index The 0-based index of the view to retrieve.\n \* @returns The `ViewRef` instance, or null if the index is out of range.\n \*/\n abstract get(index: number): ViewRef|null;\n /\*\*\n \* Reports how many views are currently attached to this container.\n \* @returns The number of views.\n \*/\n abstract get length(): number;\n /\*\*\n \* Instantiates an embedded view and inserts it\n \* into this container.\n \* @param templateRef The HTML template that defines the view.\n \* @param context The data-binding context of the embedded view, as declared\n \* in the `` usage.\n \* @param options Extra configuration for the created view. Includes:\n \* \* index: The 0-based index at which to insert the new view into this container.\n \* If not specified, appends the new view as the last entry.\n \* \* injector: Injector to be used within the embedded view.\n \*\n \* @returns The `ViewRef` instance for the newly created view.\n \*/\n abstract createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, options?: {\n index?: number,\n injector?: Injector\n }): EmbeddedViewRef<C>;\n /\*\*\n \* Instantiates an embedded view and inserts it\n \* into this container.\n \* @param templateRef The HTML template that defines the view.\n \* @param context The data-binding context of the embedded view, as declared\n \* in the `` usage.\n \* @param index The 0-based index at which to insert the new view into this container.\n \* If not specified, appends the new view as the last entry.\n \*\n \* @returns The `ViewRef` instance for the newly created view.\n \*/\n abstract createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, index?: number):\n EmbeddedViewRef<C>;\n /\*\*\n \* Instantiates a single component and inserts its host view into this container.\n \*\n \* @param componentType Component Type to use.\n \* @param options An object that contains extra parameters:\n \* \* index: the index at which to insert the new component's host view into this container.\n \* If not specified, appends the new view as the last entry.\n \* \* injector: the injector to use as the parent for the new component.\n \* \* ngModuleRef: an NgModuleRef of the component's NgModule, you should almost always provide\n \* this to ensure that all expected providers are available for the component\n \* instantiation.\n \* \* environmentInjector: an EnvironmentInjector which will provide the component's environment.\n \* you should almost always provide this to ensure that all expected providers\n \* are available for the component instantiation. This option is intended to\n \* replace the `ngModuleRef` parameter.\n \* \* projectableNodes: list of DOM nodes that should be projected through\n \* [`<ng-content>`](api/core/ng-content) of the new component instance.\n \*\n \* @returns The new `ComponentRef` which contains the component instance and the host view.\n \*/\n abstract createComponent<C>(componentType: Type<C>, options?: {\n index?: number,\n injector?: Injector,\n ngModuleRef?: NgModuleRef<unknown>,\n environmentInjector?: EnvironmentInjector|NgModuleRef<unknown>,\n projectableNodes?: Node[][],\n }): ComponentRef<C>;\n /\*\*\n \* Instantiates a single component and inserts its host view into this container.\n \*\n \* @param componentFactory Component factory to use.\n \* @param index The index at which to insert the new component's host view into this container.\n \* If not specified, appends the new view as the last entry.\n \* @param injector The injector to use as the parent for the new component.\n \* @param projectableNodes List of DOM nodes that should be projected through\n \* [`<ng-content>`](api/core/ng-content) of the new component



```

instance.\n * @param ngModuleRef An instance of the NgModuleRef that represent an NgModule.\n * This
information is
used to retrieve corresponding NgModule injector.\n * \n * @returns The new `ComponentRef` which contains
the component instance and the host view.\n * \n * @deprecated Angular no longer requires component factories
to dynamically create components.\n * Use different signature of the `createComponent` method, which allows
passing\n * Component class directly.\n * \n abstract createComponent<C>(\n componentFactory:
ComponentFactory<C>, index?: number, injector?: Injector,\n projectableNodes?: any[][],\n
environmentInjector?: EnvironmentInjector|NgModuleRef<any>): ComponentRef<C>;\n\n /**\n * Inserts a view
into this container.\n * @param viewRef The view to insert.\n * @param index The 0-based index at which to
insert the view.\n * If not specified, appends the new view as the last entry.\n * @returns The inserted `ViewRef`
instance.\n * \n * \n abstract insert(viewRef: ViewRef, index?: number): ViewRef;\n\n /**\n * Moves a view to
a new location in this container.\n * @param viewRef The view to move.\n * @param index The 0-based index
of the new location.\n * @returns The moved `ViewRef` instance.\n * \n abstract move(viewRef: ViewRef,
currentIndex: number): ViewRef;\n\n /**\n * Returns the index of a view within the current container.\n *
@param viewRef The view to query.\n * @returns The 0-based index of the view's position in this container,\n *
or `-1` if this container doesn't contain the view.\n * \n abstract indexOf(viewRef: ViewRef): number;\n\n /**\n
* Destroys a view attached to this container\n * @param index The 0-based index of the view to destroy.\n * If
not specified, the last view in the container is removed.\n * \n abstract remove(index?: number): void;\n\n /**\n
* Detaches a view from this container without destroying it.\n * Use along with `insert()` to move a view within the
current container.\n * @param index The 0-based index of the view to detach.\n
* If not specified, the last view in the container is detached.\n * \n abstract detach(index?: number):
ViewRef|null;\n\n /**\n * @internal\n * @nocollapse\n * \n static __NG_ELEMENT_ID__: () =>
ViewContainerRef = injectViewContainerRef;\n}\n\n/**\n * Creates a ViewContainerRef and stores it on the
injector. Or, if the ViewContainerRef\n * already exists, retrieves the existing ViewContainerRef.\n * \n * @returns
The ViewContainerRef instance to use\n * \n export function injectViewContainerRef(): ViewContainerRef {\n
const previousTNode = getCurrentTNode() as TElementNode | TElementContainerNode | TContainerNode;\n
return createContainerRef(previousTNode, getLView());\n}\n\nconst VE_ViewContainerRef =
ViewContainerRef;\n\n// TODO(alxhub): cleaning up this indirection triggers a subtle bug in Closure in g3. Once
the fix\n// for that lands, this can be cleaned up.\nconst R3ViewContainerRef = class ViewContainerRef extends
VE_ViewContainerRef {\n constructor(\n private _lContainer:
LContainer,\n private _hostTNode: TElementNode|TContainerNode|TElementContainerNode,\n private
_hostLView: LView) {\n super();\n }\n\n override get element(): ElementRef {\n return
createElementRef(this._hostTNode, this._hostLView);\n }\n\n override get injector(): Injector {\n return new
NodeInjector(this._hostTNode, this._hostLView);\n }\n\n /** @deprecated No replacement\n * \n override get
parentInjector(): Injector {\n const parentLocation = getParentInjectorLocation(this._hostTNode,
this._hostLView);\n if (hasParentInjector(parentLocation)) {\n const parentView =
getParentInjectorView(parentLocation, this._hostLView);\n const injectorIndex =
getParentInjectorIndex(parentLocation);\n ngDevMode && assertNodeInjector(parentView, injectorIndex);\n
const parentTNode =\n parentView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] as
TElementNode;\n return new NodeInjector(parentTNode, parentView);\n } else
{\n return new NodeInjector(null, this._hostLView);\n }\n }\n\n override clear(): void {\n while (this.length
> 0) {\n this.remove(this.length - 1);\n }\n }\n\n override get(index: number): ViewRef|null {\n const
viewRefs = getViewRefs(this._lContainer);\n return viewRefs !== null && viewRefs[index] || null;\n }\n\n
override get length(): number {\n return this._lContainer.length - CONTAINER_HEADER_OFFSET;\n }\n\n
override createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, options?: {\n index?: number,\n
injector?: Injector\n }): EmbeddedViewRef<C>;\n override createEmbeddedView<C>(templateRef:
TemplateRef<C>, context?: C, index?: number):\n EmbeddedViewRef<C>;\n override
createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, indexOrOptions?: number|{\n index?:

```

```

number,\n injector?: Injector\n }): EmbeddedViewRef<C> {\n let index: number|undefined;\n let injector:
Injector|undefined;\n\n if (typeof
indexOrOptions === 'number') {\n index = indexOrOptions;\n } else if (indexOrOptions != null) {\n index
= indexOrOptions.index;\n injector = indexOrOptions.injector;\n }\n\n const viewRef =
templateRef.createEmbeddedView(context || <any>{ }, injector);\n this.insert(viewRef, index);\n return
viewRef;\n }\n\n override createComponent<C>(componentType: Type<C>, options?: {\n index?: number,\n
injector?: Injector,\n projectableNodes?: Node[][],\n ngModuleRef?: NgModuleRef<unknown>,\n }):
ComponentRef<C>;\n /**\n * @deprecated Angular no longer requires component factories to dynamically create
components.\n * Use different signature of the `createComponent` method, which allows passing\n *
Component class directly.\n */\n override createComponent<C>(\n componentFactory:
ComponentFactory<C>, index?: number|undefined,\n injector?: Injector|undefined, projectableNodes?:
any[][]|undefined,\n environmentInjector?:
EnvironmentInjector|NgModuleRef<any>|undefined): ComponentRef<C>;\n override createComponent<C>(\n
componentFactoryOrType: ComponentFactory<C>|Type<C>, indexOrOptions?: number|undefined|{\n index?:
number,\n injector?: Injector,\n ngModuleRef?: NgModuleRef<unknown>,\n environmentInjector?:
EnvironmentInjector|NgModuleRef<unknown>,\n projectableNodes?: Node[][],\n },\n injector?:
Injector|undefined, projectableNodes?: any[][]|undefined,\n environmentInjector?:
EnvironmentInjector|NgModuleRef<any>|undefined): ComponentRef<C> {\n const isComponentFactory =
componentFactoryOrType && !isType(componentFactoryOrType);\n let index: number|undefined;\n\n // This
function supports 2 signatures and we need to handle options correctly for both:\n // 1. When first argument is a
Component type. This signature also requires extra\n // options to be provided as an object (more ergonomic
option).\n // 2. First argument is
a Component factory. In this case extra options are represented as\n // positional arguments. This signature is
less ergonomic and will be deprecated.\n if (isComponentFactory) {\n if (ngDevMode) {\n assertEquals(\n
typeof indexOrOptions !== 'object', true,\n 'It looks like Component factory was provided as the first
argument ' +\n 'and an options object as the second argument. This combination of arguments ' +\n
'is incompatible. You can either change the first argument to provide Component ' +\n 'type or change the
second argument to be a number (representing an index at ' +\n 'which to insert the new component\\'s host
view into this container');\n }\n index = indexOrOptions as number | undefined;\n } else {\n if
(ngDevMode) {\n assertDefined(\n getComponentDef(componentFactoryOrType),\n 'Provided
Component class doesn't contain Component
definition. ' +\n 'Please check whether provided class has @Component decorator.);\n assertEquals(\n
typeof indexOrOptions !== 'number', true,\n 'It looks like Component type was provided as the first
argument ' +\n 'and a number (representing an index at which to insert the new component\\'s ' +\n
'host view into this container as the second argument. This combination of arguments ' +\n 'is incompatible.
Please use an object as the second argument instead.);\n }\n const options = (indexOrOptions || {}) as {\n
index?: number,\n injector?: Injector,\n ngModuleRef?: NgModuleRef<unknown>,\n
environmentInjector?: EnvironmentInjector | NgModuleRef<unknown>,\n projectableNodes?: Node[][],\n
};\n if (ngDevMode && options.environmentInjector && options.ngModuleRef) {\n throwError(\n
`Cannot pass both environmentInjector and ngModuleRef
options to createComponent().`);\n }\n index = options.index;\n injector = options.injector;\n
projectableNodes = options.projectableNodes;\n environmentInjector = options.environmentInjector ||
options.ngModuleRef;\n }\n\n const componentFactory: ComponentFactory<C> = isComponentFactory ?\n
componentFactoryOrType as ComponentFactory<C>:\n new
R3ComponentFactory(getComponentDef(componentFactoryOrType)!);\n const contextInjector = injector ||
this.parentInjector;\n\n // If an `NgModuleRef` is not provided explicitly, try retrieving it from the DI tree.\n if
(!environmentInjector && (componentFactory as any).ngModule == null) {\n // For the `ComponentFactory`
case, entering this logic is very unlikely, since we expect that\n // an instance of a `ComponentFactory`, resolved

```

via `ComponentFactoryResolver` would have an `ngModule` field. This is possible in some test scenarios and potentially in some JIT-based

```
// use-cases. For the `ComponentFactory` case we preserve backwards-compatibility and try using a
// provided injector first, then fall back to the parent injector of this `ViewContainerRef` instance.
// For the factory-less case, it's critical to establish a connection with the module injector tree (by retrieving an
// instance of an `NgModuleRef` and accessing its injector), so that a component can use DI tokens provided in
// MgModules. For this reason, we can not rely on the provided injector, since it might be detached from the DI
// tree (for example, if it was created via `Injector.create` without specifying a parent injector, or if an injector
// is retrieved from an `NgModuleRef` created via `createNgModule` using an `NgModule` outside of a
// module tree). Instead, we always use `ViewContainerRef`'s parent injector, which is normally connected to
// the DI tree, which includes module
```

```
injector subtree.
const _injector = isComponentFactory ? contextInjector : this.parentInjector;
DO NOT REFACTOR. The code here used to have a `injector.get(NgModuleRef, null) || undefined`
expression which seems to cause internal google apps to fail. This is documented in the following internal
bug issue: go/b/142967802
const result = _injector.get(EnvironmentInjector, null);
if (result) {
  environmentInjector = result;
}
const componentRef =
componentFactory.create(contextInjector, projectableNodes, undefined, environmentInjector);
this.insert(componentRef.hostView, index);
return componentRef;
}
override insert(viewRef: ViewRef,
index?: number): ViewRef {
  const IView = (viewRef as R3ViewRef<any>)._IView!;
  const tView =
IView[TVIEW];
  if (ngDevMode && viewRef.destroyed) {
    throw new Error('Cannot insert a destroyed
View in a ViewContainer!');
  }
  if (viewAttachedToContainer(IView)) {
    // If view is already attached, detach it first so we clean up
    // references appropriately.
    const prevIdx = this.indexOf(viewRef);
    // A view might be attached either to
    // this or a different container. The `prevIdx` for
    // those cases will be:
    // equal to -1 for views attached to
    // this ViewContainerRef
    // >= 0 for views attached to a different ViewContainerRef
    if (prevIdx !== -1) {
      this.detach(prevIdx);
    } else {
      const prevLContainer = IView[PARENT] as LContainer;
      ngDevMode &&
      assertEquals(
        isLContainer(prevLContainer), true,
        'An attached view
should have its PARENT point to a container.');
```

```

// We need to re-create a R3ViewContainerRef instance
// since those are not stored on LView (nor anywhere else).
const prevVContainerRef = new
R3ViewContainerRef(
  prevLContainer, prevLContainer[T_HOST]
  as TDirectiveHostNode, prevLContainer[PARENT]);
prevVContainerRef.detach(prevVContainerRef.indexOf(viewRef));
}
}
// Logical operation of adding `LView` to `LContainer`
const adjustedIdx =
this._adjustIndex(index);
const IContainer = this._IContainer;
insertView(tView, IView, IContainer,
adjustedIdx);
// Physical operation of adding the DOM nodes.
const beforeNode =
getBeforeNodeForView(adjustedIdx, IContainer);
const renderer = IView[RENDERER];
const parentRNode
= nativeParentNode(renderer, IContainer[NATIVE] as RElement | RComment);
if (parentRNode !== null) {
  addViewToContainer(tView, IContainer[T_HOST], renderer, IView, parentRNode, beforeNode);
}
(viewRef as R3ViewRef<any>).attachToViewContainerRef();
addToArray(getOrCreateViewRefs(IContainer),
adjustedIdx, viewRef);
return viewRef;
}
override move(viewRef: ViewRef, newIndex: number):
ViewRef {
  if (ngDevMode && viewRef.destroyed) {
    throw new Error('Cannot move a destroyed View in a ViewContainer!');
  }
  return this.insert(viewRef,
newIndex);
}
override indexOf(viewRef: ViewRef): number {
  const viewRefsArr =
getViewRefs(this._IContainer);
return viewRefsArr !== null ? viewRefsArr.indexOf(viewRef) : -1;
}
override remove(index?: number): void {
  const adjustedIdx = this._adjustIndex(index, -1);
  const
detachedView = detachView(this._IContainer, adjustedIdx);
  if (detachedView) {
    // Before destroying the
    // view, remove it from the container's array of `ViewRef`s.
    // This ensures the view container length is updated
    // before calling `destroyLView`, which could recursively call view container methods that
    // rely on an
    // accurate container length.
    // (e.g. a method on this view container being called by a child directive's
```

```

OnDestroy\n // lifecycle hook)\n removeFromArray(getOrCreateViewRefs(this._lContainer),
adjustedIdx);\n destroyLView(detachedView[TVIEW], detachedView);\n }\n }\n\n override detach(index?:
number): ViewRef|null {\n const adjustedIdx = this._adjustIndex(index, -1);\n const view =
detachView(this._lContainer, adjustedIdx);\n\n const wasDetached =\n view &&
removeFromArray(getOrCreateViewRefs(this._lContainer), adjustedIdx) != null;\n return wasDetached ? new
R3ViewRef(view!) : null;\n }\n\n private _adjustIndex(index?: number, shift: number = 0) {\n if (index == null)
{\n return this.length + shift;\n }\n if (ngDevMode) {\n assertGreaterThan(index, -1, `ViewRef index must
be positive, got ${index}`);\n // +1 because it's legal to insert at the end.\n assertLessThan(index, this.length +
1 + shift, 'index');\n }\n return index;\n }\n};\n\nfunction getViewRefs(lContainer: LContainer): ViewRef[]|null
{\n return lContainer[VIEW_REFS] as ViewRef[];\n}\n\nfunction getOrCreateViewRefs(lContainer: LContainer):
ViewRef[]
{\n return (lContainer[VIEW_REFS] || (lContainer[VIEW_REFS] = [])) as ViewRef[];\n}\n\n/**\n * Creates a
ViewContainerRef and stores it on the injector.\n *\n * @param ViewContainerRefToken The ViewContainerRef
type\n *\n * @param ElementRefToken The ElementRef type\n *\n * @param hostTNode The node that is requesting a
ViewContainerRef\n *\n * @param hostLView The view to which the node belongs\n *\n * @returns The
ViewContainerRef instance to use\n */\n\nexport function createContainerRef(\n hostTNode:
TElementNode|TContainerNode|TElementContainerNode,\n hostLView: LView): ViewContainerRef {\n
ngDevMode && assertTNodeType(hostTNode, TNodeType.AnyContainer | TNodeType.AnyRNode);\n\n let
lContainer: LContainer;\n const slotValue = hostLView[hostTNode.index];\n if (isLContainer(slotValue)) {\n //
If the host is a container, we don't need to create a new LContainer\n lContainer = slotValue;\n } else {\n let
commentNode: RComment;\n // If the host is an element container, the
native host element is guaranteed to be a\n // comment and we can reuse that comment as anchor element for the
new LContainer.\n // The comment node in question is already part of the DOM structure so we don't need to
append\n // it again.\n if (hostTNode.type & TNodeType.ElementContainer) {\n commentNode =
unwrapRNode(slotValue) as RComment;\n } else {\n // If the host is a regular element, we have to insert a
comment node manually which will\n // be used as an anchor when inserting elements. In this specific case we
use low-level DOM\n // manipulation to insert it.\n const renderer = hostLView[RENDERER];\n
ngDevMode && ngDevMode.rendererCreateComment++;\n commentNode =
renderer.createComment(ngDevMode ? 'container' : ");\n\n const hostNative = getNativeByTNode(hostTNode,
hostLView!);\n const parentOfHostNative = nativeParentNode(renderer, hostNative);\n nativeInsertBefore(\n
renderer, parentOfHostNative!, commentNode,
nativeNextSibling(renderer, hostNative),\n false);\n }\n\n hostLView[hostTNode.index] = lContainer =\n
createLContainer(slotValue, hostLView, commentNode, hostTNode);\n\n addToViewTree(hostLView,
lContainer);\n }\n\n return new R3ViewContainerRef(lContainer, hostTNode, hostLView);\n }\n\n"/**\n *\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{ProcessProvidersFunction} from './../di/interface/provider';\nimport {EnvironmentInjector} from
'./../di/r3_injector';\nimport {Type} from './../interface/type';\nimport {SchemaMetadata} from
'./../metadata/schema';\nimport {ViewEncapsulation} from './../metadata/view';\nimport {FactoryFn} from
'./definition_factory';\nimport {TAttributes, TConstantsOrFactory} from './node';\nimport {CssSelectorList} from
'./projection';\nimport {TView} from './view';\n\n\n/**\n *\n * Definition of what a template rendering function should look like for a component.\n */\n\nexport type
ComponentTemplate<T> = {\n // Note: the ctx parameter is typed as T|U, as using only U would prevent a template
with\n // e.g. ctx: {} from being assigned to ComponentTemplate<any> as TypeScript won't infer U = any\n // in
that scenario. By including T this incompatibility is resolved.\n <U extends T>(rf: RenderFlags, ctx: T|U):
void;\n};\n\n/**\n *\n * Definition of what a view queries function should look like.\n */\n\nexport type
ViewQueriesFunction<T> = <U extends T>(rf: RenderFlags, ctx: U) => void;\n\n/**\n *\n * Definition of what a
content queries function should look like.\n */\n\nexport type ContentQueriesFunction<T> =\n <U extends T>(rf:

```

```
RenderFlags, ctx: U, directiveIndex: number) => void;\n\n/**\n * Flags passed into template functions to determine\n * which blocks (i.e. creation, update)\n * should be executed.\n *\n * Typically, a template runs both the creation\n * block and the update block on initialization and\n * subsequent runs only execute the update block. However,\n * dynamically created views require that\n * the creation block be executed separately from the update block (for\n * backwards compat).\n */\nexport const enum RenderFlags {\n * Whether to run the creation block (e.g. create\n * elements and directives)\n * Create = 0b01,\n * Whether to run the update block (e.g. refresh bindings)\n * Update = 0b10}\n\n/**\n * A subclass of `Type` which has a static `cmp`:\n * `ComponentDef` field making it\n * consumable for rendering.\n */\nexport interface ComponentType<T> extends Type<T> {\n * cmp:\n * unknown;\n}\n\n/**\n * A subclass of `Type` which has a static `dir`:\n * `DirectiveDef` field making it\n * consumable for rendering.\n */\nexport interface DirectiveType<T> extends Type<T> {\n * dir: unknown;\n * fac:\n * unknown;\n}\n\n/**\n * A subclass of `Type` which has a static `pipe`:\n * `PipeDef` field making it\n * consumable for rendering.\n */\nexport\n * interface PipeType<T> extends Type<T> {\n * pipe: unknown;\n}\n\n\n/**\n * Runtime link information for\n * Directives.\n *\n * This is an internal data structure used by the render to link\n * directives into templates.\n *\n * NOTE: Always use `defineDirective` function to create this object,\n * never create the object directly since the\n * shape of this object\n * can change between versions.\n *\n * @param Selector type metadata specifying the selector\n * of the directive or component\n *\n * See: {@link defineDirective}\n */\nexport interface DirectiveDef<T> {\n /**\n * A dictionary mapping the inputs' minified property names to their public API names, which\n * are their aliases if any, or their original unminified property names\n * (as in `@Input('alias') propertyName: any;`).\n */\n * readonly inputs: {[P in keyof T]: string};\n /**\n * @deprecated This is only here because `NgOnChanges`\n * incorrectly uses declared name instead of\n * public or minified name.\n */\n * readonly declaredInputs: {[P in keyof T]: string};\n /**\n * A dictionary mapping the outputs' minified\n * property names to their public API names, which\n * are their aliases if any, or their original unminified property\n * names\n * (as in `@Output('alias') propertyName: any;`).\n */\n * readonly outputs: {[P in keyof T]: string};\n /**\n * Function to create and refresh content queries associated with a given directive.\n */\n * contentQueries:\n * ContentQueriesFunction<T>|null;\n /**\n * Query-related instructions for a directive. Note that while directives\n * don't have a\n * view and as such view queries won't necessarily do anything, there might be\n * components that\n * extend the directive.\n */\n * viewQuery: ViewQueriesFunction<T>|null;\n /**\n * Refreshes host bindings on\n * the associated directive.\n */\n * readonly hostBindings: HostBindingsFunction<T>|null;\n /**\n * The number\n * of bindings in this directive `hostBindings` (including pure fn bindings).\n */\n * Used to calculate the length of the component's LView array, so we\n * can pre-fill the array and set the\n * host binding start index.\n */\n * readonly hostVars: number;\n /**\n * Assign static attribute values to a host\n * element.\n *\n * This property will assign static attribute values as well as class and style\n * values to a host\n * element. Since attribute values can consist of different types of values, the\n * `hostAttrs` array must include the\n * values in the following format:\n *\n * attrs = [\n * // static attributes (like `title`, `name`, `id`...)\n * attr1,\n * value1, attr2, value,\n * // a single namespace value (like `x:id`)\n * NAMESPACE_MARKER,\n * namespaceUri1, name1, value1,\n * // another single namespace value (like `x:name`)\n * NAMESPACE_MARKER, namespaceUri2, name2, value2,\n * // a series of CSS classes that will be\n * applied to the element (no spaces)\n * CLASSES_MARKER, class1, class2,\n * class3,\n * // a series of CSS styles (property + value) that will be applied to the element\n * STYLES_MARKER, prop1, value1, prop2, value2\n * ]\n *\n * All non-class and non-style attributes must be\n * defined at the start of the list\n * first before all class and style values are set. When there is a change in value\n * type (like when classes and styles are introduced) a marker must be used to separate\n * the entries. The marker\n * values themselves are set via entries found in the\n * [AttributeMarker] enum.\n */\n * readonly hostAttrs:\n * TAttributes|null;\n /**\n * Token representing the directive. Used by DI.\n */\n * readonly type: Type<T>;\n /**\n * Function that resolves providers and publishes them into the DI system.\n */\n * providersResolver: (<U extends\n * T>(def: DirectiveDef<U>, processProvidersFn?: ProcessProvidersFunction) =>\n * void)|null;\n /**\n * The\n * selectors that will be used to match nodes to this directive.\n */\n * readonly selectors:
```

CssSelectorList; \n\n /\*\* \n \* Name under which the directive is exported (for use with local references in template) \n \* \n readonly exportAs: string[]|null; \n\n /\*\* \n \* Whether this directive (or component) is standalone. \n \* \n readonly standalone: boolean; \n\n /\*\* \n \* Factory function used to create a new directive instance. Will be null initially. \n \* \n Populated when the factory is first requested by directive instantiation logic. \n \* \n readonly factory: FactoryFn<T>|null; \n\n /\*\* \n \* The features applied to this directive \n \* \n readonly features: DirectiveDefFeature[]|null; \n\n setInput: \n (<U extends T>(\n this: DirectiveDef<U>, instance: U, value: any, publicName: string, \n privateName: string) => void)|null; \n\n\n /\*\* \n \* Runtime link information for Components. \n \* \n \* This is an internal data structure used by the render to link \n \* components into templates. \n \* \n \* NOTE: Always use `defineComponent` function to create this object, \n \* never create the object directly since the shape of this object \n \* can change between versions. \n \* \n \* See: {@link defineComponent} \n \* \n export interface ComponentDef<T> extends DirectiveDef<T> {\n /\*\* \n \* Unique ID for the component. Used in view encapsulation and \n \* to keep track of the injector in standalone components. \n \* \n readonly id: string; \n\n /\*\* \n \* The View template of the component. \n \* \n readonly template: ComponentTemplate<T>; \n\n /\*\* \n \* Constants associated with the component's view. \n \* \n readonly consts: TConstantsOrFactory|null; \n\n /\*\* \n \* An array of `ngContent[selector]` values that were found in the template. \n \* \n readonly ngContentSelectors?: string[]; \n\n /\*\* \n \* A set of styles that the component needs to be present for component to render correctly. \n \* \n readonly styles: string[]; \n\n /\*\* \n \* The number of nodes, local refs, and pipes in this component template. \n \* \n \* Used to calculate the length of the component's LView array, so we \n \* can pre-fill the array and set the binding start index. \n \* \n // TODO(kara): remove queries from this count \n\n readonly decls: number; \n\n /\*\* \n \* The number of bindings in this component template (including pure fn bindings). \n \* \n \* Used to calculate the length of the component's LView array, so we \n \* can pre-fill the array and set the host binding start index. \n \* \n\n readonly vars: number; \n\n /\*\* \n \* Query-related instructions for a component. \n \* \n\n viewQuery: ViewQueriesFunction<T>|null; \n\n /\*\* \n \* The view encapsulation type, which determines how styles are applied to \n \* DOM elements. One of \n \* - `Emulated` (default): Emulate native scoping of styles. \n \* - `Native`: Use the native encapsulation mechanism of the renderer. \n \* - `ShadowDom`: Use modern [ShadowDOM](https://w3c.github.io/webcomponents/spec/shadow/) and \n \* create a ShadowRoot for component's host element. \n \* - `None`: Do not provide any template or style encapsulation. \n \* \n\n readonly encapsulation: ViewEncapsulation; \n\n /\*\* \n \* Defines arbitrary developer-defined data to be stored on a renderer instance. \n \* \n \* This is useful for renderers that delegate to other renderers. \n \* \n\n readonly data: {[kind: string]: any}; \n\n /\*\* \n \* Whether or not this component's ChangeDetectionStrategy is OnPush \n \* \n\n readonly onPush: boolean; \n\n /\*\* \n \* Registry of directives and components that may be found in this view. \n \* \n \* The property is either an array of `DirectiveDef`s or a function which returns the array of \n \* `DirectiveDef`s. The function is necessary to be able to support forward declarations. \n \* \n\n directiveDefs: DirectiveDefListOrFactory|null; \n\n /\*\* \n \* Registry of pipes that may be found in this view. \n \* \n \* The property is either an array of `PipeDef`s or a function which returns the array of \n \* `PipeDef`s. The function is necessary to be able to support forward declarations. \n \* \n\n pipeDefs: PipeDefListOrFactory|null; \n\n /\*\* \n \* Unfiltered list of all dependencies of a component, or `null` if none. \n \* \n\n dependencies: TypeOrFactory<DependencyTypeList>|null; \n\n /\*\* \n \* The set of schemas that declare elements to be allowed in the component's template. \n \* \n\n schemas: SchemaMetadata[]|null; \n\n /\*\* \n \* Ivy runtime uses this place to store the computed tView for the component. This gets filled on \n \* the first run of component. \n \* \n\n tView: TView|null; \n\n /\*\* \n \* A function added by the {@link StandaloneFeature} and used by the framework to create \n \* standalone injectors. \n \* \n\n getStandaloneInjector: ((parentInjector: EnvironmentInjector) => EnvironmentInjector | null)|null; \n\n /\*\* \n \* Used to store the result of `noSideEffects` function so that it is not removed by closure \n \* compiler. The property should never be read. \n \* \n\n readonly \_?: unknown; \n\n\n /\*\* \n \* Runtime link information for Pipes. \n \* \n \* \n \* This is an internal data structure used by the renderer to link \n \* pipes into templates. \n \* \n \* NOTE: Always use `definePipe` function to create this object, \n \* never create the object directly since the shape of this object \n \* can

change between versions. See: { @link definePipe} export interface PipeDef<T> {  
 /\*\* Token representing the pipe.  
 \* type: Type<T>;  
 /\*\* Pipe name.  
 \* Used to resolve pipe in templates.  
 \* readonly name: string;  
 /\*\* Factory function used to create a new pipe instance. Will be null initially.  
 \* Populated when the factory is first requested by pipe instantiation logic.  
 \* factory: FactoryFn<T>|null;  
 /\*\* Whether or not the pipe is pure.  
 \* Pure pipes result only depends on the pipe input and not on internal state of the pipe.  
 \* readonly pure: boolean;  
 /\*\* Whether this pipe is standalone.  
 \* readonly standalone: boolean;  
 /\*\* The following are lifecycle hooks for this pipe  
 \* onDestroy: (() => void)|null;  
 } export interface DirectiveDefFeature {  
 <T>(directiveDef: DirectiveDef<T>): void;  
 /\*\* Marks a feature as something that { @link InheritDefinitionFeature} will execute during inheritance.  
 \* NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers identifying the change as a side effect, and the feature will be included in every bundle.  
 \* ngInherit?: true;  
 } export interface ComponentDefFeature {  
 <T>(componentDef: ComponentDef<T>): void;  
 /\*\* Marks a feature as something that { @link InheritDefinitionFeature} will execute during inheritance.  
 \* NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers identifying the change as a side effect, and the feature will be included in every bundle.  
 \* ngInherit?: true;  
 }  
 /\*\* Type used for directiveDefs on component definition.  
 \* The function is necessary to be able to support forward declarations.  
 export type DirectiveDefListOrFactory = (() => DirectiveDefList)|DirectiveDefList;  
 export type DirectiveDefList = (DirectiveDef<any>|ComponentDef<any>)[];  
 export type DirectiveTypesOrFactory = (() => DirectiveTypeList)|DirectiveTypeList;  
 export type DirectiveTypeList = (DirectiveType<any>|ComponentType<any>|Type<any>)\* Type as workaround for: Microsoft/TypeScript/issues/4881 \*/  
 export type DependencyTypeList = (DirectiveType<any>|ComponentType<any>|PipeType<any>|Type<any>)[];  
 export type TypeOrFactory<T> = T|(() => T);  
 export type HostBindingsFunction<T> = <U extends T>(rf: RenderFlags, ctx: U) => void;  
 /\*\* Type used for PipeDefs on component definition.  
 \* The function is necessary to be able to support forward declarations.  
 export type PipeDefListOrFactory = (() => PipeDefList)|PipeDefList;  
 export type PipeDefList = PipeDef<any>[];  
 export type PipeTypesOrFactory = (() => PipeTypeList)|PipeTypeList;  
 export type PipeTypeList = (PipeType<any>|Type<any>)\* Type as workaround for: Microsoft/TypeScript/issues/4881 \*/  
 Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.  
 const unusedValueExportToPlacateAjd = 1;  
 /\*\* @license Copyright Google LLC All Rights Reserved.  
 \* Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license  
 import { ProviderToken } from '../di/provider\_token';  
 import { QueryList } from '../linker/query\_list';  
 import { TNode } from './node';  
 import { TView } from './view';  
 /\*\* An object representing query metadata extracted from query annotations.  
 export interface TQueryMetadata {  
 predicate: ProviderToken<unknown>|string[];  
 read: any;  
 flags: QueryFlags;  
 }  
 /\*\* A set of flags to be used with Queries.  
 \* NOTE: Ensure changes here are reflected in `packages/compiler/src/render3/view/compiler.ts`  
 export const enum QueryFlags {  
 /\*\* No flags  
 \* none = 0b0000,  
 /\*\* Whether or not the query should descend into children.  
 \* descendants = 0b0001,  
 /\*\* The query can be computed statically and hence can be assigned eagerly.  
 \* NOTE: Backwards compatibility with ViewEngine.  
 \* isStatic = 0b0010,  
 /\*\* If the `QueryList` should fire change event only if actual change to query was computed (vs old behavior where the change was fired whenever the query was recomputed, even if the recomputed query resulted in the same list.)  
 \* emitDistinctChangesOnly = 0b0100,  
 }  
 /\*\* TQuery objects represent all the query-related data that remain the same from one view instance to another and can be determined on the very first template pass. Most notably TQuery holds all the matches for a given view.

```

*/\nexport interface TQuery {\n /**\n * Query metadata extracted from query annotations.\n */\n metadata:
TQueryMetadata;\n\n /**\n * Index of a query in a declaration view in case of queries propagated to an embedded
view, -1\n * for queries declared in a given view. We are storing this index so we can find a parent query\n * to
clone for an embedded view (when an embedded view is created).\n */\n indexInDeclarationView: number;\n\n
/**\n * Matches collected on the first template pass. Each match is a pair of:\n * - TNode index;\n * - match
index;\n * \n * A TNode index can be either:\n * - a positive number (the most common case) to indicate a
matching TNode;\n * - a negative number to indicate that a given query is crossing a <ng-template> element and\n
* results from views created based on TemplateRef should be inserted at this place.\n * \n * A match index is a
number used to find an actual value (for a given node) when query results\n * are
materialized. This index can have one of the following values:\n * - -2 - indicates that we need to read a special
token (TemplateRef, ViewContainerRef etc.); \n * - -1 - indicates that we need to read a default value based on the
node type (TemplateRef for\n * ng-template and ElementRef for other elements); \n * - a positive number - index
of an injectable to be read from the element injector.\n */\n matches: number[]|null;\n\n /**\n * A flag indicating
if a given query crosses an <ng-template> element. This flag exists for\n * performance reasons: we can notice that
queries not crossing any <ng-template> elements will\n * have matches from a given view only (and adapt
processing accordingly).\n */\n crossesNgTemplate: boolean;\n\n /**\n * A method call when a given query is
crossing an element (or element container). This is where a\n * given TNode is matched against a query
predicate.\n * @param tView\n * @param tNode\n */\n elementStart(tView: TView,
tNode: TNode): void;\n\n /**\n * A method called when processing the elementEnd instruction - this is mostly
useful to determine\n * if a given content query should match any nodes past this point.\n * @param tNode\n
*/\n elementEnd(tNode: TNode): void;\n\n /**\n * A method called when processing the template instruction.
This is where a\n * given TContainerNode is matched against a query predicate.\n * @param tView\n * @param
tNode\n */\n template(tView: TView, tNode: TNode): void;\n\n /**\n * A query-related method called when an
embedded TView is created based on the content of a\n * <ng-template> element. We call this method to
determine if a given query should be propagated\n * to the embedded view and if so - return a cloned TQuery for
this embedded view.\n * @param tNode\n * @param childQueryIndex\n */\n embeddedTView(tNode: TNode,
childQueryIndex: number): TQuery|null;\n}\n\n/**\n * TQueries represent a collection of individual TQuery objects
tracked in a given view. Most of the\n * methods on this interface are simple proxy methods to the corresponding
functionality on TQuery.\n */\nexport interface TQueries {\n /**\n * Adds a new TQuery to a collection of queries
tracked in a given view.\n * @param tQuery\n */\n track(tQuery: TQuery): void;\n\n /**\n * Returns a TQuery
instance for at the given index in the queries array.\n * @param index\n */\n getByIndex(index: number):
TQuery;\n\n /**\n * Returns the number of queries tracked in a given view.\n */\n length: number;\n\n /**\n *
A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n * `elementStart`
on each and every TQuery.\n * @param tView\n * @param tNode\n */\n elementStart(tView: TView, tNode:
TNode): void;\n\n /**\n * A proxy method that iterates over all the TQueries in a given TView and calls the
corresponding\n * `elementEnd` on each and every TQuery.\n * @param tNode\n */\n
elementEnd(tNode: TNode): void;\n\n /**\n * A proxy method that iterates over all the TQueries in a given
TView and calls the corresponding\n * `template` on each and every TQuery.\n * @param tView\n * @param
tNode\n */\n template(tView: TView, tNode: TNode): void;\n\n /**\n * A proxy method that iterates over all the
TQueries in a given TView and calls the corresponding\n * `embeddedTView` on each and every TQuery.\n *
@param tNode\n */\n embeddedTView(tNode: TNode): TQueries|null;\n}\n\n/**\n * An interface that represents
query-related information specific to a view instance. Most notably\n * it contains:\n * - materialized query
matches;\n * - a pointer to a QueryList where materialized query results should be reported.\n */\nexport interface
LQuery<T> {\n /**\n * Materialized query matches for a given view only (!). Results are initialized lazily so the\n
* array of matches is set to `null` initially.\n */\n matches: (T|null)[]|null;\n\n /**\n * A
QueryList where materialized query results should be reported.\n */\n queryList: QueryList<T>;\n\n /**\n *
Clones an LQuery for an embedded view. A cloned query shares the same `QueryList` but has a\n * separate
collection of materialized matches.\n */\n clone(): LQuery<T>;\n\n /**\n * Called when an embedded view,

```



impacting results of this query, is inserted or removed.

```

 * ^\n setDirty(): void;\n}\n\n/**\n * LQueries represent a
collection of individual LQuery objects tracked in a given view.\n * ^\nexport interface LQueries {\n /**\n * A
collection of queries tracked in a given view.\n * ^\n queries: LQuery<any>[];\n\n /**\n * A method called when
a new embedded view is created. As a result a set of LQueries applicable\n * for a new embedded view is
instantiated (cloned) from the declaration view.\n * @param tView\n * ^\n createEmbeddedView(tView: TView):
LQueries|null;\n\n /**\n * A method called when an embedded view is inserted into a container. As
a result all impacted\n * `LQuery` objects (and associated `QueryList`) are marked as dirty.\n * @param tView\n
* ^\n insertView(tView: TView): void;\n\n /**\n * A method called when an embedded view is detached from a
container. As a result all impacted\n * `LQuery` objects (and associated `QueryList`) are marked as dirty.\n *
@param tView\n * ^\n detachView(tView: TView): void;\n}\n\n// Note: This hack is necessary so we don't
erroneously get a circular dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd =
1;\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * ^\n * Use of this source code is governed
by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\n// We are
temporarily importing the existing viewEngine_ from core so we can be sure we are\n// correctly implementing its
interfaces for backwards compatibility.\n\nimport { ProviderToken } from './di/provider_token';\nimport
{ createElementRef, ElementRef as ViewEngine_ElementRef, unwrapElementRef } from
'./linker/element_ref';\nimport { QueryList } from './linker/query_list';\nimport { createTemplateRef, TemplateRef as
ViewEngine_TemplateRef } from './linker/template_ref';\nimport { createContainerRef, ViewContainerRef } from
'./linker/view_container_ref';\nimport { assertDefined, assertIndexInRange, assertNumber, throwError } from
'./util/assert';\nimport { stringify } from './util/stringify';\nimport { assertFirstCreatePass, assertLContainer } from
'./assert';\nimport { getNodeInjectable, locateDirectiveOrProvider } from './di';\nimport { storeCleanupWithContext }
from './instructions/shared';\nimport { CONTAINER_HEADER_OFFSET, LContainer, MOVED_VIEWS } from
'./interfaces/container';\nimport { unusedValueExportToPlacateAjd as unused1 } from
'./interfaces/definition';\nimport { unusedValueExportToPlacateAjd as unused2 } from './interfaces/injector';\nimport
{ TContainerNode, TElementContainerNode, TElementNode, TNode,
TNodeType, unusedValueExportToPlacateAjd as unused3 } from './interfaces/node';\nimport { LQueries, LQuery,
QueryFlags, TQueries, TQuery, TQueryMetadata, unusedValueExportToPlacateAjd as unused4 } from
'./interfaces/query';\nimport { DECLARATION_LCONTAINER, LView, PARENT, QUERIES, TVIEW, TView }
from './interfaces/view';\nimport { assertTNodeType } from './node_assert';\nimport { getCurrentQueryIndex,
getCurrentTNode, getLView, getTView, setCurrentQueryIndex } from './state';\nimport { isCreationMode } from
'./util/view_utils';\n\nconst unusedValueToPlacateAjd = unused1 + unused2 + unused3 + unused4;\n\nclass
LQuery_<T> implements LQuery<T> {\n matches: (T|null)[]|null = null;\n constructor(public queryList:
QueryList<T>) {}\n clone(): LQuery<T> {\n return new LQuery_(this.queryList);\n }\n setDirty(): void {\n
this.queryList.setDirty();\n }\n}\n\nclass LQueries_ implements LQueries {\n constructor(public queries:
LQuery<any>[] = []) {}\n createEmbeddedView(tView: TView): LQueries|null
{\n const tQueries = tView.queries;\n if (tQueries !== null) {\n const noOfInheritedQueries =\n
tView.contentQueries !== null ? tView.contentQueries[0] : tQueries.length;\n const viewLQueries:
LQuery<any>[] = [];\n // An embedded view has queries propagated from a declaration view at the beginning
of the\n // TQueries collection and up until a first content query declared in the embedded view. Only\n //
propagated LQueries are created at this point (LQuery corresponding to declared content\n // queries will be
instantiated from the content query instructions for each directive).\n for (let i = 0; i < noOfInheritedQueries; i++)
{\n const tQuery = tQueries.getByIndex(i);\n const parentLQuery =
this.queries[tQuery.indexInDeclarationView];\n viewLQueries.push(parentLQuery.clone());\n }\n\n return new LQueries_(viewLQueries);\n }\n\n insertView(tView: TView): void {\n
this.dirtyQueriesWithMatches(tView);\n }\n\n detachView(tView: TView): void {\n
this.dirtyQueriesWithMatches(tView);\n }\n\n private dirtyQueriesWithMatches(tView: TView) {\n for (let i = 0;
i < this.queries.length; i++) {\n if (getTQuery(tView, i).matches !== null) {\n this.queries[i].setDirty();\n
}\n }\n }\n}\n\nclass TQueryMetadata_ implements TQueryMetadata {\n constructor(\n public predicate:

```

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ProviderToken<unknown>|string[], public flags: QueryFlags,\n    public read: any = null) {} \n\n\nclass TQueries_
implements TQueries {\n    constructor(private queries: TQuery[] = []) {} \n\n    elementStart(tView: TView, tNode:
TNode): void {\n        ngDevMode &&\n            assertFirstCreatePass(\n                tView, 'Queries should collect results on
the first template pass only');\n        for (let i = 0; i < this.queries.length; i++) {\n            this.queries[i].elementStart(tView,
tNode);\n        }\n    }\n\n    elementEnd(tNode: TNode): void {\n        for (let i = 0; i < this.queries.length;\n            i++) {\n            this.queries[i].elementEnd(tNode);\n        }\n    }\n\n    embeddedTView(tNode: TNode): TQueries|null {\n
let queriesForTemplateRef: TQuery[]|null = null;\n        for (let i = 0; i < this.length; i++) {\n            const
childQueryIndex = queriesForTemplateRef !== null ? queriesForTemplateRef.length : 0;\n            const tqueryClone =
this.getByIndex(i).embeddedTView(tNode, childQueryIndex);\n            if (tqueryClone) {\n                tqueryClone.indexInDeclarationView = i;\n                if (queriesForTemplateRef !== null) {\n
queriesForTemplateRef.push(tqueryClone);\n                } else {\n                    queriesForTemplateRef = [tqueryClone];\n                }\n            }\n        }\n        return queriesForTemplateRef !== null ? new TQueries_(queriesForTemplateRef) : null;\n    }\n\n    template(tView: TView, tNode: TNode): void {\n        ngDevMode &&\n            assertFirstCreatePass(\n                tView, 'Queries should collect results on the first template pass only');\n        for (let i = 0; i < this.queries.length;\n            i++) {\n            this.queries[i].template(tView, tNode);\n        }\n    }\n\n    getByIndex(index: number): TQuery {\n        ngDevMode && assertIndexInRange(this.queries, index);\n        return this.queries[index];\n    }\n\n    get length():
number {\n        return this.queries.length;\n    }\n\n    track(tquery: TQuery): void {\n        this.queries.push(tquery);\n    }\n}\n\nclass TQuery_ implements TQuery {\n    matches: number[]|null = null;\n    indexInDeclarationView = -1;\n    crossesNgTemplate = false;\n\n    /**\n     * A node index on which a query was declared (-1 for view queries and ones
inherited from the\n     * declaration template). We use this index (alongside with _appliesToNextNode flag) to
know\n     * when to apply content queries to elements in a template.\n     */\n    private _declarationNodeIndex:
number;\n\n    /**\n     * A flag indicating if a given query still applies to nodes it is crossing. We use this flag\n     *
(alongside with _declarationNodeIndex) to know when to stop applying content queries
to\n     * elements in a template.\n     */\n    private _appliesToNextNode = true;\n\n    constructor(public metadata:
TQueryMetadata, nodeIndex: number = -1) {\n        this._declarationNodeIndex = nodeIndex;\n    }\n\n    elementStart(tView: TView, tNode: TNode): void {\n        if (this.isApplyingToNode(tNode)) {\n            this.matchTNode(tView, tNode);\n        }\n    }\n\n    elementEnd(tNode: TNode): void {\n        if
(this._declarationNodeIndex === tNode.index) {\n            this._appliesToNextNode = false;\n        }\n    }\n\n    template(tView: TView, tNode: TNode): void {\n        this.elementStart(tView, tNode);\n    }\n\n    embeddedTView(tNode: TNode, childQueryIndex: number): TQuery|null {\n        if (this.isApplyingToNode(tNode))
{\n            this.crossesNgTemplate = true;\n            // A marker indicating a `` element (a placeholder for
query results from\n            // embedded views created based on this ``).\n            this.addMatch(-
tNode.index, childQueryIndex);\n            return new TQuery_(this.metadata);\n        }\n        return null;\n    }\n\n    private isApplyingToNode(tNode: TNode): boolean {\n        if (this._appliesToNextNode &&\n            (this.metadata.flags & QueryFlags.descendants) !== QueryFlags.descendants) {\n            const declarationNodeIdx =
this._declarationNodeIndex;\n            let parent = tNode.parent;\n            // Determine if a given TNode is a `"direct"`
child of a node on which a content query was\n            // declared (only direct children of query's host node can match
with the descendants: false\n            // option). There are 3 main use-case / conditions to consider here:\n            // - <needs-target><i #target></i></needs-target>: here <i #target> parent node is a query\n            // host node;\n            // - <needs-target><ng-template [ngIf]="true"><i #target></i></ng-template></needs-target>:\n            // here <i #target> parent
node is null;\n            // - <needs-target><ng-container><i #target></i></ng-container></needs-target>: here we need\n            // to go past `` to determine <i #target>
parent node (but we shouldn't traverse\n            // up past the query's host node!).\n            while (parent !== null &&
(parent.type & TNodeType.ElementContainer) &&\n                parent.index !== declarationNodeIdx) {\n                parent =
parent.parent;\n            }\n            return declarationNodeIdx === (parent !== null ? parent.index : -1);\n        }\n        return
this._appliesToNextNode;\n    }\n\n    private matchTNode(tView: TView, tNode: TNode): void {\n        const predicate =
this.metadata.predicate;\n        if (Array.isArray(predicate)) {\n            for (let i = 0; i < predicate.length; i++) {\n                const name = predicate[i];\n                this.matchTNodeWithReadOption(tView, tNode,

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getIdxOfMatchingSelector(tNode, name));\n      // Also try matching the name to a provider since strings can be
used as DI tokens too.\n      this.matchTNodeWithReadOption(\n          tView, tNode,
locateDirectiveOrProvider(tNode, tView, name, false, false));\n    }\n  } else {\n    if ((predicate as any) ===
ViewEngine_TemplateRef)
    {\n      if (tNode.type & TNodeType.Container) {\n        this.matchTNodeWithReadOption(tView, tNode, -1);\n      }\n    } else {\n      this.matchTNodeWithReadOption(\n          tView, tNode, locateDirectiveOrProvider(tNode,
tView, predicate, false, false));\n    }\n  }\n}\n\nprivate matchTNodeWithReadOption(tView: TView, tNode:
TNode, nodeMatchIdx: number|null): void {\n  if (nodeMatchIdx !== null) {\n    const read =
this.metadata.read;\n    if (read !== null) {\n      if (read === ViewEngine_ElementRef || read ===
ViewContainerRef ||\n          read === ViewEngine_TemplateRef && (tNode.type & TNodeType.Container)) {\n
        this.addMatch(tNode.index, -2);\n      } else {\n        const directiveOrProviderIdx =\nlocateDirectiveOrProvider(tNode, tView, read, false, false);\n        if (directiveOrProviderIdx !== null) {\n
          this.addMatch(tNode.index, directiveOrProviderIdx);\n        }\n      }\n    }
else {\n      this.addMatch(tNode.index, nodeMatchIdx);\n    }\n  }\n}\n\nprivate addMatch(tNodeIdx:
number, matchIdx: number) {\n  if (this.matches === null) {\n    this.matches = [tNodeIdx, matchIdx];\n  } else
{\n    this.matches.push(tNodeIdx, matchIdx);\n  }\n}\n}\n\n/**\n * Iterates over local names for a given node
and returns directive index\n * (or -1 if a local name points to an element).\n * @param tNode static data of a
node to check\n * @param selector selector to match\n * @returns directive index, -1 or null if a selector didn't
match any of the local names\n */\nfunction getIdxOfMatchingSelector(tNode: TNode, selector: string): number|null
{\n  const localNames = tNode.localNames;\n  if (localNames !== null) {\n    for (let i = 0; i < localNames.length; i
+= 2) {\n      if (localNames[i] === selector) {\n        return localNames[i + 1] as number;\n      }\n    }\n  }\n  return
null;\n}\n\nfunction createResultByTNodeType(tNode: TNode, currentView:
LView): any {\n  if (tNode.type & (TNodeType.AnyRNode | TNodeType.ElementContainer)) {\n    return
createElementRef(tNode, currentView);\n  } else if (tNode.type & TNodeType.Container) {\n    return
createTemplateRef(tNode, currentView);\n  }\n  return null;\n}\n\nfunction createResultForNode(IView: LView,
tNode: TNode, matchingIdx: number, read: any): any {\n  if (matchingIdx === -1) {\n    // if read token and / or
strategy is not specified, detect it using appropriate tNode type\n    return createResultByTNodeType(tNode,
IView);\n  } else if (matchingIdx === -2) {\n    // read a special token from a node injector\n    return
createSpecialToken(IView, tNode, read);\n  } else {\n    // read a token\n    return getNodeInjectable(IView,
IView[TVIEW], matchingIdx, tNode as TElementNode);\n  }\n}\n\nfunction createSpecialToken(IView: LView,
tNode: TNode, read: any): any {\n  if (read === ViewEngine_ElementRef) {\n    return createElementRef(tNode,
IView);\n  } else if (read === ViewEngine_TemplateRef)
{\n    return createTemplateRef(tNode, IView);\n  } else if (read === ViewContainerRef) {\n    ngDevMode &&
assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.AnyContainer);\n    return createContainerRef(\n
tNode as TElementNode | TContainerNode | TElementContainerNode, IView);\n  } else {\n    ngDevMode &&\n
throwError(\n      `Special token to read should be one of ElementRef, TemplateRef or ViewContainerRef but
got ${\n        stringify(read)}.`);\n  }\n}\n\n/**\n * A helper function that creates query results for a given view.
This function is meant to do the\n * processing once and only once for a given view instance (a set of results for a
given view\n * doesn't change).\n */\nfunction materializeViewResults<T>(\n  tView: TView, IView: LView,
tQuery: TQuery, queryIndex: number): (T|null)[] {\n  const IQuery = IView[QUERIES]!.queries![queryIndex];\n  if
(IQuery.matches === null) {\n    const tViewData = tView.data;\n    const
tQueryMatches = tQuery.matches!;\n    const result: T|null[] = [];\n    for (let i = 0; i < tQueryMatches.length; i +=
2) {\n      const matchedNodeIdx = tQueryMatches[i];\n      if (matchedNodeIdx < 0) {\n        // we at the <ng-
template> marker which might have results in views created based on this\n        // <ng-template> - those results will
be in separate views though, so here we just leave\n        // null as a placeholder\n        result.push(null);\n      } else
{\n        ngDevMode && assertIndexInRange(tViewData, matchedNodeIdx);\n        const tNode =
tViewData[matchedNodeIdx] as TNode;\n        result.push(createResultForNode(IView, tNode, tQueryMatches[i +
1], tQuery.metadata.read));\n      }\n    }\n    IQuery.matches = result;\n  }\n  return IQuery.matches;\n}\n\n/**

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A helper function that collects (already materialized) query results from a tree of views,
starting with a provided LView.
function collectQueryResults<T>(tView: TView, IView: LView, queryIndex:
number, result: T[]): T[] {
  const tQuery = tView.queries!.getByIndex(queryIndex);
  const tQueryMatches = tQuery.matches;
  if (tQueryMatches !== null) {
    const IViewResults = materializeViewResults<T>(tView, IView, tQuery, queryIndex);
    for (let i = 0; i < tQueryMatches.length; i += 2) {
      const tNodeIdx = tQueryMatches[i];
      if (tNodeIdx > 0) {
        result.push(IViewResults[i / 2] as T);
      } else {
        const childQueryIndex = tQueryMatches[i + 1];
        const declarationLContainer = IView[-tNodeIdx] as LContainer;
        ngDevMode && assertLContainer(declarationLContainer);
        // collect matches for views inserted in this container
        for (let i = CONTAINER_HEADER_OFFSET; i < declarationLContainer.length; i++) {
          const embeddedLView = declarationLContainer[i];
          if (embeddedLView[DECLARATION_LCONTAINER] === embeddedLView[PARENT]) {
            collectQueryResults(embeddedLView[TVIEW], embeddedLView, childQueryIndex, result);
          }
        }
        // collect matches for views created from this declaration container and inserted into
        // different containers
        if (declarationLContainer[MOVED_VIEWS] !== null) {
          const embeddedLViews = declarationLContainer[MOVED_VIEWS];
          for (let i = 0; i < embeddedLViews.length; i++) {
            const embeddedLView = embeddedLViews[i];
            collectQueryResults(embeddedLView[TVIEW], embeddedLView, childQueryIndex, result);
          }
        }
      }
    }
  }
  return result;
}

Refreshes a query by combining matches from all active views and removing matches from deleted views.
@returns `true` if a query got dirty during change detection or if this is a static query resolving in creation mode, `false` otherwise.
@codeGenApi
export function queryRefresh(queryList: QueryList<any>): boolean {
  const IView = getLView();
  const tView = getTView();
  const queryIndex = getCurrentQueryIndex();
  setCurrentQueryIndex(queryIndex + 1);
  const tQuery = getTQuery(tView, queryIndex);
  if (queryList.dirty && (isCreationMode(IView) === ((tQuery.metadata.flags & QueryFlags.isStatic) === QueryFlags.isStatic))) {
    if (tQuery.matches === null) {
      queryList.reset([]);
    } else {
      const result = tQuery.crossesNgTemplate ? collectQueryResults(tView, IView, queryIndex, []) : materializeViewResults(tView, IView, tQuery, queryIndex);
      queryList.reset(result, unwrapElementRef);
      queryList.notifyOnChanges();
    }
    return true;
  }
  return false;
}

Creates new QueryList, stores the reference in LView and returns QueryList.
@param predicate The type for which the query will search
@param flags Flags associated with the query
@param read What to save in the query
@codeGenApi
export function viewQuery<T>(predicate: ProviderToken<unknown>|string[], flags: QueryFlags, read?: any): void {
  ngDevMode && assertNumber(flags, 'Expecting flags');
  const tView = getTView();
  if (tView.firstCreatePass) {
    createTQuery(tView, new TQueryMetadata_(predicate, flags, read), -1);
    if ((flags & QueryFlags.isStatic) === QueryFlags.isStatic) {
      tView.staticViewQueries = true;
    }
  }
  createLQuery<T>(tView, getLView(), flags);
}

Registers a QueryList, associated with a content query, for later refresh (part of a view refresh).
@param directiveIndex Current directive index
@param predicate The type for which the query will search
@param flags Flags associated with the query
@param read What to save in the query
@returns QueryList<T>
@codeGenApi
export function contentQuery<T>(directiveIndex: number, predicate: ProviderToken<unknown>|string[], flags: QueryFlags, read?: any): void {
  ngDevMode && assertNumber(flags, 'Expecting flags');
  const tView = getTView();
  if (tView.firstCreatePass) {
    const tNode = getCurrentTNode();
    createTQuery(tView, new TQueryMetadata_(predicate, flags, read), tNode.index);
    saveContentQueryAndDirectiveIndex(tView, directiveIndex);
    if ((flags & QueryFlags.isStatic) === QueryFlags.isStatic) {
      tView.staticContentQueries = true;
    }
  }
  createLQuery<T>(tView, getLView(), flags);
}

Loads a QueryList corresponding to the current view or content query.
@codeGenApi
export function loadQuery<T>(): QueryList<T> {
  return loadQueryInternal<T>(getLView(), getCurrentQueryIndex());
}

function loadQueryInternal<T>(IView: LView, queryIndex: number): QueryList<T> {
  ngDevMode && assertDefined(IView[QUERIES], 'LQueries should be defined when

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trying to load a query');\n ngDevMode && assertIndexInRange(IView[QUERIES]!.queries, queryIndex);\n return
IView[QUERIES]!.queries[queryIndex].queryList;\n}\n\nfunction
createLQuery<T>(tView: TView, IView: LView, flags: QueryFlags) {\n const queryList = new QueryList<T>(\n
(flags & QueryFlags.emitDistinctChangesOnly) === QueryFlags.emitDistinctChangesOnly);\n
storeCleanupWithContext(tView, IView, queryList, queryList.destroy);\n\n if (IView[QUERIES] === null)
IView[QUERIES] = new LQueries_();\n IView[QUERIES]!.queries.push(new
LQuery_(queryList));\n}\n\nfunction createTQuery(tView: TView, metadata: TQueryMetadata, nodeIndex:
number): void {\n if (tView.queries === null) tView.queries = new TQueries_();\n tView.queries.track(new
TQuery_(metadata, nodeIndex));\n}\n\nfunction saveContentQueryAndDirectiveIndex(tView: TView,
directiveIndex: number) {\n const tViewContentQueries = tView.contentQueries || (tView.contentQueries = []);\n
const lastSavedDirectiveIndex =\n tViewContentQueries.length ?
tViewContentQueries[tViewContentQueries.length - 1] : -1;\n if (directiveIndex !== lastSavedDirectiveIndex) {\n
tViewContentQueries.push(tView.queries!.length
- 1, directiveIndex);\n }\n}\n\nfunction getTQuery(tView: TView, index: number): TQuery {\n ngDevMode &&
assertDefined(tView.queries, 'TQueries must be defined to retrieve a TQuery');\n return
tView.queries!.getByIndex(index);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n *\nimport { createTemplateRef, TemplateRef } from './linker/template_ref';\nimport
{TNode} from './interfaces/node';\nimport { LView } from './interfaces/view';\n\n/**\n * Retrieves `TemplateRef`
instance from `Injector` when a local reference is placed on the\n * `` element.\n *\n *
@codeGenApi\n */\nexport function templateRefExtractor(tNode: TNode, IView: LView): TemplateRef<any>|null
{\n return createTemplateRef(tNode, IView);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n *\nimport { LifecycleHooksFeature } from './component_ref';\nimport
{ defineComponent, defineDirective, defineNgModule, definePipe, setComponentScope, setNgModuleScope } from
'./definition';\nimport { CopyDefinitionFeature } from './features/copy_definition_feature';\nimport
{ InheritDefinitionFeature } from './features/inherit_definition_feature';\nimport { NgOnChangesFeature } from
'./features/ng_onchanges_feature';\nimport { ProvidersFeature } from './features/providers_feature';\nimport
{ StandaloneFeature } from './features/standalone_feature';\nimport { ComponentDef, ComponentTemplate,
ComponentType, DirectiveDef, DirectiveType, PipeDef } from './interfaces/definition';\nimport
{ ComponentDeclaration, DirectiveDeclaration, FactoryDeclaration, InjectorDeclaration, NgModuleDeclaration,
PipeDeclaration } from './interfaces/public_definitions';\nimport
{ ComponentDebugMetadata, DirectiveDebugMetadata, getComponent, getDirectiveMetadata, getDirectives,
getHostElement, getRenderedText } from './util/discovery_utils';\n\nexport { NgModuleType } from
'./metadata/ng_module_def';\nexport { ComponentFactory, ComponentFactoryResolver, ComponentRef,
injectComponentFactoryResolver } from './component_ref';\nexport { getInheritedFactory } from './di';\nexport
{ getLocaleId, setLocaleId } from './i18n/i18n_locale_id';\n\n// clang-format off\nexport {\n detectChanges,\n
store,\n advance,\n\n attribute,\n attributeInterpolate1,\n attributeInterpolate2,\n attributeInterpolate3,\n
attributeInterpolate4,\n attributeInterpolate5,\n attributeInterpolate6,\n attributeInterpolate7,\n
attributeInterpolate8,\n attributeInterpolateV,\n\n classMap,\n classMapInterpolate1,\n classMapInterpolate2,\n
classMapInterpolate3,\n classMapInterpolate4,\n classMapInterpolate5,\n classMapInterpolate6,\n
classMapInterpolate7,\n
classMapInterpolate8,\n classMapInterpolateV,\n\n classProp,\n\n directiveInject,\n\n element,\n\n
elementContainer,\n elementContainerEnd,\n elementContainerStart,\n elementEnd,\n elementStart,\n\n
getCurrentView,\n hostProperty,\n injectAttribute,\n invalidFactory,\n\n listener,\n\n namespaceHTML,\n
namespaceMathML,\n namespaceSVG,\n\n nextContext,\n\n projection,\n projectionDef,\n property,\n
propertyInterpolate,\n propertyInterpolate1,\n propertyInterpolate2,\n propertyInterpolate3,\n

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propertyInterpolate4,\n propertyInterpolate5,\n propertyInterpolate6,\n propertyInterpolate7,\n
propertyInterpolate8,\n propertyInterpolateV,\n\n reference,\n\n styleMap,\n styleMapInterpolate1,\n
styleMapInterpolate2,\n styleMapInterpolate3,\n styleMapInterpolate4,\n styleMapInterpolate5,\n
styleMapInterpolate6,\n styleMapInterpolate7,\n styleMapInterpolate8,\n
styleMapInterpolateV,\n\n styleProp,\n stylePropInterpolate1,\n stylePropInterpolate2,\n
stylePropInterpolate3,\n stylePropInterpolate4,\n stylePropInterpolate5,\n stylePropInterpolate6,\n
stylePropInterpolate7,\n stylePropInterpolate8,\n stylePropInterpolateV,\n\n syntheticHostListener,\n
syntheticHostProperty,\n\n template,\n\n text,\n textInterpolate,\n textInterpolate1,\n textInterpolate2,\n
textInterpolate3,\n textInterpolate4,\n textInterpolate5,\n textInterpolate6,\n textInterpolate7,\n textInterpolate8,\n
textInterpolateV,\n getUnknownElementStrictMode,\n setUnknownElementStrictMode,\n
getUnknownPropertyStrictMode,\n setUnknownPropertyStrictMode\n} from './instructions/all';\nexport {i18n,\n i18nApply, i18nAttributes, i18nEnd, i18nExp,i18nPostprocess, i18nStart} from './instructions/i18n';\nexport
{RenderFlags} from './interfaces/definition';\nexport {\n AttributeMarker\n}
from './interfaces/node';\nexport {CssSelectorList, ProjectionSlots} from './interfaces/projection';\nexport {\n
setClassMetadata,\n} from './metadata';\nexport {NgModuleFactory, NgModuleRef, createEnvironmentInjector}
from './ng_module_ref';\nexport {\n pipe,\n pipeBind1,\n pipeBind2,\n pipeBind3,\n pipeBind4,\n pipeBindV,\n}
from './pipe';\nexport {\n pureFunction0,\n pureFunction1,\n pureFunction2,\n pureFunction3,\n pureFunction4,\n
pureFunction5,\n pureFunction6,\n pureFunction7,\n pureFunction8,\n pureFunctionV,\n} from
'./pure_function';\nexport {\n contentQuery,\n loadQuery,\n queryRefresh,\n viewQuery} from './query';\nexport
{\n disableBindings,\n\n enableBindings,\n resetView,\n restoreView,\n} from './state';\nexport {NO_CHANGE}
from './tokens';\nexport { resolveBody, resolveDocument,resolveWindow} from './util/misc_utils';\nexport {
templateRefExtractor} from './view_engine_compatibility_prebound';\n//
clang-format on\n\nexport {\n ComponentDebugMetadata,\n ComponentDef,\n ComponentTemplate,\n
ComponentType,\n DirectiveDebugMetadata,\n DirectiveDef,\n DirectiveType,\n GetComponent,\n
getDirectiveMetadata,\n getDirectives,\n getHostElement,\n getRenderedText,\n LifecycleHooksFeature,\n
PipeDef,\n ComponentDeclaration,\n CopyDefinitionFeature,\n defineComponent,\n defineDirective,\n
defineNgModule,\n definePipe,\n DirectiveDeclaration,\n FactoryDeclaration,\n InheritDefinitionFeature,\n
InjectorDeclaration,\n NgModuleDeclaration,\n NgOnChangesFeature,\n PipeDeclaration,\n ProvidersFeature,\n
setComponentScope,\n setNgModuleScope,\n StandaloneFeature,\n};\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {forwardRef, resolveForwardRef} from
'../../di/forward_ref';\n\nimport
{inject, invalidFactoryDep} from '../../di/injector_compatibility';\nimport {defineInjectable, defineInjector} from
'../../di/interface/defs';\nimport {registerNgModuleType} from '../../linker/ng_module_registration';\nimport * as
iframe_attrs_validation from '../../sanitization/iframe_attrs_validation';\nimport * as sanitization from
'../../sanitization/sanitization';\nimport * as r3 from './index';\n\n\n/**\n * A mapping of the @angular/core API
surface used in generated expressions to the actual symbols.\n *\n * This should be kept up to date with the public
exports of @angular/core.\n */\nexport const angularCoreEnv: {[name: string]: Function} =\n\n (() => ({\n
'attribute': r3.attribute,\n 'attributeInterpolate1': r3.attributeInterpolate1,\n 'attributeInterpolate2':
r3.attributeInterpolate2,\n 'attributeInterpolate3': r3.attributeInterpolate3,\n 'attributeInterpolate4':
r3.attributeInterpolate4,\n
'attributeInterpolate5': r3.attributeInterpolate5,\n 'attributeInterpolate6': r3.attributeInterpolate6,\n
'attributeInterpolate7': r3.attributeInterpolate7,\n 'attributeInterpolate8': r3.attributeInterpolate8,\n
'attributeInterpolateV': r3.attributeInterpolateV,\n 'defineComponent': r3.defineComponent,\n
'defineDirective': r3.defineDirective,\n 'defineInjectable': defineInjectable,\n 'defineInjector':
defineInjector,\n 'defineNgModule': r3.defineNgModule,\n 'definePipe': r3.definePipe,\n 'directiveInject':
r3.directiveInject,\n 'getInheritedFactory': r3.getInheritedFactory,\n 'inject': inject,\n 'injectAttribute':
r3.injectAttribute,\n 'invalidFactory': r3.invalidFactory,\n 'invalidFactoryDep': invalidFactoryDep,\n

```

'templateRefExtractor': r3.templateRefExtractor,\n 'resetView': r3.resetView,\n 'NgOnChangesFeature': r3.NgOnChangesFeature,\n 'ProvidersFeature': r3.ProvidersFeature,\n 'CopyDefinitionFeature': r3.CopyDefinitionFeature,\n 'InheritDefinitionFeature': r3.InheritDefinitionFeature,\n 'StandaloneFeature': r3.StandaloneFeature,\n 'nextContext': r3.nextContext,\n 'namespaceHTML': r3.namespaceHTML,\n 'namespaceMathML': r3.namespaceMathML,\n 'namespaceSVG': r3.namespaceSVG,\n 'enableBindings': r3.enableBindings,\n 'disableBindings': r3.disableBindings,\n 'elementStart': r3.elementStart,\n 'elementEnd': r3.elementEnd,\n 'element': r3.element,\n 'elementContainerStart': r3.elementContainerStart,\n 'elementContainerEnd': r3.elementContainerEnd,\n 'elementContainer': r3.elementContainer,\n 'pureFunction0': r3.pureFunction0,\n 'pureFunction1': r3.pureFunction1,\n 'pureFunction2': r3.pureFunction2,\n 'pureFunction3': r3.pureFunction3,\n 'pureFunction4': r3.pureFunction4,\n 'pureFunction5': r3.pureFunction5,\n 'pureFunction6': r3.pureFunction6,\n 'pureFunction7': r3.pureFunction7,\n 'pureFunction8': r3.pureFunction8,\n 'pureFunctionV': r3.pureFunctionV,\n 'getCurrentView': r3.getCurrentView,\n 'restoreView': r3.restoreView,\n 'listener': r3.listener,\n 'projection': r3.projection,\n 'syntheticHostProperty': r3.syntheticHostProperty,\n 'syntheticHostListener': r3.syntheticHostListener,\n 'pipeBind1': r3.pipeBind1,\n 'pipeBind2': r3.pipeBind2,\n 'pipeBind3': r3.pipeBind3,\n 'pipeBind4': r3.pipeBind4,\n 'pipeBindV': r3.pipeBindV,\n 'projectionDef': r3.projectionDef,\n 'hostProperty': r3.hostProperty,\n 'property': r3.property,\n 'propertyInterpolate': r3.propertyInterpolate,\n 'propertyInterpolate1': r3.propertyInterpolate1,\n 'propertyInterpolate2': r3.propertyInterpolate2,\n 'propertyInterpolate3': r3.propertyInterpolate3,\n 'propertyInterpolate4': r3.propertyInterpolate4,\n 'propertyInterpolate5': r3.propertyInterpolate5,\n 'propertyInterpolate6': r3.propertyInterpolate6,\n 'propertyInterpolate7': r3.propertyInterpolate7,\n 'propertyInterpolate8': r3.propertyInterpolate8,\n 'propertyInterpolateV': r3.propertyInterpolateV,\n 'pipe': r3.pipe,\n 'queryRefresh': r3.queryRefresh,\n 'viewQuery': r3.viewQuery,\n 'loadQuery': r3.loadQuery,\n 'contentQuery': r3.contentQuery,\n 'reference': r3.reference,\n 'classMap': r3.classMap,\n 'classMapInterpolate1': r3.classMapInterpolate1,\n 'classMapInterpolate2': r3.classMapInterpolate2,\n 'classMapInterpolate3': r3.classMapInterpolate3,\n 'classMapInterpolate4': r3.classMapInterpolate4,\n 'classMapInterpolate5': r3.classMapInterpolate5,\n 'classMapInterpolate6': r3.classMapInterpolate6,\n 'classMapInterpolate7': r3.classMapInterpolate7,\n 'classMapInterpolate8': r3.classMapInterpolate8,\n 'classMapInterpolateV': r3.classMapInterpolateV,\n 'styleMap': r3.styleMap,\n 'styleMapInterpolate1': r3.styleMapInterpolate1,\n 'styleMapInterpolate2': r3.styleMapInterpolate2,\n 'styleMapInterpolate3': r3.styleMapInterpolate3,\n 'styleMapInterpolate4': r3.styleMapInterpolate4,\n 'styleMapInterpolate5': r3.styleMapInterpolate5,\n 'styleMapInterpolate6': r3.styleMapInterpolate6,\n 'styleMapInterpolate7': r3.styleMapInterpolate7,\n 'styleMapInterpolate8': r3.styleMapInterpolate8,\n 'styleMapInterpolateV': r3.styleMapInterpolateV,\n 'styleProp': r3.styleProp,\n 'stylePropInterpolate1': r3.stylePropInterpolate1,\n 'stylePropInterpolate2': r3.stylePropInterpolate2,\n 'stylePropInterpolate3': r3.stylePropInterpolate3,\n 'stylePropInterpolate4': r3.stylePropInterpolate4,\n 'stylePropInterpolate5': r3.stylePropInterpolate5,\n 'stylePropInterpolate6': r3.stylePropInterpolate6,\n 'stylePropInterpolate7': r3.stylePropInterpolate7,\n 'stylePropInterpolate8': r3.stylePropInterpolate8,\n 'stylePropInterpolateV': r3.stylePropInterpolateV,\n 'classProp': r3.classProp,\n 'advance': r3.advance,\n 'template': r3.template,\n 'text': r3.text,\n 'textInterpolate': r3.textInterpolate,\n 'textInterpolate1': r3.textInterpolate1,\n 'textInterpolate2': r3.textInterpolate2,\n 'textInterpolate3': r3.textInterpolate3,\n 'textInterpolate4': r3.textInterpolate4,\n 'textInterpolate5': r3.textInterpolate5,\n 'textInterpolate6': r3.textInterpolate6,\n 'textInterpolate7': r3.textInterpolate7,\n 'textInterpolate8': r3.textInterpolate8,\n 'textInterpolateV': r3.textInterpolateV,\n 'i18n': r3.i18n,\n 'i18nAttributes': r3.i18nAttributes,\n 'i18nExp': r3.i18nExp,\n 'i18nStart': r3.i18nStart,\n 'i18nEnd': r3.i18nEnd,\n 'i18nApply': r3.i18nApply,\n 'i18nPostprocess': r3.i18nPostprocess,\n

```

'resolveWindow': r3.resolveWindow,\n    'resolveDocument': r3.resolveDocument,\n    'resolveBody':
r3.resolveBody,\n    'setComponentScope': r3.setComponentScope,\n    'setNgModuleScope':
r3.setNgModuleScope,\n    'registerNgModuleType': registerNgModuleType,\n\n    'sanitizeHtml':
sanitization.sanitizeHtml,\n    'sanitizeStyle': sanitization.sanitizeStyle,\n    'sanitizeResourceUrl':
sanitization.sanitizeResourceUrl,\n
    'sanitizeScript': sanitization.sanitizeScript,\n    'sanitizeUrl': sanitization.sanitizeUrl,\n
'sanitizeUrlOrResourceUrl': sanitization.sanitizeUrlOrResourceUrl,\n    'trustConstantHtml':
sanitization.trustConstantHtml,\n    'trustConstantResourceUrl': sanitization.trustConstantResourceUrl,\n
'validateIframeAttribute': iframe_attrs_validation.validateIframeAttribute,\n\n    'forwardRef': forwardRef,\n
'resolveForwardRef': resolveForwardRef,\n    }));\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nexport function patchModuleCompilation(): void {\n // Does
nothing, but exists as a target for patching.\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {ModuleWithProviders} from
'././di/interface/provider';\nimport {Type} from '././interface/type';\nimport {NgModuleDef} from
'././metadata/ng_module_def';\nimport {getNgModuleDef} from './definition';\n\nexport function
isModuleWithProviders(value: any): value is ModuleWithProviders<{}> {\n return (value as {ngModule?:
any}).ngModule !== undefined;\n}\n\nexport function isNgModule<T>(value: Type<T>): value is
Type<T> & {mod: NgModuleDef<T>} {\n return !!getNgModuleDef(value);\n}\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n\nimport {getCompilerFacade, JitCompilerUsage,
R3InjectorMetadataFacade} from '././compiler/compiler_facade';\nimport {resolveForwardRef} from
'././di/forward_ref';\nimport {NG_INJ_DEF} from '././di/interface/defs';\nimport
{ModuleWithProviders} from '././di/interface/provider';\nimport {reflectDependencies} from
'././di/jit/util';\nimport {Type} from '././interface/type';\nimport {registerNgModuleType} from
'././linker/ng_module_registration';\nimport {Component} from '././metadata/directives';\nimport {NgModule}
from '././metadata/ng_module';\nimport {NgModuleDef, NgModuleTransitiveScopes, NgModuleType} from
'././metadata/ng_module_def';\nimport {deepForEach, flatten} from '././util/array_utils';\nimport {assertDefined}
from '././util/assert';\nimport {EMPTY_ARRAY} from '././util/empty';\nimport {getComponentDef,
getDirectiveDef, getNgModuleDef, getPipeDef, isStandalone} from './definition';\nimport {NG_COMP_DEF,
NG_DIR_DEF, NG_FACTORY_DEF, NG_MOD_DEF, NG_PIPE_DEF} from './fields';\nimport
{ComponentDef} from './interfaces/definition';\nimport {maybeUnwrapFn} from './util/misc_utils';\nimport
{stringifyForError} from './util/stringify_utils';\n\nimport {angularCoreEnv}
from './environment';\nimport {patchModuleCompilation} from './module_patch';\nimport
{isModuleWithProviders, isNgModule} from './util';\n\ninterface ModuleQueueItem {\n moduleType:
Type<any>;\n ngModule: NgModule;\n}\n\nconst moduleQueue: ModuleQueueItem[] = [];\n\n/*\n * Enqueues
moduleDef to be checked later to see if scope can be set on its\n * component declarations.\n *\nfunction
enqueueModuleForDelayedScoping(moduleType: Type<any>, ngModule: NgModule) {\n
moduleQueue.push({moduleType, ngModule});\n}\n\nlet flushingModuleQueue = false;\n\n/*\n * Loops over
queued module definitions, if a given module definition has all of its\n * declarations resolved, it dequeues that
module definition and sets the scope on\n * its declarations.\n *\nexport function
flushModuleScopingQueueAsMuchAsPossible() {\n if (!flushingModuleQueue) {\n flushingModuleQueue =
true;\n try {\n for (let i = moduleQueue.length - 1; i >= 0; i--) {\n const {moduleType, ngModule}
= moduleQueue[i];\n\n if (ngModule.declarations && ngModule.declarations.every(isResolvedDeclaration))
{\n // dequeue\n moduleQueue.splice(i, 1);\n setScopeOnDeclaredComponents(moduleType,
ngModule);\n }\n }\n } finally {\n flushingModuleQueue = false;\n }\n}\n}\n\n/*\n * Returns truthy
if a declaration has resolved. If the declaration happens to be\n * an array of declarations, it will recurse to check

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each declaration in that array\n * (which may also be arrays).\n *\nfunction isResolvedDeclaration(declaration:
any[]|Type<any>): boolean {\n if (Array.isArray(declaration)) {\n return
declaration.every(isResolvedDeclaration);\n }\n return !!resolveForwardRef(declaration);\n }\n\n/**\n * Compiles a
module in JIT mode.\n *\n * This function automatically gets called when a class has a `@NgModule` decorator.\n
*\nexport function compileNgModule(moduleType: Type<any>, ngModule: NgModule = {}): void {\n
patchModuleCompilation();\n
  compileNgModuleDefs(moduleType as NgModuleType, ngModule);\n  if (ngModule.id !== undefined) {\n
registerNgModuleType(moduleType as NgModuleType, ngModule.id);\n  }\n\n  // Because we don't know if all
declarations have resolved yet at the moment the\n  // NgModule decorator is executing, we're enqueueing the
setting of module scope\n  // on its declarations to be run at a later time when all declarations for the module,\n  //
including forward refs, have resolved.\n  enqueueModuleForDelayedScoping(moduleType, ngModule);\n}\n\n/**\n
* Compiles and adds the `mod`, `fac` and `inj` properties to the module class.\n *\n * It's possible to compile a
module via this API which will allow duplicate declarations in its\n * root.\n *\nexport function
compileNgModuleDefs(\n  moduleType: NgModuleType, ngModule: NgModule,\n
  allowDuplicateDeclarationsInRoot: boolean = false): void {\n  ngDevMode && assertDefined(moduleType,
'Required value moduleType');\n  ngDevMode && assertDefined(ngModule,
'Required value ngModule');\n  const declarations: Type<any>[] = flatten(ngModule.declarations ||
EMPTY_ARRAY);\n  let ngModuleDef: any = null;\n  Object.defineProperty(moduleType, NG_MOD_DEF, {\n
configurable: true,\n  get: () => {\n    if (ngModuleDef === null) {\n      if (ngDevMode && ngModule.imports
&& ngModule.imports.indexOf(moduleType) > -1) {\n        // We need to assert this immediately, because
allowing it to continue will cause it to\n        // go into an infinite loop before we've reached the point where we
throw all the errors.\n        throw new Error(`${stringifyForError(moduleType)}' module can't import itself`);\n
      }\n      const compiler = getCompilerFacade(\n        {usage: JitCompilerUsage.Decorator, kind: 'NgModule',
type: moduleType});\n      ngModuleDef = compiler.compileNgModule(angularCoreEnv,
`ng://${moduleType.name}/mod.js`, {\n        type: moduleType,\n        bootstrap: flatten(ngModule.bootstrap ||
EMPTY_ARRAY).map(resolveForwardRef),\n        declarations: declarations.map(resolveForwardRef),\n
imports: flatten(ngModule.imports || EMPTY_ARRAY)\n          .map(resolveForwardRef)\n
        .map(expandModuleWithProviders),\n        exports: flatten(ngModule.exports || EMPTY_ARRAY)\n
        .map(resolveForwardRef)\n          .map(expandModuleWithProviders),\n        schemas: ngModule.schemas
? flatten(ngModule.schemas) : null,\n        id: ngModule.id || null,\n      });\n      // Set `schemas` on
ngModuleDef to an empty array in JIT mode to indicate that runtime\n      // should verify that there are no
unknown elements in a template. In AOT mode, that check\n      // happens at compile time and `schemas`
information is not present on Component and Module\n      // defs after compilation (so the check doesn't happen
the second time at runtime).\n      if (!ngModuleDef.schemas) {\n        ngModuleDef.schemas
= [];\n      }\n    }\n    return ngModuleDef;\n  }\n  });\n\n  let ngFactoryDef: any = null;\n  Object.defineProperty(moduleType, NG_FACTORY_DEF, {\n
get: () => {\n    if (ngFactoryDef === null) {\n      const compiler = getCompilerFacade(\n        {usage: JitCompilerUsage.Decorator, kind: 'NgModule', type:
moduleType});\n      ngFactoryDef = compiler.compileFactory(angularCoreEnv,
`ng://${moduleType.name}/fac.js`, {\n        name: moduleType.name,\n        type: moduleType,\n        deps:
reflectDependencies(moduleType),\n        target: compiler.FactoryTarget.NgModule,\n        typeArgumentCount:
0,\n      });\n    }\n    return ngFactoryDef;\n  },\n  // Make the property configurable in dev mode to allow
overriding in tests\n  configurable: !ngDevMode,\n  });\n\n  let ngInjectorDef: any = null;\n  Object.defineProperty(moduleType, NG_INJ_DEF, {\n
get: () => {\n    if (ngInjectorDef === null) {\n      ngDevMode &&\n
        verifySemanticsOfNgModuleDef(\n          moduleType as any as NgModuleType,
allowDuplicateDeclarationsInRoot);\n      const meta: R3InjectorMetadataFacade = {\n        name:
moduleType.name,\n        type: moduleType,\n        providers: ngModule.providers || EMPTY_ARRAY,\n
imports: [\n          (ngModule.imports || EMPTY_ARRAY).map(resolveForwardRef),\n          (ngModule.exports ||

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EMPTY_ARRAY).map(resolveForwardRef),\n    ],\n    });\n    const compiler = getCompilerFacade(\n
  {usage: JitCompilerUsage.Decorator, kind: 'NgModule', type: moduleType});\n    ngInjectorDef =\n
  compiler.compileInjector(angularCoreEnv, `ng://${moduleType.name}/inj.js`, meta);\n    }\n    return
  ngInjectorDef;\n  },\n  // Make the property configurable in dev mode to allow overriding in tests\n
  configurable: !!ngDevMode,\n  });\n}\n\nexport function generateStandaloneInDeclarationsError(type: Type<any>,\n
location: string) {\n
  const prefix = `Unexpected \"${stringifyForError(type)}\" found in the \"declarations\" array of the`;\n
  const suffix = `\"${stringifyForError(type)}\" is marked as standalone and can't be declared` +\n
  'in any NgModule - did you intend to import it instead (by adding it to the \"imports\" array)?';\n
  return `${prefix} ${location},\n  ${suffix}`;\n}\n\nfunction verifySemanticsOfNgModuleDef(\n  moduleType: NgModuleType,\n
  allowDuplicateDeclarationsInRoot: boolean,\n  importingModule?: NgModuleType): void {\n  if
  (verifiedNgModule.get(moduleType)) return;\n  // skip verifications of standalone components, directives, and
  pipes\n  if (isStandalone(moduleType)) return;\n  verifiedNgModule.set(moduleType, true);\n  moduleType =
  resolveForwardRef(moduleType);\n  let ngModuleDef: NgModuleDef<any>;\n  if (importingModule) {\n
  ngModuleDef = getNgModuleDef(moduleType)!;\n  if (!ngModuleDef) {\n    throw new Error(`Unexpected value
  '${moduleType.name}' imported by the module
  '\n    importingModule.name'. Please add an @NgModule annotation.`);\n  }\n  } else {\n    ngModuleDef =
  getNgModuleDef(moduleType, true);\n  }\n  const errors: string[] = [];\n  const declarations =
  maybeUnwrapFn(ngModuleDef.declarations);\n  const imports = maybeUnwrapFn(ngModuleDef.imports);\n
  flatten(imports).map(unwrapModuleWithProvidersImports).forEach(modOrStandaloneCmpt => {\n
  verifySemanticsOfNgModuleImport(modOrStandaloneCmpt, moduleType);\n
  verifySemanticsOfNgModuleDef(modOrStandaloneCmpt, false, moduleType);\n  });\n  const exports =
  maybeUnwrapFn(ngModuleDef.exports);\n  declarations.forEach(verifyDeclarationsHaveDefinitions);\n
  declarations.forEach(verifyDirectivesHaveSelector);\n  declarations.forEach((declarationType) =>
  verifyNotStandalone(declarationType, moduleType));\n  const combinedDeclarations: Type<any>[] = [\n
  ...declarations.map(resolveForwardRef),\n
  ...flatten(imports.map(computeCombinedExports)).map(resolveForwardRef),\n  ];\n
  exports.forEach(verifyExportsAreDeclaredOrReExported);\n
  declarations.forEach(decl => verifyDeclarationIsUnique(decl, allowDuplicateDeclarationsInRoot));\n
  declarations.forEach(verifyComponentEntryComponentsIsPartOfNgModule);\n  const ngModule =
  getAnnotation<NgModule>(moduleType, 'NgModule');\n  if (ngModule) {\n    ngModule.imports &&\n
  flatten(ngModule.imports).map(unwrapModuleWithProvidersImports).forEach(mod => {\n
  verifySemanticsOfNgModuleImport(mod, moduleType);\n    verifySemanticsOfNgModuleDef(mod, false,\n
  moduleType);\n  });\n    ngModule.bootstrap && deepForEach(ngModule.bootstrap,\n
  verifyCorrectBootstrapType);\n    ngModule.bootstrap && deepForEach(ngModule.bootstrap,\n
  verifyComponentIsPartOfNgModule);\n    ngModule.entryComponents &&\n
  deepForEach(ngModule.entryComponents, verifyComponentIsPartOfNgModule);\n  }\n  // Throw Error if any
  errors were detected.\n  if (errors.length) {\n    throw new Error(errors.join("\\n"));}\n  }\n
  //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////^\n
  function verifyDeclarationsHaveDefinitions(type: Type<any>): void {\n    type = resolveForwardRef(type);\n
    const def = getComponentDef(type) || getDirectiveDef(type) || getPipeDef(type);\n    if (!def) {\n
    errors.push(`Unexpected value '${stringifyForError(type)}' declared by the module '${\n
    stringifyForError(moduleType)}'. Please add a @Pipe/@Directive/@Component annotation.`);\n    }\n  }\n
  function verifyDirectivesHaveSelector(type: Type<any>): void {\n    type = resolveForwardRef(type);\n
    const def = getDirectiveDef(type);\n    if (!getComponentDef(type) && def && def.selectors.length === 0) {\n
    errors.push(`Directive ${stringifyForError(type)} has no selector, please add it!`);\n    }\n  }\n
  function verifyNotStandalone(type: Type<any>, moduleType: NgModuleType): void {\n    type =
  resolveForwardRef(type);\n    const def = getComponentDef(type) || getDirectiveDef(type)

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    || getPipeDef(type);
    if (def?.standalone) {
        const location = `\"${stringifyForError(moduleType)}\"
NgModule`;
        errors.push(generateStandaloneInDeclarationsError(type, location));
    }
}

function
verifyExportsAreDeclaredOrReExported(type: Type<any>) {
    type = resolveForwardRef(type);
    const kind =
getComponentDef(type) && 'component' || getDirectiveDef(type) && 'directive' ||
getPipeDef(type) &&
'pipe';
    if (kind) {
        // only checked if we are declared as Component, Directive, or Pipe
        // Modules don't
need to be declared or imported.
        if (combinedDeclarations.lastIndexOf(type) === -1) {
            // We are
exporting something which we don't explicitly declare or import.
            errors.push(`Can't export ${kind}
${stringifyForError(type)} from ${
stringifyForError(moduleType)} as it was neither declared nor
imported!`);
        }
    }
}

function verifyDeclarationIsUnique(type: Type<any>, suppressErrors:
boolean) {
    type = resolveForwardRef(type);
    const existingModule = ownerNgModule.get(type);
    if (existingModule && existingModule !== moduleType) {
        if (!suppressErrors) {
            const modules =
[existingModule, moduleType].map(stringifyForError).sort();
            errors.push(`
Type
${stringifyForError(type)} is part of the declarations of 2 modules: ${
modules[0]} and ${modules[1]}!`
+ `
Please consider moving ${stringifyForError(type)} to a higher module that imports ${
modules[0]} and ${modules[1]}.`
+ `
You can also create a new NgModule that exports and includes ${
stringifyForError(
type)} then import that NgModule in ${modules[0]} and ${modules[1]}.`);
        }
    } else {
        // Mark type as having owner.
        ownerNgModule.set(type, moduleType);
    }
}

function verifyComponentIsPartOfNgModule(type: Type<any>) {
    type
= resolveForwardRef(type);
    const existingModule = ownerNgModule.get(type);
    if (!existingModule &&
!isStandalone(type)) {
        errors.push(`Component ${
stringifyForError(
type)} is not part of any
NgModule or the module has not been imported into your module.`);
    }
}

function
verifyCorrectBootstrapType(type: Type<any>) {
    type = resolveForwardRef(type);
    if
(!getComponentDef(type)) {
        errors.push(`${stringifyForError(type)} cannot be used as an entry
component.`);
    }
    if (isStandalone(type)) {
        // Note: this error should be the same as the
//
`NGMODULE_BOOTSTRAP_IS_STANDALONE` one in AOT compiler.
        errors.push(`The
`${stringifyForError(type)}` class is a standalone component, which can `
+ `
not be used in the
`${@NgModule.bootstrap}` array. Use the `bootstrapApplication` `
+ `
function for bootstrap instead.`);
    }
}

function verifyComponentEntryComponentsIsPartOfNgModule(type:
Type<any>) {
    type = resolveForwardRef(type);
    if (getComponentDef(type)) {
        // We know we are
component
        const component = getAnnotation<Component>(type, 'Component');
        if (component &&
component.entryComponents) {
            deepForEach(component.entryComponents,
verifyComponentIsPartOfNgModule);
        }
    }
}

function verifySemanticsOfNgModuleImport(type:
Type<any>, importingModule: Type<any>) {
    type = resolveForwardRef(type);
    const directiveDef =
getComponentDef(type) || getDirectiveDef(type);
    if (directiveDef !== null && !directiveDef.standalone) {
        throw new Error(`Unexpected directive '${type.name}' imported by the module '${
importingModule.name}'. Please add an @NgModule annotation.`);
    }
    const pipeDef = getPipeDef(type);
    if (pipeDef !== null && !pipeDef.standalone) {
        throw new Error(`Unexpected pipe '${type.name}' imported
by the module '${
importingModule.name}'. Please add an @NgModule annotation.`);
    }
}

function
unwrapModuleWithProvidersImports(typeOrWithProviders: NgModuleType<any>|
{ngModule: NgModuleType<any>}: NgModuleType<any> {
    typeOrWithProviders =
resolveForwardRef(typeOrWithProviders);
    return (typeOrWithProviders as any).ngModule ||
typeOrWithProviders;
}

function getAnnotation<T>(type: any, name: string): T|null {
    let annotation: T|null =
null;
    collect(type.__annotations__);
    collect(type.decorators);
    return annotation;
}

function
collect(annotations: any[]|null) {
    if (annotations) {
        annotations.forEach(readAnnotation);
    }
}

function
readAnnotation(
decorator: {type: {prototype: {ngMetadataName: string}}, args: any[], args: any}):
void {
    if (!annotation) {
        const proto = Object.getPrototypeOf(decorator);
        if (proto.ngMetadataName
=== name) {
            annotation = decorator as any;
        }
    }
}

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    } else if (decorator.type) {\n      const proto = Object.getPrototypeOf(decorator.type);\n      if
(proto.ngMetadataName == name) {\n        annotation = decorator.args[0];\n        }\n        }\n        }\n        }\n        }\n        /**\n *
Keep track of compiled components. This is needed because in tests we often want to compile the\n * same
component with more than one NgModule. This would cause an error unless we reset which\n * NgModule the
component belongs to. We keep the list of compiled components here so that the\n * TestBed can reset it later.\n
*\nlet ownerNgModule = new WeakMap<Type<any>, NgModuleType<any>>();\nlet verifiedNgModule = new
WeakMap<NgModuleType<any>, boolean>();\n\nexport function resetCompiledComponents(): void {\n
ownerNgModule = new WeakMap<Type<any>, NgModuleType<any>>();\n verifiedNgModule = new
WeakMap<NgModuleType<any>, boolean>();\n moduleQueue.length = 0;\n}\n\n/**\n * Computes the combined
declarations of explicit declarations, as well as declarations
inherited by\n * traversing the exports of imported modules.\n * @param type\n */\nfunction
computeCombinedExports(type: Type<any>): Type<any>[] {\n type = resolveForwardRef(type);\n const
ngModuleDef = getNgModuleDef(type);\n\n // a standalone component, directive or pipe\n if (ngModuleDef ===
null) {\n return [type];\n }\n\n return [...flatten(maybeUnwrapFn(ngModuleDef.exports).map((type) => {\n
const ngModuleDef = getNgModuleDef(type);\n if (ngModuleDef) {\n verifySemanticsOfNgModuleDef(type
as any as NgModuleType, false);\n return computeCombinedExports(type);\n } else {\n return type;\n }
})]);\n}\n\n/**\n * Some declared components may be compiled asynchronously, and thus may not have their\n *
cmp set yet. If this is the case, then a reference to the module is written into\n * the `ngSelectorScope` property of
the declared type.\n */\nfunction setScopeOnDeclaredComponents(moduleType: Type<any>, NgModule:
NgModule) {\n const declarations:
Type<any>[] = flatten(ngModule.declarations || EMPTY_ARRAY);\n\n const transitiveScopes =
transitiveScopesFor(moduleType);\n\n declarations.forEach(declaration => {\n declaration =
resolveForwardRef(declaration);\n if (declaration.hasOwnProperty(NG_COMP_DEF)) {\n // A `cmp` field
exists - go ahead and patch the component directly.\n const component = declaration as Type<any>& {cmp:
ComponentDef<any>};\n const componentDef = getComponentDef(component)!;\n
patchComponentDefWithScope(componentDef, transitiveScopes);\n } else if (\n
!declaration.hasOwnProperty(NG_DIR_DEF) && !declaration.hasOwnProperty(NG_PIPE_DEF)) {\n // Set
`ngSelectorScope` for future reference when the component compilation finishes.\n (declaration as Type<any>&
{ngSelectorScope?: any}).ngSelectorScope = moduleType;\n }\n });\n}\n\n/**\n * Patch the definition of a
component with directives and pipes from the compilation scope of\n * a given module.\n */\nexport
function patchComponentDefWithScope<C>(\n componentDef: ComponentDef<C>, transitiveScopes:
NgModuleTransitiveScopes) {\n componentDef.directiveDefs = () =>\n
Array.from(transitiveScopes.compilation.directives)\n .map(\n dir =>
dir.hasOwnProperty(NG_COMP_DEF) ? getComponentDef(dir)! : getDirectiveDef(dir)!)\n )\n
.filter(def => !!def);\n componentDef.pipeDefs = () =>\n
Array.from(transitiveScopes.compilation.pipes).map(pipe => getPipeDef(pipe)!);\n componentDef.schemas =
transitiveScopes.schemas;\n\n // Since we avoid Components/Directives/Pipes recompiling in case there are no
overrides, we\n // may face a problem where previously compiled defs available to a given Component/Directive\n
// are cached in TView and may become stale (in case any of these defs gets recompiled). In\n // order to avoid this
problem, we force fresh TView to be created.\n componentDef.tView = null;\n}\n\n/**\n * Compute the pair of
transitive scopes
(compilation scope and exported scope) for a given type\n * (either a NgModule or a standalone component /
directive / pipe).\n */\nexport function transitiveScopesFor<T>(type: Type<T>): NgModuleTransitiveScopes {\n
if (isNgModule(type)) {\n return transitiveScopesForNgModule(type);\n } else if (isStandalone(type)) {\n const
directiveDef = getComponentDef(type) || getDirectiveDef(type);\n if (directiveDef !== null) {\n return {\n
schemas: null,\n compilation: {\n directives: new Set<any>(),\n pipes: new Set<any>(),\n },\n
exported: {\n directives: new Set<any>([type]),\n pipes: new Set<any>(),\n },\n });\n }\n\n const pipeDef =
getPipeDef(type);\n if (pipeDef !== null) {\n return {\n schemas: null,\n compilation:

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{\n    directives: new Set<any>(),\n    pipes: new Set<any>(),\n    },\n    exported: {\n    directives:
new Set<any>(),\n
    pipes: new Set<any>([type]),\n    },\n    });\n    }\n    }\n    }\n    // TODO: change the error message to be more user-
facing and take standalone into account\n    throw new Error(`${type.name} does not have a module def (mod
property)`);\n    }\n    }\n    /**\n    * Compute the pair of transitive scopes (compilation scope and exported scope) for a given
module.\n    *\n    * This operation is memoized and the result is cached on the module's definition. This function can\n
* be called on modules with components that have not fully compiled yet, but the result should not\n
* be used until they have.\n    *\n    * @param moduleType module that transitive scope should be calculated for.\n    */\n    \nexport function
transitiveScopesForNgModule<T>(moduleType: Type<T>): NgModuleTransitiveScopes {\n    const def =
getNgModuleDef(moduleType, true);\n    \n    if (def.transitiveCompileScopes !== null) {\n    return
def.transitiveCompileScopes;\n    }\n    \n    const scopes: NgModuleTransitiveScopes = {\n    schemas: def.schemas ||
null,\n
    compilation: {\n    directives: new Set<any>(),\n    pipes: new Set<any>(),\n    },\n    exported: {\n    directives:
new Set<any>(),\n    pipes: new Set<any>(),\n    },\n    });\n    \n    maybeUnwrapFn(def.imports).forEach(<I>(imported:
Type<I>) => {\n    // When this module imports another, the imported module's exported directives and pipes are\n
// added to the compilation scope of this module.\n    const importedScope = transitiveScopesFor(imported);\n
importedScope.exported.directives.forEach(entry => scopes.compilation.directives.add(entry));\n
importedScope.exported.pipes.forEach(entry => scopes.compilation.pipes.add(entry));\n    });\n    \n    maybeUnwrapFn(def.declarations).forEach(declared => {\n    const declaredWithDefs = declared as Type<any>&
{\n    pipe?: any;\n    };\n    \n    if (getPipeDef(declaredWithDefs)) {\n    scopes.compilation.pipes.add(declared);\n
    } else {\n    // Either declared has a cmp or dir, or it's a component which hasn't\n    // had its
template compiled yet. In either case, it gets added to the compilation's\n    // directives.\n
scopes.compilation.directives.add(declared);\n    }\n    });\n    \n    maybeUnwrapFn(def.exports).forEach(<E>(exported:
Type<E>) => {\n    const exportedType = exported as Type<E>& {\n    // Components, Directives, NgModules,
and Pipes can all be exported.\n    cmp?: any;\n    dir?: any;\n    mod?: NgModuleDef<E>;\n    pipe?: any;\n
    };\n    \n    // Either the type is a module, a pipe, or a component/directive (which may not have a\n    // cmp as it might
be compiled asynchronously).\n    if (isNgModule(exportedType)) {\n    // When this module exports another, the
exported module's exported directives and pipes are\n    // added to both the compilation and exported scopes of
this module.\n    const exportedScope = transitiveScopesFor(exportedType);\n
exportedScope.exported.directives.forEach(entry => {\n    scopes.compilation.directives.add(entry);\n
scopes.exported.directives.add(entry);\n
    });\n    \n    exportedScope.exported.pipes.forEach(entry => {\n    scopes.compilation.pipes.add(entry);\n
scopes.exported.pipes.add(entry);\n    });\n    } else if (getPipeDef(exportedType)) {\n
scopes.exported.pipes.add(exportedType);\n    } else {\n    scopes.exported.directives.add(exportedType);\n    }\n
});\n    \n    def.transitiveCompileScopes = scopes;\n    return scopes;\n    }\n    }\n    \nfunction expandModuleWithProviders(value:
Type<any>|ModuleWithProviders<{}>): Type<any> {\n    if (isModuleWithProviders(value)) {\n    return
value.ngModule;\n    }\n    return value;\n    }\n    }\n    \n"/**\n    * @license\n    * Copyright Google LLC All Rights Reserved.\n
*\n    * Use of this source code is governed by an MIT-style license that can be\n    * found in the LICENSE file at
https://angular.io/license\n    */\n    \nimport {stringify as stringify} from '@angular/core';\n    \nimport
{MetadataOverride} from './metadata_override';\n    \n\nlet
StringMap = {\n    [key: string]: any;\n    };\n    \n\nlet
_nextReferenceId = 0;\n    \n\nexport class MetadataOverride {\n    private _references = new Map<any, string>();\n
}\n    \n\n/**\n    * Creates a new instance for the given metadata class\n    * based on an old instance and overrides.\n    */\n
\noverrideMetadata<C extends T, T>(metadataClass: {new(options: T): C}, oldMetadata: C, override:
MetadataOverride<T>): C {\n    const props: StringMap = {};\n    \n    if (oldMetadata) {\n
_valueProps(oldMetadata).forEach((prop) => props[prop] = (<any>oldMetadata)[prop]);\n    }\n    \n    if (override.set)
{\n    if (override.remove || override.add) {\n    throw new Error(`Cannot set and add/remove
${stringify(metadataClass)} at the same time!`);\n    }\n    \n    setMetadata(props, override.set);\n    }\n    \n    if
(override.remove) {\n    removeMetadata(props, override.remove, this._references);\n    }\n    \n    if (override.add) {\n

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    addMetadata(props, override.add);\n  }\n  return new metadataClass(<any>props);\n }\n}\n\nfunction
removeMetadata(metadata:
  StringMap, remove: any, references: Map<any, string>) {\n  const removeObjects = new Set<string>();\n  for
(const prop in remove) {\n    const removeValue = remove[prop];\n    if (Array.isArray(removeValue)) {\n
removeValue.forEach((value: any) => {\n      removeObjects.add(_propHashKey(prop, value, references));\n
});\n    } else {\n      removeObjects.add(_propHashKey(prop, removeValue, references));\n    }\n  }\n  for (const
prop in metadata) {\n    const propValue = metadata[prop];\n    if (Array.isArray(propValue)) {\n      metadata[prop]
= propValue.filter(\n      (value: any) => !removeObjects.has(_propHashKey(prop, value, references));\n    } else
{\n      if (removeObjects.has(_propHashKey(prop, propValue, references))) {\n        metadata[prop] = undefined;\n
      }\n    }\n  }\n}\n}\n}\n\nfunction addMetadata(metadata: StringMap, add: any) {\n  for (const prop in add) {\n
const
addValue = add[prop];\n  const propValue = metadata[prop];\n  if
(propValue != null && Array.isArray(propValue)) {\n    metadata[prop] = propValue.concat(addValue);\n  } else
{\n    metadata[prop] = addValue;\n  }\n}\n}\n}\n\nfunction setMetadata(metadata: StringMap, set: any) {\n  for
(const prop in set) {\n    metadata[prop] = set[prop];\n  }\n}\n}\n}\n\nfunction _propHashKey(propName: any, propValue:
any, references: Map<any, string>): string {\n  let nextObjectId = 0;\n  const objectIds = new Map<object,
string>();\n  const replacer = (key: any, value: any) => {\n    if (value !== null && typeof value === 'object') {\n
if (objectIds.has(value)) {\n      return objectIds.get(value);\n    }\n    // Record an id for this object such that any
later references use the object's id instead\n    // of the object itself, in order to break cyclic pointers in objects.\n
objectIds.set(value, `obj#${nextObjectId++}`);\n    // The first time an object is seen the object itself is
serialized.\n    return value;\n  } else if (typeof
value === 'function') {\n    value = _serializeReference(value, references);\n  }\n  return value;\n};\n\nreturn
`${propName}.${JSON.stringify(propValue, replacer)}`;\n}\n}\n}\n\nfunction _serializeReference(ref: any, references:
Map<any, string>): string {\n  let id = references.get(ref);\n  if (!id) {\n    id =
`${stringify(ref)}.${_nextReferenceId++}`;\n    references.set(ref, id);\n  }\n  return id;\n}\n}\n}\n}\n\nfunction
_valueProps(obj: any): string[] {\n  const props: string[] = [];\n  // regular public props\n
Object.keys(obj).forEach((prop) => {\n    if (!prop.startsWith('_')) {\n      props.push(prop);\n    }\n  });\n  //
getters\n  let proto = obj;\n  while (proto = Object.getPrototypeOf(proto)) {\n
Object.keys(proto).forEach((protoProp) => {\n    const desc = Object.getOwnPropertyDescriptor(proto,
protoProp);\n    if (!protoProp.startsWith('_') && desc && 'get' in desc) {\n      props.push(protoProp);\n    }\n
});\n  }\n  return props;\n}\n}\n}\n}\n\n"/**\n * @license\n
* Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Component, Directive,
NgModule, Pipe, Type, ReflectionCapabilities as ReflectionCapabilities} from '@angular/core';\n\nimport
{MetadataOverride} from './metadata_override';\nimport {MetadataOverrider} from './metadata_overrider';\n\nconst
reflection = new ReflectionCapabilities();\n\n/**\n * Base interface to resolve `@Component`, `@Directive`,
`@Pipe` and `@NgModule`.\n */\n\nexport interface Resolver<T> {\n  addOverride(type: Type<any>, override:
MetadataOverride<T>): void;\n  setOverrides(overrides: Array<[Type<any>, MetadataOverride<T>]>): void;\n
resolve(type: Type<any>): T|null;\n}\n\n/**\n * Allows to override ivy metadata for tests (via the `TestBed`).\n
*/\n\nabstract class OverrideResolver<T> implements Resolver<T> {\n  private overrides = new Map<Type<any>,
MetadataOverride<T>[]>();\n
  private resolved = new Map<Type<any>, T|null>();\n\n  abstract get type(): any;\n\n  addOverride(type:
Type<any>, override: MetadataOverride<T>) {\n    const overrides = this.overrides.get(type) || [];\n
overrides.push(override);\n    this.overrides.set(type, overrides);\n    this.resolved.delete(type);\n  }\n\n
setOverrides(overrides: Array<[Type<any>, MetadataOverride<T>]>)\n  {\n    this.overrides.clear();\n
overrides.forEach(([type, override]) => {\n    this.addOverride(type, override);\n  });\n}\n\ngetAnnotation(type:
Type<any>): T|null {\n  const annotations = reflection.annotations(type);\n  // Try to find the nearest known Type
annotation and make sure that this annotation is an\n  // instance of the type we are looking for, so we can use it
for resolution. Note: there might\n  // be multiple known annotations found due to the fact that Components can extend

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Directives (so\n // both Directive and Component annotations would be present), so we always
check if the known\n // annotation has the right type.\n for (let i = annotations.length - 1; i >= 0; i--) {\n const
annotation = annotations[i];\n const isKnownType = annotation instanceof Directive || annotation instanceof
Component ||\n annotation instanceof Pipe || annotation instanceof NgModule;\n if (isKnownType) {\n
return annotation instanceof this.type ? annotation as unknown as T : null;\n }\n }\n return null;\n }\n\n
resolve(type: Type<any>): T|null {\n let resolved: T|null = this.resolved.get(type) || null;\n\n if (!resolved) {\n
resolved = this.getAnnotation(type);\n if (resolved) {\n const overrides = this.overrides.get(type);\n if
(overrides) {\n const overrider = new MetadataOverrider();\n overrides.forEach(override => {\n
resolved = overrider.overrideMetadata(this.type, resolved!, override);\n });\n }\n }\n
this.resolved.set(type,
resolved);\n }\n\n return resolved;\n }\n}\n\n\nexport class DirectiveResolver extends
OverrideResolver<Directive> {\n override get type() {\n return Directive;\n }}\n\n\nexport class
ComponentResolver extends OverrideResolver<Component> {\n override get type() {\n return Component;\n
}}\n\n\nexport class PipeResolver extends OverrideResolver<Pipe> {\n override get type() {\n return Pipe;\n
}}\n\n\nexport class NgModuleResolver extends OverrideResolver<NgModule> {\n override get type() {\n return
NgModule;\n }}\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {ResourceLoader} from '@angular/compiler';\nimport {ApplicationInitStatus, Compiler,
COMPILER_OPTIONS, Component, Directive, Injector, InjectorType, LOCALE_ID,
ModuleWithComponentFactories, ModuleWithProviders, NgModule, NgModuleFactory,
NgZone, Pipe, PlatformRef, Provider, resolveForwardRef, Type, compileComponent as compileComponent,
compileDirective as compileDirective, compileNgModuleDefs as compileNgModuleDefs, compilePipe as
compilePipe, DEFAULT_LOCALE_ID as DEFAULT_LOCALE_ID, DirectiveDef as DirectiveDef,
getInjectableDef as getInjectableDef, NG_COMP_DEF as NG_COMP_DEF, NG_DIR_DEF as NG_DIR_DEF,
NG_INJ_DEF as NG_INJ_DEF, NG_MOD_DEF as NG_MOD_DEF, NG_PIPE_DEF as NG_PIPE_DEF,
NgModuleFactory as R3NgModuleFactory, NgModuleTransitiveScopes as NgModuleTransitiveScopes,
NgModuleType as NgModuleType, patchComponentDefWithScope as patchComponentDefWithScope,
Render3ComponentFactory as ComponentFactory, Render3NgModuleRef as NgModuleRef, setLocaleId as
setLocaleId, transitiveScopesFor as transitiveScopesFor, InjectableDeclaration as InjectableDeclaration} from
'@angular/core';\n\nimport {clearResolutionOfComponentResourcesQueue, isComponentDefPendingResolution,
resolveComponentResources, restoreComponentResolutionQueue}
from '../src/metadata/resource_loading';\nimport {ComponentDef, ComponentType} from
'../src/render3';\nimport {generateStandaloneInDeclarationsError} from '../src/render3/jit/module';\n\nimport
{MetadataOverride} from './metadata_override';\nimport {ComponentResolver, DirectiveResolver,
NgModuleResolver, PipeResolver, Resolver} from './resolvers';\nimport {TestModuleMetadata} from
'./test_bed_common';\n\nenum TestingModuleOverride {\n DECLARATION,\n
OVERRIDE_TEMPLATE,\n}\n\nfunction isTestingModuleOverride(value: unknown): value is
TestingModuleOverride {\n return value === TestingModuleOverride.DECLARATION ||\n value ===
TestingModuleOverride.OVERRIDE_TEMPLATE;\n}\n\nfunction assertNoStandaloneComponents(\n types:
Type<any>[], resolver: Resolver<any>, location: string) {\n types.forEach(type => {\n const component =
resolver.resolve(type);\n if (component && component.standalone) {\n throw new
Error(generateStandaloneInDeclarationsError(type,
location));\n }\n });\n}\n\n// Resolvers for Angular decorators\ntype Resolvers = {\n module:
Resolver<NgModule>,\n component: Resolver<Directive>,\n directive: Resolver<Component>,\n pipe:
Resolver<Pipe>,\n};\n\ninterface CleanupOperation {\n fieldName: string;\n object: any;\n originalValue:
unknown;\n}\n\nexport class TestBedCompiler {\n private originalComponentResolutionQueue: Map<Type<any>,
Component>|null = null;\n\n // Testing module configuration\n private declarations: Type<any>[] = [];\n private
imports: Type<any>[] = [];\n private providers: Provider[] = [];\n private schemas: any[] = [];\n\n // Queues of

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components/directives/pipes that should be recompiled.\n private pendingComponents = new Set<Type<any>>();\n
private pendingDirectives = new Set<Type<any>>();\n private pendingPipes = new Set<Type<any>>();\n\n //
Keep track of all components and directives, so we can patch Providers onto defs later.\n private seenComponents =
new Set<Type<any>>();\n
private seenDirectives = new Set<Type<any>>();\n\n // Keep track of overridden modules, so that we can collect
all affected ones in the module tree.\n private overriddenModules = new Set<NgModuleType<any>>();\n\n // Store
resolved styles for Components that have template overrides present and `styleUrls`\n // defined at the same time.\n
private existingComponentStyles = new Map<Type<any>, string[]>();\n\n private resolvers: Resolvers =
initResolvers();\n\n private componentToModuleScope = new Map<Type<any>,
Type<any>|TestingModuleOverride>();\n\n // Map that keeps initial version of component/directive/pipe defs in
case\n // we compile a Type again, thus overriding respective static fields. This is\n // required to make sure we
restore defs to their initial states between test runs.\n // Note: one class may have multiple defs (for example: mod
and inj in case of an\n // NgModule), store all of them in a map.\n private initialNgDefs = new Map<Type<any>,
Map<string, PropertyDescriptor|undefined>>();\n\n // Array that keeps cleanup operations for initial versions of
component/directive/pipe/module\n // defs in case TestBed makes changes to the originals.\n private
defCleanupOps: CleanupOperation[] = [];\n\n private _injector: Injector|null = null;\n private compilerProviders:
Provider[]|null = null;\n\n private providerOverrides: Provider[] = [];\n private rootProviderOverrides: Provider[] =
[];\n // Overrides for injectables with `{providedIn: SomeModule}` need to be tracked and added to that\n //
module's provider list.\n private providerOverridesByModule = new Map<InjectorType<any>, Provider[]>();\n
private providerOverridesByToken = new Map<any, Provider>();\n private scopesWithOverriddenProviders = new
Set<Type<any>>();\n\n private testModuleType: NgModuleType<any>;\n private testModuleRef:
NgModuleRef<any>|null = null;\n\n constructor(private platform: PlatformRef, private additionalModuleTypes:
Type<any>|Type<any>[])
{\n class DynamicTestModule {\n this.testModuleType = DynamicTestModule as any;\n }\n\n
setCompilerProviders(providers: Provider[]|null): void {\n this.compilerProviders = providers;\n this._injector =
null;\n }\n\n configureTestingModule(moduleDef: TestModuleMetadata): void {\n // Enqueue any compilation
tasks for the directly declared component.\n if (moduleDef.declarations !== undefined) {\n // Verify that there
are no standalone components\n assertNoStandaloneComponents(\n moduleDef.declarations,
this.resolvers.component,\n "TestBed.configureTestingModule" call);\n
this.queueTypeArray(moduleDef.declarations, TestingModuleOverride.DECLARATION);\n
this.declarations.push(...moduleDef.declarations);\n }\n\n // Enqueue any compilation tasks for imported
modules.\n if (moduleDef.imports !== undefined) {\n
this.queueTypesFromModulesArray(moduleDef.imports);\n this.imports.push(...moduleDef.imports);\n
}\n\n if (moduleDef.providers !== undefined) {\n this.providers.push(...moduleDef.providers);\n }\n\n if
(moduleDef.schemas !== undefined) {\n this.schemas.push(...moduleDef.schemas);\n }\n }\n\n
overrideModule(ngModule: Type<any>, override: MetadataOverride<NgModule>): void {\n
this.overriddenModules.add(ngModule as NgModuleType<any>);\n\n // Compile the module right away.\n
this.resolvers.module.addOverride(ngModule, override);\n const metadata =
this.resolvers.module.resolve(ngModule);\n if (metadata === null) {\n throw
invalidTypeError(ngModule.name, 'NgModule');\n }\n\n this.recompileNgModule(ngModule, metadata);\n\n //
At this point, the module has a valid module def (mod), but the override may have introduced\n // new declarations
or imported modules. Ingest any possible new types and add them to the\n // current queue.\n
this.queueTypesFromModulesArray([ngModule]);\n }\n\n overrideComponent(component: Type<any>,
override: MetadataOverride<Component>): void {\n this.verifyNoStandaloneFlagOverrides(component,
override);\n this.resolvers.component.addOverride(component, override);\n
this.pendingComponents.add(component);\n }\n\n overrideDirective(directive: Type<any>, override:
MetadataOverride<Directive>): void {\n this.verifyNoStandaloneFlagOverrides(directive, override);\n
this.resolvers.directive.addOverride(directive, override);\n this.pendingDirectives.add(directive);\n }\n\n

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overridePipe(pipe: Type<any>, override: MetadataOverride<Pipe>): void {
  this.verifyNoStandaloneFlagOverrides(pipe, override);
  this.resolvers.pipe.addOverride(pipe, override);
  this.pendingPipes.add(pipe);
}

private verifyNoStandaloneFlagOverrides(
  type: Type<any>, override: MetadataOverride<Component|Directive|Pipe>) {
  if (override.add?.hasOwnProperty('standalone') ||
    override.set?.hasOwnProperty('standalone') ||
    override.remove?.hasOwnProperty('standalone')) {
    throw new Error(`An override for the ${type.name} class has the `standalone` flag. `
    `Changing the `standalone` flag via TestBed overrides is not supported.`);
  }
}

overrideProvider(
  token: any,
  provider: {useFactory?: Function, useValue?: any, deps?: any[], multi?: boolean}): void {
  let providerDef: Provider;
  if (provider.useFactory !== undefined) {
    providerDef = {
      provide: token,
      useFactory: provider.useFactory,
      deps: provider.deps || [],
      multi: provider.multi
    };
  } else if (provider.useValue !== undefined) {
    providerDef = {
      provide: token,
      useValue: provider.useValue,
      multi: provider.multi
    };
  } else {
    providerDef = {
      provide: token
    };
  }

  const injectableDef: InjectableDeclaration<any>|null =
    typeof token !== 'string' ? getInjectableDef(token) : null;
  const providedIn = injectableDef === null ? null : resolveForwardRef(injectableDef.providedIn);

  const overridesBucket =
    providedIn === 'root' ? this.rootProviderOverrides : this.providerOverrides;
  overridesBucket.push(providerDef);
  // Keep overrides grouped by token as well for fast lookups using token
  this.providerOverridesByToken.set(token, providerDef);
  if (injectableDef !== null && providedIn !== null &&
    typeof providedIn !== 'string') {
    const existingOverrides = this.providerOverridesByModule.get(providedIn);
    if (existingOverrides !== undefined) {
      existingOverrides.push(providerDef);
    } else {
      this.providerOverridesByModule.set(providedIn, [providerDef]);
    }
  }
}

overrideTemplateUsingTestingModule(type: Type<any>, template: string): void {
  const def = (type as any)[NG_COMP_DEF];
  const hasStyleUrls = (): boolean => {
    const metadata = this.resolvers.component.resolve(type) as Component;
    return !!metadata.styleUrls && metadata.styleUrls.length > 0;
  };
  const overrideStyleUrls = !!def && !isComponentDefPendingResolution(type) &&
    hasStyleUrls();
  // In Ivy, compiling a component does not require knowing the module providing the
  // component's scope, so overrideTemplateUsingTestingModule can be implemented purely via
  // overrideComponent. Important: overriding template requires full Component re-compilation,
  // which may fail in case styleUrls are also present (thus Component is considered as required
  // resolution). In order to avoid this, we preemptively set styleUrls to an empty array,
  // preserve current styles available on Component def and restore styles back once compilation
  // is complete.
  const override = overrideStyleUrls ? {template, styles: [], styleUrls: []} : {template};
  this.overrideComponent(type, {set: override});
  if (overrideStyleUrls &&
    def.styles && def.styles.length > 0) {
    this.existingComponentStyles.set(type, def.styles);
  }
  // Set the component's scope to be the testing module.
  this.componentToModuleScope.set(type,
   TestingModuleOverride.OVERRIDE_TEMPLATE);
}

async compileComponents(): Promise<void> {
  this.clearComponentResolutionQueue();
  // Run compilers for all queued types.
  let needsAsyncResources = this.compileTypesSync();
  // compileComponents() should not be async unless it needs to be.
  if (needsAsyncResources) {
    let resourceLoader: ResourceLoader;
    let resolver = (url: string): Promise<string> => {
      if (!resourceLoader) {
        resourceLoader = this.injector.get(ResourceLoader);
      }
      return Promise.resolve(resourceLoader.get(url));
    };
    await resolveComponentResources(resolver);
  }
}

finalize(): NgModuleRef<any> {
  // One last compile
  this.compileTypesSync();
  // Create the testing module itself.
  this.compileTestModule();
  this.applyTransitiveScopes();

  this.applyProviderOverrides();
  // Patch previously stored `styles` Component values (taken from cmp), in
  // case these // Components have `styleUrls` fields defined and template override was requested.
  this.patchComponentsWithExistingStyles();
  // Clear the componentToModuleScope map, so that future compilations don't reset the scope of
  // every component.
  this.componentToModuleScope.clear();
  const parentInjector = this.platform.injector;
  this.testModuleRef = new NgModuleRef(this.testModuleType,

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parentInjector);\n\n // ApplicationInitStatus.runInitializers() is marked @internal to core.\n // Cast it to any
before accessing it.\n (this.testModuleRef.injector.get(ApplicationInitStatus) as any).runInitializers();\n\n // Set
locale ID after running app initializers, since locale information might be updated while\n // running initializers.
This is also consistent with the execution order while bootstrapping an\n // app (see
`packages/core/src/application_ref.ts` file).\n const localeId = this.testModuleRef.injector.get(LOCALE_ID,
DEFAULT_LOCALE_ID);\n setLocaleId(localeId);\n\n return this.testModuleRef;\n }\n\n /**\n *
@internal\n */\n _compileNgModuleSync(moduleType: Type<any>): void {\n
this.queueTypesFromModulesArray([moduleType]);\n this.compileTypesSync();\n
this.applyProviderOverrides();\n this.applyProviderOverridesInScope(moduleType);\n
this.applyTransitiveScopes();\n }\n\n /**\n * @internal\n */\n async _compileNgModuleAsync(moduleType:
Type<any>): Promise<void> {\n this.queueTypesFromModulesArray([moduleType]);\n await
this.compileComponents();\n this.applyProviderOverrides();\n
this.applyProviderOverridesInScope(moduleType);\n this.applyTransitiveScopes();\n }\n\n /**\n * @internal\n
*/\n _getModuleResolver(): Resolver<NgModule> {\n return this.resolvers.module;\n }\n\n /**\n * @internal\n
*/\n _GetComponentFactories(moduleType:
NgModuleType): ComponentFactory<any>[] {\n return
maybeUnwrapFn(moduleType.mod.declarations).reduce((factories, declaration) => {\n const componentDef =
(declaration as any).cmp;\n componentDef && factories.push(new ComponentFactory(componentDef,
this.testModuleRef!));\n return factories;\n }, [] as ComponentFactory<any>[]);\n }\n\n private
compileTypesSync(): boolean {\n // Compile all queued components, directives, pipes.\n let
needsAsyncResources = false;\n this.pendingComponents.forEach(declaration => {\n needsAsyncResources =
needsAsyncResources || isComponentDefPendingResolution(declaration);\n const metadata =
this.resolvers.component.resolve(declaration);\n if (metadata === null) {\n throw
invalidTypeError(declaration.name, 'Component');\n }\n this.maybeStoreNgDef(NG_COMP_DEF,
declaration);\n compileComponent(declaration, metadata);\n });\n this.pendingComponents.clear();\n\n
this.pendingDirectives.forEach(declaration
=> {\n const metadata = this.resolvers.directive.resolve(declaration);\n if (metadata === null) {\n throw
invalidTypeError(declaration.name, 'Directive');\n }\n this.maybeStoreNgDef(NG_DIR_DEF, declaration);\n
compileDirective(declaration, metadata);\n });\n this.pendingDirectives.clear();\n\n
this.pendingPipes.forEach(declaration => {\n const metadata = this.resolvers.pipe.resolve(declaration);\n if
(metadata === null) {\n throw invalidTypeError(declaration.name, 'Pipe');\n }\n
this.maybeStoreNgDef(NG_PIPE_DEF, declaration);\n compilePipe(declaration, metadata);\n });\n\n
this.pendingPipes.clear();\n\n return needsAsyncResources;\n }\n\n private applyTransitiveScopes(): void {\n if
(this.overriddenModules.size > 0) {\n // Module overrides (via `TestBed.overrideModule`) might affect scopes
that were previously\n // calculated and stored in `transitiveCompileScopes`.
If module overrides are present,\n // collect all affected modules and reset scopes to force their re-calculation.\n
const testingModuleDef = (this.testModuleType as any)[NG_MOD_DEF];\n const affectedModules =
this.collectModulesAffectedByOverrides(testingModuleDef.imports);\n if (affectedModules.size > 0) {\n
affectedModules.forEach(moduleType => {\n this.storeFieldOfDefOnType(moduleType as any,
NG_MOD_DEF, 'transitiveCompileScopes');\n (moduleType as
any)[NG_MOD_DEF].transitiveCompileScopes = null;\n });\n }\n\n const moduleToScope = new
Map<Type<any>|TestingModuleOverride, NgModuleTransitiveScopes>();\n const getScopeOfModule =\n (moduleType: Type<any>|TestingModuleOverride): NgModuleTransitiveScopes => {\n if
(!moduleToScope.has(moduleType)) {\n const isTestingModule = isTestingModuleOverride(moduleType);\n
const realType = isTestingModule ? this.testModuleType : moduleType
as Type<any>;\n moduleToScope.set(moduleType, transitiveScopesFor(realType));\n }\n return
moduleToScope.get(moduleType)!;\n });\n\n this.componentToModuleScope.forEach((moduleType,
componentType) => {\n const moduleScope = getScopeOfModule(moduleType);\n

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this.storeFieldOfDefOnType(componentType, NG_COMP_DEF, 'directiveDefs');\n
this.storeFieldOfDefOnType(componentType, NG_COMP_DEF, 'pipeDefs');\n // `tView` that is stored on
component def contains information about directives and pipes\n // that are in the scope of this component.
Patching component scope will cause `tView` to be\n // changed. Store original `tView` before patching scope, so
the `tView` (including scope\n // information) is restored back to its previous/original state before running next
test.\n this.storeFieldOfDefOnType(componentType, NG_COMP_DEF, 'tView');\n
patchComponentDefWithScope((componentType as any).cmp, moduleScope);\n });\n\n
  this.componentToModuleScope.clear();\n }\n\n private applyProviderOverrides(): void {\n const
maybeApplyOverrides = (field: string) => (type: Type<any>) => {\n const resolver = field ===
NG_COMP_DEF ? this.resolvers.component : this.resolvers.directive;\n const metadata =
resolver.resolve(type)!;\n if (this.hasProviderOverrides(metadata.providers)) {\n
this.patchDefWithProviderOverrides(type, field);\n }\n };\n
this.seenComponents.forEach(maybeApplyOverrides(NG_COMP_DEF));\n
this.seenDirectives.forEach(maybeApplyOverrides(NG_DIR_DEF));\n\n this.seenComponents.clear();\n
this.seenDirectives.clear();\n }\n\n\n /**\n * Applies provider overrides to a given type (either an NgModule or a
standalone component)\n * and all imported NgModules and standalone components recursively.\n */\n private
applyProviderOverridesInScope(type: Type<any>): void {\n const hasScope = isStandaloneComponent(type) ||
isNgModule(type);\n //
  The function can be re-entered recursively while inspecting dependencies\n // of an NgModule or a standalone
component. Exit early if we come across a\n // type that can not have a scope (directive or pipe) or the type is
already\n // processed earlier.\n if (!hasScope || this.scopesWithOverriddenProviders.has(type)) {\n return;\n
}\n this.scopesWithOverriddenProviders.add(type);\n\n // NOTE: the line below triggers JIT compilation of the
module injector,\n // which also invokes verification of the NgModule semantics, which produces\n // detailed
error messages. The fact that the code relies on this line being\n // present here is suspicious and should be
refactored in a way that the line\n // below can be moved (for ex. after an early exit check below).\n const
injectorDef: any = (type as any)[NG_INJ_DEF];\n\n // No provider overrides, exit early.\n if
(this.providerOverridesByToken.size === 0) return;\n\n if (isStandaloneComponent(type))
{\n // Visit all component dependencies and override providers there.\n const def =
getComponentDef(type);\n const dependencies = maybeUnwrapFn(def.dependencies ?? []);\n for (const
dependency of dependencies) {\n this.applyProviderOverridesInScope(dependency);\n }\n } else {\n
const providers = [\n ...injectorDef.providers,\n ...(this.providerOverridesByModule.get(type as
InjectorType<any>) || [])\n ];\n if (this.hasProviderOverrides(providers)) {\n
this.maybeStoreNgDef(NG_INJ_DEF, type);\n\n this.storeFieldOfDefOnType(type, NG_INJ_DEF,
'providers');\n injectorDef.providers = this.getOverriddenProviders(providers);\n }\n\n // Apply provider
overrides to imported modules recursively\n const moduleDef = (type as any)[NG_MOD_DEF];\n const
imports = maybeUnwrapFn(moduleDef.imports);\n for (const importedModule of imports) {\n
this.applyProviderOverridesInScope(importedModule);\n
  }\n\n // Also override the providers on any ModuleWithProviders imports since those don't appear in\n // the
moduleDef.\n for (const importedModule of flatten(injectorDef.imports)) {\n if
(isModuleWithProviders(importedModule)) {\n this.defCleanupOps.push({\n object:
importedModule,\n fieldName: 'providers',\n originalValue: importedModule.providers\n });\n
importedModule.providers = this.getOverriddenProviders(importedModule.providers);\n }\n }\n }\n\n private
patchComponentsWithExistingStyles(): void {\n this.existingComponentStyles.forEach(\n
(styles, type) => (type as any)[NG_COMP_DEF].styles = styles);\n this.existingComponentStyles.clear();\n }\n\n
private queueTypeArray(arr: any[], moduleType: Type<any>|TestingModuleOverride): void {\n for (const value
of arr) {\n if (Array.isArray(value)) {\n this.queueTypeArray(value, moduleType);\n
} else {\n this.queueType(value, moduleType);\n }\n }\n }\n\n private
recompileNgModule(ngModule: Type<any>, metadata: NgModule): void {\n // Cache the initial ngModuleDef as

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it will be overwritten.\n  this.maybeStoreNgDef(NG_MOD_DEF, ngModule);\n
this.maybeStoreNgDef(NG_INJ_DEF, ngModule);\n\n  compileNgModuleDefs(ngModule as
NgModuleType<any>, metadata);\n }\n\n private queueType(type: Type<any>, moduleType:
Type<any>|TestingModuleOverride|null): void {\n  const component = this.resolvers.component.resolve(type);\n
if (component) {\n    // Check whether a give Type has respective NG def (cmp) and compile if def is\n    //
missing. That might happen in case a class without any Angular decorators extends another\n    // class where
Component/Directive/Pipe decorator is defined.\n    if (isComponentDefPendingResolution(type) ||
!type.hasOwnProperty(NG_COMP_DEF)) {\n      this.pendingComponents.add(type);\n    }\n
this.seenComponents.add(type);\n\n    // Keep track of the module which declares this component, so later the component's scope\n    // can be set
correctly. If the component has already been recorded here, then one of several\n    // cases is true:\n    // * the
module containing the component was imported multiple times (common).\n    // * the component is declared in
multiple modules (which is an error).\n    // * the component was in 'declarations' of the testing module, and also in
an imported module\n    // in which case the module scope will be TestingModuleOverride.DECLARATION.\n    // *
overrideTemplateUsingTestingModule was called for the component in which case the module\n    // scope
will be TestingModuleOverride.OVERRIDE_TEMPLATE.\n    //\n    // If the component was previously in the
testing module's 'declarations' (meaning the\n    // current value is TestingModuleOverride.DECLARATION), then
`moduleType` is the component's\n    // real module, which was imported.
This pattern is understood to mean that the component\n    // should use its original scope, but that the testing
module should also contain the\n    // component in its scope.\n    //\n    // Note: standalone components have no
associated NgModule, so the `moduleType` can be `null`.\n    if (moduleType !== null &&\n
(!this.componentToModuleScope.has(type) ||\n      this.componentToModuleScope.get(type) ===
TestingModuleOverride.DECLARATION)) {\n      this.componentToModuleScope.set(type, moduleType);\n
}\n    return;\n  }\n\n  const directive = this.resolvers.directive.resolve(type);\n  if (directive) {\n    if
(!type.hasOwnProperty(NG_DIR_DEF)) {\n      this.pendingDirectives.add(type);\n    }\n
this.seenDirectives.add(type);\n    return;\n  }\n\n  const pipe = this.resolvers.pipe.resolve(type);\n  if (pipe &&
!type.hasOwnProperty(NG_PIPE_DEF)) {\n    this.pendingPipes.add(type);\n    return;\n  }\n}\n\n private
queueTypesFromModulesArray(arr: any[]): void {\n  // Because we may encounter the same NgModule while
processing the imports and exports of an\n  // NgModule tree, we cache them in this set so we can skip ones that
have already been seen\n  // encountered. In some test setups, this caching resulted in 10X runtime improvement.\n
const processedNgModuleDefs = new Set();\n  const queueTypesFromModulesArrayRecur = (arr: any[]): void =>
{\n    for (const value of arr) {\n      if (Array.isArray(value)) {\n
queueTypesFromModulesArrayRecur(value);\n      } else if (hasNgModuleDef(value)) {\n        const def =
value.mod;\n        if (processedNgModuleDefs.has(def)) {\n          continue;\n        }\n
processedNgModuleDefs.add(def);\n        // Look through declarations, imports, and exports, and queue\n        //
everything found there.\n        this.queueTypeArray(maybeUnwrapFn(def.declarations), value);\n
queueTypesFromModulesArrayRecur(maybeUnwrapFn(def.imports));\n
queueTypesFromModulesArrayRecur(maybeUnwrapFn(def.exports));\n      } else if
(isModuleWithProviders(value)) {\n        queueTypesFromModulesArrayRecur([value.ngModule]);\n      } else if
(isStandaloneComponent(value)) {\n        this.queueType(value, null);\n        const def =
getComponentDef(value);\n        const dependencies = maybeUnwrapFn(def.dependencies ?? []);\n
dependencies.forEach((dependency) => {\n          // Note: in AOT, the `dependencies` might also contain regular\n
// (NgModule-based) Component, Directive and Pipes, so we handle\n          // them separately and proceed
with recursive process for standalone\n          // Components and NgModules only.\n          if
(isStandaloneComponent(dependency) || hasNgModuleDef(dependency)) {\n
queueTypesFromModulesArrayRecur([dependency]);\n          } else {\n            this.queueType(dependency,
null);\n          }\n        }\n      }\n    }\n  }\n}

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    });\n    }\n  });\n  queueTypesFromModulesArrayRecur(arr);\n  }\n\n  // When module overrides
  (via `TestBed.overrideModule`) are present, it might affect all modules\n  // that import (even transitively) an
  overridden one. For all affected modules we need to\n  // recalculate their scopes for a given test run and restore
  original scopes at the end. The goal\n  // of this function is to collect all affected modules in a set for further
  processing. Example:\n  // if we have the following module hierarchy: A -> B -> C (where `->` means `imports`) and
  module\n  // `C` is overridden, we consider `A` and `B` as affected, since their scopes might become\n  // invalidated
  with the override.\n  private collectModulesAffectedByOverrides(arr: any[]): Set<NgModuleType<any>> {\n
  const seenModules = new Set<NgModuleType<any>>();\n  const affectedModules = new
  Set<NgModuleType<any>>();\n  const calcAffectedModulesRecur = (arr: any[], path: NgModuleType<any>[]):
  void =>
  {\n    for (const value of arr) {\n      if (Array.isArray(value)) {\n        // If the value is an array, just flatten it (by
        invoking this function recursively),\n        // keeping `path` the same.\n        calcAffectedModulesRecur(value,
        path);\n      } else if (hasNgModuleDef(value)) {\n        if (seenModules.has(value)) {\n          // If we've seen this
          module before and it's included into `affected modules` list, mark\n          // the whole path that leads to that
          module as affected, but do not descend into its\n          // imports, since we already examined them before.\n          if (affectedModules.has(value)) {\n            path.forEach(item => affectedModules.add(item));\n          }\n          continue;\n        }\n        seenModules.add(value);\n        if (this.overriddenModules.has(value)) {\n          path.forEach(item => affectedModules.add(item));\n        }\n        // Examine module imports recursively to look
        for overridden
        modules.\n        const moduleDef = (value as any)[NG_MOD_DEF];\n        calcAffectedModulesRecur(maybeUnwrapFn(moduleDef.imports), path.concat(value));\n      }\n    }\n  });\n  calcAffectedModulesRecur(arr, []);\n  return affectedModules;\n  }\n\n  /**\n   * Preserve an original def (such as
   mod, inj, etc) before applying an override.\n   * Note: one class may have multiple defs (for example: mod and inj in
   case of\n   * an NgModule). If there is a def in a set already, don't override it, since\n   * an original one should be
   restored at the end of a test.\n   */\n  private maybeStoreNgDef(prop: string, type: Type<any>) {\n    if
    (!this.initialNgDefs.has(type)) {\n      this.initialNgDefs.set(type, new Map());\n    }\n    const currentDefs =
    this.initialNgDefs.get(type)!;\n    if (!currentDefs.has(prop)) {\n      const currentDef =
    Object.getOwnPropertyDescriptor(type, prop);\n      currentDefs.set(prop, currentDef);\n    }\n  }\n\n  private
  storeFieldOfDefOnType(type:
  Type<any>, defField: string, fieldName: string): void {\n    const def: any = (type as any)[defField];\n    const
  originalValue: any = def[fieldName];\n    this.defCleanupOps.push({object: def, fieldName, originalValue});\n  }\n\n  /**\n   * Clears current components resolution queue, but stores the state of the queue, so we can\n   * restore
  it later. Clearing the queue is required before we try to compile components (via\n   *
  `TestBed.compileComponents`), so that component defs are in sync with the resolution queue.\n   */\n  private
  clearComponentResolutionQueue() {\n    if (this.originalComponentResolutionQueue === null) {\n
    this.originalComponentResolutionQueue = new Map();\n    }\n    clearResolutionOfComponentResourcesQueue().forEach(\n      (value, key) =>
    this.originalComponentResolutionQueue!.set(key, value));\n  }\n\n  /**\n   * Restores component resolution queue to
  the previously saved state. This operation is performed\n   * as a part of restoring the
  state after completion of the current set of tests (that might\n   * potentially mutate the state).\n   */\n  private
  restoreComponentResolutionQueue() {\n    if (this.originalComponentResolutionQueue !== null) {\n
    restoreComponentResolutionQueue(this.originalComponentResolutionQueue);\n    this.originalComponentResolutionQueue = null;\n    }\n  }\n\n  restoreOriginalState(): void {\n    // Process cleanup
    ops in reverse order so the field's original value is restored correctly (in\n    // case there were multiple overrides for
    the same field).\n    forEachRight(this.defCleanupOps, (op: CleanupOperation) => {\n      op.object[op.fieldName] =
    op.originalValue;\n    });\n    // Restore initial component/directive/pipe defs\n    this.initialNgDefs.forEach(\n      (defs: Map<string, PropertyDescriptor|undefined>, type: Type<any>) => {\n        defs.forEach((descriptor, prop)
        => {\n          if (!descriptor) {\n            // Delete operations are generally undesirable since

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they have performance\n          // implications on objects they were applied to. In this particular case, situations\n
          // where this code is invoked should be quite rare to cause any noticeable impact,\n          // since it's
applied only to some test cases (for example when class with no\n          // annotations extends some
@Component) when we need to clear 'cmp' field on a given\n          // class to restore its original state (before
applying overrides and running tests).\n          delete (type as any)[prop];\n          } else {\n
Object.defineProperty(type, prop, descriptor);\n          }\n          });\n          });\n          this.initialNgDefs.clear();\n
this.scopesWithOverriddenProviders.clear();\n          this.restoreComponentResolutionQueue();\n          // Restore the locale
ID to the default value, this shouldn't be necessary but we never know\n          setLocaleId(DEFAULT_LOCALE_ID);\n
}\n\n private compileTestModule(): void {\n          class
RootScopeModule {}\n          compileNgModuleDefs(RootScopeModule as NgModuleType<any>, {\n          providers:
[...this.rootProviderOverrides],\n          });\n\n          const ngZone = new NgZone({enableLongStackTrace: true});\n          const
providers: Provider[] = [\n          {provide: NgZone, useValue: ngZone},\n          {provide: Compiler, useFactory: () =>
new R3TestCompiler(this)},\n          ...this.providers,\n          ...this.providerOverrides,\n          ];\n          const imports =
[RootScopeModule, this.additionalModuleTypes, this.imports || []];\n\n          // clang-format off\n
compileNgModuleDefs(this.testModuleType, {\n          declarations: this.declarations,\n          imports,\n          schemas:
this.schemas,\n          providers,\n          }, /* allowDuplicateDeclarationsInRoot */ true);\n          // clang-format on\n\n
this.applyProviderOverridesInScope(this.testModuleType);\n          }\n\n          get injector(): Injector {\n          if (this._injector
!== null) {\n          return this._injector;\n          }\n\n          const providers: Provider[] = [];\n          const
compilerOptions = this.platform.injector.get(COMPILER_OPTIONS);\n          compilerOptions.forEach(opts => {\n
if (opts.providers) {\n          providers.push(opts.providers);\n          }\n          });\n          if (this.compilerProviders !== null) {\n
providers.push(...this.compilerProviders);\n          }\n\n          // TODO(ocombe): make this work with an Injector directly
instead of creating a module for it\n          class CompilerModule {}\n          compileNgModuleDefs(CompilerModule as
NgModuleType<any>, {providers});\n\n          const CompilerModuleFactory = new
R3NgModuleFactory(CompilerModule);\n          this._injector =
CompilerModuleFactory.create(this.platform.injector).injector;\n          return this._injector;\n          }\n\n          // get overrides for
a specific provider (if any)\n          private getSingleProviderOverrides(provider: Provider): Provider|null {\n          const
token = getProviderToken(provider);\n          return this.providerOverridesByToken.get(token) || null;\n          }\n\n          private
getProviderOverrides(providers?: Provider[]): Provider[]
{\n          if (!providers || !providers.length || this.providerOverridesByToken.size === 0) return [];\n          // There are two
flattening operations here. The inner flatten() operates on the metadata's\n          // providers and applies a mapping
function which retrieves overrides for each incoming\n          // provider. The outer flatten() then flattens the produced
overrides array. If this is not\n          // done, the array can contain other empty arrays (e.g. `[[], []]`) which leak into
the\n          // providers array and contaminate any error messages that might be generated.\n          return flatten(flatten(\n
providers, (provider: Provider) => this.getSingleProviderOverrides(provider) || []));\n          }\n\n          private
getOverriddenProviders(providers?: Provider[]): Provider[] {\n          if (!providers || !providers.length ||
this.providerOverridesByToken.size === 0) return [];\n\n          const flattenedProviders =
flatten<Provider[]>(providers);\n          const overrides = this.getProviderOverrides(flattenedProviders);\n
const overriddenProviders = [...flattenedProviders, ...overrides];\n          const final: Provider[] = [];\n          const
seenOverriddenProviders = new Set<Provider>();\n\n          // We iterate through the list of providers in reverse order to
make sure provider overrides\n          // take precedence over the values defined in provider list. We also filter out all
providers\n          // that have overrides, keeping overridden values only. This is needed, since presence of a\n          //
provider with `ngOnDestroy` hook will cause this hook to be registered and invoked later.\n
forEachRight(overriddenProviders, (provider: any) => {\n          const token: any = getProviderToken(provider);\n
if (this.providerOverridesByToken.has(token)) {\n          if (!seenOverriddenProviders.has(token)) {\n
seenOverriddenProviders.add(token);\n          // Treat all overridden providers as `{multi: false}` (even if it's a multi-
provider) to\n          // make sure that provided override takes highest precedence
and is not combined with\n          // other instances of the same multi provider.\n          final.unshift({...provider,
multi: false});\n          }\n          } else {\n          final.unshift(provider);\n          }\n          });\n          return final;\n          }\n\n          private

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hasProviderOverrides(providers?: Provider[]): boolean {\n  return this.getProviderOverrides(providers).length >
0;\n }\n\n private patchDefWithProviderOverrides(declaration: Type<any>, field: string): void {\n  const def =
(declaration as any)[field];\n  if (def && def.providersResolver) {\n    this.maybeStoreNgDef(field,
declaration);\n\n    const resolver = def.providersResolver;\n    const processProvidersFn = (providers: Provider[])
=> this.getOverriddenProviders(providers);\n    this.storeFieldOfDefOnType(declaration, field,
'providersResolver');\n    def.providersResolver = (ngDef: DirectiveDef<any>) => resolver(ngDef,
processProvidersFn);\n  }\n }\n\nfunction initResolvers(): Resolvers {\n  return
{\n    module: new NgModuleResolver(),\n    component: new ComponentResolver(),\n    directive: new
DirectiveResolver(),\n    pipe: new PipeResolver()\n  };\n }\n\nfunction isStandaloneComponent<T>(value:
Type<T>): value is ComponentType<T> {\n  const def = getComponentDef(value);\n  return
!!def?.standalone;\n }\n\nfunction getComponentDef(value: ComponentType<unknown>):
ComponentDef<unknown>;\nfunction getComponentDef(value: Type<unknown>):
ComponentDef<unknown>|null;\nfunction getComponentDef(value: Type<unknown>):
ComponentDef<unknown>|null {\n  return (value as any).cmp ?? null;\n }\n\nfunction hasNgModuleDef<T>(value:
Type<T>): value is NgModuleType<T> {\n  return value.hasOwnProperty('mod');\n }\n\nfunction
isNgModule<T>(value: Type<T>): boolean {\n  return hasNgModuleDef(value);\n }\n\nfunction
maybeUnwrapFn<T>(maybeFn: (() => T)|T): T {\n  return maybeFn instanceof Function ? maybeFn() :
maybeFn;\n }\n\nfunction flatten<T>(values: any[], mapFn?: (value: T) => any): T[] {\n  const
out: T[] = [];\n  values.forEach(value => {\n    if (Array.isArray(value)) {\n      out.push(...flatten<T>(value,
mapFn));\n    } else {\n      out.push(mapFn ? mapFn(value) : value);\n    }\n  });\n  return out;\n }\n\nfunction
getProviderField(provider: Provider, field: string) {\n  return provider && typeof provider === 'object' &&
(provider as any)[field];\n }\n\nfunction getProviderToken(provider: Provider) {\n  return getProviderField(provider,
'provide') || provider;\n }\n\nfunction isModuleWithProviders(value: any): value is ModuleWithProviders<any> {\n
return value.hasOwnProperty('ngModule');\n }\n\nfunction forEachRight<T>(values: T[], fn: (value: T, idx: number)
=> void): void {\n  for (let idx = values.length - 1; idx >= 0; idx--) {\n    fn(values[idx], idx);\n  }\n }\n\nfunction
invalidTypeError(name: string, expectedType: string): Error {\n  return new Error(`${name} class doesn't have
@${expectedType} decorator or is missing metadata.`);\n }\n\n\nclass R3TestCompiler implements
Compiler {\n  constructor(private testBed: TestBedCompiler) {}\n\n  compileModuleSync<T>(moduleType:
Type<T>): NgModuleFactory<T> {\n    this.testBed._compileNgModuleSync(moduleType);\n    return new
R3NgModuleFactory(moduleType);\n  }\n\n  async compileModuleAsync<T>(moduleType: Type<T>):
Promise<NgModuleFactory<T>> {\n    await this.testBed._compileNgModuleAsync(moduleType);\n    return new
R3NgModuleFactory(moduleType);\n  }\n\n  compileModuleAndAllComponentsSync<T>(moduleType:
Type<T>): ModuleWithComponentFactories<T> {\n    const ngModuleFactory =
this.compileModuleSync(moduleType);\n    const componentFactories =
this.testBed._getComponentFactories(moduleType as NgModuleType<T>);\n    return new
ModuleWithComponentFactories(ngModuleFactory, componentFactories);\n  }\n\n  async
compileModuleAndAllComponentsAsync<T>(moduleType: Type<T>):\n
Promise<ModuleWithComponentFactories<T>> {\n    const ngModuleFactory = await
this.compileModuleAsync(moduleType);\n    const componentFactories
= this.testBed._getComponentFactories(moduleType as NgModuleType<T>);\n    return new
ModuleWithComponentFactories(ngModuleFactory, componentFactories);\n  }\n\n  clearCache(): void {\n}\n\n
clearCacheFor(type: Type<any>): void {\n}\n\n  getModuleId(moduleType: Type<any>): string|undefined {\n  const
meta = this.testBed._getModuleResolver().resolve(moduleType);\n  return meta && meta.id || undefined;\n
}\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n//
The formatter and CI disagree on how this import statement should be formatted. Both try to keep\n// it on one line,
too, which has gotten very hard to read & manage. So disable the formatter for\n// this statement only.\n\n/* clang-
format off */\nimport {\n  Component,\n  Directive,\n  InjectFlags,\n  InjectionToken,\n  Injector,\n  NgModule,\n

```

NgZone,\n Pipe,\n

```
PlatformRef,\n ProviderToken,\n Type,\n flushModuleScopingQueueAsMuchAsPossible as\n flushModuleScopingQueueAsMuchAsPossible,\n getUnknownElementStrictMode as\n getUnknownElementStrictMode,\n getUnknownPropertyStrictMode as getUnknownPropertyStrictMode,\n Render3ComponentFactory as ComponentFactory,\n Render3NgModuleRef as NgModuleRef,\n resetCompiledComponents as resetCompiledComponents,\n setAllowDuplicateNgModuleIdsForTest as\n setAllowDuplicateNgModuleIdsForTest,\n setUnknownElementStrictMode as setUnknownElementStrictMode,\n setUnknownPropertyStrictMode as setUnknownPropertyStrictMode,\n stringify as stringify\n} from\n '@angular/core';\n\n/* clang-format on */\nimport {ComponentFixture} from './component_fixture';\nimport\n {MetadataOverride} from './metadata_override';\nimport {ComponentFixtureAutoDetect,\n ComponentFixtureNoNgZone, ModuleTeardownOptions,\n TEARDOWN_TESTING_MODULE_ON_DESTROY_DEFAULT, TestComponentRenderer,\n TestEnvironmentOptions, TestModuleMetadata,\n THROW_ON_UNKNOWN_ELEMENTS_DEFAULT, THROW_ON_UNKNOWN_PROPERTIES_DEFAULT}\n from './test_bed_common';\nimport {TestBedCompiler} from './test_bed_compiler';\n\n/**\n * Static methods\n implemented by the `TestBed`.\n *\n * @publicApi\n */\nexport interface TestBedStatic extends TestBed {\n\n  new(...args: any[]): TestBed;\n\n  /**\n   * @publicApi\n   */\n  export interface TestBed {\n    get platform():\n PlatformRef;\n\n    get ngModule(): Type<any>|Type<any>[];\n\n    /**\n     * Initialize the environment for testing with\n a compiler factory, a PlatformRef, and an\n     * angular module. These are common to every test in the suite.\n     *\n     * This may only be called once, to set up the common providers for the current test\n     * suite on the current\n platform. If you absolutely need to change the providers,\n     * first use `resetTestEnvironment`.\n     *\n     * Test\n modules and platforms for individual platforms are available from\n     * '@angular/<platform_name>/testing'.\n     *\n     */\n    initTestEnvironment(\n      ngModule: Type<any>|Type<any>[], platform: PlatformRef,\n      options?: TestEnvironmentOptions): void;\n\n    /**\n     * Reset the providers for the test injector.\n     *\n     */\n    resetTestEnvironment(): void;\n\n    resetTestingModule():\n TestBed;\n\n    configureCompiler(config: {providers?: any[], useJit?: boolean}): void;\n\n    configureTestingModule(moduleDef: TestModuleMetadata): TestBed;\n\n    compileComponents():\n Promise<any>;\n\n    inject<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T;\n\n    inject<T>(token: ProviderToken<T>, notFoundValue: null, flags?: InjectFlags): T|null;\n\n    /** @deprecated from\n v9.0.0 use TestBed.inject */\n    get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): any;\n\n    /** @deprecated from v9.0.0 use TestBed.inject */\n    get(token: any, notFoundValue?: any): any;\n\n    execute(tokens: any[], fn: Function, context?: any): any;\n\n    overrideModule(ngModule: Type<any>, override:\n MetadataOverride<NgModule>): TestBed;\n\n    overrideComponent(component:\n Type<any>, override: MetadataOverride<Component>): TestBed;\n\n    overrideDirective(directive: Type<any>,\n override: MetadataOverride<Directive>): TestBed;\n\n    overridePipe(pipe: Type<any>, override:\n MetadataOverride<Pipe>): TestBed;\n\n    overrideTemplate(component: Type<any>, template: string): TestBed;\n\n    /**\n     * Overwrites all providers for the given token with the given provider definition.\n     *\n     */\n    overrideProvider(token: any, provider: {\n      useFactory: Function,\n      deps: any[],\n      }): TestBed;\n\n    overrideProvider(token: any, provider: {\n      useValue: any;\n      }): TestBed;\n\n    overrideProvider(token: any, provider:\n {\n      useFactory?: Function,\n      useValue?: any,\n      deps?: any[]\n      }):\n TestBed;\n\n    overrideTemplateUsingTestingModule(component: Type<any>, template: string):\n TestBed;\n\n    createComponent<T>(component: Type<T>): ComponentFixture<T>;\n\n    let _nextRootElementId = 0;\n\n    /**\n     * Returns a singleton of the `TestBed` class.\n     *\n     * @publicApi\n     */\n    export function\n    getTestBed(): TestBed {\n      return TestBedImpl.INSTANCE;\n    }\n\n    /**\n     * @description\n     * Configures and\n initializes environment for unit testing and provides methods for\n     * creating components and services in unit\n tests.\n     *\n     * TestBed is the primary api for writing unit tests for Angular applications and\n libraries.\n     *\n     */\n    export class TestBedImpl implements TestBed {\n      private static _INSTANCE: TestBedImpl|null = null;\n\n      static get\n INSTANCE(): TestBedImpl {\n        return TestBedImpl._INSTANCE = TestBedImpl._INSTANCE || new
```



```

TestBedImpl();\n }\n\n /**\n * Teardown options that have been configured at the environment level.\n * Used
as a fallback if no instance-level options have been provided.\n */\n private static _environmentTeardownOptions:
ModuleTeardownOptions|undefined;\n\n /**\n * \"Error on unknown elements\" option that has been configured at
the environment level.\n * Used as a fallback if no instance-level option has been provided.\n */\n private static
_environmentErrorOnUnknownElementsOption: boolean|undefined;\n\n /**\n * \"Error on unknown properties\"
option that has been configured at the environment level.\n * Used as a fallback if no instance-level option has
been provided.\n */\n private static _environmentErrorOnUnknownPropertiesOption: boolean|undefined;\n\n\n /**\n * Teardown options that have been configured at the `TestBed` instance level.\n * These options take
precedence over the environment-level ones.\n */\n private _instanceTeardownOptions:
ModuleTeardownOptions|undefined;\n\n /**\n * \"Error on unknown elements\" option that has been configured at
the `TestBed` instance level.\n * This option takes precedence over the environment-level one.\n */\n private
_instanceErrorOnUnknownElementsOption: boolean|undefined;\n\n /**\n * \"Error on unknown properties\"
option that has been configured at the `TestBed` instance level.\n * This option takes precedence over the
environment-level one.\n\n */\n private _instanceErrorOnUnknownPropertiesOption: boolean|undefined;\n\n /**\n * Stores the previous
\"Error on unknown elements\" option value,\n * allowing to restore it in the reset testing module logic.\n */\n
private _previousErrorOnUnknownElementsOption: boolean|undefined;\n\n /**\n * Stores the previous \"Error on
unknown properties\" option value,\n * allowing to restore it in the reset testing module logic.\n */\n private
_previousErrorOnUnknownPropertiesOption: boolean|undefined;\n\n\n /**\n * Initialize the environment for testing
with a compiler factory, a PlatformRef, and an\n * angular module. These are common to every test in the suite.\n\n
*\n * This may only be called once, to set up the common providers for the current test\n * suite on the current
platform. If you absolutely need to change the providers,\n * first use `resetTestEnvironment`.\n * Test
modules and platforms for individual platforms are available from\n * '@angular/<platform_name>/testing'.\n\n
*\n * @publicApi\n */\n static initTestEnvironment(\n   ngModule: Type<any>|Type<any>[], platform:
PlatformRef,\n   options?: TestEnvironmentOptions): TestBed {\n   const testBed = TestBedImpl.INSTANCE;\n
testBed.initTestEnvironment(ngModule, platform, options);\n   return testBed;\n }\n\n /**\n * Reset the providers
for the test injector.\n * @publicApi\n */\n static resetTestEnvironment(): void {\n
TestBedImpl.INSTANCE.resetTestEnvironment();\n }\n\n static configureCompiler(config: { providers?: any[];
useJit?: boolean; }): TestBed {\n   return TestBedImpl.INSTANCE.configureCompiler(config);\n }\n\n /**\n *
Allows overriding default providers, directives, pipes, modules of the test injector,\n * which are defined in
test_injector.js\n */\n static configureTestingModule(moduleDef: TestModuleMetadata): TestBed {\n   return
TestBedImpl.INSTANCE.configureTestingModule(moduleDef);\n }\n\n /**\n * Compile components
with a `templateUrl` for the test's NgModule.\n * It is necessary to call this function\n * as fetching urls is
asynchronous.\n */\n static compileComponents(): Promise<any> {\n   return
TestBedImpl.INSTANCE.compileComponents();\n }\n\n static overrideModule(ngModule: Type<any>, override:
MetadataOverride<NgModule>): TestBed {\n   return TestBedImpl.INSTANCE.overrideModule(ngModule,
override);\n }\n\n static overrideComponent(component: Type<any>, override: MetadataOverride<Component>):
TestBed {\n   return TestBedImpl.INSTANCE.overrideComponent(component, override);\n }\n\n static
overrideDirective(directive: Type<any>, override: MetadataOverride<Directive>): TestBed {\n   return
TestBedImpl.INSTANCE.overrideDirective(directive, override);\n }\n\n static overridePipe(pipe: Type<any>,
override: MetadataOverride<Pipe>): TestBed {\n   return TestBedImpl.INSTANCE.overridePipe(pipe, override);\n
}\n\n static overrideTemplate(component: Type<any>, template: string):
TestBed {\n   return TestBedImpl.INSTANCE.overrideTemplate(component, template);\n }\n\n /**\n *
Overrides the template of the given component, compiling the template\n * in the context of the TestingModule.\n\n
*\n * Note: This works for JIT and AOTed components as well.\n */\n static
overrideTemplateUsingTestingModule(component: Type<any>, template: string): TestBed {\n   return
TestBedImpl.INSTANCE.overrideTemplateUsingTestingModule(component, template);\n }\n\n static
overrideProvider(token: any, provider: {\n   useFactory: Function,\n   deps: any[],\n }): TestBed;\n static

```

```

overrideProvider(token: any, provider: {useValue: any;}): TestBed;\n static overrideProvider(token: any, provider:
{\n useFactory?: Function,\n useValue?: any,\n deps?: any[],\n }): TestBed {\n return
TestBedImpl.INSTANCE.overrideProvider(token, provider);\n }\n\n static inject<T>(token: ProviderToken<T>,
notFoundValue?: T, flags?: InjectFlags): T;\n static inject<T>(token:
ProviderToken<T>, notFoundValue: null, flags?: InjectFlags): T|null;\n static inject<T>(token:
ProviderToken<T>, notFoundValue?: T|null, flags?: InjectFlags): T|null {\n return
TestBedImpl.INSTANCE.inject(token, notFoundValue, flags);\n }\n\n /** @deprecated from v9.0.0 use
TestBed.inject */\n static get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): any;\n /**
@deprecated from v9.0.0 use TestBed.inject */\n static get(token: any, notFoundValue?: any): any;\n /**
@deprecated from v9.0.0 use TestBed.inject */\n static get(\n token: any, notFoundValue: any =
Injector.THROW_IF_NOT_FOUND,\n flags: InjectFlags = InjectFlags.Default): any {\n return
TestBedImpl.INSTANCE.inject(token, notFoundValue, flags);\n }\n\n static createComponent<T>(component:
Type<T>): ComponentFixture<T> {\n return TestBedImpl.INSTANCE.createComponent(component);\n }\n\n static
resetTestingModule(): TestBed {\n return TestBedImpl.INSTANCE.resetTestingModule();\n
}\n\n static execute(tokens: any[], fn: Function, context?: any): any {\n return
TestBedImpl.INSTANCE.execute(tokens, fn, context);\n }\n\n static get platform(): PlatformRef {\n return
TestBedImpl.INSTANCE.platform;\n }\n\n static get ngModule(): Type<any>|Type<any>[] {\n return
TestBedImpl.INSTANCE.ngModule;\n }\n\n // Properties\n\n platform: PlatformRef = null!;\n ngModule:
Type<any>|Type<any>[] = null!;\n\n private _compiler: TestBedCompiler|null = null;\n private _testModuleRef:
NgModuleRef<any>|null = null;\n\n private _activeFixtures: ComponentFixture<any>[] = [];\n\n /**\n * Internal-
only flag to indicate whether a module\n * scoping queue has been checked and flushed already.\n * @nodoc\n
*/\n\n globalCompilationChecked = false;\n\n /**\n * Initialize the environment for testing with a compiler factory,
a PlatformRef, and an\n * angular module. These are common to every test in the suite.\n * This may only be
called once, to set
up the common providers for the current test\n * suite on the current platform. If you absolutely need to change the
providers,\n * first use `resetTestEnvironment`.\n * Test modules and platforms for individual platforms are
available from\n * '@angular/<platform_name>/testing'.\n * @publicApi\n */\n\n initTestEnvironment(\n
ngModule: Type<any>|Type<any>[], platform: PlatformRef,\n options?: TestEnvironmentOptions): void {\n if
(this.platform || this.ngModule) {\n throw new Error('Cannot set base providers because it has already been
called');\n }\n\n TestBedImpl._environmentTeardownOptions = options?.teardown;\n\n
TestBedImpl._environmentErrorOnUnknownElementsOption = options?.errorOnUnknownElements;\n\n
TestBedImpl._environmentErrorOnUnknownPropertiesOption = options?.errorOnUnknownProperties;\n\n
this.platform = platform;\n this.ngModule = ngModule;\n this._compiler = new TestBedCompiler(this.platform,
this.ngModule);\n\n // TestBed does not have an API which can reliably detect the start of a test, and thus could be\n // used to track
the state of the NgModule registry and reset it correctly. Instead, when we\n // know we're in a testing scenario, we
disable the check for duplicate NgModule registration\n // completely.\n\n setAllowDuplicateNgModuleIdsForTest(true);\n }\n\n /**\n * Reset the providers for the test injector.\n * @publicApi\n */\n\n resetTestEnvironment(): void {\n this.resetTestingModule();\n this._compiler = null;\n
this.platform = null!;\n this.ngModule = null!;\n TestBedImpl._environmentTeardownOptions = undefined;\n\n
setAllowDuplicateNgModuleIdsForTest(false);\n }\n\n resetTestingModule(): this {\n
this.checkGlobalCompilationFinished();\n resetCompiledComponents();\n if (this._compiler !== null) {\n
this.compiler.restoreOriginalState();\n }\n\n this._compiler = new TestBedCompiler(this.platform,
this.ngModule);\n\n // Restore the previous value of the \"error on unknown elements\" option\n\n setUnknownElementStrictMode(\n
this._previousErrorOnUnknownElementsOption ?? THROW_ON_UNKNOWN_ELEMENTS_DEFAULT);\n\n //
Restore the previous value of the \"error on unknown properties\" option\n\n setUnknownPropertyStrictMode(\n
this._previousErrorOnUnknownPropertiesOption ?? THROW_ON_UNKNOWN_PROPERTIES_DEFAULT);\n\n

```

```

// We have to chain a couple of try/finally blocks, because each step can
// throw errors and we don't want it to
// interrupt the next step and we also
// want an error to be thrown at the end.
try {
  this.destroyActiveFixtures();
} finally {
  try {
    if (this.shouldTearDownTestingModule()) {
      this.tearDownTestingModule();
    }
  } finally {
    this._testModuleRef = null;
    this._instanceTearDownOptions = undefined;
    this._instanceErrorOnUnknownElementsOption = undefined;
    this._instanceErrorOnUnknownPropertiesOption
    = undefined;
  }
}
return this;
}

configureCompiler(config: { providers?: any[]; useJit?:
boolean; }): this {
  if (config.useJit !== null) {
    throw new Error('the Render3 compiler JiT mode is not
configurable!');
  }
  if (config.providers !== undefined) {
    this.compiler.setCompilerProviders(config.providers);
  }
  return this;
}

configureTestingModule(moduleDef: TestModuleMetadata): this {
  this.assertNotInstantiated('R3TestBed.configureTestingModule', 'configure the test module');
  // Trigger module
  scoping queue flush before executing other TestBed operations in a test.
  // This is needed for the first test
  invocation to ensure that globally declared modules have
  // their components scoped properly. See the
  `checkGlobalCompilationFinished` function
  // description for additional info.
  this.checkGlobalCompilationFinished();
  // Always re-assign the options, even if
  they're undefined.
  // This ensures that we don't carry them between tests.
  this._instanceTearDownOptions =
  moduleDef.tearDown;
  this._instanceErrorOnUnknownElementsOption =
  moduleDef.errorOnUnknownElements;
  this._instanceErrorOnUnknownPropertiesOption =
  moduleDef.errorOnUnknownProperties;
  // Store the current value of the strict mode option,
  // so we can
  restore it later
  this._previousErrorOnUnknownElementsOption = getUnknownElementStrictMode();
  setUnknownElementStrictMode(this.shouldThrowErrorOnUnknownElements());
  this._previousErrorOnUnknownPropertiesOption = getUnknownPropertyStrictMode();
  setUnknownPropertyStrictMode(this.shouldThrowErrorOnUnknownProperties());
  this.compiler.configureTestingModule(moduleDef);
  return this;
}

compileComponents(): Promise<any>
{
  return this.compiler.compileComponents();
}

inject<T>(token: ProviderToken<T>, notFoundValue?: T,
flags?: InjectFlags): T;
inject<T>(token: ProviderToken<T>,
notFoundValue: null, flags?: InjectFlags): T|null;
inject<T>(token: ProviderToken<T>, notFoundValue?: T|null,
flags?: InjectFlags): T|null
{
  if (token as unknown === TestBed) {
    return this as any;
  }
  const
  UNDEFINED = {} as unknown as T;
  const result = this.testModuleRef.injector.get(token, UNDEFINED,
  flags);
  return result === UNDEFINED ? this.compiler.injector.get(token, notFoundValue, flags) as any :
  result;
}

/** @deprecated from v9.0.0 use TestBed.inject */
get<T>(token:
ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): any;
/** @deprecated from v9.0.0 use
TestBed.inject */
get(token: any, notFoundValue?: any): any;
/** @deprecated from v9.0.0 use TestBed.inject
*/
get(token: any, notFoundValue: any = Injector.THROW_IF_NOT_FOUND,
flags: InjectFlags =
InjectFlags.Default): any
{
  return this.inject(token, notFoundValue, flags);
}

execute(tokens: any[],
fn: Function, context?: any): any
{
  const params = tokens.map(t => this.inject(t));
  return fn.apply(context,
  params);
}

overrideModule(ngModule: Type<any>, override: MetadataOverride<NgModule>): this
{
  this.assertNotInstantiated('overrideModule', 'override module metadata');
  this.compiler.overrideModule(ngModule, override);
  return this;
}

overrideComponent(component:
Type<any>, override: MetadataOverride<Component>): this
{
  this.assertNotInstantiated('overrideComponent',
  'override component metadata');
  this.compiler.overrideComponent(component, override);
  return this;
}

overrideTemplateUsingTestingModule(component: Type<any>, template: string): this
{
  this.assertNotInstantiated(
  'R3TestBed.overrideTemplateUsingTestingModule',
  'Cannot override
  template when the test module has already been instantiated');
  this.compiler.overrideTemplateUsingTestingModule(component, template);
  return this;
}

}

overrideDirective(directive: Type<any>, override: MetadataOverride<Directive>): this
{
  this.assertNotInstantiated('overrideDirective', 'override directive metadata');
}

```

```

this.compiler.overrideDirective(directive, override);\n  return this;\n }\n\n overridePipe(pipe: Type<any>,\n override: MetadataOverride<Pipe>): this {\n  this.assertNotInstantiated('overridePipe', 'override pipe metadata');\n this.compiler.overridePipe(pipe, override);\n  return this;\n }\n\n /**\n  * Overwrites all providers for the given\n  token with the given provider definition.\n  */\n overrideProvider(token: any, provider: {useFactory?: Function,\n useValue?: any, deps?: any[]}):\n  this {\n  this.assertNotInstantiated('overrideProvider', 'override provider');\n this.compiler.overrideProvider(token, provider);\n  return this;\n }\n\n overrideTemplate(component: Type<any>,\n template: string): TestBed {\n  return this.overrideComponent(component, {set: {template, templateUrl:\n null!}});\n }\n\n createComponent<T>(type: Type<T>): ComponentFixture<T> {\n  const\n testComponentRenderer = this.inject(TestComponentRenderer);\n  const rootElId =\n `root${_nextRootElementId++}`;\n  testComponentRenderer.insertRootElement(rootElId);\n  const\n componentDef = (type as any).cmp;\n  if (!componentDef) {\n    throw new Error(`It looks like\n '${stringify(type)}' has not been compiled.`);\n  }\n  // TODO: Don't cast as `InjectionToken<boolean>`, proper\n type is boolean[]\n  const noNgZone = this.inject(ComponentFixtureNoNgZone as InjectionToken<boolean>,\n false);\n  // TODO: Don't cast as `InjectionToken<boolean>`, proper type is boolean[]\n  const autoDetect:\n boolean =\n this.inject(ComponentFixtureAutoDetect as InjectionToken<boolean>, false);\n  const ngZone:\n NgZone|null = noNgZone ? null : this.inject(NgZone, null);\n  const componentFactory = new\n ComponentFactory(componentDef);\n  const initComponents = () => {\n    const componentRef\n =\n componentFactory.create(Injector.NULL, [], `#${rootElId}`, this.testModuleRef);\n    return new\n ComponentFixture<any>(componentRef, ngZone, autoDetect);\n  };\n  const fixture = ngZone ?\n ngZone.run initComponents) : initComponents();\n  this._activeFixtures.push(fixture);\n  return fixture;\n }\n\n\n /**\n  * @internal strip this from published d.ts files due to\n  *\n  https://github.com/microsoft/TypeScript/issues/36216\n  */\n private get compiler(): TestBedCompiler {\n  if\n (this._compiler === null) {\n    throw new Error(`Need to call TestBed.initTestEnvironment() first`);\n  }\n  return this._compiler;\n }\n\n\n /**\n  * @internal strip this from published d.ts files due to\n  *\n  https://github.com/microsoft/TypeScript/issues/36216\n  */\n private get testModuleRef(): NgModuleRef<any> {\n  if\n (this._testModuleRef === null) {\n    this._testModuleRef = this.compiler.finalize();\n  }\n  return\n this._testModuleRef;\n }\n\n private assertNotInstantiated(methodName:\n string, methodDescription: string) {\n  if (this._testModuleRef !== null) {\n    throw new Error(`\n    `Cannot\n ${methodDescription} when the test module has already been instantiated. ` +\n    `Make sure you are not using\n \\`inject\\` before \\`${methodName}\\`.`);\n  }\n }\n\n\n /**\n  * Check whether the module scoping queue should\n  be flushed, and flush it if needed.\n  */\n * When the TestBed is reset, it clears the JIT module compilation queue,\n cancelling any\n * in-progress module compilation. This creates a potential hazard - the very first time the\n *  
TestBed is initialized (or if it's reset without being initialized), there may be pending\n * compilations of modules  
declared in global scope. These compilations should be finished.\n *  
* To ensure that globally declared modules  
have their components scoped properly, this function\n * is called whenever TestBed is initialized or reset. The  
_first_ time that this happens,  
prior\n * to any other operations, the scoping queue is flushed.\n */\n private\n checkGlobalCompilationFinished(): void {\n  // Checking _testNgModuleRef is null should not be necessary, but is  
left in as an additional\n  // guard that compilations queued in tests (after instantiation) are never flushed  
accidentally.\n  if (!this.globalCompilationChecked && this._testModuleRef === null) {\n    flushModuleScopingQueueAsMuchAsPossible();\n  }\n  this.globalCompilationChecked = true;\n }\n\n private\n destroyActiveFixtures(): void {\n  let errorCount = 0;\n  this._activeFixtures.forEach((fixture) => {\n    try {\n      fixture.destroy();\n    } catch (e) {\n      errorCount++;\n      console.error('Error during cleanup of component',\n {\n        component: fixture.componentInstance,\n        stacktrace: e,\n      });\n    }\n  });\n  this._activeFixtures = [];\n  if (errorCount > 0 && this.shouldRethrowTeardownErrors()) {\n    throw Error(`\n    `${errorCount} ${errorCount === 1 ? 'component' : 'components'} ` +\n    `threw errors during\n    cleanup`);\n  }\n }\n\n shouldRethrowTeardownErrors(): boolean {\n  const instanceOptions =\n this._instanceTeardownOptions;\n  const environmentOptions = TestBedImpl._environmentTeardownOptions;\n}

```



```

tests to be asynchronous by either returning a promise or using a 'done' parameter.\n *\n\nimport
{resetFakeAsyncZone} from './fake_async';\n\nimport {TestBedImpl} from './test_bed';\n\ndeclare var global:
any;\n\nconst _global = <any>(typeof window === 'undefined' ? global : window);\n\n// Reset the test providers and
the fake async zone before each test.\n\nif (_global.beforeEach) {\n
_global.beforeEach(getCleanupHook(false));\n}\n\n// We provide both a `beforeEach` and `afterEach`, because the
updated behavior for\n\n// tearing down the module is supposed to run after the test so that we can associate\n\n//
teardown errors with the correct test.\n\nif
(_global.afterEach) {\n
_global.afterEach(getCleanupHook(true));\n}\n\n\nfunction
getCleanupHook(expectedTeardownValue: boolean) {\n
return () => {\n
const testBed =
TestBedImpl.INSTANCE;\n
if (testBed.shouldTearDownTestingModule() === expectedTeardownValue) {\n
testBed.resetTestingModule();\n
resetFakeAsyncZone();\n
}\n
};\n}\n\n/**\n * This API should be removed.
But doing so seems to break `google3` and so it requires a bit of\n * investigation.\n * A work around is to mark
it as `@codegenApi` for now and investigate later.\n *\n * @codegenApi\n */\n\n// TODO(iminar): Remove this
code in a safe way.\n\nexport const __core_private_testing_placeholder__ = ";\n","/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * @module\n * @description\n * Entry point
for all public APIs of the core/testing package.\n
*/\n\nexport * from './async';\n\nexport * from './component_fixture';\n\nexport * from './fake_async';\n\nexport
{TestBed, getTestBed, TestBedStatic, inject, InjectSetupWrapper, withModule} from './test_bed';\n\nexport
{TestComponentRenderer, ComponentFixtureAutoDetect, ComponentFixtureNoNgZone, TestModuleMetadata,
TestEnvironmentOptions, ModuleTeardownOptions} from './test_bed_common';\n\nexport * from
 './test_hooks';\n\nexport * from './metadata_override';\n\nexport {MetadataOverrider as MetadataOverrider} from
 './metadata_overrider';\n","/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n// <reference types="jasmine" />\n\n/**\n * @module\n * @description\n * Entry
point for all public APIs of this package.\n */\n\nexport * from './src/testing';\n\n// This file only reexports content of
the `src` folder. Keep it that way.\n","/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n// This file is not
used to build this module. It is only used during editing\n\n// by the TypeScript language service and during build for
verification. `ngc` replaces this file with production index.ts when it rewrites private symbol\n\n// names.\n\nexport
* from './public_api';\n","/**\n * Generated bundle index. Do not edit.\n */\n\nexport * from
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in path(s):

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No license file was found, but licenses were detected in source scan.

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```

* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n * Wraps a test function in an asynchronous test zone. The test will automatically\n * complete when all asynchronous calls within this zone are done. Can be used\n * to wrap an {@link inject} call.\n *\n * Example:\n *\n * ```\n * it('...',\n *   waitForAsync(inject([AClass], (object) => {\n *     object.doSomething.then(() => {\n *       expect(...);\n *     })\n *   });\n * ```\n *\n * @publicApi\n */\n\nexport function waitForAsync(fn: Function): (done: any) => any {\n  const _Zone: any = typeof Zone !== 'undefined' ? Zone : null;\n  if (!_Zone) {\n    return function() {\n      return Promise.reject(\n        'Zone is needed for the waitForAsync() test helper but could not be found.\n      ');\n    }\n  }\n  const asyncTest = _Zone && _Zone[_Zone.__symbol__('asyncTest)];\n  if (typeof asyncTest === 'function') {\n    return asyncTest(fn);\n  }\n  return function() {\n    return Promise.reject(\n      'zone-testing.js is needed for the async() test helper but could not be found.\n    ');\n  }\n}\n\n * Please make sure that your environment includes zone.js/testing);\n */\n\n * @deprecated use `waitForAsync`, (expected removal in v12)\n *\n * @see {@link waitForAsync}\n *\n * @publicApi\n */\n\nexport function async(fn: Function): (done: any) => any {\n  return waitForAsync(fn);\n}\n\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {\n  ChangeDetectorRef,\n  ComponentRef,\n  DebugElement,\n  ElementRef,\n  getDebugNode,\n  NgZone,\n  RendererFactory2\n} from\n\n '@angular/core';\n\n * Fixture for debugging and testing a component.\n *\n * @publicApi\n */\n\nexport class ComponentFixture<T> {\n  /**\n   * The DebugElement associated with the root element of this component.\n   */\n  debugElement: DebugElement;\n  /**\n   * The instance of the root component class.\n   */\n  componentInstance: T;\n  /**\n   * The native element at the root of the component.\n   */\n  nativeElement: any;\n  /**\n   * The ElementRef for the element at the root of the component.\n   */\n  elementRef: ElementRef;\n  /**\n   * The ChangeDetectorRef for the component.\n   */\n  changeDetectorRef: ChangeDetectorRef;\n  private _renderer: RendererFactory2|null|undefined;\n  private _isStable: boolean = true;\n  private _isDestroyed: boolean = false;\n  private _resolve: ((result: any) => void)|null = null;\n  private _promise: Promise<any>|null = null;\n  private _onUnstableSubscription: any /** TODO #9100 */ = null;\n  private _onStableSubscription: any /** TODO #9100 */ = null;\n  private _onMicrotaskEmptySubscription: any /** TODO #9100 */ = null;\n  private _onErrorSubscription: any /** TODO #9100 */ = null;\n\n  constructor(\n    public componentRef: ComponentRef<T>,\n    public ngZone: NgZone|null,\n    private _autoDetect: boolean) {\n    this.changeDetectorRef = componentRef.changeDetectorRef;\n    this.elementRef = componentRef.location;\n    this.debugElement = <DebugElement>getDebugNode(this.elementRef.nativeElement);\n    this.componentInstance = componentRef.instance;\n    this.nativeElement = this.elementRef.nativeElement;\n    this.componentRef = componentRef;\n    this.ngZone = ngZone;\n\n    if (ngZone) {\n      // Create subscriptions outside the NgZone so that the callbacks run outside\n      // of NgZone.\n      ngZone.runOutsideAngular(() => {\n        this._onUnstableSubscription = ngZone.onUnstable.subscribe({\n          next: () => {\n            this._isStable = false;\n          }\n        });\n        this._onMicrotaskEmptySubscription = ngZone.onMicrotaskEmpty.subscribe({\n          next: () => {\n            if (this._autoDetect) {\n              // Do a change detection run with checkNoChanges set to true to check\n              // there are no changes on the second run.\n              this.detectChanges(true);\n            }\n          }\n        });\n        this._onStableSubscription = ngZone.onStable.subscribe({\n          next: () => {\n            this._isStable = true;\n            // Check whether there is a pending whenStable() completer to resolve.\n            if (this._promise !== null) {\n              // If so check whether there are no pending macrotasks before resolving.\n              // Do this check in the next tick so that ngZone gets a chance to update the state of\n              // pending macrotasks.\n              scheduleMicroTask(() => {\n                if (!ngZone.hasPendingMacrotasks) {\n                  if (this._promise !== null) {\n                    this._resolve!(true);\n                    this._resolve = null;\n                    this._promise = null;\n                  }\n                }\n              });\n            }\n          }\n        });\n        this._onErrorSubscription = ngZone.onError.subscribe({\n          next: (error: any) => {\n            throw error;\n          }\n        });\n      });\n    }\n\n    private _tick(checkNoChanges: boolean) {\n
```

```

this.changeDetectorRef.detectChanges();\n  if (checkNoChanges) {\n    this.checkNoChanges();\n  }\n}\n\n/**\n * Trigger a change detection cycle for the component.\n */\n detectChanges(checkNoChanges: boolean =\n true): void {\n  if (this.ngZone != null) {\n    // Run the change detection inside the NgZone so that any async\n    tasks as part of the change\n    // detection are captured by the zone and can be waited for in isStable.\n    this.ngZone.run(() => {\n      this._tick(checkNoChanges);\n    });\n  } else {\n    // Running without\n    zone. Just do the change detection.\n    this._tick(checkNoChanges);\n  }\n}\n\n/**\n * Do a change detection\n run to make sure there were no changes.\n */\n checkNoChanges(): void {\n  this.changeDetectorRef.checkNoChanges();\n}\n\n/**\n * Set whether the fixture should autodetect changes.\n *\n * Also runs detectChanges once so that any existing change is detected.\n */\n autoDetectChanges(autoDetect: boolean = true) {\n  if (this.ngZone == null) {\n    throw new Error('Cannot call\n autoDetectChanges when ComponentFixtureNoNgZone is set');\n  }\n  this._autoDetect = autoDetect;\n  this.detectChanges();\n}\n\n/**\n * Return whether the fixture is currently stable or has async tasks that have not\n been completed\n * yet.\n */\n isStable(): boolean {\n  return this._isStable &&\n !this.ngZone!.hasPendingMacrotasks;\n}\n\n/**\n * Get a promise that resolves when the fixture is stable.\n *\n * This can be used to resume testing after\n events have triggered asynchronous activity or\n * asynchronous change detection.\n */\n whenStable():\n Promise<any> {\n  if (this.isStable()) {\n    return Promise.resolve(false);\n  } else if (this._promise !== null) {\n    return this._promise;\n  } else {\n    this._promise = new Promise(res => {\n      this._resolve = res;\n    });\n    return this._promise;\n  }\n}\n\nprivate _getRenderer() {\n  if (this._renderer === undefined) {\n    this._renderer = this.componentRef.injector.get(RendererFactory2, null);\n  }\n  return this._renderer as\n RendererFactory2 | null;\n}\n\n/**\n * Get a promise that resolves when the ui state is stable following\n animations.\n */\n whenRenderingDone(): Promise<any> {\n  const renderer = this._getRenderer();\n  if\n (renderer && renderer.whenRenderingDone) {\n    return renderer.whenRenderingDone();\n  }\n  return\n this.whenStable();\n}\n\n/**\n * Trigger component destruction.\n */\n\n destroy(): void {\n  if (!this._isDestroyed) {\n    this.componentRef.destroy();\n    if\n (this._onUnstableSubscription != null) {\n      this._onUnstableSubscription.unsubscribe();\n      this._onUnstableSubscription = null;\n    }\n    if (this._onStableSubscription != null) {\n      this._onStableSubscription.unsubscribe();\n      this._onStableSubscription = null;\n    }\n    if\n (this._onMicrotaskEmptySubscription != null) {\n      this._onMicrotaskEmptySubscription.unsubscribe();\n      this._onMicrotaskEmptySubscription = null;\n    }\n    if (this._onErrorSubscription != null) {\n      this._onErrorSubscription.unsubscribe();\n      this._onErrorSubscription = null;\n    }\n    this._isDestroyed =\n true;\n  }\n}\n\nfunction scheduleMicroTask(fn: Function) {\n  Zone.current.scheduleMicroTask('scheduleMicrotask', fn);\n}\n\n",/**\n * @license\n * Copyright Google LLC All\n Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style\n license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nconst _Zone: any = typeof Zone\n !== 'undefined' ? Zone : null;\nconst fakeAsyncTestModule = _Zone &&\n _Zone[_Zone.__symbol__('fakeAsyncTest)];\nconst fakeAsyncTestModuleNotLoadedErrorMessage =\n `zone-\n testing.js is needed for the fakeAsync() test helper but could not be found.\n Please make sure that your\n environment includes zone.js/testing`;\n\n/**\n * Clears out the shared fake async zone for a test.\n * To be called in\n a global `beforeEach`.\n */\n * @publicApi\n */\nexport function resetFakeAsyncZone(): void {\n  if\n (fakeAsyncTestModule) {\n    return fakeAsyncTestModule.resetFakeAsyncZone();\n  }\n  throw new\n Error(fakeAsyncTestModuleNotLoadedErrorMessage);\n}\n\n/**\n * Wraps a function to be executed in the\n `fakeAsync` zone:\n * - Microtasks are manually executed by calling `flushMicrotasks()`.\n * - Timers are\n synchronous; `tick()` simulates the asynchronous passage of time.\n *\n * If there are any pending timers at the end of the function, an exception is thrown.\n *\n * Can be used to wrap\n `inject()` calls.\n */\n * @param fn The function that you want to wrap in the `fakeAysnc` zone.\n *\n * @usageNotes\n * ### Example\n *\n * {@example core/testing/ts/fake_async.ts region='basic'}\n *\n * @returns The function wrapped to be executed in the `fakeAsync` zone.\n * Any arguments passed when calling

```

this returned function will be passed through to the `fn` function in the parameters when it is called.

```

@publicApi
export function fakeAsync(fn: Function): (...args: any[]) => any {
  if (fakeAsyncTestModule)
    return fakeAsyncTestModule.fakeAsync(fn);
  throw new
  Error(fakeAsyncTestModuleNotLoadedErrorMessage);
}

```

**Simulates the asynchronous passage of time for the timers in the `fakeAsync` zone.**

The microtasks queue is drained at the very start of this function and after any timer callback has been executed.

**millis** The number of milliseconds to advance the virtual timer.

**tickOptions** The options to pass to the `tick` function.

**usageNotes**

The `tick` option is a flag called `processNewMacroTasksSynchronously`, which determines whether or not to invoke new macroTasks.

If you provide a `tickOptions` object, but do not specify a `processNewMacroTasksSynchronously` property (tick(100, {})), then `processNewMacroTasksSynchronously` defaults to true.

If you omit the `tickOptions` parameter (tick(100)), then `tickOptions` defaults to {processNewMacroTasksSynchronously: true}.

**Example**

```

@example core/testing/ts/fake_async.ts region='basic'

```

The following example includes a nested timeout (new macroTask), and the `tickOptions` parameter is allowed to default. In this case, `processNewMacroTasksSynchronously` defaults to true, and the nested function is executed on each tick.

```

it('test with nested setTimeout', fakeAsync(() => {
  let nestedTimeoutInvoked = false;
  function funcWithNestedTimeout() {
    setTimeout(() => {
      nestedTimeoutInvoked = true;
    });
    setTimeout(funcWithNestedTimeout);
    tick();
    expect(nestedTimeoutInvoked).toBe(true);
  });
  In the following case, `processNewMacroTasksSynchronously` is explicitly set to false, so the nested timeout function is not invoked.
  it('test with nested setTimeout', fakeAsync(() => {
    let nestedTimeoutInvoked = false;
    function funcWithNestedTimeout() {
      setTimeout(() => {
        nestedTimeoutInvoked = true;
      });
    };
    setTimeout(funcWithNestedTimeout);
    tick(0, {
      processNewMacroTasksSynchronously: false;
    });
    expect(nestedTimeoutInvoked).toBe(false);
  });
}

```

**tick**

```

@publicApi
export function tick(
  millis: number = 0, tickOptions:
  {processNewMacroTasksSynchronously:
  boolean} = {
    processNewMacroTasksSynchronously: true
  }): void {
  if (fakeAsyncTestModule) {
    return fakeAsyncTestModule.tick(millis, tickOptions);
  }
  throw new
  Error(fakeAsyncTestModuleNotLoadedErrorMessage);
}

```

**Flushes any pending microtasks and simulates the asynchronous passage of time for the timers in the `fakeAsync` zone by draining the macrotask queue until it is empty.**

**maxTurns** The maximum number of times the scheduler attempts to clear its queue before throwing an error.

**returns** The simulated time elapsed, in milliseconds.

```

@publicApi
export function flush(maxTurns?: number): number {
  if (fakeAsyncTestModule) {
    return
    fakeAsyncTestModule.flush(maxTurns);
  }
  throw new
  Error(fakeAsyncTestModuleNotLoadedErrorMessage);
}

```

**Discard all remaining periodic tasks.**

```

@publicApi
export function discardPeriodicTasks(): void {
  if (fakeAsyncTestModule)
    return
    fakeAsyncTestModule.discardPeriodicTasks();
  throw new
  Error(fakeAsyncTestModuleNotLoadedErrorMessage);
}

```

**Flush any pending microtasks.**

```

@publicApi
export function flushMicrotasks(): void {
  if (fakeAsyncTestModule) {
    return
    fakeAsyncTestModule.flushMicrotasks();
  }
  throw new
  Error(fakeAsyncTestModuleNotLoadedErrorMessage);
}

```

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```

import {InjectionToken, SchemaMetadata} from
'@angular/core';

```

Whether test modules should be torn down by default.

```

export const
TEARDOWN_TESTING_MODULE_ON_DESTROY_DEFAULT = true;

```

Whether unknown elements in templates should throw by default.

```

export const
THROW_ON_UNKNOWN_ELEMENTS_DEFAULT =
false;

```

Whether unknown properties in templates should throw by

```

default. */\nexport const THROW_ON_UNKNOWN_PROPERTIES_DEFAULT = false;\n\n/**\n * An abstract
class for inserting the root test component element in a platform independent way.\n *\n * @publicApi\n */\nexport
class TestComponentRenderer {\n  insertRootElement(rootElementId: string) {}\n  removeAllRootElements?()
{} }\n\n/**\n * @publicApi\n */\nexport const ComponentFixtureAutoDetect =\n  new
InjectionToken<boolean[]>('ComponentFixtureAutoDetect');\n\n/**\n * @publicApi\n */\nexport const
ComponentFixtureNoNgZone = new InjectionToken<boolean[]>('ComponentFixtureNoNgZone');\n\n/**\n *
@publicApi\n */\nexport interface TestModuleMetadata {\n  providers?: any[];\n  declarations?: any[];\n  imports?:
any[];\n  schemas?: Array<SchemaMetadata|any[]>;\n  teardown?: ModuleTeardownOptions;\n  /**\n * Whether
NG0304 runtime errors should be thrown when unknown elements are present in component's\n * template.
Defaults to `false`, where the error is simply logged. If set to `true`, the error
is\n * thrown.\n * @see https://angular.io/errors/NG8001 for the description of the problem and how to fix it\n
*\n * errorOnUnknownElements?: boolean;\n  /**\n * Whether errors should be thrown when unknown properties
are present in component's template.\n * Defaults to `false`, where the error is simply logged.\n * If set to `true`,
the error is thrown.\n * @see https://angular.io/errors/NG8002 for the description of the error and how to fix it\n
*\n * errorOnUnknownProperties?: boolean;\n}\n\n/**\n * @publicApi\n */\nexport interface
TestEnvironmentOptions {\n  /**\n * Configures the test module teardown behavior in `TestBed`.\n * /\n
teardown?: ModuleTeardownOptions;\n  /**\n * Whether errors should be thrown when unknown elements are
present in component's template.\n * Defaults to `false`, where the error is simply logged.\n * If set to `true`, the
error is thrown.\n * @see https://angular.io/errors/NG8001 for the description of the error and how to
fix it\n * /\n * errorOnUnknownElements?: boolean;\n  /**\n * Whether errors should be thrown when unknown
properties are present in component's template.\n * Defaults to `false`, where the error is simply logged.\n * If set
to `true`, the error is thrown.\n * @see https://angular.io/errors/NG8002 for the description of the error and how to
fix it\n * /\n * errorOnUnknownProperties?: boolean;\n}\n\n/**\n * Configures the test module teardown behavior in
`TestBed`.\n * @publicApi\n */\nexport interface ModuleTeardownOptions {\n  /** Whether the test module should
be destroyed after every test. Defaults to `true`. */\n  destroyAfterEach: boolean;\n  /** Whether errors during test
module destruction should be re-thrown. Defaults to `true`. */\n  rethrowErrors?: boolean;\n}\n\n"/**\n * @license\n
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that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n *\nimport {Type} from './interface/type';\nimport {Component} from './directives';\n\n\n/**\n * Used to resolve
resource URLs on `@Component` when used with JIT compilation.\n *\n * Example:\n * ```\n * @Component({\n *
selector: 'my-comp',\n * templateUrl: 'my-comp.html', // This requires asynchronous resolution\n * })\n * class
MyComponent{\n * }\n *\n * // Calling `renderComponent` will fail because `renderComponent` is a synchronous
process\n * // and `MyComponent`'s `@Component.templateUrl` needs to be resolved asynchronously.\n *\n * //
Calling `resolveComponentResources()` will resolve `@Component.templateUrl` into\n * //
`@Component.template`, which allows `renderComponent` to proceed in a synchronous manner.\n *\n * // Use
browser's `fetch()` function as the default resource resolution strategy.\n *\n
resolveComponentResources(fetch).then(() => {\n * // After resolution all URLs have been converted into
`template` strings.\n * renderComponent(MyComponent);\n * });\n
*\n * ```\n *\n * NOTE: In AOT the resolution happens during compilation, and so there should be no need\n * to
call this method outside JIT mode.\n *\n * @param resourceResolver a function which is responsible for returning a
`Promise` to the\n * contents of the resolved URL. Browser's `fetch()` method is a good default implementation.\n
*\n */\nexport function resolveComponentResources(\n  resourceResolver: (url: string) => (Promise<string|{text():
Promise<string>>): Promise<void> {\n // Store all promises which are fetching the resources.\n const
componentResolved: Promise<void>[] = [];\n\n // Cache so that we don't fetch the same resource more than once.\n
const urlMap = new Map<string, Promise<string>>();\n  function cachedResourceResolve(url: string):
Promise<string> {\n    let promise = urlMap.get(url);\n    if (!promise) {\n      const resp = resourceResolver(url);\n
      urlMap.set(url, promise = resp.then(unwrapResponse));\n    }\n    return promise;\n  }\n\n  componentResourceResolutionQueue.forEach((component:

```





```

ensure that the two files are in sync using this command:\n * ```\n * cp
packages/compiler/src/compiler_facade_interface.ts \\n *
packages/core/src/compiler/compiler_facade_interface.ts\n * ```\n */\n\nexport interface ExportedCompilerFacade
{\n  compilerFacade: CompilerFacade;\n}\n\nexport interface CompilerFacade {\n  compilePipe(angularCoreEnv:
CoreEnvironment, sourceMapUrl: string, meta: R3PipeMetadataFacade):\n  any;\n  compilePipeDeclaration(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string, declaration: R3DeclarePipeFacade): any;\n
  compileInjectable(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3InjectableMetadataFacade): any;\n  compileInjectableDeclaration(\n  angularCoreEnv: CoreEnvironment,
sourceMapUrl: string, meta: R3DeclareInjectableFacade): any;\n  compileInjector(\n  angularCoreEnv:
CoreEnvironment, sourceMapUrl: string, meta: R3InjectorMetadataFacade): any;\n  compileInjectorDeclaration(\n
angularCoreEnv: CoreEnvironment,
sourceMapUrl: string,\n  declaration: R3DeclareInjectorFacade): any;\n  compileNgModule(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3NgModuleMetadataFacade): any;\n
  compileNgModuleDeclaration(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string,\n  declaration:
R3DeclareNgModuleFacade): any;\n  compileDirective(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl:
string, meta: R3DirectiveMetadataFacade): any;\n  compileDirectiveDeclaration(\n  angularCoreEnv:
CoreEnvironment, sourceMapUrl: string,\n  declaration: R3DeclareDirectiveFacade): any;\n
  compileComponent(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3ComponentMetadataFacade): any;\n  compileComponentDeclaration(\n  angularCoreEnv: CoreEnvironment,
sourceMapUrl: string,\n  declaration: R3DeclareComponentFacade): any;\n  compileFactory(\n
angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta: R3FactoryDefMetadataFacade):
any;\n  compileFactoryDeclaration(\n  angularCoreEnv: CoreEnvironment, sourceMapUrl: string, meta:
R3DeclareFactoryFacade): any;\n\n  createParseSourceSpan(kind: string, typeName: string, sourceUrl: string):
ParseSourceSpan;\n\n  FactoryTarget: typeof FactoryTarget;\n  // Note that we do not use `new():
ResourceLoader` here because\n  // the resource loader class is abstract and not constructable.\n  ResourceLoader:
Function & { prototype: ResourceLoader };\n}\n\nexport interface CoreEnvironment {\n  [name: string]:
Function;\n}\n\nexport type ResourceLoader = {\n  get(url: string): Promise<string>|string;\n};\n\nexport type
StringMap = {\n  [key: string]: string;\n};\n\nexport type StringMapWithRename = {\n  [key: string]: string[[string,
string];\n};\n\nexport type Provider = unknown;\nexport type Type = Function;\nexport type OpaqueValue =
unknown;\n\nexport enum FactoryTarget {\n  Directive = 0,\n  Component = 1,\n  Injectable = 2,\n  Pipe = 3,\n  NgModule = 4,\n}\n\nexport
interface R3DependencyMetadataFacade {\n  token: OpaqueValue;\n  attribute: string|null;\n  host: boolean;\n  optional: boolean;\n  self: boolean;\n  skipSelf: boolean;\n}\n\nexport interface
R3DeclareDependencyMetadataFacade {\n  token: OpaqueValue;\n  attribute?: boolean;\n  host?: boolean;\n  optional?: boolean;\n  self?: boolean;\n  skipSelf?: boolean;\n}\n\nexport interface R3PipeMetadataFacade {\n
name: string;\n  type: Type;\n  pipeName: string;\n  pure: boolean;\n  isStandalone: boolean;\n}\n\nexport interface
R3InjectableMetadataFacade {\n  name: string;\n  type: Type;\n  typeArgumentCount: number;\n  providedIn?:
Type|'root'|'platform'|'any'|null;\n  useClass?: OpaqueValue;\n  useFactory?: OpaqueValue;\n  useExisting?:
OpaqueValue;\n  useValue?: OpaqueValue;\n  deps?: R3DependencyMetadataFacade[];\n}\n\nexport interface
R3NgModuleMetadataFacade {\n  type: Type;\n  bootstrap: Function[];\n  declarations: Function[];\n  imports:
Function[];\n  exports: Function[];\n  schemas:
{\n    name: string\n  }[]|null;\n  id: string|null;\n}\n\nexport interface R3InjectorMetadataFacade {\n  name: string;\n  type:
Type;\n  providers: Provider[];\n  imports: OpaqueValue[];\n}\n\nexport interface R3DirectiveMetadataFacade {\n
name: string;\n  type: Type;\n  typeSourceSpan: ParseSourceSpan;\n  selector: string|null;\n  queries:
R3QueryMetadataFacade[];\n  host: {[key: string]: string};\n  propMetadata: {[key: string]: OpaqueValue[]};\n
  lifecycle: {usesOnChanges: boolean};\n  inputs: string[];\n  outputs: string[];\n  usesInheritance: boolean;\n
  exportAs: string[]|null;\n  providers: Provider[]|null;\n  viewQueries: R3QueryMetadataFacade[];\n  isStandalone:
boolean;\n}\n\nexport interface R3ComponentMetadataFacade extends R3DirectiveMetadataFacade {\n  template:

```



```

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 * found in the LICENSE file at https://angular.io/license
 *
import { global } from './util/global';
import { CompilerFacade, ExportedCompilerFacade, Type } from
 './compiler_facade_interface';
export * from './compiler_facade_interface';
export const enum JitCompilerUsage
 {
  Decorator,
  PartialDeclaration,
}
interface JitCompilerUsageRequest {
  usage: JitCompilerUsage;
  kind: 'directive'|'component'|'pipe'|'injectable'|'NgModule';
  type: Type;
}
export function
getCompilerFacade(request:
JitCompilerUsageRequest): CompilerFacade {
  const globalNg: ExportedCompilerFacade = global['ng'];
  if (globalNg && globalNg.compilerFacade) {
    return globalNg.compilerFacade;
  }
  if (typeof ngDevMode
 === 'undefined' || ngDevMode) {
    // Log the type as an error so that a developer can easily navigate to the type
    from the
    // console.
    console.error(`JIT compilation failed for ${request.kind}`, request.type);
    let
    message = `The ${request.kind} '${request.type.name}' needs to be compiled using the JIT
    compiler, but '@angular/compiler' is not available.`;
    if (request.usage ===
JitCompilerUsage.PartialDeclaration) {
      message += `The ${request.kind} is part of a library that has been
    partially compiled.`;
      message += `However, the Angular Linker has not processed the library such
    that JIT compilation is used as fallback.`;
      message += `Ideally, the library is processed using the Angular Linker to become fully AOT compiled.`;
    } else {
      message += `JIT compilation is discouraged for production use-cases! Consider using AOT mode
    instead.`;
    }
    message += `Alternatively, the JIT compiler should be loaded by bootstrapping using
    '@angular/platform-browser-dynamic' or '@angular/platform-server',
    or manually
    provide the compiler with 'import '@angular/compiler';' before bootstrapping.`;
    throw new Error(message);
  } else {
    throw new Error('JIT compiler unavailable');
  }
}
/**
 * @license
 * Copyright Google LLC
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 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
export function
getClosureSafeProperty<T>(objWithPropertyToExtract: T): string {
  for (let key in objWithPropertyToExtract)
    if (objWithPropertyToExtract[key]
 === getClosureSafeProperty as any)
      return key;
  throw Error('Could not find renamed property
on target object.');
```

Sets properties on a target object from a source object, but only if the property
 doesn't already exist on the target object.
 @param target The target to set properties on
 @param source The source of the property keys and values to set
 @export function fillProperties(target: {[key: string]: string},
 source: {[key: string]: string})
 for (const key in source)
 if (source.hasOwnProperty(key) &&
!target.hasOwnProperty(key))
 target[key] = source[key];
}
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 \* found in the LICENSE file at https://angular.io/license
 \*/
export function stringify(token: any): string {
 if (typeof token === 'string')
 return token;
 if (Array.isArray(token))
 return '[' + token.map(stringify).join(', ') + ']';
 if (token == null)
 return '' + token;
 if (token.overriddenName)
 return `\${token.overriddenName}`;
 if (token.name)
 return `\${token.name}`;
 const res = token.toString();
 if (res == null)
 return '' + res;
 const
 newLineIndex = res.indexOf('\n');
 return newLineIndex === -1 ? res : res.substring(0,
 newLineIndex);
}
/\*\*
 \* Concatenates two strings with separator, allocating new strings only when
 necessary.
 @param before before string
 @param separator separator string
 @param after after string
 @returns concatenated string
 @export function concatStringsWithSpace(before: string|null, after:
 string|null): string
 return (before == null || before === '') ? (after === null ? '' : after) :
 (after == null ||
 after === '') ? before : before + ' ' + after;
}
/\*\*
 \* @license
 \* Copyright
 \* Google LLC All Rights Reserved.
 \* Use of this source code is governed by an MIT-style license
 that can be
 found in the LICENSE file at https://angular.io/license
 \*/
import { Type } from
 './interface/type';
import { getClosureSafeProperty } from './util/property';
import { stringify } from
 './util/stringify';
/\*\*
 \* An interface that a function passed into { @link forwardRef } has to implement.
 \* @usageNotes
 \* ### Example
 \* @example core/di/ts/forward\_ref/forward\_ref\_spec.ts

```

region='forward_ref_fn'}\n * @publicApi\n * \nexport interface ForwardRefFn {\n () : any;\n}\n\nconst
__forward_ref__ = getClosureSafeProperty({__forward_ref__: getClosureSafeProperty});\n\n/**\n * Allows to
refer to references which are not yet defined.\n *\n * For instance, `forwardRef` is used when the `token` which we
need to refer to for the purposes of\n * DI is declared, but not yet defined. It is also used when the `token` which we
use when creating\n * a query is
not yet defined.\n *\n * @usageNotes\n * ### Example\n * {@example core/di/ts/forward_ref/forward_ref_spec.ts
region='forward_ref'}\n * @publicApi\n * \nexport function forwardRef(forwardRefFn: ForwardRefFn):
Type<any> {\n (<any>forwardRefFn).__forward_ref__ = forwardRef;\n (<any>forwardRefFn).toString =
function() {\n return stringify(this());\n }; \n return (<Type<any>><any>forwardRefFn);\n}\n\n/**\n * Lazily
retrieves the reference value from a forwardRef.\n *\n * Acts as the identity function when given a non-forward-ref
value.\n *\n * @usageNotes\n * ### Example\n *\n * {@example core/di/ts/forward_ref/forward_ref_spec.ts
region='resolve_forward_ref'}\n *\n * @see `forwardRef`\n * @publicApi\n * \nexport function
resolveForwardRef<T>(type: T): T {\n return isForwardRef(type) ? type() : type;\n}\n\n/**\n * Checks whether a
function is wrapped by a `forwardRef`. \nexport function isForwardRef(fn: any): fn is() => any {\n return typeof
fn === 'function' && fn.hasOwnProperty('__forward_ref__')
&&\n fn.__forward_ref__ === forwardRef;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {Type} from '././interface/type';\nimport
{getClosureSafeProperty} from '././util/property';\n\nimport {ClassProvider, ConstructorProvider,
ExistingProvider, FactoryProvider, StaticClassProvider, ValueProvider} from './provider';\n\n\n\n/**\n *
Information about how a type or `InjectionToken` interfaces with the DI system.\n *\n * At a minimum, this
includes a `factory` which defines how to create the given type `T`, possibly\n * requesting injection of other types
if necessary.\n *\n * Optionally, a `providedIn` parameter specifies that the given type belongs to a particular\n *
`Injector`, `NgModule`, or a special scope (e.g. `root`). A value of `null` indicates\n * that the injectable does not
belong
to any scope.\n *\n * @codeGenApi\n * @publicApi The ViewEngine compiler emits code with this type for
injectables. This code is\n * deployed to npm, and should be treated as public api.\n\n\n\nexport interface
InjectableDeclaration<T> {\n /**\n * Specifies that the given type belongs to a particular injector:\n * -
`InjectorType` such as `NgModule`,\n * - `root` the root injector\n * - `any` all injectors.\n * - `null`, does not
belong to any injector. Must be explicitly listed in the injector\n * `providers`.\n * \nprovidedIn:
InjectorType<any>|'root'|'platform'|'any'|'environment'|null;\n\n /**\n * The token to which this definition
belongs.\n *\n * Note that this may not be the same as the type that the `factory` will create.\n * \n token:
unknown;\n\n /**\n * Factory method to execute to create an instance of the injectable.\n * \n factory: (t?:
Type<any>) => T;\n\n /**\n * In a case of no explicit injector, a location where the instance
of the injectable is stored.\n * \n value: T|undefined;\n}\n\n\n\n/**\n * Information about the providers to be included
in an `Injector` as well as how the given type\n * which carries the information should be created by the DI
system.\n *\n * An `InjectorDef` can import other types which have `InjectorDefs`, forming a deep nested\n *
structure of providers with a defined priority (identically to how `NgModule`s also have\n * an import/dependency
structure).\n *\n * NOTE: This is a private type and should not be exported\n *\n * @codeGenApi\n * \nexport
interface InjectorDef<T> {\n // TODO(alxhub): Narrow down the type here once decorators properly change the
return type of the\n // class they are decorating (to add the prov property for example).\n providers:
(Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|\n
StaticClassProvider|ClassProvider|any[]|);\n\n imports:
(InjectorType<any>|InjectorTypeWithProviders<any>|);\n}\n\n\n\n/**\n * A `Type` which has a `prov: InjectableDeclaration`
static field.\n *\n * `InjectableType`s contain their own
Dependency Injection metadata and are usable in an\n * `InjectorDef`-based `StaticInjector`.\n *\n * @publicApi\n
\nexport interface InjectableType<T> extends Type<T> {\n /**\n * Opaque type whose structure is highly
version dependent. Do not rely on any properties.\n * \n prov: unknown;\n}\n\n\n\n/**\n * A type which has an

```

```

`InjectorDef` static field.\n *\n * `InjectorTypes` can be used to configure a `StaticInjector`.\n *\n * This is an
opaque type whose structure is highly version dependent. Do not rely on any\n * properties.\n *\n * @publicApi\n
*/\nexport interface InjectorType<T> extends Type<T> {\n  fac?: unknown;\n  inj: unknown;\n}\n\n/**\n *
Describes the `InjectorDef` equivalent of a `ModuleWithProviders`, an `InjectorType` with an\n * associated array
of providers.\n *\n * Objects of this type can be listed in the imports section of an `InjectorDef`.\n
*\n * NOTE: This is a private type and should not be exported\n */\nexport interface
InjectorTypeWithProviders<T> {\n  ngModule: InjectorType<T>;\n  providers?:
(Type<any>|ValueProvider|ExistingProvider|FactoryProvider|ConstructorProvider|\n
StaticClassProvider|ClassProvider|any[]|)[];\n}\n\n\n/**\n * Construct an injectable definition which defines how a
token will be constructed by the DI\n * system, and in which injectors (if any) it will be available.\n *\n * This
should be assigned to a static `prov` field on a type, which will then be an\n * `InjectableType`.\n *\n * Options:\n *
* `providedIn` determines which injectors will include the injectable, by either associating it\n * with an
`@NgModule` or other `InjectorType`, or by specifying that this injectable should be\n * provided in the `root`
injector, which will be the application-level injector in most apps.\n * * `factory` gives the zero argument function
which will create an instance of the injectable.\n
* The factory can call `inject` to access the `Injector` and request injection of dependencies.\n *\n *
@codeGenApi\n * @publicApi This instruction has been emitted by ViewEngine for some time and is deployed to
npm.\n */\nexport function defineInjectable<T>(opts: {\n  token: unknown,\n  providedIn?:
Type<any>|'root'|'platform'|'any'|'environment'|null, factory: () => T,\n}): unknown {\n  return {\n  token:
opts.token,\n  providedIn: opts.providedIn as any || null,\n  factory: opts.factory,\n  value: undefined,\n } as
InjectableDeclaration<T>;\n}\n\n/**\n * @deprecated in v8, delete after v10. This API should be used only by
generated code, and that\n * code should now use defineInjectable instead.\n * @publicApi\n */\nexport const
defineInjectable = defineInjectable;\n\n\n/**\n * Construct an `InjectorDef` which configures an injector.\n *\n * This
should be assigned to a static injector def (`inj`) field on a type, which will then be an\n * `InjectorType`.\n *\n
* Options:\n *\n * * `providers`: an optional array of providers to add to the injector. Each provider must\n * either
have a factory or point to a type which has a `prov` static property (the\n * type must be an `InjectableType`).\n * *
`imports`: an optional array of imports of other `InjectorType`s or `InjectorTypeWithModule`s\n * whose providers
will also be added to the injector. Locally provided types will override\n * providers from imports.\n *\n *
@codeGenApi\n */\nexport function defineInjector(options: {providers?: any[], imports?: any[]}): unknown {\n
return {providers: options.providers || [], imports: options.imports || []};\n}\n\n\n/**\n * Read the injectable def
(`prov`) for `type` in a way which is immune to accidentally reading\n * inherited value.\n *\n * @param type A
type which may have its own (non-inherited) `prov`.\n */\nexport function getInjectableDef<T>(type: any):
InjectableDeclaration<T>|null {\n  return getOwnDefinition(type, NG_PROV_DEF) ||
getOwnDefinition(type, NG_INJECTABLE_DEF);\n}\n\n\nexport function isInjectable(type: any): boolean {\n
return getInjectableDef(type) !== null;\n}\n\n\n/**\n * Return definition only if it is defined directly on `type` and is
not inherited from a base\n * class of `type`.\n */\nexport function getOwnDefinition<T>(type: any, field: string):
InjectableDeclaration<T>|null {\n  return type.hasOwnProperty(field) ? type[field] : null;\n}\n\n\n/**\n * Read the
injectable def (`prov`) for `type` or read the `prov` from one of its ancestors.\n *\n * @param type A type which
may have `prov`, via inheritance.\n *\n * @deprecated Will be removed in a future version of Angular, where an
error will occur in the\n * scenario if we find the `prov` on an ancestor only.\n */\nexport function
getInheritedInjectableDef<T>(type: any): InjectableDeclaration<T>|null {\n  const def = type &&
(type[NG_PROV_DEF] || type[NG_INJECTABLE_DEF]);\n  if (def) {\n    const typeName =
getTypeName(type);\n    // TODO(FW-1307):
Re-add ngDevMode when closure can handle it\n    // ngDevMode &&\n    console.warn(\n      `DEPRECATED:
DI is instantiating a token "${\n      typeName}" that inherits its @Injectable decorator but does not provide one
itself.\n` +\n      `This will become an error in a future version of Angular. Please add @Injectable() to the "${\n
typeName}" class.`);\n    return def;\n  } else {\n    return null;\n  }\n}\n\n\n/**\n * Gets the name of a type,
accounting for some cross-browser differences. */\nexport function getTypeName(type: any): string {\n //

```

```

`Function.prototype.name` behaves differently between IE and other browsers. In most browsers
return the name of the function itself, no matter how many other functions it inherits from. On IE the function
doesn't have its own `name` property, but it takes it from the lowest level in the prototype chain. E.g. if we have
`class Foo extends Parent` most browsers will evaluate `Foo.name` to `Foo` while IE will return `Parent`. We work around
the issue by converting the function to a string and parsing its name out that way via a regex.
if (type.hasOwnProperty('name')) {
  return type.name;
}
const match = (" + type).match(/^(function\s*([^\s(]+));/);
return match === null ? " : match[1];
}
Read the injector def type in a way which is immune to accidentally reading inherited value.
@param type type which may have an injector def (inj)
^nexport function getInjectorDef<T>(type: any): InjectorDef<T>|null {
  return type && (type.hasOwnProperty(NG_INJ_DEF) || type.hasOwnProperty(NG_INJECTOR_DEF)) ?
  (type as any)[NG_INJ_DEF] : null;
}
^nexport const NG_PROV_DEF = getClosureSafeProperty({prov:
  getClosureSafeProperty});
^nexport const NG_INJ_DEF = getClosureSafeProperty({inj:
  getClosureSafeProperty});
^n// We need to keep these around so we can read off old defs if new defs are
unavailable
^nexport const
  NG_INJECTABLE_DEF = getClosureSafeProperty({ngInjectableDef: getClosureSafeProperty});
^nexport const
  NG_INJECTOR_DEF = getClosureSafeProperty({ngInjectorDef: getClosureSafeProperty});
^n"/**
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license
 * that can be found in the LICENSE file at https://angular.io/license
 * Base URL for the error details
 * page.
 * Keep the files below in full sync:
 * - packages/compiler-
  cli/src/ngtsc/diagnostics/src/error_details_base_url.ts
 * - packages/core/src/error_details_base_url.ts
^nexport
  const ERROR_DETAILS_PAGE_BASE_URL = 'https://angular.io/errors';
^n"/**
 * Copyright
 * Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
^nimport {ERROR_DETAILS_PAGE_BASE_URL}
  from './error_details_base_url';
^n/**
 * The list
 * of error codes used in runtime code of the `core` package.
 * Reserved error code range: 100-999.
 * Note: the
 * minus sign denotes the fact that a particular code has a detailed guide on
 * angular.io. This extra annotation is
 * needed to avoid introducing a separate set to store
 * error codes which have guides, which might leak into runtime
 * code.
 * Full list of available error guides can be found at https://angular.io/errors.
^nexport const enum
  RuntimeErrorCode {
    // Change Detection Errors
    EXPRESSION_CHANGED_AFTER_CHECKED = -100,
    RECURSIVE_APPLICATION_REF_TICK = 101,
    // Dependency Injection Errors
    CYCLIC_DI_DEPENDENCY = -200,
    PROVIDER_NOT_FOUND = -201,
    INVALID_FACTORY_DEPENDENCY = 202,
    MISSING_INJECTION_CONTEXT = -203,
    INVALID_INJECTION_TOKEN = 204,
    INJECTOR_ALREADY_DESTROYED = 205,
    PROVIDER_IN_WRONG_CONTEXT = 207,
    MISSING_INJECTION_TOKEN = 208,
    INVALID_MULTI_PROVIDER = 209,
    // Template Errors
    MULTIPLE_COMPONENTS_MATCH = -300,
    EXPORT_NOT_FOUND = -301,
    PIPE_NOT_FOUND = -302,
    UNKNOWN_BINDING = 303,
    UNKNOWN_ELEMENT = 304,
    TEMPLATE_STRUCTURE_ERROR = 305,
    INVALID_EVENT_BINDING = 306,
    // Bootstrap Errors
    MULTIPLE_PLATFORMS = 400,
    PLATFORM_NOT_FOUND = 401,
    ERROR_HANDLER_NOT_FOUND = 402,
    BOOTSTRAP_COMPONENTS_NOT_FOUND = 403,
    PLATFORM_ALREADY_DESTROYED = 404,
    ASYNC_INITIALIZERS_STILL_RUNNING = 405,
    APPLICATION_REF_ALREADY_DESTROYED = 406,
    RENDERER_NOT_FOUND = 407,
    // Styling
    Errors
    // Declarations Errors
    // i18n Errors
    INVALID_I18N_STRUCTURE = 700,
    MISSING_LOCALE_DATA = 701,
    // standalone errors
    IMPORT_PROVIDERS_FROM_STANDALONE = 800,
    // JIT Compilation Errors
    // Other
    INVALID_DIFFER_INPUT = 900,
    NO_SUPPORTING_DIFFER_FACTORY = 901,
    VIEW_ALREADY_ATTACHED = 902,
    INVALID_INHERITANCE = 903,
    UNSAFE_VALUE_IN_RESOURCE_URL = 904,
    UNSAFE_VALUE_IN_SCRIPT = 905,
    MISSING_GENERATED_DEF = 906,
    TYPE_IS_NOT_STANDALONE
  }

```

```

= 907,\n MISSING_ZONEJS = 908,\n UNEXPECTED_ZONE_STATE = 909,\n UNSAFE_IFRAME_ATTRS =
-910,\n}\n\n/**\n * Class that represents a runtime error.\n * Formats and outputs the error message in a consistent
way.\n *\n * Example:\n * ```\n * throw new RuntimeError(\n *
RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,\n *   ngDevMode && 'Injector has already been
destroyed.);\n * ```\n *\n * Note: the `message` argument contains a descriptive error message as a string in
development\n * mode (when the `ngDevMode` is defined). In production mode (after tree-shaking pass), the\n *
`message` argument becomes `false`, thus we account for it in the typings and the runtime logic.\n */\nexport class
RuntimeError<T extends number = RuntimeErrorCode> extends Error {\n  constructor(public code: T, message:
null|false|string) {\n    super(formatRuntimeError<T>(code, message));\n  }\n}\n\n/**\n * Called to format a runtime
error.\n * See additional info on the `message` argument type in the `RuntimeError`
class description.\n */\nexport function formatRuntimeError<T extends number = RuntimeErrorCode>(\n  code: T,\n  message: null|false|string): string {\n  // Error code might be a negative number, which is a special marker that
instructs the logic to\n  // generate a link to the error details page on angular.io.\n  const fullCode =
`NG0${Math.abs(code)}`;\n  let errorMessage = `${fullCode}${message ? ': ' + message.trim() : ''}`;\n  if
(ngDevMode && code < 0) {\n    const addPeriodSeparator = !errorMessage.match(/[,;!?]\$/);\n    const separator =
addPeriodSeparator ? '!': '.';\n    errorMessage =\n      `${errorMessage}${separator}`\n    Find more at
${ERROR_DETAILS_PAGE_BASE_URL}/${fullCode}`;\n  }\n  return errorMessage;\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * @description\n *\n *

```

#### Represents

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a type that a Component or other object is instances of.\n *\n * An example of a `Type` is `MyCustomComponent`
class, which in JavaScript is represented by\n * the `MyCustomComponent` constructor function.\n *\n *
@publicApi\n */\nexport const Type = Function;\nexport function isType(v: any): v is Type<any> {\n  return
typeof v === 'function';\n}\n\n/**\n * @description\n *\n * Represents an abstract class `T`, if applied to a concrete
class it would stop being\n * instantiable.\n *\n * @publicApi\n */\nexport interface AbstractType<T> extends
Function {\n  prototype: T;\n}\n\nexport interface Type<T> extends Function {\n  new(...args: any[]):
T;\n}\n\nexport type Mutable<T extends {[x: string]: any}, K extends string> = {\n  [P in K]: T[P];\n};\n\n/**\n *
Returns a writable type version of type.\n *\n * USAGE:\n *\n * Given:\n * ```\n * interface Person {readonly name:
string}\n * ```\n *\n * We would like to get a read/write version of `Person`.\n * ```\n * const WritablePerson =
Writable<Person>;\n *\n * ```\n *\n * The result is that you can do:\n * ```\n * const readonlyPerson: Person = {name: 'Marry'};\n *
readonlyPerson.name = 'John';\n * // TypeError\n * (readonlyPerson as WritablePerson).name = 'John';\n * // OK\n *\n * //
Error: Correctly detects that `Person` did not have `age` property.\n * (readonlyPerson as WritablePerson).age =
30;\n * ```\n *\n */\nexport type Writable<T> = {\n  -readonly[K in keyof T]: T[K];\n};\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n// The functions in this file verify that
the assumptions we are making\n// about state in an instruction are correct before implementing any logic.\n// They
are meant only to be called in dev mode as sanity checks.\n\nimport {stringify} from './stringify';\nexport function
assertNumber(actual: any, msg: string): asserts actual is number {\n  if (!(typeof actual === 'number')) {\n   
throwError(msg, typeof actual, 'number', '===');\n  }\n}\n\nexport function
assertNumberInRange(\n  actual: any, minInclusive: number, maxInclusive: number): asserts actual is number {\n
  assertNumber(actual, 'Expected a number');\n  assertLessThanOrEqual(actual, maxInclusive, 'Expected number to
be less than or equal to');\n  assertGreaterThanOrEqual(actual, minInclusive, 'Expected number to be greater than or
equal to');\n}\n\nexport function assertString(actual: any, msg: string): asserts actual is string {\n  if (!(typeof
actual === 'string')) {\n    throwError(msg, actual === null ? 'null' : typeof actual, 'string', '===');\n  }\n}\n\nexport function
assertFunction(actual: any, msg: string): asserts actual is Function {\n  if (!(typeof actual === 'function')) {\n
  throwError(msg, actual === null ? 'null' : typeof actual, 'function', '===');\n  }\n}\n\nexport function
assertEqual<T>(actual: T, expected: T, msg: string) {\n  if (!(actual

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=== expected)) {\n  throwError(msg, actual, expected, '==');\n }\n}\n\nexport function assertNotEqual<T>(actual:
T, expected: T, msg: string): asserts actual is T {\n if (!(actual !== expected)) {\n  throwError(msg, actual, expected,
'!==');\n }\n}\n\nexport function assertSame<T>(actual: T, expected: T, msg: string): asserts actual is T {\n if
(!(actual === expected)) {\n  throwError(msg, actual, expected, '===');\n }\n}\n\nexport function
assertNotSame<T>(actual: T, expected: T, msg: string) {\n if (!(actual !== expected)) {\n  throwError(msg, actual,
expected, '!==');\n }\n}\n\nexport function assertLessThan<T>(actual: T, expected: T, msg: string): asserts actual is
T {\n if (!(actual < expected)) {\n  throwError(msg, actual, expected, '<');\n }\n}\n\nexport function
assertLessThanOrEqual<T>(actual: T, expected: T, msg: string): asserts actual is T {\n if (!(actual <= expected))
{\n  throwError(msg, actual, expected, '<=');\n }\n}\n\nexport function assertGreaterThan<T>(actual:
T, expected: T, msg: string): asserts actual is T {\n if (!(actual > expected)) {\n  throwError(msg, actual, expected,
'>');\n }\n}\n\nexport function assertGreaterThanOrEqual<T>(actual: T, expected: T, msg: string): asserts
actual is T {\n if (!(actual >= expected)) {\n  throwError(msg, actual, expected, '>=');\n }\n}\n\nexport function
assertNotDefined<T>(actual: T, msg: string) {\n if (actual !== null) {\n  throwError(msg, actual, null, '!==');\n
}\n}\n\nexport function assertDefined<T>(actual: T|null|undefined, msg: string): asserts actual is T {\n if (actual ==
null) {\n  throwError(msg, actual, null, '!=');\n }\n}\n\nexport function throwError(msg: string): never;\nexport
function throwError(msg: string, actual: any, expected: any, comparison: string): never;\nexport function
throwError(msg: string, actual?: any, expected?: any, comparison?: string): never {\n throw new Error(\n
`ASSERTION ERROR: ${msg}` +\n (comparison == null ?
": ` [Expected=> ${expected} ${comparison} ${actual} <=Actual`));\n}\n}\n\nexport function assertDomNode(node:
any): asserts node is Node {\n // If we're in a worker, `Node` will not be defined.\n if (!(typeof Node !==
'undefined' && node instanceof Node) &&\n !(typeof node === 'object' && node !== null &&\n
node.constructor.name === 'WebWorkerRenderNode')) {\n  throwError(`The provided value must be an instance
of a DOM Node but got ${stringify(node)}`);\n }\n}\n\nexport function assertIndexInRange(arr: any[], index:
number) {\n assertDefined(arr, 'Array must be defined.);\n const maxLen = arr.length;\n if (index < 0 || index >=
maxLen) {\n  throwError(`Index expected to be less than ${maxLen} but got ${index}`);\n }\n}\n\nexport
function assertOneOf(value: any, ...validValues: any[]) {\n if (validValues.indexOf(value) !== -1) return true;\n
throwError(`Expected value to be one of ${JSON.stringify(validValues)} but was ${\n
JSON.stringify(value)}.`);\n}\n}\n", "/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{assertEqual, assertLessThanOrEqual} from './assert';\n\n/**\n * Equivalent to ES6 spread, add each item to an
array.\n *\n * @param items The items to add\n * @param arr The array to which you want to add the items\n
*\nexport function addAllToArray(items: any[], arr: any[]) {\n for (let i = 0; i < items.length; i++) {\n
arr.push(items[i]);\n }\n}\n\n/**\n * Determines if the contents of two arrays is identical\n *\n * @param a first
array\n * @param b second array\n * @param identityAccessor Optional function for extracting stable object
identity from a value in\n * the array.\n *\nexport function arrayEquals<T>(a: T[], b: T[], identityAccessor?:
(value: T) => unknown): boolean {\n if (a.length !== b.length) return false;\n for (let i = 0; i < a.length;
i++) {\n let valueA = a[i];\n let valueB = b[i];\n if (identityAccessor) {\n valueA =
identityAccessor(valueA) as any;\n valueB = identityAccessor(valueB) as any;\n }\n if (valueB !== valueA)
{\n return false;\n }\n }\n return true;\n }\n}\n\n/**\n * Flattens an array.\n *\nexport function flatten(list:
any[], dst?: any[]): any[] {\n if (dst === undefined) dst = list;\n for (let i = 0; i < list.length; i++) {\n let item =
list[i];\n if (Array.isArray(item)) {\n // we need to inline it.\n if (dst === list) {\n // Our assumption that
the list was already flat was wrong and\n // we need to clone flat since we need to write to it.\n dst =
list.slice(0, i);\n }\n flatten(item, dst);\n } else if (dst !== list) {\n dst.push(item);\n }\n }\n return
dst;\n}\n\nexport function deepForEach<T>(input: (T|any[])[], fn: (value: T) => void): void {\n input.forEach(value
=> Array.isArray(value) ? deepForEach(value,
fn) : fn(value));\n}\n\nexport function addToArray(arr: any[], index: number, value: any): void {\n // perf:
array.push is faster than array.splice!\n if (index >= arr.length) {\n arr.push(value);\n } else {\n arr.splice(index,

```





contents. For small sets (~10) the cost of binary searching an `KeyValueArray` has about the same performance characteristics that of a `Map` with significantly better memory footprint. If used as a `Map` the keys are stored in alphabetical order so that they can be binary searched for retrieval. See: `keyValueArraySet`, `keyValueArrayGet`, `keyValueArrayIndexOf`, `keyValueArrayDelete`.

```


export interface KeyValueArray<VALUE> extends Array<VALUE|string> {
  __brand__: 'array-map';
}

/**
 * Set a `value` for a `key`.
 * @param keyValueArray to modify.
 * @param key The key to locate or create.
 * @param value The value to set for a `key`.
 * @returns index (always even) of where the value was set.
 */
export function keyValueArraySet<V>(
  keyValueArray: KeyValueArray<V>, key: string, value: V): number {
  let index = keyValueArrayIndexOf(keyValueArray, key);
  if (index >= 0) { // if we found it set it.
    keyValueArray[index | 1] = value;
  } else {
    index = ~index;
    arrayInsert2(keyValueArray, index, key, value);
  }
  return index;
}

/**
 * Retrieve a `value` for a `key` (on `undefined` if not found.)
 * @param keyValueArray to search.
 * @param key The key to locate.
 * @return The `value` stored at the `key` location or `undefined` if not found.
 */
export function keyValueArrayGet<V>(keyValueArray: KeyValueArray<V>,
  key: string): V|undefined {
  const index = keyValueArrayIndexOf(keyValueArray, key);
  if (index >= 0) { // if we found it retrieve it.
    return keyValueArray[index | 1] as V;
  }
  return undefined;
}

/**
 * Retrieve a `key` index value in the array or `-1` if not found.
 * @param keyValueArray to search.
 * @param key The key to locate.
 * @returns index of where the key is (or should have been.)
 * - positive (even) index if key found.
 * - negative index if key not found. (~index` (even) to get the index where it should have been inserted.)
 */
export function keyValueArrayIndexOf<V>(keyValueArray: KeyValueArray<V>, key: string): number {
  return _arrayIndexOfSorted(keyValueArray as string[], key, 1);
}

/**
 * Delete a `key` (and `value`) from the `KeyValueArray`.
 * @param keyValueArray to modify.
 * @param key The key to locate or delete (if exist).
 * @returns index of where the key was (or should have been.)
 * - positive (even) index if key found and deleted.
 * - negative index if key not found. (~index` (even) to get the index where it should have been.)
 */
export function keyValueArrayDelete<V>(keyValueArray: KeyValueArray<V>, key: string): number {
  const index = keyValueArrayIndexOf(keyValueArray, key);
  if (index >= 0) { // if we found it remove it.
    arraySplice(keyValueArray, index, 2);
  }
  return index;
}

/**
 * INTERNAL: Get an index of an `value` in a sorted `array` by grouping search by `shift`.
 * NOTE:
 * - This uses binary search algorithm for fast removals.
 * @param array A sorted array to binary search.
 * @param value The value to look for.
 * @param shift grouping shift.
 * - `0` means look at every location
 * - `1` means only look at every other (even) location (the odd locations are to be ignored as they are values.)
 * @returns index of the value.
 * - positive index if value found.
 * - negative index if value not found. (~index` to get the value where it should have been inserted)
 */
function _arrayIndexOfSorted(array: string[], value: string, shift: number): number {
  ngDevMode &&
  assertEquals(Array.isArray(array), true, 'Expecting an array');
  let start = 0;
  let end = array.length >> shift;
  while (end !== start) {
    const middle = start + ((end - start) >> 1); // find the middle.
    const current = array[middle << shift];
    if (value === current) {
      return (middle << shift);
    } else if (current > value) {
      end = middle;
    } else {
      start = middle + 1; // We already searched middle so make it non-inclusive by adding 1
    }
  }
  return ~(end << shift);
}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
/**
 * Convince closure compiler that the wrapped function has no side-effects.
 * Closure compiler always assumes that `toString` has no side-effects. We use this quirk to allow us to execute a function but have closure compiler mark the call as no-side-effects. It is important that the return value for the `noSideEffects` function be assigned to something which is retained otherwise the call to `noSideEffects` will be removed by closure compiler.
 */
export function noSideEffects<T>(fn: () => T): T {
  return {toString: fn}.toString() as unknown as T;
}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
import {Type} from


```

```

../interface/type';\n\nimport { noSideEffects } from './closure';\n\n\n\n\n * An interface implemented by all
Angular type decorators, which allows them to be used as\n * decorators as well as Angular syntax.\n * \n * \n *
 * @ng.Component(...)\n * class MyClass {...}\n * \n * \n * @publicApi\n * \n\nexport interface TypeDecorator {\n
/**\n * Invoke as decorator.\n * \n * \n * <T extends Type<any>>(type: T): T;\n * \n * // Make TypeDecorator assignable
to built-in ParameterDecorator type.\n * // ParameterDecorator is declared in lib.d.ts as a `declare type`\n * // so we
cannot declare this interface as a subtype.\n * // see https://github.com/angular/angular/issues/3379#issuecomment-
126169417\n (target: Object, propertyKey?: string|symbol, parameterIndex?: number): void;\n}\n\n\nexport const
ANNOTATIONS = '__annotations__';\n\nexport const PARAMETERS = '__parameters__';\n\nexport const
PROP_METADATA = '__prop__metadata__';\n\n\n\n\n * @suppress {globalThis}\n * \n\nexport function
makeDecorator<T>(\n name: string, props?: (...args: any[]) => any, parentClass?: any,\n additionalProcessing?:
(type: Type<T>) => void,\n typeFn?: (type: Type<T>, ...args: any[]) => void):\n { new (...args: any[]): any;
(...args: any[]):
any; (...args: any[]): (cls: any) => any; } {\n return noSideEffects(() => {\n const metaCtor =
makeMetadataCtor(props);\n function DecoratorFactory(\n this: unknown|typeof DecoratorFactory, ...args:
any[]): (cls: Type<T>) => any {\n if (this instanceof DecoratorFactory) {\n metaCtor.call(this, ...args);\n
return this as typeof DecoratorFactory;\n }\n\n const annotationInstance = new (DecoratorFactory as
any)(...args);\n return function TypeDecorator(cls: Type<T>) {\n if (typeFn) typeFn(cls, ...args);\n // Use
of Object.defineProperty is important since it creates non-enumerable property which\n // prevents the property
is copied during subclassing.\n const annotations = cls.hasOwnProperty(ANNOTATIONS) ?\n (cls as
any)[ANNOTATIONS] :\n (Object.defineProperty(cls, ANNOTATIONS, { value: []})) as
any)[ANNOTATIONS];\n annotations.push(annotationInstance);\n\n if (additionalProcessing)
additionalProcessing(cls);\n\n return cls;\n };\n }\n\n if (parentClass) {\n DecoratorFactory.prototype
= Object.create(parentClass.prototype);\n }\n\n DecoratorFactory.prototype.ngMetadataName = name;\n
(DecoratorFactory as any).annotationCls = DecoratorFactory;\n return DecoratorFactory as any;\n
});\n}\n\nfunction makeMetadataCtor(props?: (...args: any[]) => any): any {\n return function ctor(this: any, ...args:
any[]) {\n if (props) {\n const values = props(...args);\n for (const propName in values) {\n
this[propName] = values[propName];\n }\n }\n };\n}\n\nexport function makeParamDecorator(\n name:
string, props?: (...args: any[]) => any, parentClass?: any): any {\n return noSideEffects(() => {\n const metaCtor =
makeMetadataCtor(props);\n function ParamDecoratorFactory(\n this: unknown|typeof
ParamDecoratorFactory, ...args: any[]): any {\n if (this instanceof ParamDecoratorFactory)
{\n metaCtor.apply(this, args);\n return this;\n }\n const annotationInstance = new
(<any>ParamDecoratorFactory)(...args);\n\n (<any>ParamDecorator).annotation = annotationInstance;\n
return ParamDecorator;\n\n function ParamDecorator(cls: any, unusedKey: any, index: number): any {\n //
Use of Object.defineProperty is important since it creates non-enumerable property which\n // prevents the
property is copied during subclassing.\n const parameters = cls.hasOwnProperty(PARAMETERS) ?\n (cls as
any)[PARAMETERS] :\n (Object.defineProperty(cls, PARAMETERS, { value:
[]}))\n [PARAMETERS];\n\n // there might be gaps if some in between parameters do not have annotations.\n
// we pad with nulls.\n while (parameters.length <= index) {\n parameters.push(null);\n }\n\n
(parameters[index] = parameters[index] || []).push(annotationInstance);\n return cls;\n }\n }\n\n
if (parentClass) {\n ParamDecoratorFactory.prototype = Object.create(parentClass.prototype);\n }\n\n
ParamDecoratorFactory.prototype.ngMetadataName = name;\n (<any>ParamDecoratorFactory).annotationCls =
ParamDecoratorFactory;\n return ParamDecoratorFactory;\n });\n}\n\nexport function makePropDecorator(\n
name: string, props?: (...args: any[]) => any, parentClass?: any,\n additionalProcessing?: (target: any, name: string,
...args: any[]) => void): any {\n return noSideEffects(() => {\n const metaCtor = makeMetadataCtor(props);\n
function PropDecoratorFactory(this: unknown|typeof PropDecoratorFactory, ...args: any[]): any {\n if (this
instanceof PropDecoratorFactory) {\n metaCtor.apply(this, args);\n return this;\n }\n\n const
decoratorInstance = new (<any>PropDecoratorFactory)(...args);\n\n function PropDecorator(target: any, name:
string) {\n const constructor = target.constructor;\n // Use of Object.defineProperty

```



```

aid\n // migration, but this can be revisited.\n if (typeof paramTypes === 'undefined') {\n result[i] = [];\n } else if (paramTypes[i] && paramTypes[i] !== Object)\n {\n result[i] = [paramTypes[i]];\n } else {\n result[i] = [];\n }\n if (paramAnnotations &&\n paramAnnotations[i] !== null) {\n result[i] = result[i].concat(paramAnnotations[i]);\n }\n }\n return\n result;\n }\n\n private _ownParameters(type: Type<any>, parentCtor: any): any[][]\n\n {\n const typeStr =\n type.toString();\n // If we have no decorators, we only have function.length as metadata.\n // In that case, to\n detect whether a child class declared an own constructor or not,\n // we need to look inside of that constructor to\n check whether it is\n // just calling the parent.\n // This also helps to work around for\n https://github.com/Microsoft/TypeScript/issues/12439\n // that sets 'design:paramtypes' to []\n // if a class\n inherits from another class but has no ctor declared itself.\n if (isDelegateCtor(typeStr)) {\n return null;\n }\n\n // Prefer the direct API.\n if ((<any>type).parameters && (<any>type).parameters\n !== parentCtor.parameters) {\n return (<any>type).parameters;\n }\n\n // API of tsickle for lowering\n decorators to properties on the class.\n const tsickleCtorParams = (<any>type).ctorParameters;\n if\n (tsickleCtorParams && tsickleCtorParams !== parentCtor.ctorParameters) {\n // Newer tsickle uses a function\n closure\n // Retain the non-function case for compatibility with older tsickle\n const ctorParameters =\n typeof tsickleCtorParams === 'function' ? tsickleCtorParams() : tsickleCtorParams;\n const paramTypes =\n ctorParameters.map((ctorParam: any) => ctorParam && ctorParam.type);\n const paramAnnotations =\n ctorParameters.map(\n (ctorParam: any) =>\n ctorParam &&\n convertTsickleDecoratorIntoMetadata(ctorParam.decorators));\n return\n this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n }\n\n // API for metadata created by\n invoking the decorators.\n const paramAnnotations = type.hasOwnProperty(PARAMETERS)\n && (type as any)[PARAMETERS];\n const paramTypes = this._reflect && this._reflect.getOwnMetadata &&\n this._reflect.getOwnMetadata('design:paramtypes', type);\n if (paramTypes || paramAnnotations) {\n return\n this._zipTypesAndAnnotations(paramTypes, paramAnnotations);\n }\n\n // If a class has no decorators, at least\n create metadata\n // based on function.length.\n // Note: We know that this is a real constructor as we checked\n // the content of the constructor above.\n return new Array<any[]>(type.length);\n }\n\n parameters(type:\n Type<any>): any[][]\n {\n // Note: only report metadata if we have at least one class decorator\n // to stay in sync\n with the static reflector.\n if (!isType(type)) {\n return [];\n }\n const parentCtor = getParentCtor(type);\n let parameters = this._ownParameters(type, parentCtor);\n if (!parameters && parentCtor !== Object) {\n parameters = this.parameters(parentCtor);\n }\n\n return parameters || [];\n }\n\n private _ownAnnotations(typeOrFunc: Type<any>, parentCtor: any):\n any[][]\n\n {\n // Prefer the direct API.\n if ((<any>typeOrFunc).annotations && (<any>typeOrFunc).annotations\n !== parentCtor.annotations) {\n let annotations = (<any>typeOrFunc).annotations;\n if (typeof annotations\n === 'function' && annotations.annotations) {\n annotations = annotations.annotations;\n }\n return\n annotations;\n }\n\n // API of tsickle for lowering decorators to properties on the class.\n if\n ((<any>typeOrFunc).decorators && (<any>typeOrFunc).decorators !==\n parentCtor.decorators) {\n return\n convertTsickleDecoratorIntoMetadata((<any>typeOrFunc).decorators);\n }\n\n // API for metadata created by\n invoking the decorators.\n if (typeOrFunc.hasOwnProperty(ANNOTATIONS)) {\n return (typeOrFunc as\n any)[ANNOTATIONS];\n }\n\n return null;\n }\n\n annotations(typeOrFunc: Type<any>): any[]\n {\n if\n (!isType(typeOrFunc)) {\n return [];\n }\n const parentCtor = getParentCtor(typeOrFunc);\n const\n ownAnnotations = this._ownAnnotations(typeOrFunc, parentCtor) || [];\n const parentAnnotations = parentCtor\n !== Object ? this.annotations(parentCtor) : [];\n return parentAnnotations.concat(ownAnnotations);\n }\n\n private _ownPropMetadata(typeOrFunc: any, parentCtor: any): {[key: string]: any[]}\n\n {\n // Prefer the direct\n API.\n if ((<any>typeOrFunc).propMetadata &&\n (<any>typeOrFunc).propMetadata !==\n parentCtor.propMetadata) {\n let propMetadata = (<any>typeOrFunc).propMetadata;\n if (typeof\n propMetadata === 'function' && propMetadata.propMetadata) {\n propMetadata =\n propMetadata.propMetadata;\n }\n return propMetadata;\n }\n\n // API of tsickle for lowering decorators\n to properties on the class.\n if ((<any>typeOrFunc).propDecorators &&\n (<any>typeOrFunc).propDecorators

```

```

!== parentCtor.propDecorators) {\n
  const propDecorators = (<any>typeOrFunc).propDecorators;\n  const propMetadata = <{[key: string]:\n
  any[]}>{};\n  Object.keys(propDecorators).forEach(prop => {\n    propMetadata[prop] =\n
  convertTsickleDecoratorIntoMetadata(propDecorators[prop]);\n  });\n  return propMetadata;\n  }\n\n // API\n
for metadata created by invoking the decorators.\n  if (typeOrFunc.hasOwnProperty(PROP_METADATA)) {\n
  return (typeOrFunc as any)[PROP_METADATA];\n  }\n  return null;\n  }\n\n propMetadata(typeOrFunc: any):\n
{[key: string]: any[]} {\n  if (!isType(typeOrFunc)) {\n    return {};\n  }\n  const parentCtor =\n
  getParentCtor(typeOrFunc);\n  const propMetadata: {[key: string]: any[]} = {};\n  if (parentCtor !== Object) {\n
  const parentPropMetadata = this.propMetadata(parentCtor);\n
  Object.keys(parentPropMetadata).forEach((propName) => {\n    propMetadata[propName] =\n
  parentPropMetadata[propName];\n  });\n  }\n  const ownPropMetadata = this._ownPropMetadata(typeOrFunc,\n
  parentCtor);\n  if (ownPropMetadata) {\n    Object.keys(ownPropMetadata).forEach((propName) => {\n
  const decorators: any[] = [];\n    if (propMetadata.hasOwnProperty(propName)) {\n
  decorators.push(...propMetadata[propName]);\n    }\n    decorators.push(...ownPropMetadata[propName]);\n
  propMetadata[propName] = decorators;\n    });\n  }\n  return propMetadata;\n  }\n\n\n
  ownPropMetadata(typeOrFunc: any): {[key: string]: any[]} {\n  if (!isType(typeOrFunc)) {\n    return {};\n  }\n
  return this._ownPropMetadata(typeOrFunc, getParentCtor(typeOrFunc)) || {};\n  }\n\n  hasLifecycleHook(type: any,\n
  lcProperty: string): boolean {\n  return type instanceof Type && lcProperty in type.prototype;\n  }\n\n\n
  function\n
  convertTsickleDecoratorIntoMetadata(decoratorInvocations: any[]): any[] {\n  if (!decoratorInvocations) {\n
  return [];\n  }\n  return decoratorInvocations.map(decoratorInvocation => {\n    const decoratorType\n
  = decoratorInvocation.type;\n    const annotationCls = decoratorType.annotationCls;\n    const annotationArgs =\n
  decoratorInvocation.args ? decoratorInvocation.args : [];\n    return new annotationCls(...annotationArgs);\n
  });\n  }\n\n\n
  function getParentCtor(ctor: Function): Type<any> {\n  const parentProto = ctor.prototype ?\n
  Object.getPrototypeOf(ctor.prototype) : null;\n  const parentCtor = parentProto ? parentProto.constructor : null;\n  //\n
  Note: We always use `Object` as the null value\n  // to simplify checking later on.\n  return parentCtor ||\n
  Object;\n  }\n\n  "/**\n  * @license\n  * Copyright Google LLC All Rights Reserved.\n  * \n  * Use of this source code is\n
  governed by an MIT-style license that can be\n  * found in the LICENSE file at https://angular.io/license\n
  *\n  *\n  *\n  * Values of ngDevMode\n  * Depending on the\n
  current state of the application, ngDevMode may have one of several values.\n  * \n  * For convenience,\n
  the "truthy" value which enables dev mode is also an object which contains\n  * Angular's performance counters.\n
  This is not necessary, but cuts down on boilerplate for the\n  * perf counters.\n  * \n  * ngDevMode may also be set\n
  to false. This can happen in one of a few ways:\n  * - The user explicitly sets `window.ngDevMode = false`\n
  somewhere in their app.\n  * - The user calls `enableProdMode()`.\n  * - The URL contains a `ngDevMode=false`\n
  text.\n  * Finally, ngDevMode may not have been defined at all.\n  */\n  const ngDevMode:\n
  null|NgDevModePerfCounters;\n  interface NgDevModePerfCounters {\n    namedConstructors: boolean;\n
  firstCreatePass: number;\n    tNode: number;\n    tView: number;\n    rendererCreateTextNode: number;\n
  rendererSetText: number;\n    rendererCreateElement: number;\n    rendererAddEventListener: number;\n
  rendererSetAttribute: number;\n    rendererRemoveAttribute: number;\n    rendererSetProperty: number;\n
  rendererSetClassName: number;\n
  rendererAddClass: number;\n    rendererRemoveClass: number;\n    rendererSetStyle: number;\n
  rendererRemoveStyle: number;\n    rendererDestroy: number;\n    rendererDestroyNode: number;\n
  rendererMoveNode: number;\n    rendererRemoveNode: number;\n    rendererAppendChild: number;\n
  rendererInsertBefore: number;\n    rendererCreateComment: number;\n  }\n  }\n\n\n
  export function\n
  ngDevModeResetPerfCounters(): NgDevModePerfCounters {\n  const locationString = typeof location !==\n
  'undefined' ? location.toString() : '';\n  const newCounters: NgDevModePerfCounters = {\n    namedConstructors:\n
  locationString.indexOf('ngDevMode=namedConstructors') !== -1,\n    firstCreatePass: 0,\n    tNode: 0,\n    tView:\n
  0,\n    rendererCreateTextNode: 0,\n    rendererSetText: 0,\n    rendererCreateElement: 0,\n
  rendererAddEventListener: 0,\n    rendererSetAttribute: 0,\n    rendererRemoveAttribute: 0,\n    rendererSetProperty:\n
  0,\n

```

```

0,\n rendererSetClassName: 0,\n rendererAddClass: 0,\n rendererRemoveClass:
0,\n rendererSetStyle: 0,\n rendererRemoveStyle: 0,\n rendererDestroy: 0,\n rendererDestroyNode: 0,\n
rendererMoveNode: 0,\n rendererRemoveNode: 0,\n rendererAppendChild: 0,\n rendererInsertBefore: 0,\n
rendererCreateComment: 0,\n };\n\n // Make sure to refer to ngDevMode as [ngDevMode] for closure.\n const
allowNgDevModeTrue = locationString.indexOf('ngDevMode=false') === -1;\n global['ngDevMode'] =
allowNgDevModeTrue && newCounters;\n return newCounters;\n}\n\n/**\n * This function checks to see if the
`ngDevMode` has been set. If yes,\n * then we honor it, otherwise we default to dev mode with additional checks.\n
*\n * The idea is that unless we are doing production build where we explicitly\n * set `ngDevMode === false` we
should be helping the developer by providing\n * as much early warning and errors as possible.\n *\n *
`defineComponent` is guaranteed to have been called before any component template functions\n * (and thus Ivy
instructions), so a single initialization there is sufficient to ensure ngDevMode\n * is defined for the entire
instruction set.\n *\n * When checking `ngDevMode` on toplevel, always init it before referencing it\n * (e.g.
`((typeof ngDevMode === 'undefined' || ngDevMode) && initNgDevMode())`), otherwise you can\n * get a
`ReferenceError` like in https://github.com/angular/angular/issues/31595.\n *\n * Details on possible values for
`ngDevMode` can be found on its docstring.\n *\n * NOTE:\n * - changes to the `ngDevMode` name must be
synced with `compiler-cli/src/tooling.ts`.\n */\n\nexport function initNgDevMode(): boolean {\n // The below checks
are to ensure that calling `initNgDevMode` multiple times does not\n // reset the counters.\n // If the `ngDevMode`
is not an object, then it means we have not created the perf counters\n // yet.\n if (typeof ngDevMode ===
'undefined' || ngDevMode) {\n if (typeof ngDevMode !== 'object') {\n ngDevModeResetPerfCounters();\n }\n
return typeof ngDevMode !== 'undefined' && !!ngDevMode;\n }\n return false;\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n * Used for stringify render
output in Ivy.\n * Important! This function is very performance-sensitive and we should\n * be extra careful not to
introduce megamorphic reads in it.\n * Check `core/test/render3/perf/render_stringify` for benchmarks and alternate
implementations.\n */\n\nexport function renderStringify(value: any): string {\n if (typeof value === 'string') return
value;\n if (value == null) return '';\n // Use `String` so that it invokes the `toString` method of the value. Note that
this\n // appears to be faster than calling `value.toString` (see `render_stringify` benchmark).\n return
String(value);\n}\n\n"/**\n * Used to stringify a value so that it can be displayed in
an error message.\n * Important! This function contains a megamorphic read and should only be\n * used for error
messages.\n */\n\nexport function stringifyForError(value: any): string {\n if (typeof value === 'function') return
value.name || value.toString();\n if (typeof value === 'object' && value != null && typeof value.type ===
'function') {\n return value.type.name || value.type.toString();\n }\n\n return renderStringify(value);\n}\n\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{ImportedNgModuleProviders} from './di/interface/provider';\nimport {RuntimeError, RuntimeErrorCode} from
'./errors';\nimport {Type} from './interface/type';\nimport {stringify} from './util/stringify';\n\nimport
{stringifyForError} from './util/stringify_utils';\n\n/**\n * Called when directives inject each other (creating a
circular dependency)\n */\n\nexport function throwCyclicDependencyError(token: string, path?: string[]): never {\n
const depPath = path ? ` . Dependency path: ${path.join(' >')} > ${token}` : '';\n throw new RuntimeError(\n
RuntimeErrorCode.CYCLIC_DI_DEPENDENCY,\n `Circular dependency in DI detected for
${token}${depPath}`);\n}\n\nexport function throwMixedMultiProviderError() {\n throw new Error(`Cannot mix
multi providers and regular providers`);\n}\n\nexport function throwInvalidProviderError(\n ngModuleType?:
Type<unknown>, providers?: any[], provider?: any): never {\n if (ngModuleType && providers) {\n const
providerDetail = providers.map(v => v == provider ? '?' + provider + '?' : '...');\n throw new Error(`Invalid provider
for the NgModule '${\n stringify(ngModuleType)}' - only instances of Provider and Type are allowed, got:
[${\n providerDetail.join(', ')}]`);\n } else if ((provider as ImportedNgModuleProviders).providers) {\n throw
new RuntimeError(\n

```

```

    RuntimeErrorCode.PROVIDER_IN_WRONG_CONTEXT,\n    `Invalid providers from
'importProvidersFrom' present in a non-environment injector. 'importProvidersFrom' can't be used for component
providers.`);\n } else {\n   throw new Error('Invalid provider');\n }\n}\n\n/** Throws an error when a token is not
found in DI. */\nexport function throwProviderNotFoundError(token: any, injectorName?: string): never {\n  const
injectorDetails = injectorName ? ` in ${injectorName}` : '';\n  throw new RuntimeError(\n
RuntimeErrorCode.PROVIDER_NOT_FOUND,\n    ngDevMode && `No provider for
${stringifyForError(token)} found${injectorDetails}`);\n}\n\n",/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n/**\n * Special flag indicating that a decorator is of type
`Inject`. It's used to make `Inject`\n * decorator tree-shakable
(so we don't have to rely on the `instanceof` checks).\n * Note: this flag is not included into the `InjectFlags` since
it's an internal-only API.\n */\nexport const enum DecoratorFlags {\n  Inject = -1\n}\n\n/**\n * Injection flags for
DI.\n *\n * @publicApi\n * @deprecated use an options object for `inject` instead.\n */\nexport enum InjectFlags
{\n  // TODO(alxhub): make this 'const' (and remove `InternalInjectFlags` enum) when ngc no longer\n // writes
exports of it into ngfactory files.\n\n  /** Check self and check parent injector if needed */\n  Default = 0b0000,\n\n
/**\n * Specifies that an injector should retrieve a dependency from any injector until reaching the\n * host
element of the current component. (Only used with Element Injector)\n *\n  Host = 0b0001,\n\n  /** Don't ascend
to ancestors of the node requesting injection. *\n  Self = 0b0010,\n\n  /** Skip the node that is requesting injection.
*\n  SkipSelf = 0b0100,\n\n  /** Inject `defaultValue`
instead if token not found. *\n  Optional = 0b1000,\n}\n\n/**\n * This enum is an exact copy of the `InjectFlags`
enum above, but the difference is that this is a\n * const enum, so actual enum values would be inlined in generated
code. The `InjectFlags` enum can\n * be turned into a const enum when ViewEngine is removed (see TODO at the
`InjectFlags` enum\n * above). The benefit of inlining is that we can use these flags at the top level without
affecting\n * tree-shaking (see `"no-toplevel-property-access"` tslint rule for more info).\n * Keep this enum in sync
with `InjectFlags` enum above.\n */\nexport const enum InternalInjectFlags {\n  /** Check self and check parent
injector if needed *\n  Default = 0b0000,\n\n  /**\n * Specifies that an injector should retrieve a dependency from
any injector until reaching the\n * host element of the current component. (Only used with Element Injector)\n *\n
  Host = 0b0001,\n\n  /** Don't ascend to ancestors of the node requesting injection.\n *\n  Self = 0b0010,\n\n
  /** Skip the node that is requesting injection. *\n  SkipSelf = 0b0100,\n\n  /** Inject
`defaultValue` instead if token not found. *\n  Optional = 0b1000,\n}\n\n/**\n * This token is being injected into a
pipe.\n *\n * This flag is intentionally not in the public facing `InjectFlags` because it is only added by\n * the
compiler and is not a developer applicable flag.\n *\n  ForPipe = 0b1000,\n}\n\n",/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n *
found in the LICENSE file at https://angular.io/license\n *\n\nimport {throwProviderNotFoundError} from
'./render3/errors_di';\nimport {assertNotEqual} from './util/assert';\nimport {stringify} from
'./util/stringify';\nimport {getInjectableDef, InjectableDeclaration} from './interface/defs';\nimport {InjectFlags}
from './interface/injector';\nimport {ProviderToken} from './provider_token';\n\n\n/**\n * Current implementation of inject.\n *\n * By default, it is `injectInjectorOnly`, which makes it `Injector`-only
aware. It can be changed\n * to `directiveInject`, which brings in the `NodeInjector` system of ivy. It is designed
this\n * way for two reasons:\n * 1. `Injector` should not depend on ivy logic.\n * 2. To maintain tree shake-ability
we don't want to bring in unnecessary code.\n */\nlet _injectImplementation: (<T>(token: ProviderToken<T>,
flags?: InjectFlags) => T | null)|\n  undefined;\nexport function getInjectImplementation() {\n  return
_injectImplementation;\n}\n\n/**\n * Sets the current inject implementation.\n */\nexport function
setInjectImplementation(\n  impl: (<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)|\n  undefined):
(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T | null)|\n  undefined {\n  const previous =
_injectImplementation;\n  _injectImplementation = impl;\n  return previous;\n}\n\n\n/**\n * Injects `root` tokens
in limp mode.\n *\n * If no injector exists, we can still inject tree-shakable providers which have `providedIn` set
to\n * `\"root\"`. This is known as the limp mode injection. In such case the value is stored in the\n * injectable

```





a primitive like a string or if an ancestor of this class is missing an Angular decorator.

Please check that 1) the type for the parameter at index `{index}` is correct and 2) the correct Angular decorators are defined for this class and its ancestors.

```

    * Type of the options argument to `inject`.
    * @publicApi
    * ^\nexport interface InjectOptions {
    *   /**
    *    * Use optional injection, and return `null` if the requested token is not
    *   found.
    *   * optional?: boolean;
    *   /**
    *    * Start injection at the parent of the current injector.
    *   * skipSelf?: boolean;
    *   /**
    *    * Only query the current injector for the token, and don't fall back to the parent
    *   injector if
    *   * it's not found.
    *   * self?: boolean;
    *   /**
    *    * Stop injection at the host component's injector. Only relevant when injecting from an element
    *   injector, and a no-op for environment injectors.
    *   * host?: boolean;
    * }
    * ^\n
    * @param token A token that represents a dependency that should be injected.
    * @returns the injected value if operation is successful, `null` otherwise.
    * @throws if called outside of a supported context.
    * @publicApi
    * ^\nexport function
    inject<T>(token: ProviderToken<T>): T;
    * ^\n
    * @param token A token that represents a dependency that should be injected.
    * @param flags Control how injection is executed. The flags correspond to injection strategies that
    * can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.
    * @returns the injected value if operation is successful, `null` otherwise.
    * @throws if called outside of a supported context.
    * @publicApi
    * @deprecated prefer an options object instead of `InjectFlags`
    * ^\nexport
    function inject<T>(token: ProviderToken<T>, flags?: InjectFlags): T|null;
    * ^\n
    * @param token A token that represents a dependency that should be injected.
    * @param options Control how injection is executed. Options correspond to injection strategies
    * that can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and
    * `@Optional`.
    * @returns the injected value if operation is successful.
    * @throws if called outside of a supported context, or if the token is not found.
    * @publicApi
    * ^\nexport function
    inject<T>(token: ProviderToken<T>, options: InjectOptions & { optional?: false }): T;
    * ^\n
    * @param token A token that represents a dependency that should be injected.
    * @param options Control how injection is executed. Options correspond to injection strategies
    * that can be specified with parameter decorators `@Host`, `@Self`, `@SkipSelf`, and
    * `@Optional`.
    * @returns the injected value if operation is successful, `null` if the token is not
    * found and optional injection has been requested.
    * @throws if called outside of a supported context, or if the token is not found and optional
    * injection was not requested.
    * @publicApi
    * ^\nexport function inject<T>(token: ProviderToken<T>, options: InjectOptions): T|null;
    * ^\n
    * Injects a token from the currently active injector.
    * `inject` is only supported during instantiation of a dependency by the DI system. It can be used
    * during:
    * - Construction (via the `constructor`) of a class being instantiated by the DI system, such
    * as an `@Injectable` or `@Component`.
    * - In the initializer for fields of such classes.
    * - In the factory function specified for `useFactory` of a `Provider` or an `@Injectable`.
    * - In the `factory` function specified for an `InjectionToken`.
    * @param token A token that represents a dependency that should be injected.
    * @param flags Optional flags that control how injection is executed.
    * The flags correspond to injection strategies that can be specified with
    * parameter decorators `@Host`, `@Self`, `@SkipSelf`, and `@Optional`.
    * @returns the injected value if operation is successful, `null` otherwise.
    * @throws if called outside of a supported context.
    * @usageNotes
    * In practice the `inject()` calls are allowed in a constructor, a constructor parameter and a
    * field initializer:
    * ```typescript
    * @Injectable({providedIn: 'root'})
    * export class Car {
    *   radio: Radio|undefined;
    *   // OK: field initializer
    *   spareTyre = inject(Tyre);
    *   constructor() {
    *     // OK: constructor body
    *     this.radio = inject(Radio);
    *   }
    * }
    * ```
    * It is also legal to call `inject` from a provider's factory:
    * ```typescript
    * providers: [
    *   {provide: Car, useFactory: () => {
    *     // OK: a class factory
    *     const engine = inject(Engine);
    *     return new Car(engine);
    *   }}
    * ]
    * ```
    * Calls to the `inject()` function outside of the class creation context will result in error. Most
    * notably, calls to `inject()` are disallowed after a class instance was created, in methods
    * (including lifecycle hooks):
    * ```typescript
    * @Component({ ... })
    * export class CarComponent {
    *   ngOnInit() {
    *     // ERROR: too late, the component instance was already created
    *     const engine = inject(Engine);
    *     engine.start();
    *   }
    * }
    * ```
    * @publicApi
    * ^\nexport function inject<T>(
    token: ProviderToken<T>, flags: InjectFlags|InjectOptions =

```

```

InjectFlags.Default): T|null {\n if (typeof flags !== 'number') {\n // While TypeScript doesn't accept it without a
cast, bitwise OR with false-y values in\n // JavaScript is a no-op. We can use that for a very codesize-efficient
conversion from\n // `InjectOptions` to `InjectFlags`.\n flags = (InternalInjectFlags.Default | // comment to force
a line break in the formatter\n      ((flags.optional
&& InternalInjectFlags.Optional) as number) |\n      ((flags.host && InternalInjectFlags.Host) as number) |\n
      ((flags.self && InternalInjectFlags.Self) as number) |\n      ((flags.skipSelf && InternalInjectFlags.SkipSelf)
as number)) as InjectFlags;\n }\n return inject(token, flags);\n}\n\nexport function injectArgs(types:
(ProviderToken<any>|any[])[]): any[] {\n const args: any[] = [];\n for (let i = 0; i < types.length; i++) {\n const
arg = resolveForwardRef(types[i]);\n if (Array.isArray(arg)) {\n if (arg.length === 0) {\n throw new
RuntimeError(\n      RuntimeErrorCode.INVALID_DIFFER_INPUT,\n      ngDevMode && 'Arguments
array must have arguments.);\n }\n let type: Type<any>|undefined = undefined;\n let flags: InjectFlags =
InjectFlags.Default;\n\n for (let j = 0; j < arg.length; j++) {\n const meta = arg[j];\n const flag =
getInjectFlag(meta);\n if (typeof flag ===
'number') {\n // Special case when we handle @Inject decorator.\n if (flag === DecoratorFlags.Inject)
{\n type = meta.token;\n } else {\n flags |= flag;\n }\n } else {\n type = meta;\n
}\n }\n\n args.push(inject(type!, flags));\n } else {\n args.push(inject(arg));\n }\n }\n return
args;\n}\n\n/**\n * Attaches a given InjectFlag to a given decorator using monkey-patching.\n * Since DI decorators
can be used in providers `deps` array (when provider is configured using\n * `useFactory`) without initialization
(e.g. `Host`) and as an instance (e.g. `new Host()`), we\n * attach the flag to make it available both as a static
property and as a field on decorator\n * instance.\n * @param decorator Provided DI decorator.\n * @param flag
InjectFlag that should be applied.\n */\nexport function attachInjectFlag(decorator: any, flag:
InternalInjectFlags|DecoratorFlags): any {\n decorator[DI_DECORATOR_FLAG]
= flag;\n decorator.prototype[DI_DECORATOR_FLAG] = flag;\n return decorator;\n}\n\n/**\n * Reads monkey-
patched property that contains InjectFlag attached to a decorator.\n * @param token Token that may contain
monkey-patched DI flags property.\n */\nexport function getInjectFlag(token: any): number|undefined {\n return
token[DI_DECORATOR_FLAG];\n}\n\nexport function catchInjectorError(\n e: any, token: any,
injectorErrorName: string, source: string|null): never {\n const tokenPath: any[] =
e[NG_TEMP_TOKEN_PATH];\n if (token[SOURCE]) {\n tokenPath.unshift(token[SOURCE]);\n }\n
e.message = formatError("\n' + e.message, tokenPath, injectorErrorName, source);\n e[NG_TEMP_TOKEN_PATH] =
tokenPath;\n e[NG_TEMP_TOKEN_PATH] = null;\n throw e;\n}\n\nexport function formatError(\n text: string,
obj: any, injectorErrorName: string, source: string|null = null): string {\n text = text && text.charAt(0) === '\n' &&
text.charAt(1) === NO_NEW_LINE ? text.slice(2)
: text;\n let context = stringify(obj);\n if (Array.isArray(obj)) {\n context = obj.map(stringify).join(' -> ');\n }
else if (typeof obj === 'object') {\n let parts = <string>[];\n for (let key in obj) {\n if
(obj.hasOwnProperty(key)) {\n let value = obj[key];\n parts.push(\n key + ': ' + (typeof value ===
'string' ? JSON.stringify(value) : stringify(value));\n }\n }\n context = `${parts.join(', ')}`;\n }\n return
`${injectorErrorName}${source ? '(' + source + ')' : ''}${context}: ${\n text.replace(NEW_LINE, '\n
')}`;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {makeParamDecorator} from './util/decorators';\nimport {attachInjectFlag} from
'/injector_compatibility';\nimport {DecoratorFlags, InternalInjectFlags} from './interface/injector';\n\n/**\n *
Type of the Inject decorator / constructor function.\n * @publicApi\n */\nexport interface InjectDecorator {\n
/**\n * Parameter decorator on a dependency parameter of a class constructor\n * that specifies a custom provider
of the dependency.\n * @usageNotes\n * The following example shows a class constructor that specifies a\n
* custom provider of a dependency using the parameter decorator.\n * When `@Inject()` is not present, the
injector uses the type annotation of the\n * parameter as the provider.\n * <code-example
path="core/di/ts/metadata_spec.ts" region="InjectWithoutDecorator">\n * </code-example>\n * @see
["Dependency Injection Guide"](guide/dependency-injection)\n * ^/\n (token: any): any;\n new(token: any):

```

```
Inject;\n\n\n**\n * Type of the Inject metadata.\n *\n * @publicApi\n *\n\nexport interface Inject {\n /**\n * A [DI token](guide/glossary#di-token) that maps to the dependency to be injected.\n *\n token: any;\n\n\n**\n * Inject decorator and metadata.\n *\n * @Annotation\n *\n\nexport const Inject: InjectDecorator = attachInjectFlag(\n // Disable tslint because `DecoratorFlags` is a const enum which gets inlined.\n // tslint:disable-next-line: no-toplevel-property-access\n makeParamDecorator('Inject', (token: any) => ({token})), DecoratorFlags.Inject);\n\n\n**\n * Type of the Optional decorator / constructor function.\n *\n * @publicApi\n *\n\nexport interface OptionalDecorator {\n /**\n * Parameter decorator to be used on constructor parameters,\n * which marks the parameter as being an optional dependency.\n * The DI framework provides `null` if the dependency is not found.\n *\n * Can be used together with other parameter decorators\n * that modify how dependency injection operates.\n *\n * @usageNotes\n *\n * The following code allows the possibility of a `null` result:\n *\n * 
```

```

    (): any;\n new(): Host;\n}\n\n/**\n * Type of the Host metadata.\n *\n * @publicApi\n */\nexport interface Host
{\n\n/**\n * Host decorator and metadata.\n *\n * @Annotation\n * @publicApi\n */\nexport const Host:
HostDecorator =\n // Disable tslint because `InternalInjectFlags` is a const enum which gets inlined.\n //
tslint:disable-next-line: no-toplevel-property-access\n attachInjectFlag(makeParamDecorator('Host'),
InternalInjectFlags.Host);\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n/**\n * The strategy that the default change detector uses to detect changes.\n *
When set, takes effect the next time change detection is triggered.\n *\n * @see {@link ChangeDetectorRef#usage-
notes Change detection usage}\n *\n * @publicApi\n */\nexport enum ChangeDetectionStrategy {\n /**\n * Use
the `CheckOnce` strategy,
meaning that automatic change detection is deactivated\n * until reactivated by setting the strategy to `Default`
(`CheckAlways`).\n * Change detection can still be explicitly invoked.\n * This strategy applies to all child
directives and cannot be overridden.\n */\n OnPush = 0,\n\n /**\n * Use the default `CheckAlways` strategy, in
which change detection is automatic until\n * explicitly deactivated.\n */\n Default = 1,\n}\n\n/**\n * Defines the
possible states of the default change detector.\n * @see `ChangeDetectorRef`\n */\nexport enum
ChangeDetectorStatus {\n /**\n * A state in which, after calling `detectChanges()`, the change detector\n * state
becomes `Checked`, and must be explicitly invoked or reactivated.\n */\n CheckOnce,\n\n /**\n * A state in
which change detection is skipped until the change detector mode\n * becomes `CheckOnce`.\n */\n Checked,\n\n
/**\n * A state in which change detection continues automatically until explicitly\n
* deactivated.\n */\n CheckAlways,\n\n /**\n * A state in which a change detector sub tree is not a part of the
main tree and\n * should be skipped.\n */\n Detached,\n\n /**\n * Indicates that the change detector
encountered an error checking a binding\n * or calling a directive lifecycle method and is now in an inconsistent
state. Change\n * detectors in this state do not detect changes.\n */\n Errored,\n\n /**\n * Indicates that the
change detector has been destroyed.\n */\n Destroyed,\n}\n\n/**\n * Reports whether a given strategy is currently
the default for change detection.\n * @param changeDetectionStrategy The strategy to check.\n * @returns True if
the given strategy is the current default, false otherwise.\n * @see `ChangeDetectorStatus`\n * @see
`ChangeDetectorRef`\n */\nexport function isDefaultChangeDetectionStrategy(changeDetectionStrategy:
ChangeDetectionStrategy):\n boolean {\n return changeDetectionStrategy === null ||\n changeDetectionStrategy
=== ChangeDetectionStrategy.Default;\n}\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n/**\n * Defines the CSS styles encapsulation policies for the {@link Component}
decorator's\n * `encapsulation` option.\n *\n * See {@link Component#encapsulation encapsulation}.\n *\n *
@usageNotes\n * ### Example\n *\n * {@example core/ts/metadata/encapsulation.ts region='longform'}\n *\n *
@publicApi\n */\nexport enum ViewEncapsulation {\n // TODO: consider making `ViewEncapsulation` a `const
enum` instead. See\n // https://github.com/angular/angular/issues/44119 for additional information.\n\n /**\n *
Emulates a native Shadow DOM encapsulation behavior by adding a specific attribute to the\n * component's host
element and applying the same attribute to all the CSS selectors provided\n * via {@link Component#styles
styles} or {@link Component#styleUrls styleUrls}.\n *\n * This is the default option.\n */\n Emulated = 0,\n\n
// Historically the 1 value was for `Native` encapsulation which has been removed as of v11.\n\n /**\n * Doesn't
provide any sort of CSS style encapsulation, meaning that all the styles provided\n * via {@link Component#styles
styles} or {@link Component#styleUrls styleUrls} are applicable\n * to any HTML element of the application
regardless of their host Component.\n */\n None = 2,\n\n /**\n * Uses the browser's native Shadow DOM API to
encapsulate CSS styles, meaning that it creates\n * a ShadowRoot for the component's host element which is then
used to encapsulate\n * all the Component's styling.\n */\n ShadowDom = 3,\n}\n", "/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport
{initNgDevMode} from './ng_dev_mode';\n\n/**\n * This file contains reusable `\"empty\"` symbols that can be
used as default return values\n * in different parts of the rendering code. Because the same symbols are returned,

```

```

this\n * allows for identity checks against these values to be consistently used by the framework\n * code.\n
*\n\nexport const EMPTY_OBJ: {} = {};\nexport const EMPTY_ARRAY: any[] = [];\n\n// freezing the values
prevents any code from accidentally inserting new values in\nif ((typeof ngDevMode === 'undefined' ||
ngDevMode) && initNgDevMode()) {\n // These property accesses can be ignored because ngDevMode will be set
to false\n // when optimizing code and the whole if statement will be dropped.\n // tslint:disable-next-line:no-
toplevel-property-access\n Object.freeze(EMPTY_OBJ);\n // tslint:disable-next-line:no-toplevel-property-access\n
Object.freeze(EMPTY_ARRAY);\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {getClosureSafeProperty} from '../util/property';\n\nexport const NG_COMP_DEF =
getClosureSafeProperty({cmp: getClosureSafeProperty});\nexport const NG_DIR_DEF =
getClosureSafeProperty({dir: getClosureSafeProperty});\nexport const NG_PIPE_DEF =
getClosureSafeProperty({pipe: getClosureSafeProperty});\nexport const NG_MOD_DEF =
getClosureSafeProperty({mod: getClosureSafeProperty});\nexport const NG_FACTORY_DEF =
getClosureSafeProperty({fac: getClosureSafeProperty});\n\n/**\n * If a directive is diPublic, bloomAdd sets a
property on the type with this constant as\n * the key and the directive's unique ID as the value. This allows us to
map directives to their\n * bloom filter bit for DI.\n */\n\n// TODO(misko): This is wrong. The NG_ELEMENT_ID
should never be minified.\nexport const NG_ELEMENT_ID = getClosureSafeProperty({__NG_ELEMENT_ID__:
getClosureSafeProperty});\n", "/*\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{ChangeDetectionStrategy} from '../change_detection/constants';\nimport {NG_PROV_DEF} from
'./di/interface/defs';\nimport {Mutable, Type} from './interface/type';\nimport {NgModuleDef} from
'./metadata/ng_module_def';\nimport {SchemaMetadata} from './metadata/schema';\nimport {ViewEncapsulation}
from './metadata/view';\nimport {noSideEffects} from './util/closure';\nimport {EMPTY_ARRAY, EMPTY_OBJ}
from './util/empty';\nimport {initNgDevMode} from './util/ng_dev_mode';\nimport {stringify} from
'./util/stringify';\n\nimport {NG_COMP_DEF, NG_DIR_DEF, NG_MOD_DEF, NG_PIPE_DEF} from
'/fields';\nimport {ComponentDef, ComponentDefFeature, ComponentTemplate, ComponentType,
ContentQueriesFunction, DependencyTypeList, DirectiveDef, DirectiveDefFeature, DirectiveDefList,
HostBindingsFunction, PipeDef, PipeDefList, TypeOrFactory, ViewQueriesFunction} from
'/interfaces/definition';\nimport {TAttributes, TConstantsOrFactory} from './interfaces/node';\nimport
{CssSelectorList} from './interfaces/projection';\n\n/** Counter used to generate unique IDs for component
definitions. *\nlet componentDefCount = 0;\n\n/**\n * Create a component definition object.\n *\n *\n * #
Example\n * ```\n * class MyDirective {\n * // Generated by Angular Template Compiler\n * // [Symbol] syntax
will not be supported by TypeScript until v2.7\n * static cmp = defineComponent({\n * ... \n * });\n * }\n * ```\n
* @codeGenApi\n */\nexport function defineComponent<T>(componentDefinition: {\n /**\n * Directive type,
needed to configure the injector.\n */\n type: Type<T>;\n /** The selectors that will be used to match nodes to
this component. *\n selectors?: CssSelectorList;\n /**\n * The number of nodes, local refs, and pipes in this
component template.\n *\n * Used to calculate the length of this component's LView array, so we\n * can pre-
fill the array and set the binding start index.\n */\n // TODO(kara): remove queries from this count\n decls:
number;\n /**\n * The number of bindings in this component template (including pure fn bindings).\n *\n *
Used to calculate the length of this component's LView array, so we\n * can pre-fill the array and set the host
binding start index.\n */\n vars: number;\n /**\n * A map of input names.\n *\n * The format is in:
`{actualPropertyName: string):(string|[string, string])}`.\n *\n * Given:\n * ```\n * class MyComponent {\n
* @Input()\n * publicInput1: string;\n *\n * @Input('publicInput2')\n * declaredInput2: string;\n * }\n *
```\n *\n * is described as:\n * ```\n * {\n * publicInput1: 'publicInput1',\n * declaredInput2:
['publicInput2', 'declaredInput2'],\n * }\n * ```\n *\n * Which

```

the minifier may translate to:

```

minifiedDeclaredInput2: ['publicInput2', 'declaredInput2'],

```

This allows the render to re-construct the minified, public, and declared names of properties.

NOTE: - Because declared and public name are usually same we only generate the array `['public', 'declared']` format when they differ.

- The reason why this API and `outputs` API is not the same is that `NgOnChanges` has inconsistent behavior in that it uses declared names rather than minified or public. For this reason `NgOnChanges` will be deprecated and removed in future version and this API will be simplified to be consistent with `output`.

inputs?: {[P in keyof T]: string | [string, string];}

A map of output names.

The format is in: {[actualPropertyName: string]: string}.

Which the minifier may translate to: {[minifiedPropertyName: string]: string}.

This allows the render to re-construct the minified and non-minified names of properties.

outputs?: {[P in keyof T]: string};

Function executed by the parent template to allow child directive to apply host bindings.

hostBindings?: HostBindingsFunction<T>;

The number of bindings in this directive `hostBindings` (including pure fn bindings).

Used to calculate the length of the component's LView array, so we can pre-fill the array and set the host binding start index.

hostVars?: number;

Assign static attribute values to a host element.

This property will assign static attribute values as well as class and style values to a host element. Since attribute values can consist of different types of values, the `hostAttrs` array must include the values in the following format:

```

= [
  // static attributes (like `title`, `name`, `id`...)
  attr1, value1, attr2, value,
  // a single namespace value (like `x:id`)
  NAMESPACE_MARKER, namespaceUri1, name1, value1,
  // another single namespace value (like `x:name`)
  NAMESPACE_MARKER, namespaceUri2, name2, value2,
  // a series of CSS classes that will be applied to the element (no spaces)
  CLASSES_MARKER, class1, class2, class3,
  // a series of CSS styles (property + value) that will be applied to the element
  STYLES_MARKER, prop1, value1, prop2, value2
]

```

All non-class and non-style attributes must be defined at the start of the list first before all class and style values are set. When there is a change in value type (like when classes and styles are introduced) a marker must be used to separate the entries. The marker values themselves are set via entries found in the [AttributeMarker]

```

enum

```

Function to create instances of content queries associated with a given directive.

contentQueries?: ContentQueriesFunction<T>;

Defines the name that can be used in the template to assign this directive to a variable.

See: {@link Directive.exportAs}

exportAs?: string[];

Template function use for rendering DOM.

This function has following structure.

```

function Template<T>(ctx:T, creationMode: boolean) {
  if (creationMode) {
    // Contains creation mode instructions.
  }
  // Contains binding update instructions.
}

```

Common instructions are:

- Creation mode instructions:
  - `elementStart`, `elementEnd`
  - `text`
  - `container`
  - `listener`
- Binding update instructions:
  - `bind`
  - `elementAttribute`
  - `elementProperty`
  - `elementClass`
  - `elementStyle`

template: ComponentTemplate<T>;

Constants for the nodes in the component's view.

Includes attribute arrays, local definition arrays etc.

consts?: TConstantsOrFactory;

An array of `ngContent[selector]` values that were found in the template.

ngContentSelectors?: string[];

Additional set of instructions specific to view query processing. This could be seen as a set of instruction to be inserted into the template function.

Query-related instructions need to be pulled out to a specific function as a timing of execution is different as compared to all other instructions (after change detection hooks but before view hooks).

viewQuery?: ViewQueriesFunction<T>| null;

A list of optional features to apply.

See: {@link NgOnChangesFeature}, {@link ProvidersFeature}

features?: ComponentDefFeature[];

Defines template and style encapsulation options available for Component's {@link Component}.

encapsulation?: ViewEncapsulation;

Defines arbitrary developer-defined data to be stored on a renderer instance.

This is useful for renderers that delegate to other renderers.

see: animation

```

data?: {[kind: string]: any};\n\n /**\n * A set of styles that the component needs to be present for component to
render correctly.\n */\n styles?: string[];\n\n /**\n * The strategy that the default change detector uses to detect
changes.\n * When set, takes effect the next time change detection is triggered.\n */\n changeDetection?:
ChangeDetectionStrategy;\n\n /**\n * Registry of directives, components, and pipes that may be found in this
component's view.\n */\n * This property is either an array of types or a function that returns the array of types.
This\n * function may be necessary to support forward declarations.\n
*/\n dependencies?: TypeOrFactory<DependencyTypeList>;\n\n /**\n * The set of schemas that declare
elements to be allowed in the component's template.\n */\n schemas?: SchemaMetadata[] | null;\n\n /**\n *
Whether this directive/component is standalone.\n */\n standalone?: boolean;\n}): unknown {\n return
noSideEffects() => {\n // Initialize ngDevMode. This must be the first statement in defineComponent.\n // See
the `initNgDevMode` docstring for more information.\n (typeof ngDevMode === 'undefined' || ngDevMode) &&
initNgDevMode();\n\n const type = componentDefinition.type;\n const standalone =
componentDefinition.standalone === true;\n const declaredInputs: {[key: string]: string} = {} as any;\n const
def: Mutable<ComponentDef<any>, keyof ComponentDef<any>> = {\n type: type,\n providersResolver:
null,\n decls: componentDefinition.decls,\n vars: componentDefinition.vars,\n factory: null,\n template:
componentDefinition.template
|| null!,\n consts: componentDefinition.consts || null,\n ngContentSelectors:
componentDefinition.ngContentSelectors,\n hostBindings: componentDefinition.hostBindings || null,\n
hostVars: componentDefinition.hostVars || 0,\n hostAttrs: componentDefinition.hostAttrs || null,\n
contentQueries: componentDefinition.contentQueries || null,\n declaredInputs: declaredInputs,\n inputs: null!,
// assigned in noSideEffects\n outputs: null!, // assigned in noSideEffects\n exportAs:
componentDefinition.exportAs || null,\n onPush: componentDefinition.changeDetection ===
ChangeDetectionStrategy.OnPush,\n directiveDefs: null!, // assigned in noSideEffects\n pipeDefs: null!, //
assigned in noSideEffects\n standalone,\n dependencies: standalone && componentDefinition.dependencies ||
null,\n getStandaloneInjector: null,\n selectors: componentDefinition.selectors || EMPTY_ARRAY,\n
viewQuery:
componentDefinition.viewQuery || null,\n features: componentDefinition.features as DirectiveDefFeature[] ||
null,\n data: componentDefinition.data || {},\n encapsulation: componentDefinition.encapsulation ||
ViewEncapsulation.Emulated,\n id: `c${componentDefCount++}`,\n styles: componentDefinition.styles ||
EMPTY_ARRAY,\n _: null,\n setInput: null,\n schemas: componentDefinition.schemas || null,\n tView:
null,\n };\n const dependencies = componentDefinition.dependencies;\n const feature =
componentDefinition.features;\n def.inputs = invertObject(componentDefinition.inputs, declaredInputs),\n
def.outputs = invertObject(componentDefinition.outputs),\n feature && feature.forEach((fn) => fn(def));\n
def.directiveDefs = dependencies ?\n (() => (typeof dependencies === 'function' ? dependencies() :
dependencies))\n .map(extractDirectiveDef)\n .filter(nonNull)) :\n null;\n def.pipeDefs
= dependencies ?\n (() => (typeof dependencies === 'function' ? dependencies() : dependencies))\n
.map(getPipeDef)\n .filter(nonNull)) :\n null;\n\n return def;\n });\n\n /**\n * Generated next to
NgModules to monkey-patch directive and pipe references onto a component's\n * definition, when generating a
direct reference in the component file would otherwise create an\n * import cycle.\n */\n * See [this
explanation](https://hackmd.io/Odw80D0pR6yfsOjg_7XCJg?view) for more details.\n */\n * @codeGenApi\n
*/\nexport function setComponentScope(\n type: ComponentType<any>, directives: Type<any>[])((() =>
Type<any>[]),\n pipes: Type<any>[])((() => Type<any>[])): void {\n const def = (type.cmp as
ComponentDef<any>);\n def.directiveDefs = () =>\n (typeof directives === 'function' ? directives() :
directives).map(extractDirectiveDef) as\n DirectiveDefList;\n def.pipeDefs = () =>\n (typeof pipes ===
'function'
? pipes() : pipes).map(getPipeDef) as PipeDefList;\n }\n\nexport function extractDirectiveDef(type: Type<any>):
DirectiveDef<any>|ComponentDef<any>|null {\n return getComponentDef(type) ||
getDirectiveDef(type);\n }\n\nfunction nonNull<T>(value: T|null): value is T {\n return value !== null;\n }\n\n/**\n

```



```

* @codeGenApi\n *^\nexport function defineNgModule<T>(def: {\n /** Token representing the module. Used by
DI. *\n type: T;\n\n /** List of components to bootstrap. *\n bootstrap?: Type<any>[] | (( => Type<any>[]);\n\n
/** List of components, directives, and pipes declared by this module. *\n declarations?: Type<any>[] | (( =>
Type<any>[]);\n\n /** List of modules or `ModuleWithProviders` imported by this module. *\n imports?:
Type<any>[] | (( => Type<any>[]);\n\n /**\n * List of modules, `ModuleWithProviders`, components, directives,
or pipes exported by this\n * module.\n *^\n exports?: Type<any>[] | (( => Type<any>[]);\n\n /** The set of
schemas that declare
elements to be allowed in the NgModule. *\n schemas?: SchemaMetadata[] | null;\n\n /** Unique ID for the
module that is used with `getModuleFactory`. *\n id?: string | null;\n}): unknown {\n return noSideEffects(() =>
{\n const res: NgModuleDef<T> = {\n type: def.type,\n bootstrap: def.bootstrap || EMPTY_ARRAY,\n
declarations: def.declarations || EMPTY_ARRAY,\n imports: def.imports || EMPTY_ARRAY,\n exports:
def.exports || EMPTY_ARRAY,\n transitiveCompileScopes: null,\n schemas: def.schemas || null,\n id:
def.id || null,\n });\n return res;\n });\n\n\n/**\n * Adds the module metadata that is necessary to compute the
module's transitive scope to an\n * existing module definition.\n *\n * Scope metadata of modules is not used in
production builds, so calls to this function can be\n * marked pure to tree-shake it from the bundle, allowing for all
referenced declarations\n * to become eligible for tree-shaking as well.\n *\n * @codeGenApi\n
*^\nexport function setNgModuleScope(type: any, scope: {\n /** List of components, directives, and pipes declared
by this module. *\n declarations?: Type<any>[] | (( => Type<any>[]);\n\n /** List of modules or
`ModuleWithProviders` imported by this module. *\n imports?: Type<any>[] | (( => Type<any>[]);\n\n /**\n *
List of modules, `ModuleWithProviders`, components, directives, or pipes exported by this\n * module.\n *\n
exports?: Type<any>[] | (( => Type<any>[]);\n}): unknown {\n return noSideEffects(() => {\n const
ngModuleDef = getNgModuleDef(type, true);\n ngModuleDef.declarations = scope.declarations ||
EMPTY_ARRAY;\n ngModuleDef.imports = scope.imports || EMPTY_ARRAY;\n ngModuleDef.exports =
scope.exports || EMPTY_ARRAY;\n });\n\n\n/**\n * Inverts an inputs or outputs lookup such that the keys, which
were the\n * minified keys, are part of the values, and the values are parsed so that\n * the publicName of the
property is the new key\n
*\n * e.g. for\n *\n * ```\n * class Comp {\n * @Input()\n * propName1: string;\n *\n *
@Input('publicName2')\n * declaredPropName2: number;\n * }\n * ```\n *\n * will be serialized as\n *\n * ```\n *
{\n * propName1: 'propName1',\n * declaredPropName2: ['publicName2', 'declaredPropName2'],\n * }\n * ```\n *\n
*\n * which is then translated by the minifier as:\n *\n * ```\n * {\n * minifiedPropName1: 'propName1',\n *
minifiedPropName2: ['publicName2', 'declaredPropName2'],\n * }\n * ```\n *\n *\n * becomes: (public name =>
minifiedName)\n *\n * ```\n * {\n * 'propName1': 'minifiedPropName1',\n * 'publicName2':
'minifiedPropName2',\n * }\n * ```\n *\n *\n * Optionally the function can take `secondary` which will result in: (public
name => declared name)\n *\n * ```\n * {\n * 'propName1': 'propName1',\n * 'publicName2':
'declaredPropName2',\n * }\n * ```\n *\n *\n *^\nfunction invertObject<T>(\n obj?: {[P in keyof T]?: string|[string,
string]},\n secondary?: {[key: string]:
string}): {[P in keyof T]: string} {\n if (obj == null) return EMPTY_OBJ as any;\n const newLookup: any = {};\n
for (const minifiedKey in obj) {\n if (obj.hasOwnProperty(minifiedKey)) {\n let publicName: string|[string,
string] = obj[minifiedKey]!;\n let declaredName = publicName;\n if (Array.isArray(publicName)) {\n
declaredName = publicName[1];\n publicName = publicName[0];\n }\n newLookup[publicName] =
minifiedKey;\n if (secondary) {\n (secondary[publicName] = declaredName as string);\n }\n }\n }\n
return newLookup;\n\n\n/**\n * Create a directive definition object.\n *\n * # Example\n * ```ts\n * class
MyDirective {\n * // Generated by Angular Template Compiler\n * // [Symbol] syntax will not be supported by
TypeScript until v2.7\n * static dir = defineDirective({\n * ... \n * });\n * }\n * ```\n *\n * @codeGenApi\n
*^\nexport const defineDirective =\n defineComponent as any as<T>(directiveDefinition:
{\n /**\n * Directive type, needed to configure the injector.\n *\n type: Type<T>;\n\n /** The
selectors that will be used to match nodes to this directive. *\n selectors?: CssSelectorList;\n\n /**\n * A
map of input names.\n *\n * The format is in: `{[actualPropertyName]: string|[string, string]}`.\n

```

```

*\n * Given:\n * ```\n * class MyComponent {\n * @Input()\n * publicInput1: string;\n * @Input('publicInput2')\n * declaredInput2: string;\n * }\n * ```\n * is described as:\n * ```\n * {\n * publicInput1: 'publicInput1',\n * declaredInput2: ['declaredInput2', 'publicInput2'],\n * }\n * ```\n * Which the minifier may translate to:\n * ```\n * {\n * minifiedPublicInput1: 'publicInput1',\n * minifiedDeclaredInput2: ['publicInput2', 'declaredInput2'],\n * }\n * ```\n * This allows the render to re-construct the minified, public, and declared names\n * of properties.\n * NOTE:\n * - Because declared and public name are usually same we only generate the array\n * `['declared', 'public']` format when they differ.\n * - The reason why this API and `outputs` API is not the same is that `NgOnChanges` has\n * inconsistent behavior in that it uses declared names rather than minified or public. For\n * this reason `NgOnChanges` will be deprecated and removed in future version and this\n * API will be simplified to be consistent with `output`.\n * inputs?: {[P in keyof T]?: string | [string, string]};\n * A map of output names.\n * The format is in:\n * `{[actualPropertyName: string]:string}`.\n * Which the minifier may translate to:\n * `{[minifiedPropertyName: string]:string}`.\n * This allows the render to re-construct the minified and non-minified names\n * of properties.\n * outputs?: {[P in keyof T]?: string};\n * A list of optional features to apply.\n * See: { @link NgOnChangesFeature}, { @link ProvidersFeature}, { @link InheritDefinitionFeature}\n * features?: DirectiveDefFeature[];\n * Function executed by the parent template to allow child directive to apply host bindings.\n * hostBindings?: HostBindingsFunction<T>;\n * The number of bindings in this directive `hostBindings` (including pure fn bindings).\n * Used to calculate the length of the component's LView array, so we\n * can pre-fill the array and set the host binding start index.\n * hostVars?: number;\n * Assign static attribute values to a host element.\n * This property will assign static attribute values as well as class and style\n * values to a host element. Since attribute values can consist of different types of values,\n * the `hostAttrs` array must include the values in the following format:\n * attrs = [\n * // static attributes (like `title`, `name`, `id`...)\n * attr1, value1, attr2, value,\n * // a single namespace value (like `x:id`)\n * NAMESPACE_MARKER, namespaceUri1, name1, value1,\n * // another single namespace value (like `x:name`)\n * NAMESPACE_MARKER, namespaceUri2, name2, value2,\n * // a series of CSS classes that will be applied to the element (no spaces)\n * CLASSES_MARKER, class1, class2, class3,\n * // a series of CSS styles (property + value) that will be applied to the element\n * STYLES_MARKER, prop1, value1, prop2, value2\n * ]\n * All non-class and non-style attributes must be defined at the start of the list\n * first before all class and style values are set. When there is a change in value\n * type (like when classes and styles are introduced) a marker must be used to separate\n * the entries. The marker values themselves are set via entries found in the\n * [AttributeMarker] enum.\n * hostAttrs?: TAttributes;\n * Function to create instances of content queries associated with a given directive.\n * contentQueries?: ContentQueriesFunction<T>;\n * Additional set of instructions specific to view query processing. This could be seen as a\n * set of instructions to be inserted into the template function.\n * viewQuery?: ViewQueriesFunction<T>| null;\n * Defines the name that can be used in the template to assign this directive to a variable.\n * See: { @link Directive.exportAs}\n * exportAs?: string[];\n * ) => never;\n * Create a pipe definition object.\n * # Example\n * ```\n * class MyPipe implements PipeTransform {\n * // Generated by Angular Template Compiler\n * static pipe = definePipe({\n * ... \n * });\n * }\n * ```\n * @param pipeDef Pipe definition generated by the compiler\n * @codeGenApi\n * export function definePipe<T>(pipeDef: {\n * /** Name of the pipe. Used for matching pipes in template to pipe defs. */\n * name: string,\n * /** Pipe class reference. Needed to extract pipe lifecycle hooks. */\n * type: Type<T>,\n * /** Whether the pipe is pure. */\n * pure?: boolean,\n * /** Whether the pipe is standalone. */\n * standalone?: boolean,\n * }): unknown {\n * return (<PipeDef<T>>{\n * type: pipeDef.type,\n * name: pipeDef.name,\n * factory:

```

```

null,\n pure: pipeDef.pure !== false,\n standalone: pipeDef.standalone === true,\n onDestroy:
pipeDef.type.prototype.ngOnDestroy || null\n });\n}\n\n/**\n * The following getter
methods retrieve the definition from the type. Currently the retrieval\n * honors inheritance, but in the future we
may change the rule to require that definitions are\n * explicit. This would require some sort of migration strategy.\n
*\n\nexport function getComponentDef<T>(type: any): ComponentDef<T>|null {\n return type[NG_COMP_DEF]
|| null;\n}\n\nexport function getDirectiveDef<T>(type: any): DirectiveDef<T>|null {\n return type[NG_DIR_DEF]
|| null;\n}\n\nexport function getPipeDef<T>(type: any): PipeDef<T>|null {\n return type[NG_PIPE_DEF] ||
null;\n}\n\nexport function isStandalone<T>(type: Type<T>): boolean {\n const def = getComponentDef(type) ||
getDirectiveDef(type) || getPipeDef(type);\n return def !== null ? def.standalone : false;\n}\n\nexport function
getNgModuleDef<T>(type: any, throwNotFound: true): NgModuleDef<T>;\nexport function
getNgModuleDef<T>(type: any): NgModuleDef<T>|null;\nexport function getNgModuleDef<T>(type: any,
throwNotFound?: boolean): NgModuleDef<T>|null
{\n const ngModuleDef = type[NG_MOD_DEF] || null;\n if (!ngModuleDef && throwNotFound === true) {\n
throw new Error(`Type ${stringify(type)} does not have 'mod' property.`);\n } \n return ngModuleDef;\n}\n\n",/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {Injector} from
'./di/injector';\nimport {ProviderToken} from './di/provider_token';\nimport {Type} from
'./di/interface/type';\nimport {SchemaMetadata} from './di/metadata/schema';\nimport {Sanitizer} from
'./di/sanitization/sanitizer';\nimport {LContainer} from './container';\nimport {ComponentDef,
ComponentTemplate, DirectiveDef, DirectiveDefList, HostBindingsFunction, PipeDef, PipeDefList,
ViewQueriesFunction} from './definition';\nimport {I18nUpdateOpCodes, T118n, TIcu} from './i18n';\nimport
{TConstants, TNode} from './node';\nimport
{LQueries, TQueries} from './query';\nimport {Renderer, RendererFactory} from './renderer';\nimport {RComment,
RElement} from './renderer_dom';\nimport {TStylingKey, TStylingRange} from './styling';\n\n\n// Below are
constants for LView indices to help us look up LView members\n// without having to remember the specific
indices.\n// Uglify will inline these when minifying so there shouldn't be a cost.\nexport const HOST = 0;\nexport
const TVIEW = 1;\nexport const FLAGS = 2;\nexport const PARENT = 3;\nexport const NEXT = 4;\nexport const
TRANSPLANTED_VIEWS_TO_REFRESH = 5;\nexport const T_HOST = 6;\nexport const CLEANUP =
7;\nexport const CONTEXT = 8;\nexport const INJECTOR = 9;\nexport const RENDERER_FACTORY =
10;\nexport const RENDERER = 11;\nexport const SANITIZER = 12;\nexport const CHILD_HEAD = 13;\nexport
const CHILD_TAIL = 14;\n// FIXME(misko): Investigate if the three declarations aren't all same thing.\nexport
const DECLARATION_VIEW = 15;\nexport const DECLARATION_COMPONENT_VIEW
= 16;\nexport const DECLARATION_LCONTAINER = 17;\nexport const PREORDER_HOOK_FLAGS =
18;\nexport const QUERIES = 19;\nexport const ID = 20;\nexport const EMBEDDED_VIEW_INJECTOR =
21;\n\n/**\n * Size of LView's header. Necessary to adjust for it when setting slots.\n *\n * IMPORTANT:
`HEADER_OFFSET` should only be referred to the in the `**` instructions to translate\n * instruction index into
`LView` index. All other indexes should be in the `LView` index space and\n * there should be no need to refer to
`HEADER_OFFSET` anywhere else.\n *\n\nexport const HEADER_OFFSET = 22;\n\n\n// This interface replaces
the real LView interface if it is an arg or a\n// return value of a public instruction. This ensures we don't need to
expose\n// the actual interface, which should be kept private.\nexport interface OpaqueViewState {\n `__brand__`:
'Brand for OpaqueViewState that nothing will match';\n}\n\n\n/**\n * `LView` stores all of the information needed
to process the instructions as\n * they
are invoked from the template. Each embedded view and component view has its\n * own `LView`. When
processing a particular view, we set the `viewData` to that\n * `LView`. When that view is done processing, the
`viewData` is set back to\n * whatever the original `viewData` was before (the parent `LView`).\n *\n * Keeping
separate state for each view facilitates view insertion / deletion, so we\n * don't have to edit the data array based on
which views are present.\n *\n\nexport interface LView<T = unknown> extends Array<any> {\n /**\n * Human
readable representation of the `LView`.\n *\n * NOTE: This property only exists if `ngDevMode` is set to `true`

```

and it is not present in `* production`. Its presence is purely to help debug issue in development, and should not be relied on in production application.

`*^ debug?: LViewDebug;`

The node into which this ``LView`` is inserted.

`*^ [HOST]: RElement|null;`

The static data for this view.

We need a reference to this so we can easily walk up the `* node tree` in DI and get the `TView.data` array associated with a node (where the `* directive defs` are stored).

`*^ readonly[TVIEW]: TView;`

Flags for this view. See `LViewFlags` for more info.

`*^ [FLAGS]: LViewFlags;`

This may store an `{ @link LView }` or `{ @link LContainer }`.

`*^ `LView`` - The parent view. This is needed when we exit the view and must restore the previous `* LView`. Without this, the render method would have to keep a stack of `* views` as it is recursively rendering templates.

`*^ `LContainer`` - The current view is part of a container, and is an embedded view.

`*^ [PARENT]: LView|LContainer|null;`

The next sibling `LView` or `LContainer`.

`*^` Allows us to propagate between sibling view states that aren't in the same `* container`. Embedded views already have a `node.next`, but it is only set for `* views` in the same container.

We need a way to link component views and views `* across containers` as well.

`*^ [NEXT]:`

`LView|LContainer|null;`

Queries active for this view - nodes from a view are reported to those queries.

`*^ [QUERIES]: LQueries|null;`

Store the ``TNode`` of the location where the current ``LView`` is inserted into.

`*^ Given:`

```

<div>
  <ng-template><span></span></ng-template>
</div>

```

We end up with two ``TView`s`.

- ``parent` `TView`` which contains `<div><!-- anchor --></div>`
- ``child` `TView`` which contains `<span></span>`

Typically the ``child`` is inserted into the declaration location of the ``parent``, but it can be `* inserted` anywhere. Because it can be inserted anywhere it is not possible to store the `* insertion` information in the ``TView`` and instead we must store it in the ``LView[T_HOST]``.

So to determine where is our insertion parent we would execute:

```

const parentLView = IView[PARENT];
const parentTNode = IView[T_HOST];
const insertionParent = parentLView[parentTNode.index];

```

If `null``, this is the root view of an application (root component is in this view) and it has `* no parents`.

`*^ [T_HOST]: TNode|null;`

When a view is destroyed, listeners need to be released and outputs need to be `* unsubscribed`. This context array stores both listener functions wrapped with `* their context` and output subscription instances for a particular view.

These change per `LView` instance, so they cannot be stored on `TView`. Instead, `* TView.cleanup` saves an index to the necessary context in this array.

After ``LView`` is created it is possible to attach additional instance specific functions at the `* end` of the ``IView[CLEANUP]`` because we know that no more ``T`` level cleanup functions will be `* added` here.

`*^ [CLEANUP]: any[]|null;`

- For dynamic views, this is the context with which to render the template (e.g. `* `NgForContext``), or ``{}`` if not defined explicitly.
- For root view of the root component it's a reference to the component instance itself.
- For components, the context is a reference to the component instance itself.
- For inline views, the context is `null``.

`*^ [CONTEXT]: T;`

An optional Module Injector to be used as fall back after Element Injectors are consulted.

`*^ readonly[INJECTOR]: Injector|null;`

Factory to be used for creating Renderer.

`*^ [RENDERER_FACTORY]: RendererFactory;`

Renderer to be used for this view.

`*^ [RENDERER]: Renderer;`

An optional custom sanitizer.

`*^ [SANITIZER]: Sanitizer|null;`

Reference to the first `LView` or `LContainer` beneath this `LView` in `* the hierarchy`.

`*^` Necessary to store this so views can traverse through their nested views `* to remove listeners` and call `onDestroy` callbacks.

`*^ [CHILD_HEAD]: LView|LContainer|null;`

The last `LView` or `LContainer` beneath this `LView` in the hierarchy.

`*^` The tail allows us to quickly add a new state to the end of the view list `* without having to propagate` starting from the first child.

`*^ [CHILD_TAIL]:`

`LView|LContainer|null;`

View where this view's template was declared.

`*^` The template for a dynamically created view may be declared in a different view than `* it is inserted`. We already track the ``"insertion view"`` (view where the template was `* inserted`) in `LView[PARENT]`, but we also need access to the ``"declaration view"`` (view where the template was declared). Otherwise, we wouldn't be able to call the `* view's` template function with the proper contexts. Context should be inherited from `* the declaration view tree`, not the insertion view tree.

`*^` Example (AppComponent template):

```

<ng-template #foo></ng-

```

template>

```
<-- declared here -->\n * <some-comp [tpl]="foo"></some-comp> <-- inserted inside this component -->\n *\n * The <ng-template> above is declared in the AppComponent template, but it will be passed into\n * SomeComp and inserted there. In this case, the declaration view would be the AppComponent,\n * but the insertion view would be SomeComp. When we are removing views, we would want to\n * traverse through the insertion view to clean up listeners. When we are calling the\n * template function during change detection, we need the declaration view to get inherited\n * context.\n */\n [DECLARATION_VIEW]: LView|null;\n\n /**\n * Points to the declaration component view, used to track transplanted `LView`s.\n */\n * See:\n * `DECLARATION_VIEW` which points to the actual `LView` where it was declared, whereas\n * `DECLARATION_COMPONENT_VIEW` points to the component which may not be same as\n * `DECLARATION_VIEW`.\n */\n * Example:\n * ```\n * <#VIEW #myComp>\n * <div *ngIf="true">\n * <ng-template #myTpl>...</ng-template>\n * </div>\n * </#VIEW>\n * ```\n * In the above case `DECLARATION_VIEW` for `myTpl` points to the\n * `LView` of `ngIf` whereas\n * `DECLARATION_COMPONENT_VIEW` points to `LView` of the `myComp`\n * which owns the template.\n */\n * The reason for this is that all embedded views are always check-always whereas\n * the component\n * view can be check-always or on-push. When we have a transplanted view it is important to\n * determine if we have transplanted a view from check-always declaration to on-push insertion\n * point. In such a case the transplanted view needs to be added to the `LContainer` in the\n * declared `LView` and CD during the declared view CD (in addition to the CD at the insertion\n * point.) (Any transplanted views which are intra Component are of no interest because the CD\n * strategy of declaration and insertion will always be the same, because it is\n * the same\n * component.)\n */\n * Queries already track moved views in\n * `LView[DECLARATION_LCONTAINER]` and\n * `LContainer[MOVED_VIEWS]`. However the queries also track\n * `LView`s which moved within the same\n * component `LView`. Transplanted views are a subset of moved views, and we use\n * `DECLARATION_COMPONENT_VIEW` to differentiate them. As in this example.\n */\n * Example showing intra component `LView` movement.\n * ```\n * <#VIEW #myComp>\n * <div *ngIf="condition; then thenBlock else elseBlock"></div>\n * <ng-template #thenBlock>Content to render when condition is true.</ng-template>\n * <ng-template #elseBlock>Content to render when condition is false.</ng-template>\n * </#VIEW>\n * ```\n * The `thenBlock` and `elseBlock` is moved but not transplanted.\n */\n * Example showing inter component `LView` movement (transplanted view).\n * ```\n * <#VIEW #myComp>\n * <ng-template #myTpl>...</ng-template>\n * <insertion-component [template]="myTpl"></insertion-component>\n * </#VIEW>\n * ```\n * In the above example `myTpl` is passed into a different component. If `insertion-component`\n * instantiates `myTpl` and `insertion-component` is on-push then the `LContainer` needs to be\n * marked as containing transplanted views and those views need to be CD as part of the\n * declaration CD.\n */\n *\n * When change detection runs, it iterates over\n * `[MOVED_VIEWS]` and CDs any child `LView`s where\n * the `DECLARATION_COMPONENT_VIEW` of the current component and the child `LView`\n * does not match\n * (it has been transplanted across components.)\n */\n *\n * Note: `DECLARATION_COMPONENT_VIEW` points to itself if the LView is a component view (the\n * simplest / most common case).\n */\n * see also:\n * - https://hackmd.io/@mhevery/rJUsvv9H write up of the problem\n * - `LContainer[HAS_TRANSPLANTED_VIEWS]` which marks which `LContainer` has transplanted views.\n * - `LContainer[TRANSPLANT_HEAD]` and `LContainer[TRANSPLANT_TAIL]` storage for transplanted\n * -\n * `LView[DECLARATION_LCONTAINER]` similar problem for queries\n * - `LContainer[MOVED_VIEWS]` similar problem for queries\n */\n [DECLARATION_COMPONENT_VIEW]: LView;\n\n /**\n * A declaration point of embedded views (ones instantiated based on the content of a\n * <ng-template>), null for other types of views.\n */\n * We need to track all embedded views created from a given declaration point so we can prepare\n * query matches in a proper order (query matches are ordered based on their declaration point and\n * _not_ the insertion point).\n */\n [DECLARATION_LCONTAINER]: LContainer|null;\n\n /**\n * More flags for this
```

view. See PreOrderHookFlags for more info.\n \*^n [PREORDER\_HOOK\_FLAGS]: PreOrderHookFlags;\n\n /\*\*\n \* The number of direct transplanted views which need a refresh or have descendants themselves\n \* that need a refresh but have not marked their ancestors as Dirty. This tells us that during\n \* change detection we should still descend to find those children to refresh, even if the parents\n \* are not `Dirty`^`CheckAlways`.\n \*^n [TRANSPANTED\_VIEWS\_TO\_REFRESH]: number;\n\n /\*\* Unique ID of the view. Used for `\_\_ngContext\_\_` lookups in the `LView` registry. \*\n [ID]: number;\n\n /\*\*\n \* Optional injector assigned to embedded views that takes\n \* precedence over the element and module injectors.\n \*^n readonly[EMBEDDED\_VIEW\_INJECTOR]: Injector|null;\n}\n\n/\*\* Flags associated with an LView (saved in LView[FLAGS]) \*\nexport const enum LViewFlags {\n /\*\* The state of the init phase on the first 2 bits \*\n InitPhaseStateIncrementer = 0b000000000001,\n InitPhaseStateMask = 0b00000000011,\n\n /\*\*\n \* Whether or not the view is in creationMode.\n \*\n \* This must be stored in the view rather than using `data` as a marker so that\n \* we can properly support embedded views. Otherwise, when exiting a child view\n \* back into the parent view, `data` will be defined and `creationMode` will be\n \* improperly reported as false.\n \*\n CreationMode = 0b00000000100,\n\n /\*\*\n \* Whether or not this LView instance is on its first processing pass.\n \*\n \* An LView instance is considered to be on its "first pass" until it\n \* has completed one creation mode run and one update mode run. At this\n \* time, the flag is turned off.\n \*\n FirstLViewPass = 0b00000001000,\n\n /\*\* Whether this view has default change detection strategy (checks always) or onPush \*\n CheckAlways = 0b00000010000,\n\n /\*\* Whether or not this view is currently dirty (needing check) \*\n Dirty = 0b00000100000,\n\n /\*\* Whether or not this view is currently attached to change detection tree. \*\n Attached = 0b000001000000,\n\n /\*\* Whether or not this view is destroyed. \*\n Destroyed = 0b000010000000,\n\n /\*\* Whether or not this view is the root view \*\n IsRoot = 0b000100000000,\n\n /\*\*\n \* Whether this moved LView was needs to be refreshed at the insertion location because the\n \* declaration was dirty.\n \*\n RefreshTransplantedView = 0b001000000000,\n\n /\*\* Indicates that the view \*\*or any of its ancestors\*\* have an embedded view injector. \*\n HasEmbeddedViewInjector = 0b001000000000,\n\n /\*\*\n \* Index of the current init phase on last 21 bits\n \*\n IndexWithinInitPhaseIncrementer = 0b0100000000000,\n\n IndexWithinInitPhaseShift = 11,\n\n IndexWithinInitPhaseReset = 0b0011111111111,\n}\n\n/\*\* Possible states of the init phase:\n \* - 00: OnInit hooks to be run.\n \* - 01: AfterContentInit hooks to be run\n \* - 10: AfterViewInit hooks to be run\n \* - 11: All init hooks have been run\n \*\nexport const enum InitPhaseState {\n OnInitHooksToBeRun = 0b00,\n AfterContentInitHooksToBeRun = 0b01,\n AfterViewInitHooksToBeRun = 0b10,\n InitPhaseCompleted = 0b11,\n}\n\n/\*\* More flags associated with an LView (saved in LView[PREORDER\_HOOK\_FLAGS]) \*\nexport const enum PreOrderHookFlags {\n /\*\*\n \* The index of the next pre-order hook to be called in the hooks array, on the first 16\n \* bits\n \*\n IndexOfTheNextPreOrderHookMaskMask = 0b0111111111111111,\n\n /\*\*\n \* The number of init hooks that have already been called, on the last 16 bits\n \*\n\n NumberOfInitHooksCalledIncrementer = 0b010000000000000000,\n\n NumberOfInitHooksCalledShift = 16,\n\n NumberOfInitHooksCalledMask = 0b11111111111111110000000000000000,\n}\n\n/\*\* Stores a set of OpCodes to process `HostBindingsFunction` associated with a current view.\n \*\n \* In order to invoke `HostBindingsFunction` we need:\n \* 1. `elementIdx`: Index to the element associated with the `HostBindingsFunction`.\n \* 2. `directiveIdx`: Index to the directive associated with the `HostBindingsFunction`.\n (This will\n \* become the context for the `HostBindingsFunction` invocation.)\n \* 3. `bindingRootIdx`: Location where the bindings for the `HostBindingsFunction` start. Internally\n \* `HostBindingsFunction` binding indexes start from `0` so we need to add `bindingRootIdx` to\n \* it.\n \* 4. `HostBindingsFunction`: A host binding function to execute.\n \*\n \* The above information needs to be encoded into the `HostBindingOpCodes` in an efficient manner.\n \*\n \* 1. `elementIdx` is encoded into the `HostBindingOpCodes` as `~elementIdx` (so a negative number);\n \* 2. `directiveIdx`\n \* 3. `bindingRootIdx`\n \* 4. `HostBindingsFunction` is passed in as is.\n \*\n \* The `HostBindingOpCodes` array contains:\n \* - negative number to select the element index.\n \* - followed by 1 or more of:\n \* - a number to select the directive index\n \*

```

- a number to select the bindingRoot index\n * - and a function to invoke.\n *\n * ## Example\n *\n * const
hostBindingOpCodes = [\n * ~30, // Select element 30\n * 40, 45, MyDir.dir.hostBindings //
Invoke host bindings on MyDir on element 30;\n *
// directiveIdx = 40; bindingRootIdx = 45;\n * 50, 55, OtherDir.dir.hostBindings // Invoke host bindings on
OtherDir on element 30\n * // directiveIdx = 50; bindingRootIdx = 55;\n * ]\n *\n * ## Pseudocode\n *\n * const hostBindingOpCodes = tView.hostBindingOpCodes;\n * if (hostBindingOpCodes
=== null) return;\n * for (let i = 0; i < hostBindingOpCodes.length; i++) {\n * const opCode =
hostBindingOpCodes[i] as number;\n * if (opCode < 0) {\n * // Negative numbers are element indexes.\n *
setSelectedIndex(~opCode);\n * } else {\n * // Positive numbers are NumberTuple which store
bindingRootIndex and directiveIndex.\n * const directiveIdx = opCode;\n * const bindingRootIdx =
hostBindingOpCodes[++i] as number;\n * const hostBindingFn = hostBindingOpCodes[++i] as
HostBindingsFunction<any>;\n * setBindingRootForHostBindings(bindingRootIdx, directiveIdx);\n * const
context = IView[directiveIdx];\n *
hostBindingFn(RenderFlags.Update, context);\n * }\n * }\n * }\n * }\n * ^nextport interface
HostBindingOpCodes extends Array<number|HostBindingsFunction<any>> {\n * __brand__:
'HostBindingOpCodes';\n * debug?: string[];\n * }\n * }\n * Explicitly marks `TView` as a specific type in
`ngDevMode`\n * It is useful to know conceptually what time of `TView` we are dealing with when\n *
debugging an application (even if the runtime does not need it.) For this reason\n * we store this information in the
`ngDevMode` `TView` and then use it for\n * better debugging experience.\n * ^nextport const enum TViewType {\n *
/**\n * Root `TView` is the used to bootstrap components into. It is used in conjunction with\n * `LView` which
takes an existing DOM node not owned by Angular and wraps it in `TView`/`LView`\n * so that other components
can be loaded into it.\n * ^\n * Root = 0,\n * /**\n * `TView` associated with a Component. This would be the
`TView` directly associated with the\n *
component view (as opposed an `Embedded` `TView` which would be a child of `Component` `TView`)\n * ^\n *
Component = 1,\n * /**\n * `TView` associated with a template. Such as `ngIf`, `` etc... A
`Component`\n * can have zero or more `Embedded` `TView`s.\n * ^\n * Embedded = 2,\n * /**\n * Converts
`TViewType` into human readable text.\n * Make sure this matches with `TViewType`\n * ^nextport const
TViewTypeAsString = [\n * 'Root', // 0\n * 'Component', // 1\n * 'Embedded', // 2\n * ] as const;\n * /**\n * The
static data for an LView (shared between all templates of a\n * given type).\n * Stored on the
`ComponentDef.tView`.\n * ^nextport interface TView {\n * /**\n * Type of `TView`
(`Root`|`Component`|`Embedded`).\n * ^\n * type: TViewType;\n * /**\n * This is a blueprint used to generate
LView instances for this TView. Copying this\n * blueprint is faster than creating a new LView from scratch.\n *
^\n * blueprint: LView;\n * /**\n * The template
function used to refresh the view of dynamically created views\n * and components. Will be null for inline
views.\n * ^\n * template: ComponentTemplate<{}>|null;\n * /**\n * A function containing query-related
instructions.\n * ^\n * viewQuery: ViewQueriesFunction<{}>|null;\n * /**\n * A `TNode` representing the
declaration location of this `TView` (not part of this TView).\n * ^\n * declTNode: TNode|null;\n * //
FIXME(misko): Why does `TView` not have `declarationTView` property?\n * /** Whether or not this template
has been processed in creation mode. ^\n * firstCreatePass: boolean;\n * /**\n * Whether or not this template has
been processed in update mode (e.g. change detected)\n * ^\n * `firstUpdatePass` is used by styling to set up
`TData` to contain metadata about the styling\n * instructions. (Mainly to build up a linked list of styling priority
order.)\n * ^\n * Typically this function gets cleared after first execution. If exception is thrown then this\n *
flag can remain turned un until there is first successful (no exception) pass. This means that\n * individual
styling instructions keep track of if they have already been added to the linked\n * list to prevent double adding.\n *
^\n * firstUpdatePass: boolean;\n * /** Static data equivalent of LView.data[]. Contains TNodes, PipeDefInternal or
TI18n.\n * ^\n * data: TData;\n * /**\n * The binding start index is the index at which the data array\n * starts to store
bindings only. Saving this value ensures that we\n * will begin reading bindings at the correct point in the array
when\n * we are in update mode.\n * ^\n * -1 means that it has not been initialized.\n * ^\n * bindingStartIndex:

```

number;\n\n /\*\*\n \* The index where the \"expando\" section of `LView` begins. The expando\n \* section contains injectors, directive instances, and host binding values.\n \* Unlike the \"decls\" and \"vars\" sections of `LView`, the length of this\n \* section cannot be calculated at compile-time because directives are matched\n \* at runtime to preserve locality.\n \*\n \* We store this start index so we know where to start checking host bindings\n \* in `setHostBindings`.\n \*/\n expandoStartIndex: number;\n\n /\*\*\n \* Whether or not there are any static view queries tracked on this view.\n \*\n \* We store this so we know whether or not we should do a view query\n \* refresh after creation mode to collect static query results.\n \*/\n staticViewQueries: boolean;\n\n /\*\*\n \* Whether or not there are any static content queries tracked on this view.\n \*\n \* We store this so we know whether or not we should do a content query\n \* refresh after creation mode to collect static query results.\n \*/\n staticContentQueries: boolean;\n\n /\*\*\n \* A reference to the first child node located in the view.\n \*/\n firstChild: TNode|null;\n\n /\*\*\n \* Stores the OpCodes to be replayed during change-detection to process the `HostBindings`\n \*\n \* See `HostBindingOpCodes` for encoding details.\n \*/\n hostBindingOpCodes: HostBindingOpCodes|null;\n\n /\*\*\n \* Full registry of directives and components that may be found in this view.\n \*\n \* It's necessary to keep a copy of the full def list on the TView so it's possible\n \* to render template functions without a host component.\n \*/\n directiveRegistry: DirectiveDefList|null;\n\n /\*\*\n \* Full registry of pipes that may be found in this view.\n \*\n \* The property is either an array of `PipeDefs`'s or a function which returns the array of\n \* `PipeDefs`'s. The function is necessary to be able to support forward declarations.\n \*\n \* It's necessary to keep a copy of the full def list on the TView so it's possible\n \* to render template functions without a host component.\n \*/\n pipeRegistry: PipeDefList|null;\n\n /\*\*\n \* Array of ngOnInit, ngOnChanges and ngDoCheck hooks that should be executed for this view in\n \* creation mode.\n \*\n \* This array has a flat structure and contains TNode indices, directive indices (where an\n \* instance can be found in `LView`) and hook functions. TNode index is followed by the directive\n \* index and a hook function. If there are multiple hooks for a given TNode, the TNode index is\n \* not repeated and the next lifecycle hook information is stored right after the previous hook\n \* function. This is done so that at runtime the system can efficiently iterate over all of the\n \* functions to invoke without having to make any decisions/lookups.\n \*/\n preOrderHooks: HookData|null;\n\n /\*\*\n \* Array of ngOnChanges and ngDoCheck hooks that should be executed for this view in update mode.\n \*\n \* This array has the same structure as the `preOrderHooks` one.\n \*/\n preOrderCheckHooks: HookData|null;\n\n /\*\*\n \* Array of ngAfterContentInit and ngAfterContentChecked hooks that should be executed\n \* for this view in creation mode.\n \*/\n evenIndices: Directive index\n \* Odd indices: Hook function\n \*/\n contentHooks: HookData|null;\n\n /\*\*\n \* Array of ngAfterContentChecked hooks that should be executed for this view in update\n \* mode.\n \*/\n evenIndices: Directive index\n \* Odd indices: Hook function\n \*/\n contentCheckHooks: HookData|null;\n\n /\*\*\n \* Array of ngAfterViewInit and ngAfterViewChecked hooks that should be executed for\n \* this view in creation mode.\n \*/\n \* Even indices: Directive index\n \* Odd indices: Hook function\n \*/\n viewHooks: HookData|null;\n\n /\*\*\n \* Array of ngAfterViewChecked hooks that should be executed for this view in\n \* update mode.\n \*/\n \* Even indices: Directive index\n \* Odd indices: Hook function\n \*/\n viewCheckHooks: HookData|null;\n\n /\*\*\n \* Array of ngOnDestroy hooks that should be executed when this view is destroyed.\n \*/\n \* Even indices: Directive index\n \* Odd indices: Hook function\n \*/\n destroyHooks: DestroyHookData|null;\n\n /\*\*\n \* When a view is destroyed, listeners need to be released and outputs need to be\n \* unsubscribed. This cleanup array stores both listener data (in chunks of 4)\n \* and output data (in chunks of 2) for a particular view. Combining the arrays\n \* saves on memory (70 bytes per array) and on a few bytes of code size (for two\n \* separate for loops).\n \*\n \* If it's a native DOM listener or output subscription being stored:\n \* 1st index is: event name `name = tView.cleanup[i+0]`\n \* 2nd index is: index of native element or a function that retrieves global target (window,\n \* document or body) reference based on the native element:\n \* `typeof idxOrTargetGetter === 'function': global target getter function`\n \* `typeof idxOrTargetGetter === 'number': index of native element`\n \* 3rd index is: index of listener function `listener = IView[CLEANUP][tView.cleanup[i+2]]`\n \* 4th index is: `useCaptureOrIdx = tView.cleanup[i+3]`\n \*



```

`typeof useCaptureOrIndx === 'boolean' : useCapture boolean\n * `typeof useCaptureOrIndx === 'number':\n *
`useCaptureOrIndx >= 0` removeListener = LView[CLEANUP][useCaptureOrIndx]`\n *
`useCaptureOrIndx < 0` `subscription = LView[CLEANUP][-useCaptureOrIndx]`\n * \n * If it's an output
subscription or query list destroy hook:\n * 1st index is: output unsubscribe function / query list destroy function\n
* 2nd index is: index of function context in LView.cleanupInstances[]\n *
`tView.cleanup[i+0].call(IView[CLEANUP][tView.cleanup[i+1]])`\n * \n cleanup: any[]|null;\n\n /**\n * A list
of element indices for child components that will need to be\n * refreshed when the current view has finished its
check. These indices have\n * already been adjusted for the HEADER_OFFSET.\n * \n * \n components:
number[]|null;\n\n /**\n * A collection of queries tracked in a given view.\n * \n queries: TQueries|null;\n\n
/**\n * An array
of indices pointing to directives with content queries alongside with the\n * corresponding query index. Each entry
in this array is a tuple of:\n * - index of the first content query index declared by a given directive;\n * - index of a
directive.\n * \n * We are storing those indexes so we can refresh content queries as part of a view refresh\n *
process.\n * \n contentQueries: number[]|null;\n\n /**\n * Set of schemas that declare elements to be allowed
inside the view.\n * \n schemas: SchemaMetadata[]|null;\n\n /**\n * Array of constants for the view. Includes
attribute arrays, local definition arrays etc.\n * \n Used for directive matching, attribute bindings, local definitions and
more.\n * \n consts: TConstants|null;\n\n /**\n * Indicates that there was an error before we managed to
complete the first create pass of the\n * view. This means that the view is likely corrupted and we should try to
recover it.\n * \n incompleteFirstPass: boolean;\n}\n\n/**
Single hook callback function. \n\nexport type HookFn = () => void;\n\n/**\n * Information necessary to call a
hook. E.g. the callback that\n * needs to be invoked and the index at which to find its context.\n * \n\nexport type
HookEntry = number|HookFn;\n\n/**\n * Array of hooks that should be executed for a view and their directive
indices.\n * \n * For each node of the view, the following data is stored:\n * 1) Node index (optional)\n * 2) A series
of number/function pairs where:\n * - even indices are directive indices\n * - odd indices are hook functions\n * \n *
Special cases:\n * - a negative directive index flags an init hook (ngOnInit, ngAfterContentInit, ngAfterViewInit)\n
*\n\nexport type HookData = HookEntry[];\n\n/**\n * Array of destroy hooks that should be executed for a view and
their directive indices.\n * \n * The array is set up as a series of number/function or number/(number|function)[]:\n *
- Even indices represent the context with which hooks should be called.\n
* - Odd indices are the hook functions themselves. If a value at an odd index is an array,\n * it represents the
destroy hooks of a `multi` provider where:\n * - Even indices represent the index of the provider for which we've
registered a destroy hook,\n * inside of the `multi` provider array.\n * - Odd indices are the destroy hook
functions.\n * For example:\n * LView: `[0, 1, 2, AService, 4, [BService, CService, DService]]`\n * destroyHooks:
`[3, AService.ngOnDestroy, 5, [0, BService.ngOnDestroy, 2, DService.ngOnDestroy]]`\n * \n * In the example
above `AService` is a type provider with an `ngOnDestroy`, whereas `BService`,\n * `CService` and `DService` are
part of a `multi` provider where only `BService` and `DService`\n * have an `ngOnDestroy` hook.\n * \n\nexport type
DestroyHookData = (HookEntry|HookData)[];\n\n/**\n * Static data that corresponds to the instance-specific data
array on an LView.\n * \n * Each node's static data is stored in tData at the same index
that it's stored\n * in the data array. Any nodes that do not have static data store a null value in\n * tData to avoid a
sparse array.\n * \n * Each pipe's definition is stored here at the same index as its pipe instance in\n * the data
array.\n * \n * Each host property's name is stored here at the same index as its value in the\n * data array.\n * \n *
Each property binding name is stored here at the same index as its value in\n * the data array. If the binding is an
interpolation, the static string values\n * are stored parallel to the dynamic values. Example:\n * \n * id="prefix { {
v0 } } a { { v1 } } b { { v2 } } suffix"\n * \n * LView | TView.data\n * -----*\n * v0 value | 'a'\n *
v1 value | 'b'\n * v2 value | id prefix suffix\n * \n * Injector bloom filters are also stored here.\n * \n\nexport type
TData = (TNode|PipeDef<any>|DirectiveDef<any>|ComponentDef<any>|number|TStylingRange|\n
TStylingKey|ProviderToken<any>|TI18n|I18nUpdateOpCodes|Ticu|null|string)[];\n\n//
Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure based on types.\n\nexport
const unusedValueExportToPlacateAjd = 1;\n\n/**\n * Human readable version of the `LView`.\n * \n * `LView` is

```

a data structure used internally to keep track of views. The `LView` is designed for efficiency and so at times it is difficult to read or write tests which assert on its values. For this reason when `ngDevMode` is true we patch a `LView.debug` property which points to `LViewDebug` for easier debugging and test writing. It is the intent of `LViewDebug` to be used in tests.

```

export interface LViewDebug<T = unknown> {
  /**
   * Flags associated with the `LView` unpacked into a more readable state.
   * See `LViewFlags` for the flag meanings.
   * readonly flags: {
    initPhaseState: number,
    creationMode: boolean,
    firstViewPass: boolean,
    checkAlways: boolean,
    dirty: boolean,
    attached: boolean,
    destroyed: boolean,
    isRoot: boolean,
    indexWithinInitPhase: number,
  };
  /**
   * Associated TView
   * readonly tView: TView;
  /**
   * Parent view (or container)
   * readonly parent: LViewDebug|LContainerDebug|null;
  /**
   * Next sibling to the `LView`.
   * readonly next: LViewDebug|LContainerDebug|null;
  /**
   * The context used for evaluation of the `LView`
   * (Usually the component)
   * readonly context: T;
  /**
   * Hierarchical tree of nodes.
   * readonly nodes: DebugNode[];
  /**
   * Template structure (no instance data).
   * (Shows how TNodes are connected)
   * readonly template: string;
  /**
   * HTML representation of the `LView`.
   * This is only approximate to actual HTML as child `LView`s are removed.
   * readonly html: string;
  /**
   * The host element to which this `LView` is attached.
   * readonly hostHTML: string|null;

  /**
   * Child `LView`s
   * readonly childViews: Array<LViewDebug|LContainerDebug>;
  /**
   * Sub range of `LView` containing decls (DOM elements).
   * readonly decls: LViewDebugRange;
  /**
   * Sub range of `LView` containing vars (bindings).
   * readonly vars: LViewDebugRange;
  /**
   * Sub range of `LView` containing expando (used by DI).
   * readonly expando: LViewDebugRange;
}

```

The `LContainer` is a data structure used internally to keep track of child views. The `LContainer` is designed for efficiency and so at times it is difficult to read or write tests which assert on its values. For this reason when `ngDevMode` is true we patch a `LContainer.debug` property which points to `LContainerDebug` for easier debugging and test writing. It is the intent of `LContainerDebug` to be used in tests.

```

export interface LContainerDebug {
  /**
   * Child `LView`s.
   * readonly views: LViewDebug[];
  /**
   * Parent: LViewDebug|null;
  /**
   * movedViews: LView[]|null;
  /**
   * host: RElement|RComment|LView;
  /**
   * next: LViewDebug|LContainerDebug|null;
  /**
   * hasTransplantedViews: boolean;
}

```

The `LView` is subdivided to ranges where the actual data is stored. Some of these ranges such as `decls` and `vars` are known at compile time. Other such as `i18n` and `expando` are runtime only concepts.

```

export interface LViewDebugRange {
  /**
   * The starting index in `LView` where the range begins. (Inclusive)
   * start: number;
  /**
   * The ending index in `LView` where the range ends. (Exclusive)
   * end: number;
  /**
   * The length of the range
   * length: number;
  /**
   * The merged content of the range. `t` contains data from `TView.data` and `l` contains `LView` data at an index.
   * content: LViewDebugRangeContent[];
}

```

For convenience the static and instance portions of `TView` and `LView` are merged into a single object in `LViewRange`.

```

export interface LViewDebugRangeContent {
  /**
   * Index into original `LView` or `TView.data`.
   * index: number;
  /**
   * Value from the `TView.data[index]` location.
   * t: any;
  /**
   * Value from the `LView[index]` location.
   * l: any;
}

```

A logical node which comprise into `LView`s.

```

export interface DebugNode {
  /**
   * HTML representation of the node.
   * html: string|null;
  /**
   * Associated `TNode`
   * tNode: TNode;
  /**
   * Human readable node type.
   * type: string;
  /**
   * DOM native node.
   * native: Node;
  /**
   * Child nodes
   * children: DebugNode[];
  /**
   * A list of Component/Directive types which need to be instantiated an this location.
   * factories: Type<unknown>[];
  /**
   * A list of Component/Directive instances which were instantiated an this location.
   * instances: unknown[];
  /**
   * NodeInjector information.
   * injector: NodeInjectorDebug;
  /**
   * Injector resolution path.
   * injectorResolutionPath: any;
}

```

```

export interface NodeInjectorDebug {
  /**
   * Instance bloom. Does the current injector have a provider with a given bloom mask.
   * bloom: string;
  /**
   * Cumulative bloom.

```

```

Do any of the above injectors have a provider with a given bloom mask.\n */\n cumulativeBloom: string;\n\n
/**\n * A list of providers associated with this injector.\n */\n providers:
(Type<unknown>|DirectiveDef<unknown>|ComponentDef<unknown>)[];\n\n /**\n * A list of providers
associated with this injector visible to the view of the component only.\n */\n viewProviders:
Type<unknown>[];\n\n /**\n * Location of the parent `TNode`.\n */\n parentInjectorIndex:
number;\n}\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {TNode} from './node';\nimport {RComment,
RElement} from './render_dom';\nimport {HOST, LView, NEXT, PARENT, T_HOST,
TRANSPLANTED_VIEWS_TO_REFRESH} from './view';\n\n\n/**\n * Special location which allows easy
identification of type. If we have an array which was\n * retrieved from the `LView` and that array has `true` at
`TYPE` location, we know it is\n * `LContainer`.\n */\n\nexport const TYPE = 1;\n\n/**\n * Below are constants for
LContainer indices to help us look up LContainer members\n * without having to remember the specific indices.\n */
Uglify will inline these when minifying so there shouldn't be a cost.\n */\n\n/**\n * Flag to signify that this
`LContainer` may have transplanted views which need to be change\n * detected. (see:
`LView[DECLARATION_COMPONENT_VIEW]`).\n */\n\n * This flag, once set,
is never unset for the `LContainer`. This means that when unset we can skip\n * a lot of work in
`refreshEmbeddedViews`. But when set we still need to verify\n * that the `MOVED_VIEWS` are transplanted and
on-push.\n */\n\nexport const HAS_TRANSPLANTED_VIEWS = 2;\n\n// PARENT, NEXT,
TRANSPLANTED_VIEWS_TO_REFRESH are indices 3, 4, and 5\n// As we already have these constants in
LView, we don't need to re-create them.\n\n// T_HOST is index 6\n// We already have this constants in LView, we
don't need to re-create it.\n\nexport const NATIVE = 7;\nexport const VIEW_REFS = 8;\nexport const
MOVED_VIEWS = 9;\n\n\n/**\n * Size of LContainer's header. Represents the index after which all views in the\n
* container will be inserted. We need to keep a record of current views so we know\n * which views are already in
the DOM (and don't need to be re-added) and so we can\n * remove views from the DOM when they are no longer
required.\n */\n\nexport const CONTAINER_HEADER_OFFSET = 10;\n\n\n/**\n * The state
associated with a container.\n */\n\n * This is an array so that its structure is closer to LView. This helps\n * when
traversing the view tree (which is a mix of containers and component\n * views), so we can jump to
viewOrContainer[NEXT] in the same way regardless\n * of type.\n */\n\nexport interface LContainer extends
Array<any> {\n\n /**\n * The host element of this LContainer.\n */\n\n * The host could be an LView if this
container is on a component node.\n * In that case, the component LView is its HOST.\n */\n\n readonly[HOST]:
RElement|RComment|LView;\n\n /**\n * This is a type field which allows us to differentiate `LContainer` from
`StylingContext` in an\n * efficient way. The value is always set to `true`\n */\n\n [TYPE]: true;\n\n /**\n * Flag
to signify that this `LContainer` may have transplanted views which need to be change\n * detected. (see:
`LView[DECLARATION_COMPONENT_VIEW]`).\n */\n\n * This flag, once set, is never unset for the
`LContainer`.\n */\n\n [HAS_TRANSPLANTED_VIEWS]: boolean;\n\n /**\n * Access to the parent view is necessary so we can
propagate back\n * up from inside a container to parent[NEXT].\n */\n\n [PARENT]: LView;\n\n /**\n * This
allows us to jump from a container to a sibling container or component\n * view with the same parent, so we can
remove listeners efficiently.\n */\n\n [NEXT]: LView|LContainer|null;\n\n /**\n * The number of direct
transplanted views which need a refresh or have descendants themselves\n * that need a refresh but have not
marked their ancestors as Dirty. This tells us that during\n * change detection we should still descend to find those
children to refresh, even if the parents\n * are not `Dirty`/`CheckAlways`.\n */\n\n [TRANSPLANTED_VIEWS_TO_REFRESH]: number;\n\n /**\n * A collection of views created based on the
underlying `` element but inserted into\n * a different `LContainer`. We need to track views created
from a given declaration point
since\n * queries collect matches from the embedded view declaration point and _not_ the insertion point.\n */\n\n [MOVED_VIEWS]: LView[]|null;\n\n /**\n * Pointer to the `TNode` which represents the host of the container.\n

```

```

*\n [T_HOST]: TNode;\n\n /** The comment element that serves as an anchor for this LContainer. *\n
readonly[NATIVE]:\n    RComment; // TODO(misko): remove as this value can be gotten by unwrapping
`[HOST]`\n\n /**\n * Array of `ViewRef`s used by any `ViewContainerRef`s that point to this container.\n * \n
* This is lazily initialized by `ViewContainerRef` when the first view is inserted.\n * \n * NOTE: This is stored as
`any[]` because render3 should really not be aware of `ViewRef` and\n * doing so creates circular dependency.\n
*\n [VIEW_REFS]: unknown[]|null;\n}\n\n// Note: This hack is necessary so we don't erroneously get a circular
dependency\n// failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n", "/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\nimport
{LContainer, TYPE} from './container';\nimport {ComponentDef, DirectiveDef} from './definition';\nimport
{TNode, TNodeFlags} from './node';\nimport {RNode} from './renderer_dom';\nimport {FLAGS, LView,
LViewFlags} from './view';\n\n/**\n * True if `value` is `LView`.\n * \n * @param value wrapped value of `RNode`,
`LView`, `LContainer`\n * \n\nexport function isLView(value: RNode|LView|LContainer|{}|null): value is LView {\n
return Array.isArray(value) && typeof value[TYPE] === 'object';\n}\n\n/**\n * True if `value` is `LContainer`.\n *
\n * @param value wrapped value of `RNode`, `LView`, `LContainer`\n * \n\nexport function isLContainer(value:
RNode|LView|LContainer|{}|null): value is LContainer {\n return Array.isArray(value) && value[TYPE] ===
true;\n}\n\nexport function isContentQueryHost(tNode:
TNode): boolean {\n return (tNode.flags & TNodeFlags.hasContentQuery) !== 0;\n}\n\nexport function
isComponentHost(tNode: TNode): boolean {\n return (tNode.flags & TNodeFlags.isComponentHost) ===
TNodeFlags.isComponentHost;\n}\n\nexport function isDirectiveHost(tNode: TNode): boolean {\n return
(tNode.flags & TNodeFlags.isDirectiveHost) === TNodeFlags.isDirectiveHost;\n}\n\nexport function
isComponentDef<T>(def: DirectiveDef<T>): def is ComponentDef<T> {\n return (def as
ComponentDef<T>).template !== null;\n}\n\nexport function isRootView(target: LView): boolean {\n return
(target[FLAGS] & LViewFlags.IsRoot) !== 0;\n}\n", "/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n * \n\nimport {assertDefined, assertEqual, assertNumber, throwError}
from './util/assert';\nimport {getComponentDef, getNgModuleDef} from './definition';\nimport
{LContainer} from './interfaces/container';\nimport {DirectiveDef} from './interfaces/definition';\nimport {Ticu}
from './interfaces/i18n';\nimport {NodeInjectorOffset} from './interfaces/injector';\nimport {TNode} from
'./interfaces/node';\nimport {isLContainer, isLView} from './interfaces/type_checks';\nimport
{DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LView, T_HOST, TVIEW, TView} from
'./interfaces/view';\n\n// [Assert functions do not constraint type when they are guarded by a truthy\n//
expression.](https://github.com/microsoft/TypeScript/issues/37295)\n\nexport function
assertTNodeForLView(tNode: TNode, lView: LView) {\n assertTNodeForTView(tNode,
lView[TVIEW]);\n}\n\nexport function assertTNodeForTView(tNode: TNode, tView: TView) {\n
assertTNode(tNode);\n tNode.hasOwnProperty('tView_') &&\n assertEqual(\n (tNode as any as {tView_:
TView}).tView_, tView,\n 'This TNode does not belong to this TView.);\n}\n\nexport function
assertTNode(tNode:
TNode) {\n assertDefined(tNode, 'TNode must be defined');\n if (!(tNode && typeof tNode === 'object' &&
tNode.hasOwnProperty('directiveStylingLast'))) {\n throwError('Not of type TNode, got: ' + tNode);\n
}\n}\n\nexport function assertTicu(tIcu: Ticu) {\n assertDefined(tIcu, 'Expected Ticu to be defined');\n if
(!(typeof tIcu.currentCaseLViewIndex === 'number')) {\n throwError('Object is not of Ticu type.);\n
}\n}\n\nexport function assertComponentType(\n actual: any,\n msg: string = 'Type passed in is not
ComponentType, it does not have `cmp` property.){\n if (!getComponentDef(actual)) {\n throwError(msg);\n
}\n}\n\nexport function assertNgModuleType(\n actual: any,\n msg: string = 'Type passed in is not
NgModuleType, it does not have `mod` property.){\n if (!getNgModuleDef(actual)) {\n throwError(msg);\n
}\n}\n\nexport function assertCurrentTNodeIsParent(isParent: boolean) {\n assertEqual(isParent, true,
'currentTNode should

```

```

be a parent');\n}\n\nexport function assertHasParent(tNode: TNode|null) {\n  assertDefined(tNode, 'currentTNode
should exist!');\n  assertDefined(tNode!.parent, 'currentTNode should have a parent');\n}\n\nexport function
assertDataNext(IView: LView, index: number, arr?: any[]) {\n  if (arr == null) arr = IView;\n  assertEquals(\n
arr.length, index, `index ${index} expected to be at the end of arr (length ${arr.length})`);\n}\n\nexport function
assertLContainer(value: any): asserts value is LContainer {\n  assertDefined(value, 'LContainer must be defined');\n
assertEquals(isLContainer(value), true, 'Expecting LContainer');\n}\n\nexport function
assertLViewOrUndefined(value: any): asserts value is LView|null|undefined {\n  value &&
assertEquals(isLView(value), true, 'Expecting LView or undefined or null');\n}\n\nexport function
assertLView(value: any): asserts value is LView {\n  assertDefined(value, 'LView must be defined');\n
assertEquals(isLView(value), true, 'Expecting LView');\n}\n\nexport
function assertFirstCreatePass(tView: TView, errMessage?: string) {\n  assertEquals(\n    tView.firstCreatePass,
true, errMessage || 'Should only be called in first create pass.);\n}\n\nexport function assertFirstUpdatePass(tView:
TView, errMessage?: string) {\n  assertEquals(\n    tView.firstUpdatePass, true, errMessage || 'Should only be called
in first update pass.);\n}\n\n/**\n * This is a basic sanity check that an object is probably a directive def.
DirectiveDef is\n * an interface, so we can't do a direct instanceof check.\n */\nexport function
assertDirectiveDef<T>(obj: any): asserts obj is DirectiveDef<T> {\n  if (obj.type === undefined || obj.selectors ==
undefined || obj.inputs === undefined) {\n    throwError(\n      `Expected a DirectiveDef/ComponentDef and this
object does not seem to have the expected shape.`);\n  }\n}\n\nexport function assertIndexInDeclRange(IView:
LView, index: number) {\n  const tView = IView[1];\n  assertBetween(HEADER_OFFSET,
tView.bindingStartIndex,
index);\n}\n\nexport function assertIndexInVarsRange(IView: LView, index: number) {\n  const tView =
IView[1];\n  assertBetween(tView.bindingStartIndex, tView.expandoStartIndex, index);\n}\n\nexport function
assertIndexInExpandoRange(IView: LView, index: number) {\n  const tView = IView[1];\n
assertBetween(tView.expandoStartIndex, IView.length, index);\n}\n\nexport function assertBetween(lower:
number, upper: number, index: number) {\n  if (!(lower <= index && index < upper)) {\n    throwError(`Index out
of range (expecting ${lower} <= ${index} < ${upper})`);\n  }\n}\n\nexport function assertProjectionSlots(IView:
LView, errMessage?: string) {\n  assertDefined(IView[DECLARATION_COMPONENT_VIEW], 'Component
views should exist.);\n  assertDefined(\n
IView[DECLARATION_COMPONENT_VIEW][T_HOST]!.projection,\n    errMessage ||\n      'Components
with projection nodes (<ng-content>) must have projection slots defined.);\n}\n\nexport function
assertParentView(IView:
LView|null, errMessage?: string) {\n  assertDefined(\n    IView,\n    errMessage || 'Component views should
always have a parent view (component\\'s host view));\n}\n\n/**\n * This is a basic sanity check that the
`injectorIndex` seems to point to what looks like a\n * NodeInjector data structure.\n * @param IView `LView`
which should be checked.\n * @param injectorIndex index into the `LView` where the `NodeInjector` is expected.\n
*/\nexport function assertNodeInjector(IView: LView, injectorIndex: number) {\n
assertIndexInExpandoRange(IView, injectorIndex);\n  assertIndexInExpandoRange(IView, injectorIndex +
NodeInjectorOffset.PARENT);\n  assertNumber(IView[injectorIndex + 0], 'injectorIndex should point to a bloom
filter');\n  assertNumber(IView[injectorIndex + 1], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 2], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 3], 'injectorIndex should
point to a bloom filter');\n  assertNumber(IView[injectorIndex + 4], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 5], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 6], 'injectorIndex should point to a bloom filter');\n
assertNumber(IView[injectorIndex + 7], 'injectorIndex should point to a bloom filter');\n  assertNumber(\n
IView[injectorIndex + NodeInjectorOffset.PARENT],\n    'injectorIndex should point to parent
injector');\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n

```

```

*\n\nimport {Type} from './interface/type';\nimport {stringify} from './util/stringify';\nimport
{NG_FACTORY_DEF} from './fields';\n\n/**\n * Definition of what a factory function should look like.\n
*\n\nexport type FactoryFn<T> = {\n /**\n * Subclasses without
an explicit constructor call through to the factory of their base\n * definition, providing it with their own
constructor to instantiate.\n *\n <U extends T>(t?: Type<U>): U;\n\n /**\n * If no constructor to instantiate is
provided, an instance of type T itself is created.\n *\n (t?: undefined): T;};\n\n\nexport function
getFactoryDef<T>(type: any, throwNotFound: true): FactoryFn<T>;\nexport function getFactoryDef<T>(type:
any): FactoryFn<T>|null;\nexport function getFactoryDef<T>(type: any, throwNotFound?: boolean):
FactoryFn<T>|null {\n const hasFactoryDef = type.hasOwnProperty(NG_FACTORY_DEF);\n if (!hasFactoryDef
&& throwNotFound === true && ngDevMode) {\n throw new Error(`Type ${stringify(type)} does not have 'fac'
property.`);\n }\n return hasFactoryDef ? type[NG_FACTORY_DEF] : null;};\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE
file at https://angular.io/license\n *\n\n/**\n * Represents a basic change from a previous to a new value for a
single\n * property on a directive instance. Passed as a value in a\n * {@link SimpleChanges} object to the
`ngOnChanges` hook.\n *\n * @see `OnChanges`\n *\n * @publicApi\n *\n\nexport class SimpleChange {\n
constructor(public previousValue: any, public currentValue: any, public firstChange: boolean) {\n /**\n * Check
whether the new value is the first value assigned.\n *\n isFirstChange(): boolean {\n return this.firstChange;\n
}\n}\n\n/**\n * A hashtable of changes represented by {@link SimpleChange} objects stored\n * at the declared
property name they belong to on a Directive or Component. This is\n * the type passed to the `ngOnChanges`
hook.\n *\n * @see `OnChanges`\n *\n * @publicApi\n *\n\nexport interface SimpleChanges {\n [propName:
string]: SimpleChange;};\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {OnChanges} from './../interface/lifecycle_hooks';\nimport {SimpleChange, SimpleChanges} from
'./../interface/simple_change';\nimport {EMPTY_OBJ} from './../util/empty';\nimport {DirectiveDef,
DirectiveDefFeature} from './interfaces/definition';\n\n/**\n * The NgOnChangesFeature decorates a component
with support for the ngOnChanges\n * lifecycle hook, so it should be included in any component that implements\n
* that hook.\n *\n * If the component or directive uses inheritance, the NgOnChangesFeature MUST\n * be included
as a feature AFTER {@link InheritDefinitionFeature}, otherwise\n * inherited properties will not be propagated to
the ngOnChanges lifecycle\n * hook.\n *\n * Example usage:\n *\n * ```\n * static cmp = defineComponent({\n *
... \n * inputs: {name: 'publicName'},\n * features: [NgOnChangesFeature]\n * });\n * ```\n *\n * @codeGenApi\n
*\n\nexport function NgOnChangesFeature<T>(): DirectiveDefFeature {\n return
NgOnChangesFeatureImpl;};\n\n\nexport function NgOnChangesFeatureImpl<T>(definition: DirectiveDef<T>) {\n
if (definition.type.prototype.ngOnChanges) {\n definition.setInput = ngOnChangesSetInput;\n }\n return
rememberChangeHistoryAndInvokeOnChangesHook;};\n\n\n// This option ensures that the ngOnChanges lifecycle
hook will be inherited\n// from superclasses (in InheritDefinitionFeature).\n/** @nocollapse */\n// tslint:disable-
next-line:no-toplevel-property-access\n(NgOnChangesFeature as DirectiveDefFeature).ngInherit = true;\n\n/**\n *
This is a synthetic lifecycle hook which gets inserted into `TVIEW.preOrderHooks` to simulate\n *
`ngOnChanges`.\n *\n * The hook reads the `NgSimpleChangesStore` data from the component instance and if
changes are\n * found it invokes `ngOnChanges` on the component instance.\n *\n * @param this Component
instance. Because this function gets inserted into `TVIEW.preOrderHooks`,\n
* it is guaranteed to be called with component instance.\n *\n\nfunction
rememberChangeHistoryAndInvokeOnChangesHook(this: OnChanges) {\n const simpleChangesStore =
getSimpleChangesStore(this);\n const current = simpleChangesStore?.current;\n\n if (current) {\n const previous
= simpleChangesStore!.previous;\n if (previous === EMPTY_OBJ) {\n simpleChangesStore!.previous =
current;\n } else {\n // New changes are copied to the previous store, so that we don't lose history for inputs\n
// which were not changed this time\n for (let key in current) {\n previous[key] = current[key];\n }\n }\n }\n
}

```

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    simpleChangesStore!.current = null;\n    this.ngOnChanges(current);\n  }\n}\n\nfunction
ngOnChangesSetInput<T>(\n  this: DirectiveDef<T>, instance: T, value: any, publicName: string, privateName:
string): void {\n  const simpleChangesStore = getSimpleChangesStore(instance) ||\n
setSimpleChangesStore(instance, {previous: EMPTY_OBJ,
  current: null});\n  const current = simpleChangesStore.current || (simpleChangesStore.current = {});\n  const
previous = simpleChangesStore.previous;\n\n  const declaredName = (this.declaredInputs as {[key: string]:
string})[publicName];\n  const previousChange = previous[declaredName];\n  current[declaredName] = new
SimpleChange(\n    previousChange && previousChange.currentValue, value, previous === EMPTY_OBJ);\n\n
(instance as any)[privateName] = value;\n}\n\nconst SIMPLE_CHANGES_STORE =
'__ngSimpleChanges__';\n\nfunction getSimpleChangesStore(instance: any): null|NgSimpleChangesStore {\n
return instance[SIMPLE_CHANGES_STORE] || null;\n}\n\nfunction setSimpleChangesStore(instance: any, store:
NgSimpleChangesStore): NgSimpleChangesStore {\n  return instance[SIMPLE_CHANGES_STORE] =
store;\n}\n\n/**\n * Data structure which is monkey-patched on the component instance and used by
`ngOnChanges`\n * life-cycle hook to track previous input values.\n */\ninterface NgSimpleChangesStore
{\n  previous: SimpleChanges;\n  current: SimpleChanges|null;\n}\n\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\n\n * Profiler events is an enum used by the profiler to
distinguish between different calls of user\n * code invoked throughout the application lifecycle.\n */\nexport const
enum ProfilerEvent {\n  /**\n   * Corresponds to the point in time before the runtime has called the template
function of a\n   * component with `RenderFlags.Create`.\n   */\n  TemplateCreateStart,\n  /**\n   * Corresponds to
the point in time after the runtime has called the template function of a\n   * component with
`RenderFlags.Create`.\n   */\n  TemplateCreateEnd,\n  /**\n   * Corresponds to the point in time before the
runtime has called the template function of a\n   * component with `RenderFlags.Update`.\n   */\n
  TemplateUpdateStart,\n  /**\n   * Corresponds to the point in time after the runtime has called the template
function of a\n   * component
with `RenderFlags.Update`.\n   */\n  TemplateUpdateEnd,\n  /**\n   * Corresponds to the point in time before the
runtime has called a lifecycle hook of a component\n   * or directive.\n   */\n  LifecycleHookStart,\n  /**\n   *
Corresponds to the point in time after the runtime has called a lifecycle hook of a component\n   * or directive.\n
   */\n  LifecycleHookEnd,\n  /**\n   * Corresponds to the point in time before the runtime has evaluated an
expression associated with\n   * an event or an output.\n   */\n  OutputStart,\n  /**\n   * Corresponds to the point in
time after the runtime has evaluated an expression associated with\n   * an event or an output.\n   */\n
  OutputEnd,\n}\n\n/**\n * Profiler function which the runtime will invoke before and after user code.\n */\nexport
interface Profiler {\n  (event: ProfilerEvent, instance: {})|null,
  hookOrListener?: (e?: any) => any): void;\n}\n\nlet profilerCallback: Profiler|null = null;\n\n/**\n * Sets the
callback function which will be invoked before and after performing certain actions at\n * runtime (for example,
before and after running change detection).\n */\n * Warning: this function is *INTERNAL* and should not be relied
upon in application's code.\n * The contract of the function might be changed in any release and/or the function can
be removed\n * completely.\n */\n * @param profiler function provided by the caller or null value to disable
profiling.\n */\nexport const setProfiler = (profiler: Profiler|null) => {\n  profilerCallback = profiler;\n};\n\n/**\n *
Profiler function which wraps user code executed by the runtime.\n */\n * @param event ProfilerEvent
corresponding to the execution context\n * @param instance component instance\n * @param hookOrListener
lifecycle hook function or output listener. The value depends on the\n * execution context\n * @returns\n
*/\nexport const profiler: Profiler = function(\n  event: ProfilerEvent, instance: {})|null, hookOrListener?: (e?: any)
=> any) {\n  if (profilerCallback != null /* both `null` and `undefined` */) {\n    profilerCallback(event, instance,
hookOrListener);\n  }\n};\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nexport const SVG_NAMESPACE = 'svg';\nexport const SVG_NAMESPACE_URI
= 'http://www.w3.org/2000/svg';\nexport const MATH_ML_NAMESPACE = 'math';\nexport const

```

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MATH_ML_NAMESPACE_URI = 'http://www.w3.org/1998/MathML/';\n\nexport function
getNamespaceUri(namespace: string): string|null {\n  const name = namespace.toLowerCase();\n  return name ===
SVG_NAMESPACE ? SVG_NAMESPACE_URI :\n                                     (name === MATH_ML_NAMESPACE
? MATH_ML_NAMESPACE_URI : null);\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {assertGreaterThan, assertGreaterThanOrEqual,
assertIndexInRange, assertLessThan} from './util/assert';\nimport {assertTNode, assertTNodeForLView} from
 './assert';\nimport {LContainer, TYPE} from './interfaces/container';\nimport {TConstants, TNode} from
 './interfaces/node';\nimport {RNode} from './interfaces/renderer_dom';\nimport {isLContainer, isLView} from
 './interfaces/type_checks';\nimport {FLAGS, HEADER_OFFSET, HOST, LView, LViewFlags, PARENT,
PREORDER_HOOK_FLAGS, TData, TRANSPLANTED_VIEWS_TO_REFRESH, TView} from
 './interfaces/view';\n\n\n/**\n * For efficiency reasons we often put several different data types (`RNode`,
`LView`, `LContainer`)\n * in same location in `LView`. This is because we don't want to pre-allocate space for it\n
* because the storage is sparse. This file contains utilities
for dealing with such data types.\n * How do we know what is stored at a given location in `LView`.\n * -
`Array.isArray(value) === false` => `RNode` (The normal storage value)\n * - `Array.isArray(value) === true` =>
then the `value[0]` represents the wrapped value.\n * - `typeof value[TYPE] === 'object'` => `LView`\n * - This
happens when we have a component at a given location\n * - `typeof value[TYPE] === true` => `LContainer`\n *
- This happens when we have `LContainer` binding at a given location.\n * \n * NOTE: it is assumed that
`Array.isArray` and `typeof` operations are very efficient.\n * \n\n/**\n * Returns `RNode`.\n * @param value
wrapped value of `RNode`, `LView`, `LContainer`\n */\nexport function unwrapRNode(value:
RNode|LView|LContainer): RNode {\n  while (Array.isArray(value)) {\n    value = value[HOST] as any;\n  }\n  return value as RNode;\n}\n\n/**\n * Returns `LView` or `null` if not found.\n * @param value wrapped value of
`RNode`, `LView`,
`LContainer`\n */\nexport function unwrapLView(value: RNode|LView|LContainer): LView|null {\n  while
(Array.isArray(value)) {\n    // This check is same as `isLView()` but we don't call at as we don't want to call\n
// `Array.isArray()` twice and give JITer more work for inlining.\n    if (typeof value[TYPE] === 'object') return value
as LView;\n    value = value[HOST] as any;\n  }\n  return null;\n}\n\n/**\n * Returns `LContainer` or `null` if not
found.\n * @param value wrapped value of `RNode`, `LView`, `LContainer`\n */\nexport function
unwrapLContainer(value: RNode|LView|LContainer): LContainer|null {\n  while (Array.isArray(value)) {\n    //
This check is same as `isLContainer()` but we don't call at as we don't want to call\n // `Array.isArray()` twice and
give JITer more work for inlining.\n    if (value[TYPE] === true) return value as LContainer;\n    value =
value[HOST] as any;\n  }\n  return null;\n}\n\n/**\n * Retrieves an element value from the provided `viewData`,
by unwrapping\n * from any containers, component views, or style contexts.\n */\nexport function
getNativeByIndex(index: number, IView: LView): RNode {\n  ngDevMode && assertIndexInRange(IView,
index);\n  ngDevMode && assertGreaterThanOrEqual(index, HEADER_OFFSET, 'Expected to be past
HEADER_OFFSET');\n  return unwrapRNode(IView[index]);\n}\n\n/**\n * Retrieve an `RNode` for a given
`TNode` and `LView`.\n * This function guarantees in dev mode to retrieve a non-null `RNode`.\n * \n *
@param tNode\n * @param IView\n */\nexport function getNativeByTNode(tNode: TNode, IView: LView):
RNode {\n  ngDevMode && assertTNodeForLView(tNode, IView);\n  ngDevMode && assertIndexInRange(IView,
tNode.index);\n  const node: RNode = unwrapRNode(IView[tNode.index]);\n  return node;\n}\n\n/**\n * Retrieve
an `RNode` or `null` for a given `TNode` and `LView`.\n * Some `TNode`s don't have associated `RNode`s. For
example `Projection`.\n * \n * @param tNode\n * @param IView\n */\nexport function
getNativeByTNodeOrNull(tNode:
TNode|null, IView: LView): RNode|null {\n  const index = tNode === null ? -1 : tNode.index;\n  if (index !== -1)
{\n    ngDevMode && assertTNodeForLView(tNode!, IView);\n    const node: RNode|null =
unwrapRNode(IView[index]);\n    return node;\n  }\n  return null;\n}\n\n\n// fixme(misko): The return Type should
be `TNode|null`\nexport function getTNode(tView: TView, index: number): TNode {\n  ngDevMode &&

```



```

assertGreaterThan(index, -1, 'wrong index for TNode');\n ngDevMode && assertLessThan(index,
tView.data.length, 'wrong index for TNode');\n const tNode = tView.data[index] as TNode;\n ngDevMode &&
tNode !== null && assertTNode(tNode);\n return tNode;\n}\n\n/** Retrieves a value from any `LView` or `TData`.
*/\nexport function load<T>(view: LView|TData, index: number): T {\n ngDevMode &&
assertIndexInRange(view, index);\n return view[index];\n}\n\nexport function
getComponentLViewByIndex(nodeIndex: number, hostView: LView): LView {\n // Could be an LView
or an LContainer. If LContainer, unwrap to find LView.\n ngDevMode && assertIndexInRange(hostView,
nodeIndex);\n const slotValue = hostView[nodeIndex];\n const IView = isLView(slotValue) ? slotValue :
slotValue[HOST];\n return IView;\n}\n\n/** Checks whether a given view is in creation mode */\nexport function
isCreationMode(view: LView): boolean {\n return (view[FLAGS] & LViewFlags.CreationMode) ===
LViewFlags.CreationMode;\n}\n\n/**\n * Returns a boolean for whether the view is attached to the change
detection tree.\n * \n * Note: This determines whether a view should be checked, not whether it's inserted\n * into a
container. For that, you'll want `viewAttachedToContainer` below.\n */\nexport function
viewAttachedToChangeDetector(view: LView): boolean {\n return (view[FLAGS] & LViewFlags.Attached) ===
LViewFlags.Attached;\n}\n\n/** Returns a boolean for whether the view is attached to a container. */\nexport
function viewAttachedToContainer(view: LView): boolean {\n return
isLContainer(view[PARENT]);\n}\n\n/** Returns a constant from `TConstants` instance. */\nexport function
getConstant<T>(consts: TConstants|null, index: null|undefined): null;\nexport function getConstant<T>(consts:
TConstants, index: number): T|null;\nexport function getConstant<T>(consts: TConstants|null, index:
number|null|undefined): T|null;\nexport function getConstant<T>(consts: TConstants|null, index:
number|null|undefined): T|null {\n if (index === null || index === undefined) return null;\n ngDevMode &&
assertIndexInRange(consts!, index);\n return consts![index] as unknown as T;\n}\n\n/**\n * Resets the pre-order
hook flags of the view.\n * @param IView the LView on which the flags are reset\n */\nexport function
resetPreOrderHookFlags(IView: LView) {\n IView[PREORDER_HOOK_FLAGS] = 0;\n}\n\n/**\n * Updates the
`TRANSPLANTED_VIEWS_TO_REFRESH` counter on the `LContainer` as well as the parents\n * whose\n * 1.
counter goes from 0 to 1, indicating that there is a new child that
has a view to refresh\n * or\n * 2. counter goes from 1 to 0, indicating there are no more descendant views to
refresh\n */\nexport function updateTransplantedViewCount(IContainer: LContainer, amount: 1|- 1) {\n
IContainer[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;\n let viewOrContainer: LView|LContainer =
IContainer;\n let parent: LView|LContainer|null = IContainer[PARENT];\n while (parent !== null &&\n
((amount === 1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH] === 1) ||\n (amount ===
-1 && viewOrContainer[TRANSPLANTED_VIEWS_TO_REFRESH] === 0))) {\n
parent[TRANSPLANTED_VIEWS_TO_REFRESH] += amount;\n viewOrContainer = parent;\n parent =
parent[PARENT];\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {InjectFlags} from './di/interface/injector';\nimport {assertDefined,
assertEqual, assertGreaterThanOrEqual, assertLessThan, assertNotEqual, throwError} from './util/assert';\nimport
{assertLViewOrUndefined, assertTNodeForLView, assertTNodeForTView} from './assert';\nimport {DirectiveDef}
from './interfaces/definition';\nimport {TNode, TNodeType} from './interfaces/node';\nimport {CONTEXT,
DECLARATION_VIEW, HEADER_OFFSET, LView, OpaqueViewState, T_HOST, TData, TVIEW, TView,
TViewType} from './interfaces/view';\nimport {MATH_ML_NAMESPACE, SVG_NAMESPACE} from
'/namespaces';\nimport {getTNode} from './util/view_utils';\n\n/**\n * \n * \n */\ninterface LFrame {\n /**\n * Parent
LFrame.\n * \n * This is needed when `leaveView` is called to restore the previous state.\n * \n parent:
LFrame;\n\n /**\n * Child LFrame.\n * \n * This is used to cache existing LFrames to relieve the memory
pressure.\n * \n child: LFrame|null;\n\n /**\n * State of the current view being processed.\n * \n * An array of
nodes (text, element, container, etc),
pipes, their bindings, and\n * any local variables that need to be stored between invocations.\n * \n IView:
LView;\n\n /**\n * Current `TView` associated with the `LFrame.IView`.\n * \n * One can get `TView` from

```

```

`lFrame[TVIEW]` however because it is so common it makes sense to
 * store it in `lFrame` for perf reasons.
 *
 * tView: TView;
 /**
 * Used to set the parent property when nodes are created and track query results.
 *
 * This is used in conjunction with `isParent`.
 * currentTNode: TNode|null;
 /**
 * If `isParent`
 is:
 * - `true`: then `currentTNode` points to a parent node.
 * - `false`: then `currentTNode` points to previous
 node (sibling).
 * isParent: boolean;
 /**
 * Index of currently selected element in LView.
 *
 * Used by binding instructions. Updated as part of advance instruction.
 * selectedIndex: number;
 /**
 *
 * Current pointer to the binding index.
 * bindingIndex: number;
 *
 /**
 * The last viewData retrieved by nextContext().
 * Allows building nextContext() and reference() calls.
 *
 * e.g. const inner = x().$implicit; const outer = x().$implicit;
 * contextLView: LView|null;
 /**
 *
 * Store the element depth count. This is used to identify the root elements of the template
 * so that we can then
 attach patch data `LView` to only those elements. We know that those
 * are the only places where the patch data
 could change, this way we will save on number
 * of places where the patching occurs.
 *
 elementDepthCount: number;
 /**
 * Current namespace to be used when creating elements
 *
 * currentNamespace: string|null;
 /**
 * The root index from which pure function instructions should calculate
 their binding
 * indices. In component views, this is TView.bindingStartIndex. In a host binding
 * context, this
 is the TView.expandoStartIndex + any dirs/hostVars before the given dir.
 *
 * bindingRootIndex: number;
 /**
 * Current index of a View or Content Query which needs to be
 processed next.
 * We iterate over the list of Queries and increment current query index at every step.
 *
 * currentQueryIndex: number;
 /**
 * When host binding is executing this points to the directive index.
 *
 * `TView.data[currentDirectiveIndex]` is `DirectiveDef`
 * `LView[currentDirectiveIndex]` is directive instance.
 *
 * currentDirectiveIndex: number;
 /**
 * Are we currently in i18n block as denoted by `elementStart` and
 `elementEnd`.
 *
 * This information is needed because while we are in i18n block all elements must be pre-
 declared
 * in the translation. (i.e. `Hello #2World/#2!` pre-declares element at `#2` location.)
 * This allocates
 `TNodeType.Placeholder` element at location `2`. If translator removes `#2`
 * from translation than the runtime
 must also ensure the element at `2` does not get inserted
 *
 * into the DOM. The translation does not carry information about deleted elements. Therefor the
 * only way to
 know that an element is deleted is that it was not pre-declared in the translation.
 *
 * This flag works by
 ensuring that elements which are created without pre-declaration
 * (`TNodeType.Placeholder`) are not inserted
 into the DOM render tree. (It does mean that the
 * element still gets instantiated along with all of its behavior
 [directives])
 *
 * inI18n: boolean;
 }
 /**
 * All implicit instruction state is stored here.
 *
 * It is useful to
 have a single object where all of the state is stored as a mental model
 * (rather it being spread across many
 different variables.)
 *
 * PERF NOTE: Turns out that writing to a true global variable is slower than
 * having
 an intermediate object with properties.
 *
 * interface InstructionState {
 /**
 * Current `lFrame`
 *
 * `null` if we have not called `enterView`
 *
 * lFrame: LFrame;
 *
 /**
 * Stores whether directives should be matched to elements.
 *
 * When template contains
 `ngNonBindable` then we need to prevent the runtime from matching
 * directives on children of that element.
 *
 * Example:
 * ``
 * <my-comp my-directive>
 * Should match component / directive.
 * </my-
 comp>
 * <div ngNonBindable>
 * <my-comp my-directive>
 * Should not match component / directive
 because we are in ngNonBindable.
 * </my-comp>
 * </div>
 * ``
 *
 * bindingsEnabled:
 boolean;
 }
 const instructionState: InstructionState = {
 lFrame: createLFrame(null),
 bindingsEnabled:
 true,
 };
 /**
 * In this mode, any changes in bindings will throw an ExpressionChangedAfterChecked error.
 *
 * Necessary to support ChangeDetectorRef.checkNoChanges().
 *
 * The `checkNoChanges` function is
 invoked only in ngDevMode=true and verifies that no unintended
 * changes exist in the change detector or its
 children.
 *
 * let
 _isInCheckNoChangesMode = false;
 /**
 * Returns true if the instruction state stack is empty.
 *
 * Intended
 to be called from tests only (tree shaken otherwise).
 *
 * export function specOnlyIsInstructionStateEmpty():
 boolean {
 return instructionState.lFrame.parent === null;
 }
 *
 * export function getElementDepthCount() {
 return instructionState.lFrame.elementDepthCount;
 }
 *
 * export function increaseElementDepthCount() {

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instructionState.IFrame.elementDepthCount++;}\n\n\nexport function decreaseElementDepthCount() {\n
instructionState.IFrame.elementDepthCount--;}\n\n\nexport function getBindingsEnabled(): boolean {\n return
instructionState.bindingsEnabled;}\n}\n\n\n/**\n * Enables directive matching on elements.\n * \n * Example:\n *
```\n * <my-comp my-directive>\n *   Should match component / directive.\n * </my-comp>\n * <div
ngNonBindable>\n *   <!-- disableBindings() -->\n *   <my-comp my-directive>\n *   Should not match component
/ directive because
we are in ngNonBindable.\n * </my-comp>\n * <!-- enableBindings() -->\n * </div>\n * ```\n * \n *
@codeGenApi\n * \n\nexport function enableBindings(): void {\n instructionState.bindingsEnabled =
true;}\n}\n\n\n/**\n * Disables directive matching on element.\n * \n * Example:\n * ```\n * <my-comp my-
directive>\n *   Should match component / directive.\n * </my-comp>\n * <div ngNonBindable>\n * <!--
disableBindings() -->\n * <my-comp my-directive>\n *   Should not match component / directive because we are
in ngNonBindable.\n * </my-comp>\n * <!-- enableBindings() -->\n * </div>\n * ```\n * \n *
@codeGenApi\n * \n\nexport function disableBindings(): void {\n instructionState.bindingsEnabled = false;}\n}\n\n\n/**\n * Return the
current `LView`.\n * \n\nexport function getLView<T>(): LView<T> {\n return instructionState.IFrame.IView as
LView<T>;}\n}\n\n\n/**\n * Return the current `TVView`.\n * \n\nexport function getTVView(): TVView {\n return
instructionState.IFrame.tView;}\n}\n\n\n/**\n * Restores `contextViewData` to the given OpaqueViewState instance.\n * \n * Used in conjunction with the
getCurrentView() instruction to save a snapshot\n * of the current view and restore it when listeners are invoked.
This allows\n * walking the declaration view tree in listeners to get vars from parent views.\n * \n * @param
viewToRestore The OpaqueViewState instance to restore.\n * @returns Context of the restored OpaqueViewState
instance.\n * \n * @codeGenApi\n * \n\nexport function restoreView<T = any>(viewToRestore: OpaqueViewState): T
{\n instructionState.IFrame.contextLView = viewToRestore as any as LView;\n return (viewToRestore as any as
LView)[CONTEXT] as unknown as T;}\n}\n\n\n\n/**\n * Clears the view set in `restoreView` from memory. Returns
the passed in\n * value so that it can be used as a return value of an instruction.\n * \n * @codeGenApi\n * \n\nexport
function resetView<T>(value?: T): T|undefined {\n instructionState.IFrame.contextLView = null;\n return
value;}\n}\n\n\n\nexport function getCurrentTNode(): TNode|null {\n let currentTNode =
getCurrentTNodePlaceholderOk();\n while (currentTNode !== null && currentTNode.type ===
TNodeType.Placeholder) {\n currentTNode = currentTNode.parent;\n }\n return currentTNode;}\n}\n\n\n\nexport
function getCurrentTNodePlaceholderOk(): TNode|null {\n return
instructionState.IFrame.currentTNode;}\n}\n\n\n\nexport function getCurrentParentTNode(): TNode|null {\n const
IFrame = instructionState.IFrame;\n const currentTNode = IFrame.currentTNode;\n return IFrame.isParent ?
currentTNode : currentTNode!.parent;}\n}\n\n\n\nexport function setCurrentTNode(tNode: TNode|null, isParent:
boolean) {\n ngDevMode && tNode && assertTNodeForTVView(tNode, instructionState.IFrame.tView);\n const
IFrame = instructionState.IFrame;\n IFrame.currentTNode = tNode;\n IFrame.isParent = isParent;}\n}\n\n\n\nexport
function isCurrentTNodeParent(): boolean {\n return instructionState.IFrame.isParent;}\n}\n\n\n\nexport function
setCurrentTNodeAsNotParent():\n void {\n instructionState.IFrame.isParent = false;}\n}\n\n\n\nexport function setCurrentTNodeAsParent(): void {\n
instructionState.IFrame.isParent = true;}\n}\n\n\n\nexport function getContextLView(): LView {\n const contextLView
= instructionState.IFrame.contextLView;\n ngDevMode && assertDefined(contextLView, 'contextLView must be
defined.);\n return contextLView!;}\n}\n\n\n\nexport function isInCheckNoChangesMode(): boolean {\n !ngDevMode
&& throwError('Must never be called in production mode');\n return _isInCheckNoChangesMode;}\n}\n\n\n\nexport
function setIsInCheckNoChangesMode(mode: boolean): void {\n !ngDevMode && throwError('Must never be
called in production mode');\n _isInCheckNoChangesMode = mode;}\n}\n\n\n\n// top level variables should not be
exported for performance reasons (PERF_NOTES.md)\nexport function getBindingRoot() {\n const IFrame =
instructionState.IFrame;\n let index = IFrame.bindingRootIndex;\n if (index === -1) {\n index =
IFrame.bindingRootIndex = IFrame.tView.bindingStartIndex;\n
}\n return index;}\n}\n\n\n\nexport function getBindingIndex(): number {\n return
instructionState.IFrame.bindingIndex;}\n}\n\n\n\nexport function setBindingIndex(value: number): number {\n return

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instructionState.IFrame.bindingIndex = value;\n\n\nexport function nextBindingIndex(): number {\n return
instructionState.IFrame.bindingIndex++;\n}\n\nexport function incrementBindingIndex(count: number): number {\n
const IFrame = instructionState.IFrame;\n const index = IFrame.bindingIndex;\n IFrame.bindingIndex =
IFrame.bindingIndex + count;\n return index;\n}\n\n\nexport function isInI18nBlock() {\n return
instructionState.IFrame.inI18n;\n}\n\n\nexport function setInI18nBlock(isInI18nBlock: boolean): void {\n
instructionState.IFrame.inI18n = isInI18nBlock;\n}\n\n\n/**\n * Set a new binding root index so that host template
functions can execute.\n *\n * Bindings inside the host template are 0 index. But because we don't know ahead of
time\n *\n * how many host bindings
we have we can't pre-compute them. For this reason they are all\n *\n * 0 index and we just shift the root so that they
match next available location in the LView.\n *\n * @param bindingRootIndex Root index for `hostBindings`\n *\n *
@param currentDirectiveIndex `TData[currentDirectiveIndex]` will point to the current directive\n *\n * whose
`hostBindings` are being processed.\n *\n\nexport function setBindingRootForHostBindings(\n bindingRootIndex:
number, currentDirectiveIndex: number) {\n const IFrame = instructionState.IFrame;\n IFrame.bindingIndex =
IFrame.bindingRootIndex = bindingRootIndex;\n setCurrentDirectiveIndex(currentDirectiveIndex);\n}\n\n\n/**\n *
When host binding is executing this points to the directive index.\n *\n * `TView.data[getCurrentDirectiveIndex()]` is
`DirectiveDef`\n *\n * `LView[getCurrentDirectiveIndex()]` is directive instance.\n *\n\nexport function
getCurrentDirectiveIndex(): number {\n return instructionState.IFrame.currentDirectiveIndex;\n}\n\n\n/**\n * Sets
an index of a directive whose `hostBindings` are being processed.\n *\n * @param currentDirectiveIndex `TData`
index where current directive instance can be found.\n *\n\nexport function
setCurrentDirectiveIndex(currentDirectiveIndex: number): void {\n instructionState.IFrame.currentDirectiveIndex
= currentDirectiveIndex;\n}\n\n\n/**\n * Retrieve the current `DirectiveDef` which is active when `hostBindings`
instruction is being\n *\n * executed.\n *\n * @param tData Current `TData` where the `DirectiveDef` will be looked up
at.\n *\n\nexport function getCurrentDirectiveDef(tData: TData): DirectiveDef<any>|null {\n const
currentDirectiveIndex = instructionState.IFrame.currentDirectiveIndex;\n return currentDirectiveIndex === -1 ?
null : tData[currentDirectiveIndex] as DirectiveDef<any>;\n}\n\n\nexport function getCurrentQueryIndex(): number
{\n return instructionState.IFrame.currentQueryIndex;\n}\n\n\nexport function setCurrentQueryIndex(value: number):
void {\n instructionState.IFrame.currentQueryIndex
= value;\n}\n\n\n/**\n * Returns a `TNode` of the location where the current `LView` is declared at.\n *\n * @param
IView an `LView` that we want to find parent `TNode` for.\n *\n\nfunction getDeclarationTNode(IView: LView):
TNode|null {\n const tView = IView[TVIEW];\n\n // Return the declaration parent for embedded views\n if
(tView.type === TViewType.Embedded) {\n ngDevMode && assertDefined(tView.declTNode, 'Embedded
TNodes should have declaration parents.);\n return tView.declTNode;\n }\n\n // Components don't have
`TView.declTNode` because each instance of component could be\n // inserted in different location, hence
`TView.declTNode` is meaningless.\n // Falling back to `T_HOST` in case we cross component boundary.\n if
(tView.type === TViewType.Component) {\n return IView[T_HOST];\n }\n\n // Remaining TNode type is
`TViewType.Root` which doesn't have a parent TNode.\n return null;\n}\n\n\n/**\n * This is a light weight version of
the `enterView` which
is needed by the DI system.\n *\n * @param IView `LView` location of the DI context.\n *\n * @param tNode `TNode`
for DI context\n *\n * @param flags DI context flags. if `SkipSelf` flag is set than we walk up the declaration\n *\n *
tree from `tNode` until we find parent declared `TElementNode`.\n *\n * @returns `true` if we have successfully entered DI
associated with `tNode` (or with declared\n *\n * `TNode` if `flags` has `SkipSelf`). Failing to enter DI implies that
no associated\n *\n * `NodeInjector` can be found and we should instead use `ModuleInjector`.\n *\n * - If `true` than
this call must be followed by `leaveDI`\n *\n * - If `false` than this call failed and we should NOT call `leaveDI`\n
*\n\nexport function enterDI(IView: LView, tNode: TNode, flags: InjectFlags) {\n ngDevMode &&
assertLViewOrUndefined(IView);\n\n if (flags & InjectFlags.SkipSelf) {\n ngDevMode &&
assertTNodeForTView(tNode, IView[TVIEW]);\n\n let parentTNode = tNode as TNode | null;\n let
parentLView =

```

```

IView;\n\n while (true) {\n   ngDevMode && assertDefined(parentTNode, 'Parent TNode should be defined');\n   parentTNode = parentTNode!.parent as TNode | null;\n   if (parentTNode === null && !(flags & InjectFlags.Host)) {\n     parentTNode = getDeclarationTNode(parentLView);\n     if (parentTNode === null) break;\n     // In this case, a parent exists and is definitely an element. So it will definitely\n     // have an existing IView as the declaration view, which is why we can assume it's defined.\n     ngDevMode && assertDefined(parentLView, 'Parent LView should be defined');\n     parentLView = parentLView[DECLARATION_VIEW]!;\n     // In Ivy there are Comment nodes that correspond to ngIf and NgFor embedded directives\n     // We want to skip those and look only at Elements and ElementContainers to ensure\n     // we're looking at true parent nodes, and not content or other types.\n     if (parentTNode.type & (TNodeType.Element | TNodeType.ElementContainer)) {\n       break;\n     } else {\n       break;\n     }\n   } if (parentTNode === null) {\n     // If we failed to find a parent TNode this means that we should use module injector.\n     return false;\n   } else {\n     tNode = parentTNode;\n     IView = parentLView;\n   }\n   ngDevMode && assertTNodeForLView(tNode, IView);\n   const lFrame = instructionState.lFrame = allocLFrame();\n   lFrame.currentTNode = tNode;\n   lFrame.IView = IView;\n   return true;\n}\n\n**\n * Swap the current IView with a new IView.\n * For performance reasons we store the IView in the top level of the module.\n * This way we minimize the number of properties to read. Whenever a new view\n * is entered we have to store the IView for later, and when the view is\n * exited the state has to be restored\n * @param newView New IView to become active\n * @returns the previously active IView;\n */\nexport function enterView(newView: LView): void {\n  ngDevMode && assertNotEqual(newView[0], newView[1] as any, '???');\n  ngDevMode && assertLViewOrUndefined(newView);\n  const newLFrame = allocLFrame();\n  if (ngDevMode) {\n    assertEquals(newLFrame.isParent, true, 'Expected clean LFrame');\n    assertEquals(newLFrame.IView, null, 'Expected clean LFrame');\n    assertEquals(newLFrame.tView, null, 'Expected clean LFrame');\n    assertEquals(newLFrame.selectedIndex, -1, 'Expected clean LFrame');\n    assertEquals(newLFrame.elementDepthCount, 0, 'Expected clean LFrame');\n    assertEquals(newLFrame.currentDirectiveIndex, -1, 'Expected clean LFrame');\n    assertEquals(newLFrame.currentNamespace, null, 'Expected clean LFrame');\n    assertEquals(newLFrame.bindingRootIndex, -1, 'Expected clean LFrame');\n    assertEquals(newLFrame.currentQueryIndex, 0, 'Expected clean LFrame');\n  }\n  const tView = newView[TVIEW];\n  instructionState.lFrame = newLFrame;\n  ngDevMode && tView.firstChild && assertTNodeForTView(tView.firstChild, tView);\n  newLFrame.currentTNode = tView.firstChild!;\n  newLFrame.IView = newView;\n  newLFrame.tView = tView;\n  newLFrame.contextLView = newView;\n  newLFrame.bindingIndex = tView.bindingStartIndex;\n  newLFrame.inI18n = false;\n}\n\n**\n * Allocates next free LFrame. This function tries to reuse the `LFrame`s to lower memory pressure.\n */\nfunction allocLFrame() {\n  const currentLFrame = instructionState.lFrame;\n  const childLFrame = currentLFrame === null ? null : currentLFrame.child;\n  const newLFrame = childLFrame === null ? createLFrame(currentLFrame) : childLFrame;\n  return newLFrame;\n}\n\nfunction createLFrame(parent: LFrame | null): LFrame {\n  const lFrame: LFrame = {\n    currentTNode: null,\n    isParent: true,\n    IView: null!,\n    tView: null!,\n    selectedIndex: -1,\n    contextLView: null,\n    elementDepthCount: 0,\n    currentNamespace: null,\n    currentDirectiveIndex: -1,\n    bindingRootIndex: -1,\n    bindingIndex: -1,\n    currentQueryIndex: 0,\n    parent: parent!,\n    child: null,\n    inI18n: false,\n  };\n  parent !== null && (parent.child = lFrame); // link the new LFrame for reuse.\n  return lFrame;\n}\n\n**\n * A lightweight version of leave which is used with DI.\n * This function only resets `currentTNode` and `LView` as those are the only properties\n * used with DI (`enterDI`).\n * NOTE: This function is reexported as `leaveDI`. However `leaveDI` has return type of `void` where\n * as `leaveViewLight` has `LFrame`. This is so that `leaveViewLight` can be used in `leaveView`.\n */\nfunction leaveViewLight(): LFrame {\n  const oldLFrame = instructionState.lFrame;\n  instructionState.lFrame = oldLFrame.parent;\n  oldLFrame.currentTNode = null!;\n  oldLFrame.IView = null!;\n  return

```

```

oldLFrame;
}

/**
 * This is a lightweight version of the `leaveView` which is needed by the DI system.
 */
NOTE: this function is an alias so that we can change the type of the function to have `void` return type.
export const leaveDI:
() => void = leaveViewLight;

/**
 * Leave the current `LView`
 */
This pops the `LFrame` with the associated `LView` from the stack.
IMPORTANT: We must zero out the `LFrame` values here otherwise they will be retained. This is because for performance reasons we don't release `LFrame` but rather keep it for next use.
export function leaveView() {
  const oldLFrame = leaveViewLight();
  oldLFrame.isParent = true;
  oldLFrame.tView = null!;
  oldLFrame.selectedIndex = -1;
  oldLFrame.contextLView = null;
  oldLFrame.elementDepthCount = 0;
  oldLFrame.currentDirectiveIndex = -1;
  oldLFrame.currentNamespace = null;
  oldLFrame.bindingRootIndex = -1;
  oldLFrame.bindingIndex = -1;
  oldLFrame.currentQueryIndex = 0;
}

export function nextContextImpl<T = any>(level: number): T {
  const contextLView = instructionState.lFrame.contextLView =
    walkUpViews(level, instructionState.lFrame.contextLView!);
  return contextLView[CONTEXT] as unknown as T;
}

function walkUpViews(nestingLevel: number, currentView: LView): LView {
  while (nestingLevel > 0) {
    ngDevMode && assertDefined(
      currentView[DECLARATION_VIEW],
      'Declaration view should be defined if nesting level is greater than 0.'
    );
    currentView = currentView[DECLARATION_VIEW]!;
    nestingLevel--;
  }
  return currentView;
}

/**
 * Gets the currently selected element index.
 */
Used with { @link property } instruction (and more in the future) to identify the index in the current `LView` to act on.
export function getSelectedIndex() {
  return instructionState.lFrame.selectedIndex;
}

/**
 * Sets the most recent index passed to { @link select }
 */
Used with { @link property } instruction (and more in the future) to identify the index in the current `LView` to act on.
(Note that if an "exit function" was set earlier (via `setElementExitFn`) then that will be run if and when the provided `index` value is different from the current selected index value.)
export function setSelectedIndex(index: number) {
  ngDevMode && index !== -1 && assertGreaterThanOrEqual(index, HEADER_OFFSET, 'Index must be past HEADER_OFFSET (or -1).');
  ngDevMode && assertLessThan(index, instructionState.lFrame.lView.length, 'Can't set index passed end of LView');
  instructionState.lFrame.selectedIndex = index;
}

/**
 * Gets the `tNode` that represents currently selected element.
 */
export function getSelectedTNode() {
  const lFrame = instructionState.lFrame;
  return getTNode(lFrame.tView, lFrame.selectedIndex);
}

/**
 * Sets the namespace used to create elements to `http://www.w3.org/2000/svg` in global state.
 */
@codeGenApi
export function namespaceSVG() {
  instructionState.lFrame.currentNamespace = SVG_NAMESPACE;
}

/**
 * Sets the namespace used to create elements to `http://www.w3.org/1998/MathML/` in global state.
 */
@codeGenApi
export function namespaceMathML() {
  instructionState.lFrame.currentNamespace = MATH_ML_NAMESPACE;
}

/**
 * Sets the namespace used to create elements to `null`, which forces element creation to use `createElement` rather than `createElementNS`.
 */
@codeGenApi
export function namespaceHTML() {
  namespaceHTMLInternal();
}

/**
 * Sets the namespace used to create elements to `null`, which forces element creation to use `createElement` rather than `createElementNS`.
 */
export function namespaceHTMLInternal() {
  instructionState.lFrame.currentNamespace = null;
}

export function getNamespace(): string|null {
  return instructionState.lFrame.currentNamespace;
}

"

/**
 * Copyright Google LLC All Rights Reserved.
 */
Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
import {
  AfterContentChecked, AfterContentInit,
  AfterViewChecked, AfterViewInit, DoCheck, OnChanges, OnDestroy, OnInit
} from './interface/lifecycle_hooks';
import { assertDefined, assertEqual, assertNotEqual } from './util/assert';
import { assertFirstCreatePass } from './assert';
import { NgOnChangesFeatureImpl } from './features/ng_onchanges_feature';
import { DirectiveDef } from './interfaces/definition';
import { TNode } from './interfaces/node';
import { FLAGS, HookData, InitPhaseState, LView, LViewFlags,

```

```
PREORDER_HOOK_FLAGS, PreOrderHookFlags, TView} from './interfaces/view';\nimport { profiler,  
ProfilerEvent} from './profiler';\nimport { isInCheckNoChangesMode} from './state';\n\n/**\n * Adds all  
directive lifecycle hooks from the given `DirectiveDef` to the given `TView`.\n * Must be run *only* on the first  
template pass.\n * Sets up the pre-order hooks on the provided `tView`, see { @link HookData} for details  
about the data structure.\n * @param directiveIndex The index of the directive in LView\n * @param  
directiveDef The definition containing the hooks to setup in tView\n * @param tView The current TView\n */\nexport function registerPreOrderHooks(\n  directiveIndex: number, directiveDef: DirectiveDef<any>, tView:  
TView): void {\n  ngDevMode && assertFirstCreatePass(tView);\n  const { ngOnChanges, ngOnInit, ngDoCheck }  
= directiveDef.type.prototype as OnChanges & OnInit & DoCheck;\n  if (ngOnChanges as Function |  
undefined) {\n    const wrappedOnChanges = NgOnChangesFeatureImpl(directiveDef);\n    (tView.preOrderHooks ||  
tView.preOrderHooks = []).push(directiveIndex, wrappedOnChanges);\n    (tView.preOrderCheckHooks ||  
tView.preOrderCheckHooks = []).push(directiveIndex, wrappedOnChanges);\n  }\n  if (ngOnInit) {\n    (tView.preOrderHooks || (tView.preOrderHooks = [])).push(0 - directiveIndex, ngOnInit);\n  }\n  if (ngDoCheck)  
{\n    (tView.preOrderHooks || (tView.preOrderHooks = [])).push(directiveIndex, ngDoCheck);\n    (tView.preOrderCheckHooks || (tView.preOrderCheckHooks  
= [])).push(directiveIndex, ngDoCheck);\n  }\n}\n\n/**\n * Loops through the directives on the provided  
`tNode` and queues hooks to be run that are not initialization hooks.\n * Should be executed during  
`elementEnd()` and similar to `preserve hook execution order`. Content, view, and destroy hooks for projected  
components and directives must be called *before* their hosts.\n * Sets up the content, view, and destroy hooks  
on the provided `tView`, see { @link HookData} for details about the data structure.\n * NOTE: This does  
not set up `onChanges`, `onInit` or `doCheck`, those are set up separately at `elementStart`.\n * @param  
tView The current TView\n * @param tNode The TNode whose directives are to be searched for hooks to queue\n */\nexport function registerPostOrderHooks(tView: TView, tNode: TNode): void {\n  ngDevMode &&  
assertFirstCreatePass(tView);\n  // It's necessary to loop through the directives at elementEnd() (rather  
than processing in directiveCreate) so we can preserve the current hook order. Content, view, and destroy  
//  
hooks for projected components and directives must be called *before* their hosts.\n  for (let i =  
tNode.directiveStart, end = tNode.directiveEnd; i < end; i++) {\n    const directiveDef = tView.data[i] as  
DirectiveDef<any>;\n    ngDevMode && assertDefined(directiveDef, 'Expecting DirectiveDef');\n    const  
lifecycleHooks: AfterContentInit&AfterContentChecked&AfterViewInit&AfterViewChecked&\n    OnDestroy =  
directiveDef.type.prototype;\n    const {\n      ngAfterContentInit,\n      ngAfterContentChecked,\n      ngAfterViewInit,\n      ngAfterViewChecked,\n      ngOnDestroy\n    } = lifecycleHooks;\n    if  
(ngAfterContentInit) {\n      (tView.contentHooks || (tView.contentHooks = [])).push(-i, ngAfterContentInit);\n    }\n    if (ngAfterContentChecked) {\n      (tView.contentHooks || (tView.contentHooks = [])).push(i,  
ngAfterContentChecked);\n      (tView.contentCheckHooks  
|| (tView.contentCheckHooks = [])).push(i, ngAfterContentChecked);\n    }\n    if (ngAfterViewInit) {\n      (tView.viewHooks || (tView.viewHooks = [])).push(-i, ngAfterViewInit);\n    }\n    if (ngAfterViewChecked) {\n      (tView.viewHooks || (tView.viewHooks = [])).push(i, ngAfterViewChecked);\n      (tView.viewCheckHooks ||  
tView.viewCheckHooks = []).push(i, ngAfterViewChecked);\n    }\n    if (ngOnDestroy != null) {\n      (tView.destroyHooks || (tView.destroyHooks = [])).push(i, ngOnDestroy);\n    }\n  }\n}\n\n/**\n * Executing hooks  
requires complex logic as we need to deal with 2 constraints.\n * 1. Init hooks (ngOnInit, ngAfterContentInit,  
ngAfterViewInit) must all be executed once and only once, across many change detection cycles. This must be  
true even if some hooks throw, or if some recursively trigger a change detection cycle. To solve that, it is  
required to track the state of the execution of these init hooks. This is done by storing  
and maintaining flags in the view: the { @link InitPhaseState}, and the index within that phase. They can be  
seen as a cursor in the following structure: [[onInit1, onInit2], [afterContentInit1], [afterViewInit1,  
afterViewInit2, afterViewInit3]] They are are stored as flags in LView[FLAGS].\n * 2. Pre-order hooks can  
be executed in batches, because of the select instruction. To be able to pause and resume their execution, we also  
need some state about the hook's array that is being processed: - the index of the next hook to be executed\n
```

\* - the number of init hooks already found in the processed part of the array\n \* They are stored as flags in LView[PREORDER\_HOOK\_FLAGS].\n \* ^\n\n\n\*\*\n \* Executes pre-order check hooks ( OnChanges, DoChanges) given a view where all the init hooks were\n \* executed once. This is a light version of executeInitAndCheckPreOrderHooks where we can skip read\n \* / write of the init-hooks related flags.\n \* @param LView The

LView where hooks are defined\n \* @param hooks Hooks to be run\n \* @param nodeId 3 cases depending on the value:\n \* - undefined: all hooks from the array should be executed (post-order case)\n \* - null: execute hooks only from the saved index until the end of the array (pre-order case, when\n \* flushing the remaining hooks)\n \* - number: execute hooks only from the saved index until that node index exclusive (pre-order\n \* case, when executing select(number))\n \* ^\n\nexport function executeCheckHooks(LView: LView, hooks: HookData, nodeId?: number|null) {\n callHooks(LView, hooks, InitPhaseState.InitPhaseCompleted, nodeId);\n}\n\n\*\*\n \* Executes post-order init and check hooks (one of AfterContentInit, AfterContentChecked,\n \* AfterViewInit, AfterViewChecked) given a view where there are pending init hooks to be executed.\n \* @param LView The LView where hooks are defined\n \* @param hooks Hooks to be run\n \* @param initPhase A phase for which hooks should be run\n \* @param nodeId

3 cases depending on the value:\n \* - undefined: all hooks from the array should be executed (post-order case)\n \* - null: execute hooks only from the saved index until the end of the array (pre-order case, when\n \* flushing the remaining hooks)\n \* - number: execute hooks only from the saved index until that node index exclusive (pre-order\n \* case, when executing select(number))\n \* ^\n\nexport function executeInitAndCheckHooks(LView: LView, hooks: HookData, initPhase: InitPhaseState, nodeId?: number|null) {\n ngDevMode &&\n assertNotEqual(\n initPhase, InitPhaseState.InitPhaseCompleted,\n 'Init pre-order hooks should not be called more than once');\n if ((LView[FLAGS] & LViewFlags.InitPhaseStateMask) === initPhase) {\n callHooks(LView, hooks, initPhase, nodeId);\n }\n}\n\nexport function incrementInitPhaseFlags(LView: LView, initPhase: InitPhaseState): void {\n ngDevMode &&\n assertNotEqual(\n initPhase, InitPhaseState.InitPhaseCompleted,\n

'Init hooks phase should not be incremented after all init hooks have been run.');

```

let flags = LView[FLAGS];
if ((flags & LViewFlags.InitPhaseStateMask) === initPhase) {
  flags &= LViewFlags.IndexWithinInitPhaseReset;
  flags += LViewFlags.InitPhaseStateIncrementer;
  LView[FLAGS] = flags;
}
}
}

```

\* Calls lifecycle hooks with their contexts, skipping init hooks if it's not\n \* the first LView pass\n \* @param currentView The current view\n \* @param arr The array in which the hooks are found\n \* @param initPhaseState the current state of the init phase\n \* @param currentNodeIndex 3 cases depending on the value:\n \* - undefined: all hooks from the array should be executed (post-order case)\n \* - null: execute hooks only from the saved index until the end of the array (pre-order case, when\n \* flushing the remaining hooks)\n \* - number: execute hooks only from the saved index until that node index exclusive (pre-order\n \* case, when executing select(number))\n \* ^\n\nfunction callHooks(\n currentView: LView, arr: HookData, initPhase: InitPhaseState,\n currentNodeIndex: number|null|undefined): void {\n ngDevMode &&\n assertEquals(\n isInCheckNoChangesMode(), false,\n 'Hooks should never be run when in check no changes mode.');

```

const startIndex = currentNodeIndex !== undefined ?\n (currentView[PREORDER_HOOK_FLAGS] & PreOrderHookFlags.IndexOfTheNextPreOrderHookMaskMask) : 0;
const nodeIdLimit = currentNodeIndex !== null ? currentNodeIndex - 1;
const max = arr.length - 1; // Stop the loop at length - 1, because we look for the hook at i + 1
let lastNodeIndexFound = 0;
for (let i = startIndex; i < max; i++) {
  const hook = arr[i + 1] as number | (() => void);
  if (typeof hook === 'number') {
    lastNodeIndexFound = arr[i] as number;
    if (currentNodeIndex !== null && lastNodeIndexFound >= currentNodeIndex) {
      break;
    }
  } else {

```

```

const isInitHook = arr[i] < 0;
if (isInitHook)
  currentView[PREORDER_HOOK_FLAGS] += PreOrderHookFlags.NumberOfInitHooksCalledIncrementer;
if (lastNodeIndexFound < nodeIdLimit || nodeIdLimit === -1) {
  callHook(currentView, initPhase, arr, i);
  currentView[PREORDER_HOOK_FLAGS] =\n (currentView[PREORDER_HOOK_FLAGS] &

```



```

PreOrderHookFlags.NumberOfInitHooksCalledMask) + i +\n      2;\n    }\n    i++;\n  }\n }\n}\n\n/**\n *
Execute one hook against the current `LView`. \n * @param currentView The current view \n * @param
initPhaseState the current state of the init phase \n * @param arr The array in which the hooks are found \n * @param
i The current index within the hook data array \n */\nfunction callHook(currentView: LView, initPhase:
InitPhaseState, arr: HookData, i: number) {\n  const isInitHook = arr[i] < 0;\n  const hook = arr[i + 1] as () =>
void;\n  const directiveIndex = isInitHook ? -arr[i] : arr[i] as number;\n
  const directive = currentView[directiveIndex];\n  if (isInitHook) {\n    const indexWithinInitPhase =
currentView[FLAGS] >> LViewFlags.IndexWithinInitPhaseShift;\n    // The init phase state must be always
checked here as it may have been recursively updated.\n    if (indexWithinInitPhase <\n
(currentView[PREORDER_HOOK_FLAGS] >> PreOrderHookFlags.NumberOfInitHooksCalledShift) &&\n
(currentView[FLAGS] & LViewFlags.InitPhaseStateMask) === initPhase) {\n      currentView[FLAGS] +=
LViewFlags.IndexWithinInitPhaseIncrementer;\n      profiler(ProfilerEvent.LifecycleHookStart, directive, hook);\n
      try {\n        hook.call(directive);\n      } finally {\n        profiler(ProfilerEvent.LifecycleHookEnd, directive,
hook);\n      }\n    } else {\n      profiler(ProfilerEvent.LifecycleHookStart, directive, hook);\n      try {\n
hook.call(directive);\n      } finally {\n        profiler(ProfilerEvent.LifecycleHookEnd, directive, hook);\n      }\n
    }\n  }\n}\n\n", "/*\n * @license\n
 * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\nimport {InjectFlags} from
'../../di/interface/injector';\nimport {ProviderToken} from ' ../../di/provider_token';\nimport {assertDefined,
assertEqual} from ' ../../util/assert';\nimport {TDirectiveHostNode} from './node';\nimport {LView, TData} from
'./view';\n\n/**\n * Offsets of the `NodeInjector` data structure in the expando.\n * \n * `NodeInjector` is stored in
both `LView` as well as `TView.data`. All storage requires 9 words.\n * First 8 are reserved for bloom filter and the
9th is reserved for the associated `TNode` as well\n * as parent `NodeInjector` pointer. All indexes are starting with
`index` and have an offset as\n * shown.\n * \n * `LView` layout:\n * ``\n * index + 0: cumulative bloom filter\n *
index + 1: cumulative bloom filter\n * index + 2: cumulative bloom filter\n * index
+ 3: cumulative bloom filter\n * index + 4: cumulative bloom filter\n * index + 5: cumulative bloom filter\n * index
+ 6: cumulative bloom filter\n * index + 7: cumulative bloom filter\n * index + 8: cumulative bloom filter\n * index
+ PARENT: Index to the parent injector. See `RelativeInjectorLocation`\n *
`const parent = lView[index +
NodeInjectorOffset.PARENT]`\n * ``\n * \n * `TViewData` layout:\n * ``\n * index + 0: cumulative bloom filter\n
* index + 1: cumulative bloom filter\n * index + 2: cumulative bloom filter\n * index + 3: cumulative bloom filter\n
* index + 4: cumulative bloom filter\n * index + 5: cumulative bloom filter\n * index + 6: cumulative bloom filter\n
* index + 7: cumulative bloom filter\n * index + 8: cumulative bloom filter\n * index + TNODE: TNode associated
with this `NodeInjector`\n *
`const tNode = tView.data[index + NodeInjectorOffset.TNODE]`\n * ``\n
*/\n\nexport const enum NodeInjectorOffset {\n  TNODE = 8,\n  PARENT = 8,\n
  BLOOM_SIZE = 8,\n  SIZE = 9,\n}\n\n/**\n * Represents a relative location of parent injector.\n * \n * The
interfaces encodes number of parents `LView`s to traverse and index in the `LView`\n * pointing to the parent
injector.\n */\nexport interface RelativeInjectorLocation {\n  __brand__:
'RelativeInjectorLocationFlags';\n}\n\nexport const enum RelativeInjectorLocationFlags {\n  InjectorIndexMask =
0b1111111111111111,\n  ViewOffsetShift = 16,\n  NO_PARENT = -1,\n}\n\nexport const
NO_PARENT_INJECTOR: RelativeInjectorLocation = -1 as any;\n\n/**\n * Each injector is saved in 9 contiguous
slots in `LView` and 9 contiguous slots in\n * `TView.data`. This allows us to store information about the current
node's tokens (which\n * can be shared in `TView`) as well as the tokens of its ancestor nodes (which cannot be\n
* shared, so they live in `LView`).\n * \n * Each of these slots (aside from the last slot) contains a bloom filter. This
bloom filter\n * determines whether a directive is available
on the associated node or not. This prevents us\n * from searching the directives array at this level unless it's
probable the directive is in it.\n * \n * See: https://en.wikipedia.org/wiki/Bloom_filter for more about bloom filters.\n
*\n * Because all injectors have been flattened into `LView` and `TViewData`, they cannot typed\n * using
interfaces as they were previously. The start index of each `LInjector` and `TInjector`\n * will differ based on where

```

it is flattened into the main array, so it's not possible to know the indices ahead of time and save their types here. The interfaces are still included here for documentation purposes.

```

export interface LInjector extends
Array<any> {
  // Cumulative bloom for directive IDs 0-31 (IDs are % BLOOM_SIZE)
  [0]: number;
  // Cumulative bloom for directive IDs 32-63
  [1]: number;
  // Cumulative bloom for directive IDs 64-95
  [2]: number;
  // Cumulative bloom for directive IDs 96-127
  [3]: number;
  // Cumulative bloom for directive IDs 128-159
  [4]: number;
  // Cumulative bloom for directive IDs 160 - 191
  [5]: number;
  // Cumulative bloom for directive IDs 192 - 223
  [6]: number;
  // Cumulative bloom for directive IDs 224 - 255
  [7]: number;
  // We need to store a reference to the injector's parent so DI can keep looking up the
  // injector tree until it finds the dependency it's looking for.
  [PARENT_INJECTOR]: number;
}
export interface TInjector extends Array<any> {
  // Shared node bloom for directive IDs 0-31 (IDs are % BLOOM_SIZE)
  [0]: number;
  // Shared node bloom for directive IDs 32-63
  [1]: number;
  // Shared node bloom for directive IDs 64-95
  [2]: number;
  // Shared node bloom for directive IDs 96-127
  [3]: number;
  // Shared node bloom for directive IDs 128-159
  [4]: number;
  // Shared node bloom for directive IDs 160 - 191
  [5]: number;
  // Shared node bloom for directive IDs 192 - 223
  [6]: number;
  // Shared node bloom for directive IDs 224 - 255
  [7]: number;
  // Necessary to find directive indices for a particular node.
  [TNODE]: TElementNode|TElementContainerNode|TContainerNode;
}
}
Factory for creating instances of injectors in the NodeInjector.
This factory is complicated by the fact that it can resolve `multi` factories as well.
NOTE: Some of the fields are optional which means that this class has two hidden classes.
- One without `multi` support (most common)
- One with `multi` values, (rare).
Since VMs can cache up to 4 inline hidden classes this is OK.
- Single factory: Only `resolving` and `factory` is defined.
- `providers` factory: `componentProviders` is a number and `index = -1`.
- `viewProviders` factory: `componentProviders` is a number and `index` points to `providers`.
export class
NodeInjectorFactory {
  /**
   * The inject implementation to be activated when using the factory.
   */
  injectImpl: null|(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T);
  /**
   * Marker set to true during factory invocation to see if we get into recursive loop.
   * Recursive loop causes an error to be displayed.
   */
  resolving = false;
  /**
   * Marks that the token can see other Tokens declared in `viewProviders` on the same node.
   */
  canSeeViewProviders: boolean;
  /**
   * An array of factories to use in case of `multi` provider.
   */
  multi?: Array<() => any>;
  /**
   * Number of `multi`-providers which belong to the component.
   * This is needed because when multiple components and directives declare the `multi` provider they have to be concatenated in the correct order.
   * Example:
   * If we have a component and directive active on a single element as declared here:
   * component: {
   *   providers: [ { provide: String, useValue: 'component', multi: true } ],
   *   viewProviders: [ { provide: String, useValue: 'componentView', multi: true } ],
   *   directive: {
   *     providers: [ { provide: String, useValue: 'directive', multi: true } ],
   *   }
   * }
   * Then the expected results are:
   * providers: ['component', 'directive']
   * viewProviders: ['component', 'componentView', 'directive']
   * The way to think about it is that the `viewProviders` have been inserted after the component but before the directives, which is why we need to know how many `multi`s have been declared by the component.
   */
  componentProviders?: number;
  /**
   * Current index of the Factory in the `data`. Needed for `viewProviders` and `providers` merging.
   * See `providerFactory`.
   */
  index?: number;
}
* Because the same `multi` provider can be declared in `providers` and `viewProviders` it is possible for `viewProviders` to shadow the `providers`. For this reason we store the `provideFactory` of the `providers` so that `providers` can be extended with `viewProviders`.
Example:
Given:
providers: [ { provide: String, useValue: 'all', multi: true } ],
viewProviders: [ { provide: String, useValue: 'viewOnly', multi: true } ],
We have to return `[all]` in case of content injection, but `[all, 'viewOnly']` in case of view injection. We further have to make sure that the shared instances (in our case `all`) are the exact same instance in both the content as well as the view injection. (We have to make sure that we don't

```

double instantiate.) For this reason the `viewProviders` has a pointer to the shadowed `providers` factory so that it can instantiate the `providers`

```

(['all']) and then extend it with `viewProviders` (['all'] + ['viewOnly'] = ['all', 'viewOnly']).
providerFactory?: NodeInjectorFactory|null;
constructor(
  /**
   * Factory to invoke in order to create a new instance.
   */
  public factory: (this: NodeInjectorFactory, _: undefined,
    /**
     * array where injectables tokens are stored. This is used in case of an error reporting to produce friendlier errors.
     */
    tData: TData,
    /**
     * array where existing instances of injectables are stored. This is used in case of multi shadow is needed. See `multi` field documentation.
     */
    lView: LView,
    /**
     * The TNode of the same element injector.
     */
    tNode: TDirectiveHostNode) => any,
    /**
     * Set to `true` if the token is declared in `viewProviders` (or if it is component).
     */
    isViewProvider: boolean,
    injectImplementation: null|(<T>(token: ProviderToken<T>, flags?: InjectFlags) => T)) {
  ngDevMode && assertDefined(factory, 'Factory not specified');
  ngDevMode && assertEqual(typeof factory, 'function', 'Expected factory function.');
```

```

this.canSeeViewProviders = isViewProvider;
this.injectImpl = injectImplementation;
}
}
export function isFactory(obj: any): obj is NodeInjectorFactory {
  return obj instanceof NodeInjectorFactory;
}
// Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.
export const unusedValueExportToPlacateAjd = 1;
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 */
Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at
https://angular.io/license
import {KeyValueArray} from '../util/array_utils';
import {TStylingRange} from '../interfaces/styling';
import {Ticu} from './i18n';
import {CssSelector} from './projection';
import {RNode} from './renderer_dom';
import {LView, TView} from './view';
/**
 * TNodeType corresponds to the {@link TNode} `type` property.
 */
NOTE: type IDs are such that we use each bit to denote a type. This is done so that we can easily check if the `TNode` is of more than one type.
if (tNode.type === TNodeType.Text || tNode.type === TNodeType.Element)
  can be written as:
  if (tNode.type & (TNodeType.Text | TNodeType.Element))
  However any given `TNode` can only be of one type.
export const enum TNodeType {
  /**
   * The TNode contains information about a DOM element aka {@link RText}.
   */
  Text = 0b1,
  /**
   * The TNode contains information about a DOM element aka {@link RElement}.
   */
  Element = 0b10,
  /**
   * The TNode contains information about an {@link LContainer} for embedded views.
   */
  Container = 0b100,
  /**
   * The TNode contains information about an <ng-container> element {@link RNode}.
   */
  ElementContainer = 0b1000,
  /**
   * The TNode contains information about an <ng-content> projection
   */
  Projection = 0b10000,
  /**
   * The TNode contains information about an ICU comment used in `i18n`.
   */
  Icu = 0b100000,
  /**
   * Special node type representing a placeholder for future `TNode` at this location.
   */
  I18n = 0b1000000,
}
I18n translation blocks are created before the element nodes which they contain. (I18n blocks can span over many elements.) Because i18n `TNode`s (representing text) are created first they often may need to point to element `TNode`s which are not yet created. In such a case we create a `Placeholder` `TNode`. This allows the i18n to structurally link the `TNode`s together without knowing any information about the future nodes which will be at that location.
On `firstCreatePass` When element instruction executes it will try to create a `TNode` at that location. Seeing a `Placeholder` `TNode` already there tells the system that it should reuse existing `TNode` (rather than create a new one) and just update the missing information.
Placeholder = 0b1000000,
// Combined Types These should never be used for `TNode.type` only as a useful way to check if `TNode.type` is one of several choices.
// See:
https://github.com/microsoft/TypeScript/issues/35875 why we can't refer to existing enum.
AnyRNode = 0b11,
// Text | Element,
AnyContainer = 0b1100, // Container | ElementContainer,
// See:
}
/**
 * Converts `TNodeType` into human readable text.
 */
Make sure this matches with `TNodeType`
export function toTNodeTypeAsString(tNodeType: TNodeType): string {
  let text = '';
  (tNodeType & TNodeType.Text) && (text += 'Text');
  (tNodeType & TNodeType.Element) && (text += 'Element');
  (tNodeType &

```

```

TNodeType.Container) && (text += 'Container');\n
(tNodeType & TNodeType.ElementContainer) && (text += 'ElementContainer');\n (tNodeType &
TNodeType.Projection) && (text += 'Projection');\n (tNodeType & TNodeType.Icu) && (text +=
'IcuContainer');\n (tNodeType & TNodeType.Placeholder) && (text += 'Placeholder');\n return text.length > 0 ?
text.substring(1) : text;\n}\n\n/**\n * Corresponds to the TNode.flags property.\n */\n\nexport const enum
TNodeFlags {\n /** Bit #1 - This bit is set if the node is a host for any directive (including a component) */\n
isDirectiveHost = 0x1,\n /**\n * Bit #2 - This bit is set if the node is a host for a component.\n */\n * Setting
this bit implies that the `isDirectiveHost` bit is set as well.\n */\n isComponentHost = 0x2,\n /** Bit #3 - This
bit is set if the node has been projected */\n isProjected = 0x4,\n /** Bit #4 - This bit is set if any directive on this
node has content queries */\n hasContentQuery = 0x8,\n /** Bit #5 - This bit is set if the node has
any `class` inputs */\n hasClassInput = 0x10,\n /** Bit #6 - This bit is set if the node has any `style` inputs
*/\n hasStyleInput = 0x20,\n /** Bit #7 This bit is set if the node has been detached by i18n */\n isDetached =
0x40,\n /**\n * Bit #8 - This bit is set if the node has directives with host bindings.\n */\n * This flags allows
us to guard host-binding logic and invoke it only on nodes\n * that actually have directives with host bindings.\n
*/\n hasHostBindings = 0x80,\n}\n\n/**\n * Corresponds to the TNode.providerIndexes property.\n */\n\nexport const
enum TNodeProviderIndexes {\n /** The index of the first provider on this node is encoded on the least significant
bits. */\n ProvidersStartIndexMask = 0b00000000000011111111111111111111,\n /**\n * The count of view
providers from the component on this node is\n * encoded on the 20 most significant bits.\n */\n
CptViewProvidersCountShift = 20,\n CptViewProvidersCountShifter =
0b00000000000100000000000000000000,\n}\n\n/**\n
* A set of marker values to be used in the attributes arrays. These markers indicate that some\n * items are not
regular attributes and the processing should be adapted accordingly.\n */\n\nexport const enum AttributeMarker {\n
/**\n * An implicit marker which indicates that the value in the array are of `attributeKey`,\n */\n * `attributeValue`
format.\n */\n * NOTE: This is implicit as it is the type when no marker is present in array. We indicate that\n * it
should not be present at runtime by the negative number.\n */\n ImplicitAttributes = -1,\n /**\n * Marker
indicates that the following 3 values in the attributes array are:\n * namespaceUri, attributeName, attributeValue\n
* in that order.\n */\n NamespaceURI = 0,\n /**\n * Signals class declaration.\n */\n * Each value following
`Classes` designates a class name to include on the element.\n * ## Example:\n */\n * Given:\n * ```\n * <div
class="foo bar baz">...</div>\n
* ```\n */\n * the generated code is:\n * ```\n * var _c1 = [AttributeMarker.Classes, 'foo', 'bar', 'baz'];\n * ```\n
*/\n\nClasses = 1,\n /**\n * Signals style declaration.\n */\n * Each pair of values following `Styles` designates
a style name and value to include on the\n * element.\n * ## Example:\n */\n * Given:\n * ```\n * <div
style="width:100px; height:200px; color:red">...</div>\n
* ```\n */\n * the generated code is:\n * ```\n * var
_c1 = [AttributeMarker.Styles, 'width', '100px', 'height', '200px', 'color', 'red'];\n * ```\n */\n\nStyles = 2,\n /**\n
* Signals that the following attribute names were extracted from input or output bindings.\n */\n * For example,
given the following HTML:\n */\n * ```\n * <div moo="car" [foo]="exp" (bar)="doSth()">\n * ```\n */\n *
the generated code is:\n */\n * ```\n * var _c1 = ['moo', 'car', AttributeMarker.Bindings, 'foo', 'bar'];\n * ```\n
*/\n\n\nBindings = 3,\n /**\n * Signals that the following attribute names were hoisted from an inline-template
declaration.\n */\n * For example, given the following HTML:\n */\n * ```\n * <div *ngFor="let value of
values; trackBy:trackBy" dirA [dirB]="value">\n * ```\n */\n * the generated code for the `template()`
instruction would include:\n */\n * ```\n * ['dirA', AttributeMarker.Bindings, 'dirB', AttributeMarker.Template,
'ngFor', 'ngForOf',\n * 'ngForTrackBy', 'let-value']\n * ```\n */\n * while the generated code for the `element()`
instruction inside the template function would\n * include:\n */\n * ```\n * ['dirA', AttributeMarker.Bindings,
'dirB']\n * ```\n */\n\nTemplate = 4,\n /**\n * Signals that the following attribute is `ngProjectAs` and its value
is a parsed\n * `CssSelector`.\n */\n * For example, given the following HTML:\n */\n * ```\n * <h1
attr="value" ngProjectAs="[title]">\n * ```\n */\n * the

```

generated code for the `element()` instruction would include:

```

    * \n * ``\n * ['attr', 'value',
AttributeMarker.ProjectAs, ['', 'title', '']]
    * ``\n * /\n ProjectAs = 5,\n /**\n * Signals that the following
attribute will be translated by runtime
    * \n * For example, given the following HTML:
    * \n * ``\n *
<div moo="car" foo="value" i18n-foo [bar]="binding" i18n-bar>
    * ``\n * \n * the generated code is:
    * \n * ``\n * var _c1 = ['moo', 'car', AttributeMarker.I18n, 'foo', 'bar'];
    * /\n I18n = 6,\n }\n /**\n * A
combination of:
    * - Attribute names and values.
    * - Special markers acting as flags to alter attributes
processing.
    * - Parsed ngProjectAs selectors.
    * /\n export type TAttributes =
(string|AttributeMarker|CssSelector)[];
    * \n /**\n * Constants that are associated with a view. Includes:
    * - Attribute
arrays.
    * - Local definition arrays.
    * - Translated messages (i18n).
    * /\n export type TConstants =
(TAttributes|string)[];
    * \n /**\n
    * Factory function that returns an array of consts. Consts can be represented as a function in
    * case any additional
statements are required to define consts in the list. An example is
    * where additional
i18n calls are generated,
which should be executed when consts are requested
    * for the first time.
    * /\n export type TConstantsFactory = ()
=> TConstants;
    * \n /**\n * TConstants type that describes how the `consts` field is generated on ComponentDef: it
can be
    * either an array or a factory function that returns that array.
    * /\n export type TConstantsOrFactory =
TConstants|TConstantsFactory;
    * \n /**\n * Binding data (flyweight) for a particular node that is shared between all
templates
    * of a specific type.
    * \n * If a property is:
    * - PropertyAliases: that property's data was generated
and this is it
    * - Null: that property's data was already generated and nothing was found.
    * - Undefined: that
property's data has not yet been generated
    * \n * see: https://en.wikipedia.org/wiki/Flyweight\_pattern for more on the Flyweight pattern
    * /\n export interface
TNode {
    /** The type of the TNode. See TNodeType.
    * \n type: TNodeType;
    * \n /**\n * Index of the TNode
in TView.data and corresponding native element in LView.
    * \n * This is necessary to get from any TNode to its
corresponding native element when
    * traversing the node tree.
    * \n * If index is -1, this is a dynamically
created container node or embedded view node.
    * /\n index: number;
    * \n /**\n * Insert before existing DOM
node index.
    * \n * When DOM nodes are being inserted, normally they are being appended as they are created.
    * \n * Under i18n case, the translated text nodes are created ahead of time as part of the
    * `i18nStart` instruction
which means that this `TNode` can't just be appended and instead
    * needs to be inserted using
`insertBeforeIndex` semantics.
    * \n * Additionally sometimes it is necessary to insert
new text nodes as a child of this `TNode`. In
    * such a case the value stores an array of text nodes to insert.
    * \n * Example:
    * ``\n * <div i18n>
    * Hello <span>World</span>
    * </div>
    * ``\n * In the above
example the `i18nStart` instruction can create `Hello`, `World` and `!` text
    * nodes. It can also insert `Hello`
and `!` text node as a child of `

`, but it can't
    * insert `World` because the `` node has not yet been
created. In such a case the
    * `` `TNode` will have an array which will direct the `` to not only
insert
    * itself in front of `!` but also to insert the `World` (created by `i18nStart`) into
    * `` itself.
    * \n * Pseudo code:
    * ``\n * if (insertBeforeIndex === null) {
    * // append as normal
    * } else if
(Array.isArray(insertBeforeIndex)) {
    * // First insert current `TNode` at correct location
    * const
currentNode = IView[this.index];
    * parentNode.insertBefore(currentNode,
IView[this.insertBeforeIndex[0]]);
    * // Now append all of the children
    * for(let i=1;
i<this.insertBeforeIndex; i++) {
    * currentNode.appendChild(IView[this.insertBeforeIndex[i]]);
    * }
    * } else {
    * parentNode.insertBefore(IView[this.index], IView[this.insertBeforeIndex])
    * }
    * ``\n * -
null: Append as normal using `parentNode.appendChild`
    * - `number`: Append using
    * `parentNode.insertBefore(IView[this.index], IView[this.insertBeforeIndex])`
    * \n * *Initialization*
    * \n * Because `i18nStart` executes before nodes are created, on `TView.firstCreatePass` it is not
    * possible for
`i18nStart` to set the `insertBeforeIndex` value as the corresponding `TNode`
    * has not yet been created. For this
reason the `i18nStart` creates a `TNodeType.Placeholder`
    * `TNode` at that location. See
`TNodeType.Placeholder` for more information.
    * /\n insertBeforeIndex: InsertBeforeIndex;
    * \n
    * \n /**\n * The index of the closest injector in this node's LView.
    * \n * If the index === -1, there is no injector
on this node or any ancestor node in this view.
    * \n * If the index !== -1, it is the index of this node's injector OR


```

the index of a parent injector in the same view. We pass the parent injector index down the node tree of a view so it's possible to find the parent injector without walking a potentially deep node tree. Injector indices are not set across view boundaries because there could be multiple component hosts. If `tNode.injectorIndex === tNode.parent.injectorIndex`, then the index belongs to a parent injector.

`injectorIndex: number;`  
 Stores starting index of the directives. NOTE: The first directive is always component (if present).  
`directiveStart: number;`  
 Stores final exclusive index of the directives. The area right behind the `directiveStart-directiveEnd` range is used to allocate the `HostBindingFunction`vars`` (or null if no bindings.) Therefore `directiveEnd` is used to set `LFrame.bindingRootIndex`` before `HostBindingFunction`` is executed.  
`directiveEnd: number;`  
 Stores the last directive which had a styling instruction. Initial value of this is `-1`` which means that no `hostBindings`` styling instruction has executed. As `hostBindings`` instructions execute they set the value to the index of the `DirectiveDef`` which contained the last `hostBindings`` styling instruction. Valid values are:  
`-1`` No `hostBindings`` instruction has executed.  
`directiveStart <= directiveStylingLast < directiveEnd``: Points to the `DirectiveDef`` of the last styling instruction which executed in the `hostBindings``. This data is needed so that styling instructions know which static styling data needs to be collected from the `DirectiveDef.hostAttrs``. A styling instruction needs to collect all data since last styling instruction.  
`directiveStylingLast: number;`  
 Stores indexes of property bindings. This field is only set in the `ngDevMode` and holds indexes of property bindings so  `TestBed`  can get bound property metadata for a given node.  
`propertyBindings: number[]|null;`  
 Stores if `Node` is `Component`, `isProjected`, `hasContentQuery`, `hasClassInput` and `hasStyleInput` etc.  
`flags: TNodeFlags;`  
 This number stores two values using its bits:  
 - the index of the first provider on that node (first 16 bits)  
 - the count of view providers from the component on this node (last 16 bits)  
 // TODO(misko): break this into actual vars.  
`providerIndexes: TNodeProviderIndexes;`  
 The value name associated with this node. if type:  
`TNodeType.Text``: text value  
`TNodeType.Element``: tag name  
`TNodeType.ICUContainer``: `TIcu`` value: any;  
 Attributes associated with an element. We need to store attributes to support various use-cases (attribute injection, content projection with selectors, directives matching). Attributes are stored statically because reading them from the DOM would be way too slow for content projection and queries. Since `attrs` will always be calculated first, they will never need to be marked undefined by other instructions. For regular attributes a name of an attribute and its value alternate in the array. e.g. `['role', 'checkbox']`. This array can contain flags that will indicate "special attributes" (attributes with namespaces, attributes extracted from bindings and outputs).  
`TAttributes|null;`  
 Same as `TNode.attrs`` but contains merged data across all directive host bindings. We need to keep `attrs`` as unmerged so that it can be used for attribute selectors. We merge `attrs` here so that it can be used in a performant way for initial rendering. The `attrs`` are merged in first pass in following order:  
 - Component's `hostAttrs``  
 - Directives' `hostAttrs``  
 - Template `TNode.attrs`` associated with the current `TNode``.  
`mergedAttrs: TAttributes|null;`  
 A set of local names under which a given element is exported in a template and visible to queries. An entry in this array can be created for different reasons:  
 - an element itself is referenced, ex.: `<div #foo>`  
 - a component is referenced, ex.: `<my-cmpt #foo>`  
 - a directive is referenced, ex.: `<my-cmpt #foo="directiveExportAs">`.  
 A given element might have different local names and those names can be associated with a directive. We store local names at even indexes while odd indexes are reserved for directive index in a view (or `-1`` if there is no associated directive).  
 Some examples:  
 - `<div #foo>` => `["foo", -1]`  
 - `<my-cmpt #foo>` => `["foo", myCmptIdx]`  
 - `<my-cmpt #foo #bar="directiveExportAs">` => `["foo", myCmptIdx, "bar", directiveIdx]`  
 - `<div #foo #bar="directiveExportAs">` => `["foo", -1, "bar", directiveIdx]`  
`localNames: (string|number)[]|null;`  
 Information about input properties that need to be set once from attribute data.  
`initialInputs: InitialInputData|null|undefined;`  
 Input data for all

directives on this node. `null` means that there are no directives with\n \* inputs on this node.\n \* /\n inputs: PropertyAliases|null;\n\n /\*\*\n \* Output data for all directives on this node. `null` means that there are no directives with\n \* outputs on this node.\n \* /\n outputs: PropertyAliases|null;\n\n /\*\*\n \* The TView or TViews attached to this node.\n \* \n \* If this TNode corresponds to an LContainer with inline views, the container will\n \* need to store separate static data for each of its view blocks (TView[]). Otherwise,\n \* nodes in inline views with the same index as nodes in their parent views will overwrite\n \* each other, as they are in the same template.\n \* \n \* Each index in this array corresponds to the static data for a certain\n \* view. So if you had V(0) and V(1) in a container, you might have:\n \* \n \* [\n \* [{tagName: 'div', attrs: ...}, null], // V(0) TView\n \* [{tagName: 'button', attrs ...}, null] // V(1) TView\n \* \n \* If this TNode corresponds to an LContainer with a template (e.g. structural\n \* directive), the template's TView will be stored here.\n \* \n \* If this TNode corresponds to an element, tViews will be null.\n \* /\n tViews: TView|TView[]|null;\n\n /\*\*\n \* The next sibling node. Necessary so we can propagate through the root nodes of a view\n \* to insert them or remove them from the DOM.\n \* /\n next: TNode|null;\n\n /\*\*\n \* The next projected sibling. Since in Angular content projection works on the node-by-node\n \* basis the act of projecting nodes might change nodes relationship at the insertion point\n \* (target view). At the same time we need to keep initial relationship between nodes as\n \* expressed in content view.\n \* /\n projectionNext: TNode|null;\n\n /\*\*\n \* First child of the current node.\n \* \n \* For component nodes, the child will always be a ContentChild (in same view).\n \* \n \* For embedded view nodes, the child will be in their child view.\n \* /\n child: TNode|null;\n\n /\*\*\n \* Parent node (in the same view only).\n \* \n \* We need a reference to a node's parent so we can append the node to its parent's native\n \* element at the appropriate time.\n \* \n \* If the parent would be in a different view (e.g. component host), this property will be null.\n \* \n \* It's important that we don't try to cross component boundaries when retrieving the parent\n \* \n \* because the parent will change (e.g. index, attrs) depending on where the component was\n \* used (and thus shouldn't be stored on TNode). In these cases, we retrieve the parent through\n \* LView.node instead (which will be instance-specific).\n \* \n \* If this is an inline view node (V), the parent will be its container.\n \* /\n parent: TElementNode|TContainerNode|null;\n\n /\*\*\n \* List of projected TNodes for a given component host element OR index into the said nodes.\n \* \n \* For easier discussion assume this example:\n \* \n \* <parent>'s view definition:\n \* \n \* <child id="c1">content1</child>\n \* \n \* <child id="c2"><span>content2</span></child>\n \* \n \* <child>'s view definition:\n \* \n \* <ng-content id="cont1"></ng-content>\n \* \n \* \n \* If `Array.isArray(projection)` then `TNode` is a host element:\n \* \n \* - `projection` stores the content nodes which are to be projected.\n \* \n \* - The nodes represent categories defined by the selector: For example:\n \* \n \* <ng-content/><ng-content select="abc"/>` would represent the heads for `<ng-content/>\n \* \n \*` and `<ng-content select="abc"/>` respectively.\n \* \n \* - The nodes we store in `projection` are heads only, we used `.next` to get their\n \* \n \* siblings.\n \* \n \* - The nodes `.next` is sorted/rewritten as part of the projection setup.\n \* \n \* - `projection` size is equal to the number of projections `<ng-content>`. The size of\n \* \n \* `c1` will be `1` because `<child>` has only one `<ng-content>`. \n \* \n \* - we store `projection` with the host (`c1`, `c2`) rather than the `<ng-content>` (`cont1`)\n \* \n \* because the same component (`<child>`) can be used in multiple locations (`c1`, `c2`) and\n \* \n \* as a result have different set of nodes to project.\n \* \n \* - without `projection` it would be difficult to efficiently traverse nodes to be projected.\n \* \n \* \n \* If `typeof projection == 'number'` then `TNode` is a `<ng-content>` element:\n \* \n \* - `projection` is an index of the host's `projection`Nodes.\n \* \n \* - This would return the first head node to project:\n \* \n \* `getHost(currentTNode).projection[currentTNode.projection]`.\n \* \n \* - When projecting nodes the parent node retrieved may be a `<ng-content>` node, in which case\n \* \n \* the process is recursive in nature.\n \* \n \* \n \* If `projection` is of type `RNode[]` then we have a collection of native nodes passed as\n \* \n \* projectable nodes during dynamic component creation.\n \* \n \* /\n projection: (TNode|RNode[]|number|null);\n\n /\*\*\n \* A collection of all `style` static values for an element (including from host).\n \* \n \* This field will be populated if and when:\n \* \n \* \n \* - There are one or more initial `style`s on an element (e.g. `<div style="width:200px;">`)\n \* \n \* - There are one or more initial `style`s on a directive/component host\n \* \n \* (e.g. `@Directive({host: {style: "width:200px;" } })`)\n

```

*/\n styles: string|null;\n\n /**\n * A collection
of all `style` static values for an element excluding host sources.\n *\n * Populated when there are one or more
initial `style`s on an element\n * (e.g. `

---



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\* If this is a component TNode with projection, this will be an array of projected TNodes or native nodes (see TNode.projection for more info). If it's a regular element node or a component without projection, it will be null.

\* projection: (TNode|RNode[])|null;

\* Stores TagName

\* value: string;

Static data for a text node

\* export interface TTextNode extends TNode {

\* Index in the data[] array

index: number;

child: null;

\* Text nodes will have parents unless they are the first node of a component or embedded view (which means their parent is in a different view and must be retrieved using LView.node).

\* parent: TElementNode|TElementContainerNode|null;

tViews: null;

projection: null;

Static data for an LContainer

\* export interface TContainerNode extends TNode {

\* Index in the data[] array.

\* If it's -1, this is a dynamically created container node that isn't stored in data[] (e.g. when you inject ViewContainerRef).

index: number;

child: null;

\* Container nodes will have parents unless:

\* - They are the first node of a component or embedded view

\* - They are dynamically created

\* parent: TElementNode|TElementContainerNode|null;

tViews: TView|TView[]|null;

projection: null;

value: null;

Static data for an <ng-container>

\* export interface TElementContainerNode extends TNode {

\* Index in the LView[] array.

index: number;

child: TElementNode|TTextNode|TContainerNode|TElementContainerNode|TProjectionNode|null;

parent: TElementNode|TElementContainerNode|null;

tViews: null;

projection: null;

Static data for an ICU expression

\* export interface TIcuContainerNode extends TNode {

\* Index in the LView[] array.

index: number;

child: null;

parent: TElementNode|TElementContainerNode|null;

tViews: null;

projection: null;

value: TIcu;

Static data for an LProjectionNode

\* export interface TProjectionNode extends TNode {

\* Index in the data[] array

child: null;

\* Projection nodes will have parents unless they are the first node of a component or embedded view (which means their parent is in a different view and must be retrieved using LView.node).

\* parent: TElementNode|TElementContainerNode|null;

tViews: null;

\* Index of the projection node. (See TNode.projection for more info.)

projection: number;

value: null;

A union type representing all TNode types that can host a directive.

\* export type TDirectiveHostNode = TElementNode|TContainerNode|TElementContainerNode;

\* This mapping is necessary so we can set input properties and output listeners properly at runtime when property names are minified or aliased.

\* Key: unminified / public input or output name

\* Value: array containing minified / internal name and related directive index

\* The value must be an array to support inputs and outputs with the same name on the same node.

\* export type PropertyAliases = {

// This uses an object map because using the Map type would be too slow

[key: string]: PropertyAliasValue;

};

\* Store the runtime input or output names for all the directives.

\* i+0: directive instance index

\* i+1: privateName

\* e.g. [0, 'change-minified']

\* export type PropertyAliasValue = (number|string)[];

\* This array contains information about input properties that need to be set once from attribute data. It's ordered by directive index (relative to element) so it's simple to look up a specific directive's initial input data.

\* Within each sub-array:

\* i+0: attribute name

\* i+1: minified/internal input name

\* i+2: initial value

\* If a directive on a node does not have any input properties that should be set from attributes, its index is set to null to avoid a sparse array.

\* e.g. [null, ['role-min', 'minified-input', 'button']]

\* export type InitialInputData = (InitialInputs|null)[];

\* Used by InitialInputData to store input properties that should be set once from attributes.

\* i+0: attribute name

\* i+1: minified/internal input name

\* i+2: initial value

\* e.g. ['role-min', 'minified-input', 'button']

\* export type InitialInputs = string[];

Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.

\* export const unusedValueExportToPlacateAjd = 1;

\* Type representing a set of TNodes that can have local refs (#foo) placed on them.

\* export type TNodeWithLocalRefs = TContainerNode|TElementNode|TElementContainerNode;

\* Type for a function that extracts a value for a local refs.

\* Example:

\* - <div #nativeDivEl> - nativeDivEl should point to the native <div> element;

\* - <ng-template #tplRef> - tplRef should point to the TemplateRef instance;

\* export type LocalRefExtractor = (tNode: TNodeWithLocalRefs, currentView: LView) => any;

\* Returns true if the

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`TNode` has a directive which has `@Input()` for `class` binding.\n *\n * ```\n * <div my-dir
[class]="exp"></div>\n * ```\n * and\n * ```\n * @Directive({\n * })\n * class MyDirective {\n * @Input()\n *
class: string;\n * }\n * ```\n *\n * In the above case it is necessary to write the reconciled styling information into
the\n * directive's input.\n *\n * @param tNode\n */\n * export function hasClassInput(tNode: TNode) {\n return
(tNode.flags & TNodeFlags.hasClassInput) !== 0;\n }\n *\n * Returns `true` if the `TNode` has a directive which
has `@Input()` for `style` binding.\n *\n * ```\n * <div my-dir [style]="exp"></div>\n * ```\n * and\n * ```\n *
@Directive({\n * })\n * class MyDirective {\n * @Input()\n * class: string;\n * }\n * ```\n *\n * In the above
case it is necessary to write the reconciled styling information into the\n * directive's input.\n *\n * @param
tNode\n */\n * export function hasStyleInput(tNode: TNode) {\n return (tNode.flags & TNodeFlags.hasStyleInput)
!== 0;\n }\n }\n */\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertDefined, throwError} from './util/assert';\nimport {TNode, TNodeType,
toTNodeTypeAsString} from './interfaces/node';\n\nexport function assertTNodeType(\n tNode: TNode|null,
expectedTypes: TNodeType, message?: string): void {\n assertDefined(tNode, 'should be called with a TNode');\n
if ((tNode.type & expectedTypes) === 0) {\n throwError(\n message ||\n `Expected
[${toTNodeTypeAsString(expectedTypes)}] but got ${\n toTNodeTypeAsString(tNode.type)}.`);\n
}\n }\n\nexport function assertPureTNodeType(type:
TNodeType) {\n if (!(type === TNodeType.Element || //\n type === TNodeType.Text || //\n
type === TNodeType.Container || //\n type === TNodeType.ElementContainer || //\n type ===
TNodeType.Icu || //\n type === TNodeType.Projection || //\n type ===
TNodeType.Placeholder)) {\n throwError(`Expected TNodeType to have only a single type selected, but got ${\n
toTNodeTypeAsString(type)}.`);\n }\n }\n */\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n
* Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {CharCode} from './util/char_code';\nimport {AttributeMarker,
TAttributes} from './interfaces/node';\nimport {CssSelector} from './interfaces/projection';\nimport {Renderer}
from './interfaces/renderer';\nimport {RElement} from './interfaces/renderer_dom';\n\n\n*\n * Assigns all attribute values to the provided element via the inferred renderer.\n *\n * This function accepts two
forms of attribute entries:\n *\n * default: (key, value):\n * attrs = [key1, value1, key2, value2]\n *\n * namespaced:
(NAMESPACE_MARKER, uri, name, value)\n * attrs = [NAMESPACE_MARKER, uri, name, value,
NAMESPACE_MARKER, uri, name, value]\n *\n * The `attrs` array can contain a mix of both the default and
namespaced entries.\n *\n * The \"default\" values are set without a marker, but if the function comes across\n * a
marker value then it will attempt to set a namespaced value. If the marker is\n * not of a namespaced value then the
function will quit and return the index value\n * where it stopped during the iteration of the attrs array.\n *\n * See
[AttributeMarker] to understand what the namespace marker value is.\n *\n * Note that this instruction does not
support assigning style and class values to\n * an element. See `elementStart` and `elementHostAttrs` to
learn how styling values\n * are applied to an element.\n *\n * @param renderer The renderer to be used\n *\n * @param
native The element that the attributes will be assigned to\n *\n * @param attrs The attribute array of values that will be
assigned to the element\n *\n * @returns the index value that was last accessed in the attributes array\n */\n * export
function setUpAttributes(renderer: Renderer, native: RElement, attrs: TAttributes): number {\n let i = 0;\n while (i
< attrs.length) {\n const value = attrs[i];\n if (typeof value === 'number') {\n // only namespaces are
supported. Other value types (such as style/class\n // entries) are not supported in this function.\n if (value !==
AttributeMarker.NamespaceURI) {\n break;\n }\n // we just landed on the marker value ... therefore\n
// we should skip to the next entry\n i++;\n const namespaceURI = attrs[i++] as string;\n const attrName
= attrs[i++] as string;\n const attrVal = attrs[i++]
as string;\n ngDevMode && ngDevMode.rendererSetAttribute++;;\n renderer.setAttribute(native, attrName,
attrVal, namespaceURI);\n } else {\n // attrName is string;\n const attrName = value as string;\n const
attrVal = attrs[++i];\n // Standard attributes\n ngDevMode && ngDevMode.rendererSetAttribute++;;\n if
(isAnimationProp(attrName)) {\n renderer.setProperty(native, attrName, attrVal);\n } else {\n

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renderer.setAttribute(native, attrName, attrVal as string);\n    }\n    i++;\n  }\n }\n\n // another piece of code
may iterate over the same attributes array. Therefore\n // it may be helpful to return the exact spot where the
attributes array exited\n // whether by running into an unsupported marker or if all the static values were\n //
iterated over.\n return i;\n}\n\n/**\n * Test whether the given value is a marker that indicates that the following\n *
attribute values in a `TAttributes` array are only the names
of attributes,\n * and not name-value pairs.\n * @param marker The attribute marker to test.\n * @returns true if the
marker is a `\"name-only\"` marker (e.g. `Bindings`, `Template` or `I18n`).\n */\nexport function
isNameOnlyAttributeMarker(marker: string|AttributeMarker|CssSelector) {\n return marker ===
AttributeMarker.Bindings || marker === AttributeMarker.Template ||\n    marker ===
AttributeMarker.I18n;\n}\n\nexport function isAnimationProp(name: string): boolean {\n // Perf note: accessing
charCodeAt to check for the first character of a string is faster as\n // compared to accessing a character at index 0
(ex. name[0]). The main reason for this is that\n // charCodeAt doesn't allocate memory to return a substring.\n
return name.charCodeAt(0) === CharCode.AT_SIGN;\n}\n\n/**\n * Merges `src` `TAttributes` into `dst`
`TAttributes` removing any duplicates in the process.\n *\n * This merge function keeps the order of attrs same.\n
*\n * @param dst Location of where the merged
`TAttributes` should end up.\n * @param src `TAttributes` which should be appended to `dst`\n */\nexport function
mergeHostAttrs(dst: TAttributes|null, src: TAttributes|null): TAttributes|null {\n if (src === null || src.length === 0)
{\n // do nothing\n } else if (dst === null || dst.length === 0) {\n // We have source, but dst is empty, just make a
copy.\n dst = src.slice();\n } else {\n let srcMarker: AttributeMarker = AttributeMarker.ImplicitAttributes;\n
for (let i = 0; i < src.length; i++) {\n const item = src[i];\n if (typeof item === 'number') {\n srcMarker =
item;\n } else {\n if (srcMarker === AttributeMarker.NamespaceURI) {\n // Case where we need to
consume `key1`, `key2`, `value` items.\n } else if (\n srcMarker === AttributeMarker.ImplicitAttributes
||\n srcMarker === AttributeMarker.Styles) {\n // Case where we have to consume `key1` and `value`
only.\n mergeHostAttribute(dst,
srcMarker, item as string, null, src[++i] as string);\n } else {\n // Case where we have to consume `key1`
only.\n mergeHostAttribute(dst, srcMarker, item as string, null, null);\n }\n }\n }\n }\n }\n return
dst;\n}\n\n/**\n * Append `key`/`value` to existing `TAttributes` taking region marker and duplicates into account.\n
*\n * @param dst `TAttributes` to append to.\n * @param marker Region where the `key`/`value` should be
added.\n * @param key1 Key to add to `TAttributes`\n * @param key2 Key to add to `TAttributes` (in case of
`AttributeMarker.NamespaceURI`)\n * @param value Value to add or to overwrite to `TAttributes` Only used if
`marker` is not Class.\n */\nexport function mergeHostAttribute(\n dst: TAttributes, marker: AttributeMarker,
key1: string, key2: string|null,\n value: string|null): void {\n let i = 0;\n // Assume that new markers will be
inserted at the end.\n let markerInsertPosition = dst.length;\n // scan
until correct type.\n if (marker === AttributeMarker.ImplicitAttributes) {\n markerInsertPosition = -1;\n } else
{\n while (i < dst.length) {\n const dstValue = dst[i++];\n if (typeof dstValue === 'number') {\n if
(dstValue === marker) {\n markerInsertPosition = -1;\n break;\n } else if (dstValue > marker) {\n
// We need to save this as we want the markers to be inserted in specific order.\n markerInsertPosition = i -
1;\n break;\n }\n }\n }\n }\n }\n\n // search until you find place of insertion\n while (i < dst.length) {\n
const item = dst[i];\n if (typeof item === 'number') {\n // since `i` started as the index after the marker, we did
not find it if we are at the next\n // marker\n break;\n } else if (item === key1) {\n // We already have
same token\n if (key2 === null) {\n if (value !== null) {\n dst[i + 1] = value;\n }\n return;\n
} else if (key2 === dst[i + 1]) {\n dst[i + 2] = value!;\n return;\n }\n }\n // Increment counter.\n
i++;\n if (key2 !== null) i++;\n if (value !== null) i++;\n }\n\n // insert at location.\n if (markerInsertPosition
!== -1) {\n dst.splice(markerInsertPosition, 0, marker);\n i = markerInsertPosition + 1;\n }\n dst.splice(i++, 0,
key1);\n if (key2 !== null) {\n dst.splice(i++, 0, key2);\n }\n if (value !== null) {\n dst.splice(i++, 0, value);\n
}\n }\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertGreaterThan, assertNotEqual, assertNumber} from './util/assert';\nimport

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{NO_PARENT_INJECTOR, RelativeInjectorLocation, RelativeInjectorLocationFlags} from
'./interfaces/injector';\nimport {DECLARATION_VIEW, HEADER_OFFSET, LView} from
'./interfaces/view';\n\n\n//
Parent Injector Utils //////////////////////////////////////////\nexport function
hasParentInjector(parentLocation: RelativeInjectorLocation): boolean {\n return parentLocation !==
NO_PARENT_INJECTOR;\n}\n\nexport function getParentInjectorIndex(parentLocation:
RelativeInjectorLocation): number {\n ngDevMode && assertNumber(parentLocation, 'Number expected');\n
ngDevMode && assertNotEqual(parentLocation as any, -1, 'Not a valid state.);\n const parentInjectorIndex =\n (parentLocation as any as number) & RelativeInjectorLocationFlags.InjectorIndexMask;\n ngDevMode &&\n
assertGreaterThan(\n parentInjectorIndex, HEADER_OFFSET,\n 'Parent injector must be pointing past
HEADER_OFFSET.);\n return (parentLocation as any as number) &
RelativeInjectorLocationFlags.InjectorIndexMask;\n}\n\nexport function
getParentInjectorViewOffset(parentLocation: RelativeInjectorLocation): number {\n return (parentLocation as any
as number)
>>> RelativeInjectorLocationFlags.ViewOffsetShift;\n}\n\n/**\n * Unwraps a parent injector location number to
find the view offset from the current injector,\n * then walks up the declaration view tree until the view is found that
contains the parent\n * injector.\n * @param location The location of the parent injector, which contains the
view offset\n * @param startView The LView instance from which to start walking up the view tree\n * @returns
The LView instance that contains the parent injector\n */\nexport function getParentInjectorView(location:
RelativeInjectorLocation, startView: LView): LView {\n let viewOffset = getParentInjectorViewOffset(location);\n
let parentView = startView;\n // For most cases, the parent injector can be found on the host node (e.g. for
component\n // or container), but we must keep the loop here to support the rarer case of deeply nested\n // <ng-
template> tags or inline views, where the parent injector might live many views\n // above the
child injector.\n while (viewOffset > 0) {\n parentView = parentView[DECLARATION_VIEW]!;\n
viewOffset--;\n }\n return parentView;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {isForwardRef, resolveForwardRef} from './di/forward_ref';\nimport
{injectRootLimpMode, setInjectImplementation} from './di/inject_switch';\nimport {Injector} from
'./di/injector';\nimport {InjectorMarkers} from './di/injector_marker';\nimport {InjectFlags} from
'./di/interface/injector';\nimport {ProviderToken} from './di/provider_token';\nimport {Type} from
'./interface/type';\nimport {assertDefined, assertEqual, assertIndexInRange} from './util/assert';\nimport
{noSideEffects} from './util/closure';\n\nimport {assertDirectiveDef, assertNodeInjector, assertTNodeForLView}
from './assert';\nimport {FactoryFn, getFactoryDef}
from './definition_factory';\nimport {throwCyclicDependencyError, throwProviderNotFoundError} from
'./errors_di';\nimport {NG_ELEMENT_ID, NG_FACTORY_DEF} from './fields';\nimport
{registerPreOrderHooks} from './hooks';\nimport {DirectiveDef} from './interfaces/definition';\nimport {isFactory,
NO_PARENT_INJECTOR, NodeInjectorFactory, NodeInjectorOffset, RelativeInjectorLocation,
RelativeInjectorLocationFlags} from './interfaces/injector';\nimport {AttributeMarker, TContainerNode,
TDirectiveHostNode, TElementContainerNode, TElementNode, TNode, TNodeProviderIndexes, TNodeType} from
'./interfaces/node';\nimport {isComponentDef, isComponentHost} from './interfaces/type_checks';\nimport
{DECLARATION_COMPONENT_VIEW, DECLARATION_VIEW, EMBEDDED_VIEW_INJECTOR, FLAGS,
INJECTOR, LView, LViewFlags, T_HOST, TData, TVIEW, TView, TViewType} from './interfaces/view';\nimport
{assertTNodeType} from './node_assert';\nimport {enterDI, getCurrentTNode, getLView, leaveDI} from
'./state';\nimport {isNameOnlyAttributeMarker}
from './util/attrs_utils';\nimport {getParentInjectorIndex, getParentInjectorView, hasParentInjector} from
'./util/injector_utils';\nimport {stringifyForError} from './util/stringify_utils';\n\n\n/**\n * Defines if the call to
`inject` should include `viewProviders` in its resolution.\n * This is set to true when we try to instantiate a
component. This value is reset in\n * `getNodeInjectable` to a value which matches the declaration location of the

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token about to be instantiated. This is done so that if we are injecting a token which was declared outside of
`viewProviders` we don't accidentally pull `viewProviders` in. Example:
class MyService {
  constructor(public value: String) {}
  @Component({ providers: [MyService,
    { provide: String, value: 'providers' } ], viewProviders: [
    { provide: String, value: 'viewProviders' } ] })
  class MyComponent {
    constructor(myService: MyService, value: String) {
      // We expect that Component can see into `viewProviders`
      expect(value).toEqual('viewProviders');
      // `MyService` was not declared in `viewProviders` hence it can't see it.
      expect(myService.value).toEqual('providers');
    }
  }
}
**
let includeViewProviders = true;
export function setIncludeViewProviders(v: boolean): boolean {
  const oldValue = includeViewProviders;
  includeViewProviders = v;
  return oldValue;
}
**
The number of slots in each bloom filter (used by DI). The larger this number, the fewer directives that will share slots, and thus, the fewer false positives when checking for the existence of a directive.
const BLOOM_SIZE = 256;
const BLOOM_MASK = BLOOM_SIZE - 1;
**
The number of bits that is represented by a single bloom bucket. JS bit operations are 32 bits, so each bucket represents 32 distinct tokens which accounts for log2(32) = 5 bits of a bloom hash number.
const BLOOM_BUCKET_BITS = 5;
**
Counter used to generate unique IDs for directives.
let nextNgElementId = 0;
**
Value used when something wasn't found by an injector.
const NOT_FOUND = {};
**
Registers this directive as present in its node's injector by flipping the directive's corresponding bit in the injector's bloom filter.
@param injectorIndex The index of the node injector where this token should be registered
@param tView The TView for the injector's bloom filters
@param type The directive token to register
export function bloomAdd(injectorIndex: number, tView: TView, type: ProviderToken<any>|string): void {
  ngDevMode && assertEquals(tView.firstCreatePass, true, 'expected firstCreatePass to be true');
  let id: number|undefined;
  if (typeof type === 'string') {
    id = type.charCodeAt(0) || 0;
  } else if (type.hasOwnProperty(NG_ELEMENT_ID)) {
    id = (type as any)[NG_ELEMENT_ID];
  }
  // Set a unique ID on the directive type, so if something tries to inject the directive, we can easily retrieve the ID and hash it into the bloom bit that should be checked.
  if (id == null) {
    id = (type as any)[NG_ELEMENT_ID] = nextNgElementId++;
  }
  // We only have BLOOM_SIZE (256) slots in our bloom filter (8 buckets * 32 bits each), so all unique IDs must be modulo-ed into a number from 0 - 255 to fit into the filter.
  const bloomHash = id & BLOOM_MASK;
  // Create a mask that targets the specific bit associated with the directive. JS bit operations are 32 bits, so this will be a number between 2^0 and 2^31, corresponding to bit positions 0 - 31 in a 32 bit integer.
  const mask = 1 << bloomHash;
  // Each bloom bucket in `tData` represents `BLOOM_BUCKET_BITS` number of bits of `bloomHash`. Any bits in `bloomHash` beyond `BLOOM_BUCKET_BITS` indicate the bucket offset that the mask should be written to.
  (tView.data as number[])[injectorIndex + (bloomHash >> BLOOM_BUCKET_BITS)] |= mask;
}
**
Creates (or gets an existing) injector for a given element or container.
@param tNode for which an injector should be retrieved / created.
@param IView View where the node is stored
@returns Node injector
export function getOrCreateNodeInjectorForNode(tNode: TElementNode|TContainerNode|TElementContainerNode, IView: LView): number {
  const existingInjectorIndex = getInjectorIndex(tNode, IView);
  if (existingInjectorIndex !== -1) {
    return existingInjectorIndex;
  }
  const tView = IView[TVIEW];
  if (tView.firstCreatePass) {
    tNode.injectorIndex = IView.length;
    insertBloom(tView.data, tNode); // foundation for node bloom
    insertBloom(IView, null); // foundation for cumulative bloom
    insertBloom(tView.blueprint, null);
  }
  const parentLoc = getParentInjectorLocation(tNode, IView);
  const injectorIndex = tNode.injectorIndex;
  // If a parent injector can't be found, its location is set to -1. In that case, we don't need to set up a cumulative bloom
  if (hasParentInjector(parentLoc)) {
    const parentIndex = getParentInjectorIndex(parentLoc);
    const parentLView = getParentInjectorView(parentLoc, IView);
    const parentData = parentLView[TVIEW].data as any;
    // Creates a cumulative bloom filter that merges the parent's bloom filter and its own cumulative bloom (which contains tokens for all ancestors)
    for (let i = 0; i < NodeInjectorOffset.BLOOM_SIZE; i++) {
      IView[injectorIndex + i] = parentLView[parentIndex + i] |

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parentData[parentIndex + i];\n  }\n }\n\n IView[injectorIndex + NodeInjectorOffset.PARENT] = parentLoc;\n
return injectorIndex;\n}\n\nfunction insertBloom(arr: any[], footer: TNode|null): void {\n  arr.push(0, 0, 0, 0, 0, 0, 0, 0, 0, footer);\n}\n}\n\n\nexport function getInjectorIndex(tNode: TNode, IView: LView): number {\n  if
(tNode.injectorIndex
=== -1 ||\n  // If the injector index is the same as its parent's injector index, then the index has been\n  // copied
down from the parent node. No injector has been created yet on this node.\n  (tNode.parent &&
tNode.parent.injectorIndex === tNode.injectorIndex) ||\n  // After the first template pass, the injector index might
exist but the parent values\n  // might not have been calculated yet for this instance\n
IView[tNode.injectorIndex + NodeInjectorOffset.PARENT] === null) {\n  return -1;\n } else {\n  ngDevMode
&& assertIndexInRange(IView, tNode.injectorIndex);\n  return tNode.injectorIndex;\n }\n}\n\n\n* Finds the
index of the parent injector, with a view offset if applicable. Used to set the\n * parent injector initially.\n * @returns Returns a number that is the combination of the number of LViews that we have to go up\n * to find the
LView containing the parent inject AND the index of the injector within that LView.\n
* ^\nexport function getParentInjectorLocation(tNode: TNode, IView: LView): RelativeInjectorLocation {\n  if
(tNode.parent && tNode.parent.injectorIndex !== -1) {\n  // If we have a parent `TNode` and there is an injector
associated with it we are done, because\n  // the parent injector is within the current `LView`.\n  return
tNode.parent.injectorIndex as any; // ViewOffset is 0\n  }\n\n  // When parent injector location is computed it may
be outside of the current view. (ie it could\n  // be pointing to a declared parent location). This variable stores
number of declaration parents\n  // we need to walk up in order to find the parent injector location.\n  let
declarationViewOffset = 0;\n  let parentTNode: TNode|null = null;\n  let IViewCursor: LView|null = IView;\n\n  //
The parent injector is not in the current `LView`. We will have to walk the declared parent\n  // `LView` hierarchy
and look for it. If we walk of the top, that means that there is no parent\n  // `NodeInjector`.\n
  while (IViewCursor !== null) {\n  parentTNode = getTNodeFromLView(IViewCursor);\n\n  if (parentTNode
=== null) {\n  // If we have no parent, than we are done.\n  return NO_PARENT_INJECTOR;\n  }\n\n  ngDevMode
&& parentTNode && assertTNodeForLView(parentTNode!,
IViewCursor[DECLARATION_VIEW]);\n  // Every iteration of the loop requires that we go to the declared
parent.\n  declarationViewOffset++;\n  IViewCursor = IViewCursor[DECLARATION_VIEW];\n\n  if
(parentTNode.injectorIndex !== -1) {\n  // We found a NodeInjector which points to something.\n  return
(parentTNode.injectorIndex |\n  (declarationViewOffset << RelativeInjectorLocationFlags.ViewOffsetShift))
as any;\n  }\n }\n\n  return NO_PARENT_INJECTOR;\n}\n\n\n* Makes a type or an injection token public to the
DI system by adding it to an\n * injector's bloom filter.\n * @param di The node injector in which a directive
will be added\n * @param token The type or the injection
token to be made public\n * ^\nexport function diPublicInInjector(\n  injectorIndex: number, tView: TView, token:
ProviderToken<any>): void {\n  bloomAdd(injectorIndex, tView, token);\n}\n\n\n* Inject static attribute value
into directive constructor.\n * @param token The type or the injection
token to be made public\n * This method is used with `factory` functions which are generated as part of\n *
`defineDirective` or `defineComponent`. The method retrieves the static value\n * of an attribute. (Dynamic
attributes are not supported since they are not resolved\n * at the time of injection and can change over time.)\n *
# Example\n * Given:\n * ```\n * @Component(...)\n * class MyComponent {\n *   constructor(@Attribute('title')
title: string) { ... }\n * }\n * ```\n * When instantiated with\n * ```\n * <my-component title="Hello"></my-
component>\n * ```\n * Then factory method generated is:\n * ```\n * MyComponent.cmp =
defineComponent({\n *   factory: () => new MyComponent(injectAttribute('title'))\n *   ...\n * })\n * ```\n *
* @publicApi\n * ^\nexport function injectAttributeImpl(tNode: TNode, attrNameToInject: string): string|null {\n
ngDevMode && assertTNodeType(tNode, TNodeType.AnyContainer | TNodeType.AnyRNode);\n  ngDevMode
&& assertDefined(tNode, 'expecting tNode');\n  if (attrNameToInject === 'class') {\n  return tNode.classes;\n }\n
if (attrNameToInject === 'style') {\n  return tNode.styles;\n }\n\n  const attrs = tNode.attrs;\n  if (attrs) {\n  const
attrsLength = attrs.length;\n  let i = 0;\n  while (i < attrsLength) {\n  const value = attrs[i];\n\n  // If we hit a
`Bindings` or `Template` marker then we are done.\n  if (isNameOnlyAttributeMarker(value)) break;\n\n  //
Skip namespaced attributes\n  if (value === AttributeMarker.NamespaceURI) {\n  // we skip the next two

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values\n    // as namespaced attributes looks like\n    // [..., AttributeMarker.NamespaceURI,
'http://someuri.com/test', 'test:exist',\n    // 'existValue', ...]\n    i = i
+ 2;\n    } else if (typeof value === 'number') {\n    // Skip to the first value of the marked attribute.\n    i++;\n    while (i < attrsLength && typeof attrs[i] === 'string') {\n    i++;\n    }\n    } else if (value ===
attrNameToInject) {\n    return attrs[i + 1] as string;\n    } else {\n    i = i + 2;\n    }\n    }\n    }\n    return
null;\n}\n\nfunction notFoundValueOrThrow<T>(\n    notFoundValue: T|null, token: ProviderToken<T>, flags:
InjectFlags): T|null {\n    if ((flags & InjectFlags.Optional) || notFoundValue !== undefined) {\n    return
notFoundValue;\n    } else {\n    throwProviderNotFoundError(token, 'NodeInjector');\n    }\n}\n\n/**\n * Returns the
value associated to the given token from the ModuleInjector or throws exception\n * \n * @param IView The
`LView` that contains the `tNode`\n * @param token The token to look for\n * @param flags Injection flags\n *
@param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n
* @returns the value from the injector or throws an exception\n */\nfunction
lookupTokenUsingModuleInjector<T>(\n    IView: LView, token: ProviderToken<T>, flags: InjectFlags,
notFoundValue?: any): T|null {\n    if ((flags & InjectFlags.Optional) && notFoundValue === undefined) {\n    //
This must be set or the NullInjector will throw for optional deps\n    notFoundValue = null;\n    }\n    if ((flags &
(InjectFlags.Self | InjectFlags.Host)) === 0) {\n    const moduleInjector = IView[INJECTOR];\n    // switch to
`injectInjectorOnly` implementation for module injector, since module injector\n    // should not have access to
Component/Directive DI scope (that may happen through\n    // `directiveInject` implementation)\n    const
previousInjectImplementation = setInjectImplementation(undefined);\n    try {\n    if (moduleInjector) {\n
return moduleInjector.get(token, notFoundValue, flags & InjectFlags.Optional);\n    } else {\n    return
injectRootLimpMode(token,
notFoundValue, flags & InjectFlags.Optional);\n    }\n    } finally {\n
setInjectImplementation(previousInjectImplementation);\n    }\n    }\n    return
notFoundValueOrThrow<T>(notFoundValue, token, flags);\n}\n\n/**\n * Returns the value associated to the given
token from the NodeInjectors => ModuleInjector.\n * \n * Look for the injector providing the token by walking up
the node injector tree and then\n * the module injector tree.\n * \n * This function patches `token` with
`__NG_ELEMENT_ID__` which contains the id for the bloom\n * filter. `-1` is reserved for injecting `Injector`
(implemented by `NodeInjector`)\n * \n * @param tNode The Node where the search for the injector should start\n *
@param IView The `LView` that contains the `tNode`\n * @param token The token to look for\n * @param flags
Injection flags\n * @param notFoundValue The value to return when the injection flags is `InjectFlags.Optional`\n *
@returns the value from the injector, `null` when not found, or `notFoundValue`
if provided\n */\nexport function getOrCreateInjectable<T>(\n    tNode: TDirectiveHostNode|null, IView: LView,
token: ProviderToken<T>,\n    flags: InjectFlags = InjectFlags.Default, notFoundValue?: any): T|null {\n    if (tNode
!== null) {\n    // If the view or any of its ancestors have an embedded\n    // view injector, we have to look it up
there first.\n    if (IView[FLAGS] & LViewFlags.HasEmbeddedViewInjector) {\n    const embeddedInjectorValue
=\n    lookupTokenUsingEmbeddedInjector(tNode, IView, token, flags, NOT_FOUND);\n    if
(embeddedInjectorValue !== NOT_FOUND) {\n    return embeddedInjectorValue;\n    }\n    }\n    // Otherwise
try the node injector.\n    const value = lookupTokenUsingNodeInjector(tNode, IView, token, flags,
NOT_FOUND);\n    if (value !== NOT_FOUND) {\n    return value;\n    }\n    }\n    // Finally, fall back to the
module injector.\n    return lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n}\n\n/**\n * Returns
the value associated to the given token from the node injector.\n * \n * @param tNode The Node where the search
for the injector should start\n * @param IView The `LView` that contains the `tNode`\n * @param token The token
to look for\n * @param flags Injection flags\n * @param notFoundValue The value to return when the injection
flags is `InjectFlags.Optional`\n * @returns the value from the injector, `null` when not found, or `notFoundValue`
if provided\n */\nfunction lookupTokenUsingNodeInjector<T>(\n    tNode: TDirectiveHostNode, IView: LView,
token: ProviderToken<T>, flags: InjectFlags,\n    notFoundValue?: any) {\n    const bloomHash =
bloomHashBitOrFactory(token);\n    // If the ID stored here is a function, this is a special object like ElementRef or

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TemplateRef\n // so just call the factory function to create it.\n if (typeof bloomHash === 'function') {\n  if
(!enterDI(IView, tNode, flags)) {\n   // Failed to enter DI, try module injector instead. If a token is injected
with the @Host\n   // flag, the module injector is not searched for that token in Ivy.\n   return (flags &
InjectFlags.Host) ?\n   notFoundValueOrThrow<T>(notFoundValue, token, flags) :\n
lookupTokenUsingModuleInjector<T>(IView, token, flags, notFoundValue);\n  }\n  try {\n   const value =
bloomHash(flags);\n   if (value == null && !(flags & InjectFlags.Optional)) {\n
throwProviderNotFoundError(token);\n  } else {\n   return value;\n  }\n } finally {\n  leaveDI();\n }
} else if (typeof bloomHash === 'number') {\n  // A reference to the previous injector TView that was found while
climbing the element\n  // injector tree. This is used to know if viewProviders can be accessed on the current\n
// injector.\n  let previousTView: TView|null = null;\n  let injectorIndex = getInjectorIndex(tNode, IView);\n  let
parentLocation: RelativeInjectorLocation = NO_PARENT_INJECTOR;\n  let hostTElementNode: TNode|null =\n
flags & InjectFlags.Host ? IView[DECLARATION_COMPONENT_VIEW][T_HOST] : null;\n  // If we
should skip this injector, or if there is no injector on this node, start by\n  // searching the parent injector.\n  if
(injectorIndex === -1 || flags & InjectFlags.SkipSelf) {\n   parentLocation = injectorIndex === -1 ?
getParentInjectorLocation(tNode, IView) :\n   IView[injectorIndex +
NodeInjectorOffset.PARENT];\n   if (parentLocation === NO_PARENT_INJECTOR ||
!shouldSearchParent(flags, false)) {\n    injectorIndex = -1;\n   } else {\n    previousTView =
IView[TVIEW];\n    injectorIndex = getParentInjectorIndex(parentLocation);\n    IView =
getParentInjectorView(parentLocation, IView);\n   }\n  }\n  // Traverse up the injector tree until we find a
potential match or until we know there\n  // *isn't* a match.\n  while (injectorIndex !== -1) {\n   ngDevMode
&& assertNodeInjector(IView, injectorIndex);\n
// Check the current injector. If it matches, see if it contains token.\n   const tView = IView[TVIEW];\n
ngDevMode &&\n   assertTNodeForLView(tView.data[injectorIndex + NodeInjectorOffset.TNODE] as
TNode, IView);\n   if (bloomHasToken(bloomHash, injectorIndex, tView.data)) {\n    // At this point, we have
an injector which *may* contain the token, so we step through\n    // the providers and directives associated with
the injector's corresponding node to get\n    // the instance.\n    const instance: T|{}|null =
searchTokensOnInjector<T>(\n     injectorIndex, IView, token, previousTView, flags, hostTElementNode);\n
if (instance !== NOT_FOUND) {\n   return instance;\n } }\n parentLocation = IView[injectorIndex
+ NodeInjectorOffset.PARENT];\n if (parentLocation !== NO_PARENT_INJECTOR &&\n
shouldSearchParent(\n  flags,\n  IView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE]
=== hostTElementNode) &&\n  bloomHasToken(bloomHash, injectorIndex, IView)) {\n  // The def wasn't
found anywhere on this node, so it was a false positive.\n  // Traverse up the tree and continue searching.\n
previousTView = tView;\n  injectorIndex = getParentInjectorIndex(parentLocation);\n  IView =
getParentInjectorView(parentLocation, IView);\n } else {\n  // If we should not search parent OR if the
ancestor bloom filter value does not have the\n  // bit corresponding to the directive we can give up on traversing
up to find the specific\n  // injector.\n  injectorIndex = -1;\n }\n }\n }\n return
notFoundValue;\n}\n\nfunction searchTokensOnInjector<T>(\n  injectorIndex: number, IView: LView, token:
ProviderToken<T>, previousTView: TView|null,\n  flags: InjectFlags, hostTElementNode: TNode|null) {\n  const
currentTView = IView[TVIEW];\n  const tNode = currentTView.data[injectorIndex
+ NodeInjectorOffset.TNODE] as TNode;\n  // First, we need to determine if view providers can be accessed by the
starting element.\n  // There are two possibilities\n  const canAccessViewProviders = previousTView == null ?\n
// 1) This is the first invocation `previousTView == null` which means that we are at the\n  // `TNode` of where
injector is starting to look. In such a case the only time we are allowed\n  // to look into the ViewProviders is if:\n
// - we are on a component\n  // - AND the injector set `includeViewProviders` to true (implying that the token
can see\n  // ViewProviders because it is the Component or a Service which itself was declared in\n  //
ViewProviders)\n  (isComponentHost(tNode) && includeViewProviders) :\n  // 2) `previousTView != null`
which means that we are now walking across the parent nodes.\n  // In such a case we are only allowed to look
into the ViewProviders if:\n  // - We just crossed from child View

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to Parent View `previousTView != currentTView`\n    // - AND the parent TNode is an Element.\n    // This
means that we just came from the Component's View and therefore are allowed to see\n    // into the
ViewProviders.\n    (previousTView != currentTView && ((tNode.type & TNodeType.AnyRNode) !== 0));\n\n //
This special case happens when there is a @host on the inject and when we are searching\n // on the host element
node.\n const isHostSpecialCase = (flags & InjectFlags.Host) && hostTElementNode === tNode;\n\n const
injectableIdx = locateDirectiveOrProvider(\n    tNode, currentTView, token, canAccessViewProviders,
isHostSpecialCase);\n if (injectableIdx !== null) {\n    return getNodeInjectable(IView, currentTView,
injectableIdx, tNode as TElementNode);\n } else {\n    return NOT_FOUND;\n }\n}\n\n/**\n * Searches for the
given token among the node's directives and providers.\n * @param tNode TNode on which directives are
present.\n * @param tView The tView we are
currently processing\n * @param token Provider token or type of a directive to look for.\n * @param
canAccessViewProviders Whether view providers should be considered.\n * @param isHostSpecialCase Whether
the host special case applies.\n * @returns Index of a found directive or provider, or null when none found.\n
*/\nexport function locateDirectiveOrProvider<T>(\n    tNode: TNode, tView: TView, token:
ProviderToken<T>|string, canAccessViewProviders: boolean,\n    isHostSpecialCase: boolean|number): number|null
{\n    const nodeProviderIndexes = tNode.providerIndexes;\n    const tInjectables = tView.data;\n\n    const
injectablesStart = nodeProviderIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n    const directivesStart
= tNode.directiveStart;\n    const directiveEnd = tNode.directiveEnd;\n    const cptViewProvidersCount =\n    nodeProviderIndexes >> TNodeProviderIndexes.CptViewProvidersCountShift;\n    const startingIndex =\n    canAccessViewProviders ? injectablesStart : injectablesStart
+ cptViewProvidersCount;\n    // When the host special case applies, only the viewProviders and the component are
visible\n    const endIndex = isHostSpecialCase ? injectablesStart + cptViewProvidersCount : directiveEnd;\n    for (let
i = startingIndex; i < endIndex; i++) {\n        const providerTokenOrDef = tInjectables[i] as ProviderToken<any>|
DirectiveDef<any>| string;\n        if (i < directivesStart && token === providerTokenOrDef ||\n            i >=
directivesStart && (providerTokenOrDef as DirectiveDef<any>).type === token) {\n            return i;\n        }\n    }\n    if
(isHostSpecialCase) {\n        const dirDef = tInjectables[directivesStart] as DirectiveDef<any>;\n        if (dirDef &&
isComponentDef(dirDef) && dirDef.type === token) {\n            return directivesStart;\n        }\n    }\n    return
null;\n}\n\n/**\n * Retrieve or instantiate the injectable from the `LView` at particular `index`.\n * This function
checks to see if the value has already been instantiated and if so returns the\n * cached `injectable` .
Otherwise if it detects that the value is still a factory it\n * instantiates the `injectable` and caches the value.\n
*/\nexport function getNodeInjectable(\n    IView: LView, tView: TView, index: number, tNode:
TDirectiveHostNode): any {\n    let value = IView[index];\n    const tData = tView.data;\n    if (isFactory(value)) {\n
const factory: NodeInjectorFactory = value;\n    if (factory.resolving) {\n
throwCyclicDependencyError(stringifyForError(tData[index]));\n    }\n    const previousIncludeViewProviders =
setIncludeViewProviders(factory.canSeeViewProviders);\n    factory.resolving = true;\n    const
previousInjectImplementation =\n        factory.injectImpl ? setInjectImplementation(factory.injectImpl) : null;\n    const
success = enterDI(IView, tNode, InjectFlags.Default);\n    ngDevMode &&\n        assertEquals(\n
success, true,\n        'Because flags do not contain `SkipSelf` we expect this to always succeed.);\n    try {\n
value = IView[index]
= factory.factory(undefined, tData, IView, tNode);\n    // This code path is hit for both directives and providers.\n
// For perf reasons, we want to avoid searching for hooks on providers.\n    // It does no harm to try (the hooks just
won't exist), but the extra\n    // checks are unnecessary and this is a hot path. So we check to see\n    // if the
index of the dependency is in the directive range for this\n    // tNode. If it's not, we know it's a provider and skip
hook registration.\n    if (tView.firstCreatePass && index >= tNode.directiveStart) {\n        ngDevMode &&
assertDirectiveDef(tData[index]);\n        registerPreOrderHooks(index, tData[index] as DirectiveDef<any>,
tView);\n    }\n    } finally {\n        previousInjectImplementation !== null &&\n
setInjectImplementation(previousInjectImplementation);\n
setIncludeViewProviders(previousIncludeViewProviders);\n        factory.resolving = false;\n        leaveDI();\n    }\n}

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}\n return value;\n}\n\n/**\n
 * Returns the bit in an injector's bloom filter that should be used to determine whether or not\n * the directive might
be provided by the injector.\n *\n * When a directive is public, it is added to the bloom filter and given a unique ID
that can be\n * retrieved on the Type. When the directive isn't public or the token is not a directive `null`\n * is
returned as the node injector can not possibly provide that token.\n *\n * @param token the injection token\n *
@return the matching bit to check in the bloom filter or `null` if the token is not known.\n * When the returned
value is negative then it represents special values such as `Injector`.\n */\nexport function
bloomHashBitOrFactory(token: ProviderToken<any>|string): number|Function|undefined {\n  ngDevMode &&
assertDefined(token, 'token must be defined');\n  if (typeof token === 'string') {\n    return token.charCodeAt(0) ||
0;\n  }\n  const tokenId: number|undefined =\n    // First check with `hasOwnProperty`
so we don't get an inherited ID.\n    token.hasOwnProperty(NG_ELEMENT_ID) ? (token as
any)[NG_ELEMENT_ID] : undefined;\n  // Negative token IDs are used for special objects such as `Injector`\n  if
(typeof tokenId === 'number') {\n    if (tokenId >= 0) {\n      return tokenId & BLOOM_MASK;\n    } else {\n
ngDevMode &&\n      assertEquals(tokenId, InjectorMarkers.Injector, 'Expecting to get Special Injector Id');\n
return createNodeInjector;\n    } } else {\n    return tokenId;\n  }\n}\n\nexport function
bloomHasToken(bloomHash: number, injectorIndex: number, injectorView: LView|TData) {\n  // Create a mask
that targets the specific bit associated with the directive we're looking for.\n  // JS bit operations are 32 bits, so this
will be a number between 2^0 and 2^31, corresponding\n  // to bit positions 0 - 31 in a 32 bit integer.\n  const mask
= 1 << bloomHash;\n  // Each bloom bucket in `injectorView` represents `BLOOM_BUCKET_BITS` number of
bits of\n  // `bloomHash`.\n  Any bits in `bloomHash` beyond `BLOOM_BUCKET_BITS` indicate the bucket offset\n  // that should be used.\n  const value = injectorView[injectorIndex + (bloomHash >> BLOOM_BUCKET_BITS)];\n  // If the bloom filter
value has the bit corresponding to the directive's bloomBit flipped on,\n  // this injector is a potential match.\n  return
!!(value & mask);\n}\n\n/** Returns true if flags prevent parent injector from being searched for tokens */\nfunction
shouldSearchParent(flags: InjectFlags, isFirstHostTNode: boolean): boolean|number {\n  return !(flags &
InjectFlags.Self) && !(flags & InjectFlags.Host && isFirstHostTNode);\n}\n\nexport class NodeInjector
implements Injector {\n  constructor(\n    private _tNode:
TElementNode|TContainerNode|TElementContainerNode|null,\n    private _lView: LView) {} \n\n  get(token: any,
notFoundValue?: any, flags?: InjectFlags): any {\n    return getOrCreateInjectable(this._tNode, this._lView, token,
flags, notFoundValue);\n  }\n}\n\n/** Creates
a `NodeInjector` for the current node. */\nexport function createNodeInjector(): Injector {\n  return new
NodeInjector(getCurrentTNode() as TDirectiveHostNode, getLView()) as any;\n}\n\n/**\n * @codeGenApi\n
*/\nexport function getInheritedFactory<T>(type: Type<any>): (type: Type<T>) => T {\n  return noSideEffects(()
=> {\n    const ownConstructor = type.prototype.constructor;\n    const ownFactory =
ownConstructor[NG_FACTORY_DEF] || getFactoryOf(ownConstructor);\n    const objectPrototype =
Object.prototype;\n    let parent = Object.getPrototypeOf(type.prototype).constructor;\n\n    // Go up the prototype
until we hit `Object`.\n    while (parent && parent !== objectPrototype) {\n      const factory =
parent[NG_FACTORY_DEF] || getFactoryOf(parent);\n\n      // If we hit something that has a factory and the
factory isn't the same as the type,\n      // we've found the inherited factory. Note the check that the factory isn't the
type's\n      // own factory is redundant in most cases,\n      but if the user has custom decorators on the\n      // class, this lookup will start one level down in the prototype
chain, causing us to\n      // find the own factory first and potentially triggering an infinite loop downstream.\n      if
(factory && factory !== ownFactory) {\n        return factory;\n      }\n\n      parent =
Object.getPrototypeOf(parent);\n    }\n\n    // There is no factory defined. Either this was improper usage of
inheritance\n    // (no Angular decorator on the superclass) or there is no constructor at all\n    // in the inheritance
chain. Since the two cases cannot be distinguished, the\n    // latter has to be assumed.\n    return t => new t();\n  });\n}\n\nfunction getFactoryOf<T>(type: Type<any>): ((type?: Type<T>) => T | null)|null {\n  if
(isForwardRef(type)) {\n    return () => {\n      const factory = getFactoryOf<T>(resolveForwardRef(type));\n

```

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return factory && factory();\n  };\n }\n return getFactoryDef<T>(type);\n}\n\n/**\n * Returns a value\n from the closest embedded or node injector.\n *\n * @param tNode The Node where the search for the injector\n should start\n *\n * @param IView The `LView` that contains the `tNode`\n *\n * @param token The token to look for\n *\n * @param flags Injection flags\n *\n * @param notFoundValue The value to return when the injection flags is\n `InjectFlags.Optional`\n *\n * @returns the value from the injector, `null` when not found, or `notFoundValue` if\n provided\n */\nfunction lookupTokenUsingEmbeddedInjector<T>(tNode: TDirectiveHostNode, IView: LView,\n token: ProviderToken<T>, flags: InjectFlags, notFoundValue?: any) {\n  let currentTNode:\n TDirectiveHostNode|null = tNode;\n  let currentLView: LView|null = IView;\n\n  // When an LView with an\n embedded view injector is inserted, it'll likely be interlaced with\n // nodes who may have injectors (e.g. node\n injector -> embedded view injector -> node injector).\n // Since the bloom filters for the node injectors have already\n been constructed and we don't\n\n  // have a way of extracting the records from an injector, the only way to maintain the correct\n // hierarchy when\n resolving the value is to walk it node-by-node while attempting to resolve\n // the token at each level.\n  while\n (currentTNode !== null && currentLView !== null &&\n (currentLView[FLAGS] &\n LViewFlags.HasEmbeddedViewInjector) &&\n !(currentLView[FLAGS] & LViewFlags.IsRoot)) {\n    ngDevMode && assertTNodeForLView(currentTNode, currentLView);\n\n    // Note that this lookup on the node\n injector is using the `Self` flag, because\n // we don't want the node injector to look at any parent injectors since\n we\n // may hit the embedded view injector first.\n    const nodeInjectorValue =\n lookupTokenUsingNodeInjector(\n currentTNode, currentLView, token, flags | InjectFlags.Self,\n NOT_FOUND);\n    if (nodeInjectorValue !== NOT_FOUND) {\n      return nodeInjectorValue;\n    }\n\n    // Has\n an explicit type due to a TS bug: https://github.com/microsoft/TypeScript/issues/33191\n    let parentTNode: TElementNode|TContainerNode|null = currentTNode.parent;\n\n    // `TNode.parent` includes\n the parent within the current view only. If it doesn't exist,\n // it means that we've hit the view boundary and we\n need to go up to the next view.\n    if (!parentTNode) {\n      // Before we go to the next LView, check if the token\n exists on the current embedded injector.\n      const embeddedViewInjector =\n currentLView[EMBEDDED_VIEW_INJECTOR];\n      if (embeddedViewInjector) {\n        const\n embeddedViewInjectorValue =\n embeddedViewInjector.get(token, NOT_FOUND as T | {}, flags);\n        if\n (embeddedViewInjectorValue !== NOT_FOUND) {\n          return embeddedViewInjectorValue;\n        }\n      }\n\n      // Otherwise keep going up the tree.\n      parentTNode = getTNodeFromLView(currentLView);\n      currentLView = currentLView[DECLARATION_VIEW];\n    }\n\n    currentTNode = parentTNode;\n  }\n\n  return\n notFoundValue;\n}\n\n/**\n Gets the TNode associated with an LView inside of the declaration view.\n */\nfunction\n getTNodeFromLView(IView: LView): TElementNode|TElementContainerNode|null {\n  const tView =\n IView[TVIEW];\n  const tViewType = tView.type;\n\n  // The parent pointer differs based on `TView.type`.\n  if\n (tViewType === TViewType.Embedded) {\n    ngDevMode && assertDefined(tView.declTNode, 'Embedded\n TNodes should have declaration parents.);\n    return tView.declTNode as TElementContainerNode;\n  } else if\n (tViewType === TViewType.Component) {\n    // Components don't have `TView.declTNode` because each\n instance of component could be\n // inserted in different location, hence `TView.declTNode` is meaningless.\n    return IView[T_HOST] as TElementNode;\n  }\n\n  return null;\n}\n\n"/**\n * @license\n * Copyright Google LLC\n All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in\n the LICENSE file at https://angular.io/license\n */\nimport {injectAttributeImpl}\n from './di';\nimport {getCurrentTNode} from './state';\n\n"/**\n * Facade for the attribute injection from DI.\n *\n * @codeGenApi\n */\nexport function injectAttribute(attrNameToInject: string): string|null {\n  return\n injectAttributeImpl(getCurrentTNode()!, attrNameToInject);\n}\n\n"/**\n * @license\n * Copyright Google LLC\n All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in\n the LICENSE file at https://angular.io/license\n */\nimport {injectAttribute} from\n './render3/instructions/di_attr';\nimport {makeParamDecorator} from './util/decorators';\n\n"/**\n * Type of the\n Attribute decorator / constructor function.\n *\n * @publicApi\n */\nexport interface AttributeDecorator {\n  /**

```

```

* Parameter decorator for a directive constructor that designates a host-element attribute whose value is
injected as a constant string literal.
* @usageNotes
* Suppose we have an <input>
element and want to know its type.
* <input type="text">
* The following
example uses the decorator to inject the string literal 'text' in a directive.
* { @example
core/ts/metadata/metadata.ts region='attributeMetadata'}
* The following example uses the decorator in a
component constructor.
* { @example core/ts/metadata/metadata.ts region='attributeFactory'}
* (name: string): any;
* new(name: string): Attribute;
* Type of the Attribute metadata.
* @publicApi
* export interface Attribute {
* The name of the attribute whose value can be injected.
* attributeName: string;
* Attribute decorator and metadata.
* @Annotation
* @publicApi
* export const Attribute: AttributeDecorator = makeParamDecorator(
  (attributeName?: string) =>
    ({ attributeName, __NG_ELEMENT_ID__: () => injectAttribute(attributeName!)}));
* @license
* Copyright Google LLC All Rights Reserved.
* Use of this source code is governed by an
MIT-style license that can be found in the LICENSE file at https://angular.io/license
import { R3DependencyMetadataFacade } from '../compiler/compiler_facade';
import { RuntimeError,
RuntimeErrorCode } from '../errors';
import { Type } from '../interface/type';
import { ReflectionCapabilities }
from '../reflection/reflection_capabilities';
import { Host, Inject, Optional, Self, SkipSelf } from
'../metadata';
import { Attribute } from '../metadata_attr';
let _reflect: ReflectionCapabilities | null = null;
export function getReflect(): ReflectionCapabilities {
  return (_reflect = _reflect || new
ReflectionCapabilities());
}
export function reflectDependencies(type: Type<any>):
R3DependencyMetadataFacade[] {
  return convertDependencies(getReflect().parameters(type));
}
export function convertDependencies(deps: any[]):
R3DependencyMetadataFacade[] {
  return deps.map(dep => reflectDependency(dep));
}
function reflectDependency(dep: any|any[]):
R3DependencyMetadataFacade {
  const meta: R3DependencyMetadataFacade = {
    token: null,
    attribute:
null,
    host: false,
    optional: false,
    self: false,
    skipSelf: false,
  };
  if (Array.isArray(dep) &&
dep.length > 0) {
    for (let j = 0; j < dep.length; j++) {
      const param = dep[j];
      if (param === undefined)
// param may be undefined if type of dep is not set by ngts
continue;
    }
    const proto =
Object.getPrototypeOf(param);
    if (param instanceof Optional || proto.ngMetadataName === 'Optional') {
      meta.optional = true;
    } else if (param instanceof SkipSelf || proto.ngMetadataName === 'SkipSelf') {
      meta.skipSelf = true;
    } else if (param instanceof Self || proto.ngMetadataName === 'Self') {
      meta.self =
true;
    } else if (param instanceof Host || proto.ngMetadataName
=== 'Host') {
      meta.host = true;
    } else if (param instanceof Inject) {
      meta.token = param.token;
    } else if (param instanceof Attribute) {
      if (param.attributeName === undefined)
throw new
RuntimeError(
RuntimeErrorCode.INVALID_INJECTION_TOKEN,
ngDevMode &&
`Attribute name must be defined.`);
      meta.attribute = param.attributeName;
    } else {
      meta.token = param;
    }
  } else if (dep === undefined || (Array.isArray(dep) &&
dep.length === 0)) {
    meta.token = null;
  } else {
    meta.token = dep;
  }
  return meta;
}
* @license
* Copyright
Google LLC All Rights Reserved.
* Use of this source code is governed by an MIT-style license that can be
found in the LICENSE file at https://angular.io/license
import { Type } from '../interface/type';
import { NgModuleType } from '../metadata/ng_module_def';
import { getNgModuleDef }
from '../render3/definition';
import { stringify } from '../util/stringify';
* Map of module-id to the
corresponding NgModule.
* const modules = new Map<string, NgModuleType>();
* Whether to check
for duplicate NgModule registrations.
* This can be disabled for testing.
let
checkForDuplicateNgModules = true;
function assertSameOrNotExisting(id: string, type: Type<any>|null,
incoming: Type<any>): void {
  if (type && type !== incoming && checkForDuplicateNgModules)
throw
new Error(
`Duplicate module registered for ${id} - ${stringify(type)} vs
${stringify(type.name)}`);
}
* Adds the given NgModule type to Angular's NgModule registry.
* This is generated as a side-
effect of NgModule compilation. Note that the `id` is passed in explicitly and not read from the NgModule
definition. This is for two reasons: it avoids a megamorphic read, and in JIT there's a chicken-and-egg problem

```

where the NgModule

```
may not be\n * fully resolved when it's registered.\n * \n * @codeGenApi\n * ^\nexport function\nregisterNgModuleType(ngModuleType: NgModuleType, id: string): void {\n  const existing = modules.get(id) ||\n  null;\n  assertSameOrNotExisting(id, existing, ngModuleType);\n  modules.set(id, ngModuleType);\n}\n\nexport\nfunction clearModulesForTest(): void {\n  modules.clear();\n}\n\nexport function getRegisteredNgModuleType(id:\nstring): NgModuleType|undefined {\n  return modules.get(id);\n}\n\n/**\n * Control whether the NgModule\nregistration system enforces that each NgModule type registered has\n * a unique id.\n * This is useful for\n * testing as the NgModule registry cannot be properly reset between tests with\n * Angular's current API.\n * ^\nexport\nfunction setAllowDuplicateNgModuleIdsForTest(allowDuplicates: boolean): void {\n  checkForDuplicateNgModules = !allowDuplicates;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights\nReserved.\n * Use of this source code is governed
```

```
by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport\n{RElement} from '../interfaces/renderer_dom';\n\n/**\n * \n * @codeGenApi\n * ^\nexport function\nresolveWindow(element: RElement&{ownerDocument: Document}) {\n  return\n  element.ownerDocument.defaultView;\n}\n\n/**\n * \n * @codeGenApi\n * ^\nexport function\nresolveDocument(element: RElement&{ownerDocument: Document}) {\n  return\n  element.ownerDocument;\n}\n\n/**\n * \n * @codeGenApi\n * ^\nexport function resolveBody(element:\nRElement&{ownerDocument: Document}) {\n  return element.ownerDocument.body;\n}\n\n/**\n * The special\n * delimiter we use to separate property names, prefixes, and suffixes\n * in property binding metadata. See\n * storeBindingMetadata().\n * We intentionally use the Unicode \"REPLACEMENT CHARACTER\" (U+FFFD)\n * as a delimiter\n * because it is a very uncommon character that is unlikely to be part of a user's\n * property names\n * or interpolation strings. If it
```

```
is in fact used in a property\n * binding, DebugElement.properties will not return the correct value for that\n * binding. However, there should be no runtime effect for real applications.\n * This character is typically\n * rendered as a question mark inside of a diamond.\n * See https://en.wikipedia.org/wiki/Specials_(Unicode_block)\n * ^\n\nexport const INTERPOLATION_DELIMITER = `;\n\n/**\n * Unwrap a value which might be behind a\n * closure (for forward declaration reasons).\n * ^\nexport function maybeUnwrapFn<T>(value: T|(() => T)): T {\n  if\n  (value instanceof Function) {\n    return value();\n  } else {\n    return value;\n  }\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license\n * that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\n/**\n * A schema definition\n * associated with an NgModule.\n * @see `@NgModule`, `CUSTOM_ELEMENTS_SCHEMA`,\n * `NO_ERRORS_SCHEMA`\n * @param
```

```
name The name of a defined schema.\n * @publicApi\n * ^\nexport interface SchemaMetadata {\n  name:\nstring;\n}\n\n/**\n * Defines a schema that allows an NgModule to contain the following:\n * - Non-Angular\n * elements named with dash case (-).\n * - Element properties named with dash case (-).\n * Dash case is the\n * naming convention for custom elements.\n * @publicApi\n * ^\nexport const\nCUSTOM_ELEMENTS_SCHEMA: SchemaMetadata = {\n  name: 'custom-elements'\n};\n\n/**\n * Defines a\n * schema that allows any property on any element.\n * This schema allows you to ignore the errors related to any\n * unknown elements or properties in a\n * template. The usage of this schema is generally discouraged because it\n * prevents useful validation\n * and may hide real errors in your template. Consider using the
```

```
`CUSTOM_ELEMENTS_SCHEMA` instead.\n * @publicApi\n * ^\nexport const NO_ERRORS_SCHEMA:\nSchemaMetadata = {\n  name: 'no-errors-schema'\n};\n\n", "/*\n * @license\n * Copyright Google\n * LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found\n * in the LICENSE file at https://angular.io/license\n * ^\n\nimport {formatRuntimeError, RuntimeError,\nRuntimeErrorCodes} from '../errors';\nimport {Type} from '../interface/type';\nimport\n{CUSTOM_ELEMENTS_SCHEMA, NO_ERRORS_SCHEMA, SchemaMetadata} from\n '../metadata/schema';\nimport {throwError} from '../util/assert';\nimport {getComponentDef} from\n '../definition';\nimport {ComponentDef} from '../interfaces/definition';\nimport {TNodeType} from
```

```

'./interfaces/node';\nimport {RComment, RElement} from './interfaces/renderer_dom';\nimport {CONTEXT,
DECLARATION_COMPONENT_VIEW, LView} from './interfaces/view';\nimport {isAnimationProp} from
'./util/attrs_utils';\n\nlet shouldThrowErrorOnUnknownElement = false;\n\n/**\n * Sets a strict mode for JIT-
compiled components to throw an error on unknown elements,\n * instead of just logging the error.\n * (for AOT-
compiled ones
this check happens at build time).\n */\nexport function setUnknownElementStrictMode(shouldThrow: boolean) {\n
shouldThrowErrorOnUnknownElement = shouldThrow;\n}\n\n/**\n * Gets the current value of the strict mode.\n
*/\nexport function getUnknownElementStrictMode() {\n return shouldThrowErrorOnUnknownElement;\n}\n\nlet
shouldThrowErrorOnUnknownProperty = false;\n\n/**\n * Sets a strict mode for JIT-compiled components to throw
an error on unknown properties,\n * instead of just logging the error.\n * (for AOT-compiled ones this check
happens at build time).\n */\nexport function setUnknownPropertyStrictMode(shouldThrow: boolean) {\n
shouldThrowErrorOnUnknownProperty = shouldThrow;\n}\n\n/**\n * Gets the current value of the strict mode.\n
*/\nexport function getUnknownPropertyStrictMode() {\n return
shouldThrowErrorOnUnknownProperty;\n}\n\n/**\n * Validates that the element is known at runtime and
produces\n * an error if it's not the case.\n * This check is relevant for JIT-compiled
components (for AOT-compiled\n * ones this check happens at build time).\n * \n * The element is considered
known if either:\n * - it's a known HTML element\n * - it's a known custom element\n * - the element matches any
directive\n * - the element is allowed by one of the schemas\n * \n * @param element Element to validate\n *
@param lView An `LView` that represents a current component that is being rendered\n * @param tagName Name
of the tag to check\n * @param schemas Array of schemas\n * @param hasDirectives Boolean indicating that the
element matches any directive\n */\nexport function validateElementIsKnown(\n element: RElement, lView:
LView, tagName: string|null, schemas: SchemaMetadata[]|null,\n hasDirectives: boolean): void {\n // If `schemas`
is set to `null`, that's an indication that this Component was compiled in AOT\n // mode where this check happens at
compile time. In JIT mode, `schemas` is always present and\n // defined as an array (as an empty array
in case `schemas` field is not defined) and we should\n // execute the check below.\n if (schemas === null)
return;\n // If the element matches any directive, it's considered as valid.\n if (!hasDirectives && tagName !==
null) {\n // The element is unknown if it's an instance of HTMLUnknownElement, or it isn't registered\n // as a
custom element. Note that unknown elements with a dash in their name won't be instances\n // of
HTMLUnknownElement in browsers that support web components.\n const isUnknown =\n // Note that we
can't check for `typeof HTMLUnknownElement === 'function`,\n // because while most browsers return
'function', IE returns 'object'.\n (typeof HTMLUnknownElement !== 'undefined' && HTMLUnknownElement
&&\n element instanceof HTMLUnknownElement) ||\n (typeof customElements !== 'undefined' &&
tagName.indexOf('-') > -1 &&\n !customElements.get(tagName));\n\n if (isUnknown &&
!matchingSchemas(schemas, tagName))\n {\n const isHostStandalone = isHostComponentStandalone(lView);\n const templateLocation =
getTemplateLocationDetails(lView);\n const schemas = `${isHostStandalone ? '@Component' :
'@NgModule'}.schemas`;\n\n let message = `${tagName} is not a known element${templateLocation}:\n`;\n
message += `1. If ${tagName} is an Angular component, then verify that it is ${\n isHostStandalone ?
'included in the \\`@Component.imports\\` of this component' : \n 'a part of an @NgModule where
this component is declared'}`;\n\n if (tagName && tagName.indexOf('-') > -1) {\n message +=\n `2.
If ${tagName} is a Web Component then add 'CUSTOM_ELEMENTS_SCHEMA' to the ${\n schemas }
of this component to suppress this message.`;\n } else {\n message +=\n `2. To allow any element add
'NO_ERRORS_SCHEMA' to the ${schemas} of this component.`;\n } \n\n if
(shouldThrowErrorOnUnknownElement)\n {\n throw new RuntimeError(RuntimeErrorCode.UNKNOWN_ELEMENT, message);\n } else {\n
console.error(formatRuntimeError(RuntimeErrorCode.UNKNOWN_ELEMENT, message));\n } \n\n }\n}\n\n\n/**\n * Validates that the property of the element is known at runtime and returns\n * false if it's not the
case.\n * This check is relevant for JIT-compiled components (for AOT-compiled\n * ones this check happens at

```

```

build time).\n * The property is considered known if either:\n * - it's a known property of the element\n * - the element is allowed by one of the schemas\n * - the property is used for animations\n * @param element Element to validate\n * @param propName Name of the property to check\n * @param tagName Name of the tag hosting the property\n * @param schemas Array of schemas\n * ^next function isPropertyValid(\n element: RElement|RComment, propName: string, tagName: string|null,\n schemas: SchemaMetadata[]|null): boolean {\n // If `schemas` is set to `null`, that's an indication that this Component was compiled in AOT\n // mode where this check happens at compile time. In JIT mode, `schemas` is always present and\n // defined as an array (as an empty array in case `schemas` field is not defined) and we should\n // execute the check below.\n if (schemas === null) return true;\n // The property is considered valid if the element matches the schema, it exists on the element,\n // or it is synthetic, and we are in a browser context (web worker nodes should be skipped).\n if (matchingSchemas(schemas, tagName) || propName in element || isAnimationProp(propName)) {\n return true;\n }\n // Note: `typeof Node` returns 'function' in most browsers, but on IE it is 'object' so we\n // need to account for both here, while being careful with `typeof null` also returning 'object'.\n return typeof Node === 'undefined' || Node === null || !(element instanceof Node);\n }\n\n * Logs or throws an error that a property is not supported on an element.\n * @param propName Name of the invalid property\n * @param tagName Name of the tag hosting the property\n * @param nodeType Type of the node hosting the property\n * @param IView An `LView` that represents a current component\n * ^next function handleUnknownPropertyError(\n propName: string, tagName: string|null, nodeType: TNodeType, IView: LView): void {\n // Special-case a situation when a structural directive is applied to\n // an `` element, for example: `

```

```

for production mode and also it relies on the constructor function being available.\n *\n * Gets a reference to the
host component def (where a current component is declared).\n *\n * @param IView An `LView` that represents a
current component that is being rendered.\n *\nfunction getDeclarationComponentDef(IView: LView):
ComponentDef<unknown>|null {\n  !ngDevMode && throwError('Must never be called in production mode');\n\n
const declarationLView = IView[DECLARATION_COMPONENT_VIEW] as LView<Type<unknown>>;\n const
context = declarationLView[CONTEXT];\n\n // Unable to obtain a context.\n
if (!context) return null;\n\n return context.constructor ? getComponentDef(context.constructor) : null;\n}\n\n/**\n
* WARNING: this is a **dev-mode only** function (thus should always be guarded by the `ngDevMode`)\n * and
must **not** be used in production bundles. The function makes megamorphic reads, which might\n * be too slow
for production mode.\n *\n * Checks if the current component is declared inside of a standalone component
template.\n *\n * @param IView An `LView` that represents a current component that is being rendered.\n
*\nexport function isHostComponentStandalone(IView: LView): boolean {\n  !ngDevMode && throwError('Must
never be called in production mode');\n\n  const componentDef = getDeclarationComponentDef(IView);\n  // Treat
host component as non-standalone if we can't obtain the def.\n  return !!componentDef?.standalone;\n}\n\n/**\n
* WARNING: this is a **dev-mode only** function (thus should always be guarded by the `ngDevMode`)\n * and
must **not** be
used in production bundles. The function makes megamorphic reads, which might\n * be too slow for production
mode.\n *\n * Constructs a string describing the location of the host component template. The function is used\n * in
dev mode to produce error messages.\n *\n * @param IView An `LView` that represents a current component that is
being rendered.\n *\nexport function getTemplateLocationDetails(IView: LView): string {\n  !ngDevMode &&
throwError('Must never be called in production mode');\n\n  const hostComponentDef =
getDeclarationComponentDef(IView);\n  const componentClassName = hostComponentDef?.type?.name;\n  return
componentClassName ? ` (used in the '${componentClassName}' component template)` : '';\n}\n\n/**\n
* The set of
known control flow directives and their corresponding imports.\n * We use this set to produce a more precises error
message with a note\n * that the `CommonModule` should also be included.\n *\nexport const
KNOWN_CONTROL_FLOW_DIRECTIVES = new Map([\n
  ['ngIf', 'NgIf'], ['ngFor', 'NgFor'], ['ngSwitchCase', 'NgSwitchCase'],\n  ['ngSwitchDefault',
'NgSwitchDefault']\n]);\n\n/**\n
* Returns true if the tag name is allowed by specified schemas.\n * @param schemas
Array of schemas\n * @param tagName Name of the tag\n *\nexport function matchingSchemas(schemas:
SchemaMetadata[]|null, tagName: string|null): boolean {\n  if (schemas !== null) {\n    for (let i = 0; i <
schemas.length; i++) {\n      const schema = schemas[i];\n      if (schema === NO_ERRORS_SCHEMA ||\n
schema === CUSTOM_ELEMENTS_SCHEMA && tagName && tagName.indexOf('-') > -1) {\n        return
true;\n      }\n    }\n  }\n  return false;\n}\n\n"/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\nimport { ViewEncapsulation } from './metadata/view';\n\n/**\n
* Used by
`RendererFactory2` to associate custom rendering
data and styles\n * with a rendering implementation.\n * @publicApi\n *\nexport interface RendererType2 {\n
/\n * A unique identifying string for the new renderer, used when creating\n * unique styles for encapsulation.\n
*\n * id: string;\n /\n * The view encapsulation type, which determines how styles are applied to\n * DOM
elements. One of\n * - `Emulated` (default): Emulate native scoping of styles.\n * - `Native`: Use the native
encapsulation mechanism of the renderer.\n * - `ShadowDom`: Use modern [Shadow\n *
DOM](https://w3c.github.io/webcomponents/spec/shadow/) and\n * create a ShadowRoot for component's host
element.\n * - `None`: Do not provide any template or style encapsulation.\n *\n * encapsulation:
ViewEncapsulation;\n /\n * Defines CSS styles to be stored on a renderer instance.\n *\n * styles:
(string|any[])[];\n /\n * Defines arbitrary developer-defined data to be stored on a renderer instance.\n * This is
useful for
renderers that delegate to other renderers.\n *\n * data: {[kind: string]: any};\n}\n\n/**\n
* Flags for render-
specific style modifiers.\n * @publicApi\n *\nexport enum RendererStyleFlags2 {\n  // TODO(misko): This needs

```







```

update the monkey-patch\n    if (directives && context.directives === undefined) {\n        context.directives =
directives;\n        for (let i = 0; i < directives.length; i++) {\n            attachPatchData(directives[i], context);\n        }\n    }\n    attachPatchData(context.native, context);\n    mpValue = context;\n    }\n} else {\n    const rElement =
target as RElement;\n    ngDevMode && assertDomNode(rElement);\n\n    // if the context is not found then we
need to traverse upwards up the DOM\n    // to find the nearest element that has already been monkey patched with
data\n    let parent = rElement as any;\n    while (parent = parent.parentNode) {\n        const parentContext =
readPatchedData(parent);\n        if (parentContext) {\n            const IView = Array.isArray(parentContext)
? parentContext as LView : parentContext.IView;\n\n            // the edge of the app was also reached here through
another means\n            // (maybe because the DOM was changed manually).\n            if (!IView) {\n                return null;\n            }\n            const index = findViaNativeElement(IView, rElement);\n            if (index >= 0) {\n                const native =
unwrapRNode(IView[index]);\n                const context = createLContext(IView, index, native);\n                attachPatchData(native, context);\n                mpValue = context;\n                break;\n            }\n        }\n    }\n    return
(mpValue as LContext) || null;\n}\n\n/**\n * Creates an empty instance of a `LContext` context\n */\nfunction
createLContext(IView: LView, nodeIndex: number, native: RNode): LContext {\n    return new LContext(IView[ID],
nodeIndex, native);\n}\n\n/**\n * Takes a component instance and returns the view for that component.\n */\n *
@param componentInstance\n * @returns The component's view\n */\nexport
function getViewByInstance(componentInstance: {}): LView {\n    let patchedData =
readPatchedData(componentInstance);\n    let IView: LView;\n    if (isLView(patchedData)) {\n        const
contextLView: LView = patchedData;\n        const nodeIndex = findViaComponent(contextLView,
componentInstance);\n        IView = getComponentLViewByIndex(nodeIndex, contextLView);\n        const context =
createLContext(contextLView, nodeIndex, IView[HOST] as RElement);\n        context.component =
componentInstance;\n        attachPatchData(componentInstance, context);\n        attachPatchData(context.native,
context);\n    } else {\n        const context = patchedData as unknown as LContext;\n        const contextLView =
context.IView!;\n        ngDevMode && assertLView(contextLView);\n        IView =
getComponentLViewByIndex(context.nodeIndex, contextLView);\n    }\n    return IView;\n}\n\n/**\n * This property
will be monkey-patched on elements, components and directives.\n */\nconst MONKEY_PATCH_KEY_NAME =
'__ngContext__';\n\n/**\n * Assigns the given data to the given target (which could be a component,\n */\n * directive or DOM node instance)
using monkey-patching.\n */\nexport function attachPatchData(target: any, data: LView|LContext) {\n    ngDevMode
&& assertDefined(target, 'Target expected');\n    // Only attach the ID of the view in order to avoid memory leaks (see
#41047). We only do this\n    // for `LView`, because we have control over when an `LView` is created and
destroyed, whereas\n    // we can't know when to remove an `LContext`.\n    if (isLView(data)) {\n        target[MONKEY_PATCH_KEY_NAME] = data[ID];\n        registerLView(data);\n    } else {\n        target[MONKEY_PATCH_KEY_NAME] = data;\n    }\n}\n\n/**\n * Returns the monkey-patch value data present
on the target (which could be\n */\n * a component, directive or a DOM node).\n */\nexport function
readPatchedData(target: any): LView|LContext|null {\n    ngDevMode && assertDefined(target, 'Target expected');\n    const data = target[MONKEY_PATCH_KEY_NAME];\n    return (typeof data
=== 'number') ? getLViewById(data) : data || null;\n}\n\nexport function readPatchedLView<T>(target: any):
LView<T>|null {\n    const value = readPatchedData(target);\n    if (value) {\n        return (isLView(value) ? value :
value.IView) as LView<T>;\n    }\n    return null;\n}\n\nexport function isComponentInstance(instance: any): boolean
{\n    return instance && instance.constructor && instance.constructor.cmp;\n}\n\nexport function
isDirectiveInstance(instance: any): boolean {\n    return instance && instance.constructor &&
instance.constructor.dir;\n}\n\n/**\n * Locates the element within the given LView and returns the matching index\n
*/\n */\nfunction findViaNativeElement(IView: LView, target: RElement): number {\n    const tView = IView[TVIEW];\n    for (let i = HEADER_OFFSET; i < tView.bindingStartIndex; i++) {\n        if (unwrapRNode(IView[i]) === target) {\n            return i;\n        }\n    }\n    return -1;\n}\n\n/**\n * Locates the next tNode (child, sibling or parent).\n */\nfunction
traverseNextElement(tNode:

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TNode): TNode|null {\n if (tNode.child) {\n return tNode.child;\n } else if (tNode.next) {\n return
tNode.next;\n } else {\n // Let's take the following template: <div><span>text</span></div><component/>\n //
After checking the text node, we need to find the next parent that has a \"next\" TNode,\n // in this case the parent
`div`, so that we can find the component.\n while (tNode.parent && !tNode.parent.next) {\n tNode =
tNode.parent;\n }\n return tNode.parent && tNode.parent.next;\n }\n}\n\n/**\n * Locates the component within
the given LView and returns the matching index\n */\nfunction findViaComponent(IView: LView,
componentInstance: {}): number {\n const componentIndices = IView[TVIEW].components;\n if
(componentIndices) {\n for (let i = 0; i < componentIndices.length; i++) {\n const elementComponentIndex =
componentIndices[i];\n const componentView = getComponentLViewByIndex(elementComponentIndex,
IView);\n if (componentView[CONTEXT]
=== componentInstance) {\n return elementComponentIndex;\n }\n }\n } else {\n const
rootComponentView = getComponentLViewByIndex(HEADER_OFFSET, IView);\n const rootComponent =
rootComponentView[CONTEXT];\n if (rootComponent === componentInstance) {\n // we are dealing with the
root element here therefore we know that the\n // element is the very first element after the HEADER data in the
IView\n return HEADER_OFFSET;\n }\n }\n return -1;\n}\n}\n\n/**\n * Locates the directive within the given
LView and returns the matching index\n */\nfunction findViaDirective(IView: LView, directiveInstance: {}):
number {\n // if a directive is monkey patched then it will (by default)\n // have a reference to the LView of the
current view. The\n // element bound to the directive being search lives somewhere\n // in the view data. We loop
through the nodes and check their\n // list of directives for the instance.\n let tNode = IView[TVIEW].firstChild;\n
while (tNode) {\n const directiveIndexStart = tNode.directiveStart;\n const directiveIndexEnd =
tNode.directiveEnd;\n for (let i = directiveIndexStart; i < directiveIndexEnd; i++) {\n if (IView[i] ===
directiveInstance) {\n return tNode.index;\n }\n }\n tNode = traverseNextElement(tNode);\n }\n}\n return -
1;\n}\n}\n\n/**\n * Returns a list of directives extracted from the given view based on the\n * provided list of directive
index values.\n */\n * @param nodeIndex The node index\n * @param IView The target view data\n * @param
includeComponents Whether or not to include components in returned directives\n */\nexport function
getDirectivesAtNodeIndex(\n nodeIndex: number, IView: LView, includeComponents: boolean): any[]|null {\n
const tNode = IView[TVIEW].data[nodeIndex] as TNode;\n let directiveStartIndex = tNode.directiveStart;\n if
(directiveStartIndex == 0) return EMPTY_ARRAY;\n const directiveEndIndex = tNode.directiveEnd;\n
if (!includeComponents && tNode.flags & TNodeFlags.isComponentHost) directiveStartIndex++;\n return
IView.slice(directiveStartIndex, directiveEndIndex);\n}\n}\n\nexport function getComponentAtNodeIndex(nodeIndex:
number, IView: LView): {}|null {\n const tNode = IView[TVIEW].data[nodeIndex] as TNode;\n let
directiveStartIndex = tNode.directiveStart;\n return tNode.flags & TNodeFlags.isComponentHost ?
IView[directiveStartIndex] : null;\n}\n}\n\n/**\n * Returns a map of local references (local reference name => element
or directive instance) that\n * exist on a given element.\n */\nexport function discoverLocalRefs(IView: LView,
nodeIndex: number): {[key: string]: any}|null {\n const tNode = IView[TVIEW].data[nodeIndex] as TNode;\n if
(tNode && tNode.localNames) {\n const result: {[key: string]: any} = {};\n let localIndex = tNode.index + 1;\n
for (let i = 0; i < tNode.localNames.length; i += 2) {\n result[tNode.localNames[i]] = IView[localIndex];\n
localIndex++;\n }\n
return result;\n }\n}\n return null;\n}\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n
* Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * @fileoverview\n */\n * This file provides mechanism by which code
relevant to the `TicuContainerNode` is only loaded if\n * ICU is present in the template.\n */\n\nimport
{TicuContainerNode} from './interfaces/node';\nimport {RNode} from './interfaces/renderer_dom';\nimport
{LView} from './interfaces/view';\n\nlet _icuContainerIterate: (TicuContainerNode: TicuContainerNode, IView:
LView) =>\n ((() => RNode | null);\n\n/**\n * Iterator which provides ability to visit all of the
`TicuContainerNode` root `RNode`s.\n */\nexport function icuContainerIterate(TicuContainerNode:
TicuContainerNode, IView: LView): () =>\n RNode | null {\n return _icuContainerIterate(TicuContainerNode,
IView);\n}\n}\n\n/**\n * Ensures that `IcuContainerVisitor`s

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implementation is present.\n * This function is invoked when i18n instruction comes across an ICU. The
purpose is to allow the\n * bundler to tree shake ICU logic and only load it if ICU instruction is executed.\n
*/\nexport function ensureIcuContainerVisitorLoaded(\n  loader: () => ((tIcuContainerNode: TIcuContainerNode,
IView: LView) => () => RNode | null))) {\n  if (_icuContainerIterate === undefined) {\n    // Do not inline this
function. We want to keep `ensureIcuContainerVisitorLoaded` light, so it\n    // can be inlined into call-site.\n    _icuContainerIterate = loader();\n  }\n}\n", "\n**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\n**\n * Expresses a single CSS Selector.\n *\n * Beginning of array\n * - First
index: element name\n * - Subsequent odd indices: attr keys\n * - Subsequent
even indices: attr values\n *\n * After SelectorFlags.CLASS flag\n * - Class name values\n *\n *
SelectorFlags.NOT flag\n * - Changes the mode to NOT\n * - Can be combined with other flags to set the element /
attr / class mode\n *\n * e.g. SelectorFlags.NOT | SelectorFlags.ELEMENT\n *\n * Example:\n * Original:
`div.foo.bar[attr1=val1][attr2]`\n * Parsed: ['div', 'attr1', 'val1', 'attr2', '\n * SelectorFlags.CLASS, 'foo', 'bar']\n *\n *
Original: 'div[attr1]:not(.foo[attr2])`\n * Parsed: [\n * 'div', 'attr1', '\n * SelectorFlags.NOT |
SelectorFlags.ATTRIBUTE 'attr2', '\n * SelectorFlags.CLASS, 'foo'\n * ]\n *\n * See more examples in
node_selector_matcher_spec.ts\n */\nexport type CssSelector = (string|SelectorFlags)[];\n\n**\n * A list of
CssSelectors.\n *\n * A directive or component can have multiple selectors. This type is used for\n * directive defs
so any of the selectors in the list will match that directive.\n *\n * Original: 'form, [ngForm]`\n * Parsed: [['form'], ['
'ngForm',
'']]\n */\nexport type CssSelectorList = CssSelector[];\n\n**\n * List of slots for a projection. A slot can be either
based on a parsed CSS selector\n * which will be used to determine nodes which are projected into that slot.\n *\n *
When set to `*`, the slot is reserved and can be used for multi-slot projection\n * using { @link
ViewContainerRef#createComponent}. The last slot that specifies the\n * wildcard selector will retrieve all
projectable nodes which do not match any selector.\n */\nexport type ProjectionSlots =
(CssSelectorList|*)[];\n\n**\n * Flags used to build up CssSelectors\n */\nexport const enum SelectorFlags {\n /**
Indicates this is the beginning of a new negative selector\n */\n NOT = 0b0001,\n /** Mode for matching attributes
*\n */\n ATTRIBUTE = 0b0010,\n /** Mode for matching tag names\n */\n ELEMENT = 0b0100,\n /** Mode for
matching class names\n */\n CLASS = 0b1000,\n }\n\n// Note: This hack is necessary so we don't erroneously get a
circular dependency\n//
failure based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n", "\n**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {RendererStyleFlags2, RendererType2}
from '../render/api_flags';\nimport {TrustedHTML, TrustedScript, TrustedScriptURL} from
'../util/security/trusted_type_defs';\nimport {RComment, RElement, RNode, RText} from
'./renderer_dom';\n\n**\n * The goal here is to make sure that the browser DOM API is the Renderer.\n * We do
this by defining a subset of DOM API to be the renderer and then\n * use that at runtime for rendering.\n *\n * At
runtime we can then use the DOM api directly, in server or web-worker\n * it will be easy to implement such API.\n
*\n */\nexport type GlobalTargetName = 'document'|'window'|'body';\nexport type GlobalTargetResolver =
(element: any) => EventTarget;\n\n**\n
* Procedural style of API needed to create elements and text nodes.\n *\n * In non-native browser environments
(e.g. platforms such as web-workers), this is the\n * facade that enables element manipulation. In practice, this is
implemented by `Renderer2`.\n */\nexport interface Renderer {\n  destroy(): void;\n  createComment(value: string):
RComment;\n  createElement(name: string, namespace?: string|null): RElement;\n  createText(value: string):
RText;\n\n /**\n * This property is allowed to be null / undefined,\n * in which case the view engine won't call it.\n
*\n * This is used as a performance optimization for production mode.\n */\n  destroyNode?: ((node: RNode) =>
void)|null;\n  appendChild(parent: RElement, newChild: RNode): void;\n  insertBefore(parent: RNode, newChild:
RNode, refChild: RNode|null, isMove?: boolean): void;\n  removeChild(parent: RElement, oldChild: RNode,
isHostElement?: boolean): void;\n  selectRootElement(selectorOrNode: string|any, preserveContent?: boolean):

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RElement;
parentNode(node: RNode): RElement|null;
nextSibling(node: RNode): RNode|null;
setAttribute(el: RElement, name: string, value: string|TrustedHTML|TrustedScript|TrustedScriptURL, namespace?: string|null): void;
removeAttribute(el: RElement, name: string, namespace?: string|null): void;
addClass(el: RElement, name: string): void;
removeClass(el: RElement, name: string): void;
setStyle(el: RElement, style: string, value: any, flags?: RendererStyleFlags2): void;
removeStyle(el: RElement, style: string, flags?: RendererStyleFlags2): void;
setProperty(el: RElement, name: string, value: any): void;
setValue(node: RText|RComment, value: string): void;
// TODO(misko): Deprecate in favor of
addEventListener/removeEventListener
listen(target: GlobalTargetName|RNode, eventName: string, callback: (event: any) => boolean | void): () => void;
export interface RendererFactory {
createRenderer(hostElement: RElement|null, rendererType: RendererType2|null): Renderer;
begin?(): void;
end?(): void;
}
// Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.
export const unusedValueExportToPlacateAjd = 1;
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at
 * https://angular.io/license
 */
import {assertDefined} from '../util/assert';
import {assertLView} from '../assert';
import {readPatchedLView} from '../context_discovery';
import {LContainer} from '../interfaces/container';
import {isLContainer, isLView} from '../interfaces/type_checks';
import {CHILD_HEAD, CONTEXT, FLAGS, LView, LViewFlags, NEXT, PARENT} from '../interfaces/view';
/**
 * Gets the parent LView of the passed LView, if the PARENT is an LContainer, will get the parent of that LContainer, which is an LView
 * @param
 * LView the LView whose parent to get
 */
export function getLViewParent(LView: LView): LView|null {
  const parent = LView[PARENT];
  return isLContainer(parent) ? parent[PARENT]! : parent;
}
/**
 * Retrieve the root view from any component or `LView` by walking the parent `LView` until reaching the root `LView`.
 * @param componentOrLView any component or `LView`
 */
export function getRootView<T>(componentOrLView: LView|{}): LView<T> {
  const ngDevMode = true;
  assertDefined(componentOrLView, 'component');
  let LView = isLView(componentOrLView) ? componentOrLView : readPatchedLView(componentOrLView!);
  while (LView && !(LView[FLAGS] & LViewFlags.IsRoot)) {
    LView = getLViewParent(LView!);
  }
  const ngDevMode = true;
  assertDefined(LView, 'rootView');
  return LView as LView<T>;
}
/**
 * Returns the context information associated with the application where the target is situated. It does this by walking the parent views until it gets to the root view, then getting the context off of that.
 * @param viewOrComponent the `LView` or component to get the root context for.
 */
export function getRootContext<T>(viewOrComponent: LView<T>|{}): T {
  const ngDevMode = true;
  assertDefined(viewOrComponent, 'rootView');
  const rootView = getRootView(viewOrComponent);
  const ngDevMode = true;
  assertDefined(rootView[CONTEXT], 'Root view has no context. Perhaps it is disconnected?');
  return rootView[CONTEXT] as T;
}
/**
 * Gets the first `LContainer` in the LView or `null` if none exists.
 */
export function getFirstLContainer(LView: LView): LContainer|null {
  return getNearestLContainer(LView[CHILD_HEAD]);
}
/**
 * Gets the next `LContainer` that is a sibling of the given container.
 */
export function getNextLContainer(container: LContainer): LContainer|null {
  return getNearestLContainer(container[NEXT]);
}
function getNearestLContainer(viewOrContainer: LContainer|LView|null) {
  while (viewOrContainer !== null && !isLContainer(viewOrContainer)) {
    viewOrContainer = viewOrContainer[NEXT];
  }
  return viewOrContainer as LContainer | null;
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 */
import {ViewEncapsulation} from '../metadata/view';
import {RendererStyleFlags2} from '../render/api_flags';
import {addToArray, removeFromArray} from '../util/array_utils';
import {assertDefined, assertEqual, assertFunction, assertString} from '../util/assert';
import {escapeCommentText} from '../util/dom';
import {assertLContainer, assertLView, assertParentView, assertProjectionSlots, assertTNodeForLView} from '../assert';
import {attachPatchData} from '../context_discovery';
import {icuContainerIterate} from './i18n/i18n_tree_shaking';
import

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{CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS, NATIVE,
unusedValueExportToPlacateAjd as unused1 } from './interfaces/container';\nimport
{ComponentDef} from './interfaces/definition';\nimport {NodeInjectorFactory} from './interfaces/injector';\nimport
{unregisterLView} from './interfaces/lview_tracking';\nimport {TElementNode, TICuContainerNode, TNode,
TNodeFlags, TNodeType, TProjectionNode, unusedValueExportToPlacateAjd as unused2} from
'/interfaces/node';\nimport {unusedValueExportToPlacateAjd as unused3} from './interfaces/projection';\nimport
{Renderer, unusedValueExportToPlacateAjd as unused4} from './interfaces/renderer';\nimport {RComment,
RElement, RNode, RTemplate, RText} from './interfaces/renderer_dom';\nimport {isLContainer, isLView} from
'/interfaces/type_checks';\nimport {CHILD_HEAD, CLEANUP, DECLARATION_COMPONENT_VIEW,
DECLARATION_LCONTAINER, DestroyHookData, FLAGS, HookData, HookFn, HOST, LView, LViewFlags,
NEXT, PARENT, QUERIES, RENDERER, T_HOST, TVIEW, TView, TViewType,
unusedValueExportToPlacateAjd as unused5} from './interfaces/view';\nimport {assertTNodeType} from
'/node_assert';\nimport
{profiler, ProfilerEvent} from './profiler';\nimport {getLViewParent} from './util/view_traversal_utils';\nimport
{getNativeByTNode, unwrapRNode, updateTransplantedViewCount} from './util/view_utils';\n\n\nconst
unusedValueToPlacateAjd = unused1 + unused2 + unused3 + unused4 + unused5;\n\nconst enum
WalkTNodeTreeAction {\n /** node create in the native environment. Run on initial creation. *\n Create = 0,\n /**\n * node insert in the native environment.\n * Run when existing node has been detached and needs to be re-
attached.\n */\n Insert = 1,\n /** node detach from the native environment *\n Detach = 2,\n /** node
destruction using the renderer's API *\n Destroy = 3,\n}\n\n\n/**\n * NOTE: for performance reasons, the
possible actions are inlined within the function instead of\n * being passed as an argument.\n */\nfunction
applyToElementOrContainer(\n action: WalkTNodeTreeAction, renderer: Renderer, parent: RElement|null,\n
INodeToHandle:
RNode|LContainer|LView, beforeNode?: RNode|null) {\n // If this slot was allocated for a text node dynamically
created by i18n, the text node itself\n // won't be created until i18nApply() in the update block, so this node should
be skipped.\n // For more info, see `ICU expressions should work inside an ngTemplateOutlet inside an ngFor`\n\n
// in `i18n_spec.ts`\n if (INodeToHandle !== null) {\n let IContainer: LContainer|undefined;\n let isComponent =
false;\n // We are expecting an RNode, but in the case of a component or LContainer the `RNode` is\n // wrapped
in an array which needs to be unwrapped. We need to know if it is a component and if\n // it has LContainer so
that we can process all of those cases appropriately.\n if (isLContainer(INodeToHandle)) {\n IContainer =
INodeToHandle;\n } else if (isLView(INodeToHandle)) {\n isComponent = true;\n ngDevMode &&
assertDefined(INodeToHandle[HOST], 'HOST must be defined for a component LView');\n
INodeToHandle = INodeToHandle[HOST]!;\n }\n const rNode: RNode =
unwrapRNode(INodeToHandle);\n if (action === WalkTNodeTreeAction.Create && parent !== null) {\n if
(beforeNode === null) {\n nativeAppendChild(renderer, parent, rNode);\n } else {\n
nativeInsertBefore(renderer, parent, rNode, beforeNode || null, true);\n }\n } else if (action ===
WalkTNodeTreeAction.Insert && parent !== null) {\n nativeInsertBefore(renderer, parent, rNode, beforeNode ||
null, true);\n } else if (action === WalkTNodeTreeAction.Detach) {\n nativeRemoveNode(renderer, rNode,
isComponent);\n } else if (action === WalkTNodeTreeAction.Destroy) {\n ngDevMode &&
ngDevMode.rendererDestroyNode++;\n renderer.destroyNode!(rNode);\n }\n if (IContainer !== null) {\n
applyContainer(renderer, action, IContainer, parent, beforeNode);\n }\n }\n\n\nexport function
createTextNode(renderer: Renderer, value: string): RText {\n ngDevMode
&& ngDevMode.rendererCreateTextNode++;\n ngDevMode && ngDevMode.rendererSetText++;\n return
renderer.createTextNode(value);\n}\n\nexport function updateTextNode(renderer: Renderer, rNode: RText, value: string):
void {\n ngDevMode && ngDevMode.rendererSetText++;\n renderer.setValue(rNode, value);\n}\n\nexport
function createCommentNode(renderer: Renderer, value: string): RComment {\n ngDevMode &&
ngDevMode.rendererCreateComment++;\n return
renderer.createComment(escapeCommentText(value));\n}\n\n\n/**\n * Creates a native element from a tag name,

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using a renderer.\n * @param renderer A renderer to use\n * @param name the tag name\n * @param namespace
Optional namespace for element.\n * @returns the element created\n */\nexport function createElement(\n
renderer: Renderer, name: string, namespace: string|null): RElement {\n  ngDevMode &&
ngDevMode.rendererCreateElement++; \n  return renderer.createElement(name, namespace);\n}\n\n/**\n
Removes all DOM elements associated with a
view.\n * \n * Because some root nodes of the view may be containers, we sometimes need\n * to propagate deeply
into the nested containers to remove all elements in the\n * views beneath it.\n * \n * @param tView The `TView` of
the `LView` from which elements should be added or removed\n * @param lView The view from which elements
should be added or removed\n */\nexport function removeViewFromContainer(tView: TView, lView: LView): void
{\n  const renderer = lView[RENDERER];\n  applyView(tView, lView, renderer, WalkTreeNodeTreeAction.Detach,
null, null);\n  lView[HOST] = null;\n  lView[T_HOST] = null;\n}\n\n/**\n
Adds all DOM elements associated
with a view.\n * \n * Because some root nodes of the view may be containers, we sometimes need\n * to propagate
deeply into the nested containers to add all elements in the\n * views beneath it.\n * \n * @param tView The `TView`
of the `LView` from which elements should be added or removed\n * @param parentTNode The `TNode` where the
`LView` should be
attached to.\n * @param renderer Current renderer to use for DOM manipulations.\n * @param lView The view
from which elements should be added or removed\n * @param parentNode The parent `RElement` where it
should be inserted into.\n * @param beforeNode The node before which elements should be added, if insert mode\n
*/\nexport function addViewToContainer(\n  tView: TView, parentTNode: TNode, renderer: Renderer, lView:
LView, parentNode: RElement,\n  beforeNode: RNode|null): void {\n  lView[HOST] =
parentNode;\n  lView[T_HOST] = parentTNode;\n  applyView(tView, lView, renderer,
WalkTreeNodeTreeAction.Insert, parentNode, beforeNode);\n}\n\n/**\n
Detach a `LView` from the DOM
by detaching its nodes.\n * \n * @param tView The `TView` of the `LView` to be detached\n * @param lView the
`LView` to be detached.\n */\nexport function renderDetachView(tView: TView, lView: LView) {\n
  applyView(tView, lView, lView[RENDERER], WalkTreeNodeTreeAction.Detach, null, null);\n}\n\n/**\n
* Traverses down and up the tree of views and containers to remove listeners and\n * call onDestroy callbacks.\n
*\n * Notes:\n * - Because it's used for onDestroy calls, it needs to be bottom-up.\n * - Must process containers
instead of their views to avoid splicing\n * when views are destroyed and re-added.\n * - Using a while loop
because it's faster than recursion\n * - Destroy only called on movement to sibling or movement to parent (laterally
or up)\n * \n * @param rootView The view to destroy\n */\nexport function destroyViewTree(rootView: LView):
void {\n  // If the view has no children, we can clean it up and return early.\n  let lViewOrLContainer =
rootView[CHILD_HEAD];\n  if (!lViewOrLContainer) {\n    return cleanUpView(rootView[TVIEW], rootView);\n  }\n
  while (lViewOrLContainer) {\n    let next: LView|LContainer|null = null;\n    if
(isLView(lViewOrLContainer)) {\n      // If LView, traverse down to child.\n      next =
lViewOrLContainer[CHILD_HEAD];\n    } else {\n      ngDevMode && assertLContainer(lViewOrLContainer);\n      // If container, traverse down to its
first LView.\n      const firstView: LView|undefined = lViewOrLContainer[CONTAINER_HEADER_OFFSET];\n      if (firstView) next = firstView;\n    }\n    if (!next) {\n      // Only clean up view when moving to the side or up, as
destroy hooks\n      // should be called in order from the bottom up.\n      while (lViewOrLContainer &&
!lViewOrLContainer[NEXT] && lViewOrLContainer !== rootView) {\n        if (isLView(lViewOrLContainer))
{\n          cleanUpView(lViewOrLContainer[TVIEW], lViewOrLContainer);\n        }\n        lViewOrLContainer =
lViewOrLContainer[PARENT];\n      }\n      if (lViewOrLContainer === null) lViewOrLContainer = rootView;\n    }\n    if (isLView(lViewOrLContainer)) {\n      cleanUpView(lViewOrLContainer[TVIEW], lViewOrLContainer);\n    }\n    next = lViewOrLContainer && lViewOrLContainer[NEXT];\n    lViewOrLContainer = next;\n  }\n}\n\n/**\n
* Inserts a view into a container.\n * \n * This adds the view to the container's array of active views in the correct\n
* position. It also adds the view's elements to the DOM if the container isn't a\n * root node of another view (in that
case, the view's elements will be added when\n * the container's parent view is added later).\n * \n * @param tView

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The `TVView` of the `LView` to insert\n * @param IView The view to insert\n * @param IContainer The container
into which the view should be inserted\n * @param index Which index in the container to insert the child view
into\n */\nexport function insertView(tView: TVView, IView: LView, IContainer: LContainer, index: number) {\n
  ngDevMode && assertLView(IView);\n  ngDevMode && assertLContainer(IContainer);\n  const indexInContainer
= CONTAINER_HEADER_OFFSET + index;\n  const containerLength = IContainer.length;\n  if (index > 0) {\n
  // This is a new view, we need to add it to the children.\n  IContainer[indexInContainer - 1][NEXT]
= IView;\n  }\n  if (index < containerLength - CONTAINER_HEADER_OFFSET) {\n  IView[NEXT] =
IContainer[indexInContainer];\n  addToArray(IContainer, CONTAINER_HEADER_OFFSET + index, IView);\n
  } else {\n  IContainer.push(IView);\n  IView[NEXT] = null;\n  }\n  IView[PARENT] = IContainer;\n  // track
views where declaration and insertion points are different\n  const declarationLContainer =
IView[DECLARATION_LCONTAINER];\n  if (declarationLContainer !== null && IContainer !==
declarationLContainer) {\n  trackMovedView(declarationLContainer, IView);\n  }\n  // notify query that a new
view has been added\n  const IQueries = IView[QUERIES];\n  if (IQueries !== null) {\n
  IQueries.insertView(tView);\n  }\n  // Sets the attached flag\n  IView[FLAGS] |=
LViewFlags.Attached;\n  }\n  // Track views created from the declaration container (TemplateRef) and inserted
into a\n  // different LContainer.\n  //\n  function trackMovedView(declarationContainer: LContainer, IView: LView)
{\n
  ngDevMode && assertDefined(IView, 'LView required');\n  ngDevMode &&
assertLContainer(declarationContainer);\n  const movedViews = declarationContainer[MOVED_VIEWS];\n  const
insertedLContainer = IView[PARENT] as LContainer;\n  ngDevMode && assertLContainer(insertedLContainer);\n
  const insertedComponentLView = insertedLContainer[PARENT]![DECLARATION_COMPONENT_VIEW];\n  ngDevMode &&
assertDefined(insertedComponentLView, 'Missing insertedComponentLView');\n  const
declaredComponentLView = IView[DECLARATION_COMPONENT_VIEW];\n  ngDevMode &&
assertDefined(declaredComponentLView, 'Missing declaredComponentLView');\n  if (declaredComponentLView
!== insertedComponentLView) {\n  // At this point the declaration-component is not same as insertion-component;
this means that\n  // this is a transplanted view. Mark the declared IView as having transplanted views so that\n
  // those views can participate in CD.\n  declarationContainer[HAS_TRANSPLANTED_VIEWS] = true;\n  }\n  if
(movedViews
=== null) {\n  declarationContainer[MOVED_VIEWS] = [IView];\n  } else {\n  movedViews.push(IView);\n
  }\n  }\n  //\n  function detachMovedView(declarationContainer: LContainer, IView: LView) {\n  ngDevMode &&
assertLContainer(declarationContainer);\n  ngDevMode &&\n  assertDefined(\n
  declarationContainer[MOVED_VIEWS],\n  'A projected view should belong to a non-empty projected views
collection');\n  const movedViews = declarationContainer[MOVED_VIEWS]!;\n  const declarationViewIndex =
movedViews.indexOf(IView);\n  const insertionLContainer = IView[PARENT] as LContainer;\n  ngDevMode &&
assertLContainer(insertionLContainer);\n  // If the view was marked for refresh but then detached before it was
checked (where the flag\n  // would be cleared and the counter decremented), we need to decrement the view counter
here\n  // instead.\n  if (IView[FLAGS] & LViewFlags.RefreshTransplantedView) {\n  IView[FLAGS] &=
~LViewFlags.RefreshTransplantedView;\n  updateTransplantedViewCount(insertionLContainer,
-1);\n  }\n  movedViews.splice(declarationViewIndex, 1);\n  }\n  //\n  // Detaches a view from a container.\n  //\n  // This method removes the view from the container's array of active views. It also\n  // removes the view's elements
from the DOM.\n  //\n  // @param IContainer The container from which to detach a view\n  // @param removeIndex
The index of the view to detach\n  // @returns Detached LView instance.\n  //\n  //\n  export function
detachView(IContainer: LContainer, removeIndex: number): LView|undefined {\n  if (IContainer.length <=
CONTAINER_HEADER_OFFSET) return;\n  const indexInContainer = CONTAINER_HEADER_OFFSET +
removeIndex;\n  const viewToDetach = IContainer[indexInContainer];\n  if (viewToDetach) {\n  const
declarationLContainer = viewToDetach[DECLARATION_LCONTAINER];\n  if (declarationLContainer !== null
&& declarationLContainer !== IContainer) {\n  detachMovedView(declarationLContainer, viewToDetach);\n
  }\n  }\n  if (removeIndex > 0) {\n

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    IContainer[indexInContainer - 1][NEXT] = viewToDetach[NEXT] as LView;\n  }\n  const removedLView =
removeFromArray(IContainer, CONTAINER_HEADER_OFFSET + removeIndex);\n
removeViewFromContainer(viewToDetach[TVIEW], viewToDetach);\n\n  // notify query that a view has been
removed\n  const IQueries = removedLView[QUERIES];\n  if (IQueries !== null) {\n
IQueries.detachView(removedLView[TVIEW]);\n  }\n\n  viewToDetach[PARENT] = null;\n
viewToDetach[NEXT] = null;\n  // Unsets the attached flag\n  viewToDetach[FLAGS] &=
~LViewFlags.Attached;\n  }\n  return viewToDetach;\n}\n\n/**\n * A standalone function which destroys an
LView,\n * conducting clean up (e.g. removing listeners, calling onDestroy).\n *\n * @param tView The `TView`
of the `LView` to be destroyed\n * @param IView The view to be destroyed.\n */\nexport function
destroyLView(tView: TView, IView: LView) {\n  if (!(IView[FLAGS] & LViewFlags.Destroyed)) {\n  const
renderer = IView[RENDERER];\n
  if (renderer.destroyNode) {\n    applyView(tView, IView, renderer, WalkTreeNodeTreeAction.Destroy, null,
null);\n  }\n\n  destroyViewTree(IView);\n  }\n}\n\n/**\n * Calls onDestroy hooks for all directives and pipes in
a given view and then removes all\n * listeners. Listeners are removed as the last step so events delivered in the
onDestroys hooks\n * can be propagated to @Output listeners.\n *\n * @param tView `TView` for the `LView` to
clean up.\n * @param IView The LView to clean up\n */\nfunction cleanUpView(tView: TView, IView: LView):
void {\n  if (!(IView[FLAGS] & LViewFlags.Destroyed)) {\n    // Usually the Attached flag is removed when the
view is detached from its parent, however\n    // if it's a root view, the flag won't be unset hence why we're also
removing on destroy.\n    IView[FLAGS] &= ~LViewFlags.Attached;\n    // Mark the LView as destroyed\n
*before* executing the onDestroy hooks. An onDestroy hook\n    // runs arbitrary user code, which could include its
own\n    `viewRef.destroy()` (or similar). If\n    // We don't flag the view as destroyed before the hooks, this could lead to an
infinite loop.\n    // This also aligns with the ViewEngine behavior. It also means that the onDestroy hook is\n    //
really more of an "afterDestroy" hook if you think about it.\n    IView[FLAGS] |= LViewFlags.Destroyed;\n\n    executeOnDestroys(tView, IView);\n    processCleanups(tView, IView);\n    // For component views only, the local
renderer is destroyed at clean up time.\n    if (IView[TVIEW].type === TViewType.Component) {\n      ngDevMode && ngDevMode.rendererDestroy++;\n      IView[RENDERER].destroy();\n    }\n\n    const
declarationContainer = IView[DECLARATION_LCONTAINER];\n    // we are dealing with an embedded view that
is still inserted into a container\n    if (declarationContainer !== null && isLContainer(IView[PARENT])) {\n      //
and this is a projected view\n      if (declarationContainer !== IView[PARENT]) {\n        detachMovedView(declarationContainer,
IView);\n      }\n      // For embedded views still attached to a container: remove query result from this view.\n
const IQueries = IView[QUERIES];\n      if (IQueries !== null) {\n        IQueries.detachView(tView);\n      }\n
    }\n\n    // Unregister the view once everything else has been cleaned up.\n    unregisterLView(IView);\n  }\n}\n\n/**\n * Removes listeners and unsubscribes from output subscriptions\n */\nfunction processCleanups(tView: TView, IView:
LView): void {\n  const tCleanup = tView.cleanup;\n  const ICleanup = IView[CLEANUP];\n  // `LCleanup`
contains both share information with `TCleanup` as well as instance specific\n  // information appended at the end.
We need to know where the end of the `TCleanup` information\n  // is, and we track this with\n  `lastLCleanupIndex`.\n  let lastLCleanupIndex = -1;\n  if (tCleanup !== null) {\n    for (let i = 0; i < tCleanup.length
- 1; i += 2) {\n      if (typeof tCleanup[i] === 'string') {\n        // This is a
native DOM listener\n        const idxOrTargetGetter = tCleanup[i + 1];\n        const target = typeof
idxOrTargetGetter === 'function' ?\n          idxOrTargetGetter(IView) :\n        unwrapRNode(IView[idxOrTargetGetter]);\n        const listener = ICleanup[lastLCleanupIndex = tCleanup[i + 2]];\n
        const useCaptureOrSubIdx = tCleanup[i + 3];\n        if (typeof useCaptureOrSubIdx === 'boolean') {\n          //
native DOM listener registered with Renderer3\n          target.removeEventListener(tCleanup[i], listener,
useCaptureOrSubIdx);\n        } else {\n          if (useCaptureOrSubIdx >= 0) {\n            // unregister\n
ICleanup[lastLCleanupIndex = useCaptureOrSubIdx]();\n          } else {\n            // Subscription\n
ICleanup[lastLCleanupIndex = -useCaptureOrSubIdx].unsubscribe();\n          }\n        }\n        i += 2;\n      } else {\n

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*\nexport function appendChild(\n  tView: TView, lView: LView, childRNode: RNode|RNode[], childTNode:
TNode): void {\n  const parentRNode
= getParentRElement(tView, childTNode, lView);\n  const renderer = lView[RENDERER];\n  const parentTNode:
TNode = childTNode.parent || lView[T_HOST]!;\n  const anchorNode = getInsertInFrontOfRNode(parentTNode,
childTNode, lView);\n  if (parentRNode != null) {\n    if (Array.isArray(childRNode)) {\n      for (let i = 0; i <
childRNode.length; i++) {\n        nativeAppendOrInsertBefore(renderer, parentRNode, childRNode[i], anchorNode,
false);\n      }\n    } else {\n      nativeAppendOrInsertBefore(renderer, parentRNode, childRNode, anchorNode,
false);\n    }\n  }\n  _processInsertBefore !== undefined &&\n  _processInsertBefore(renderer,
childTNode, lView, childRNode, parentRNode);\n}\n\n/**\n * Returns the first native node for a given LView,
starting from the provided TNode.\n *\n * Native nodes are returned in the order in which those appear in the native
tree (DOM).\n */\nfunction getFirstNativeNode(lView: LView, tNode: TNode|null): RNode|null {\n  if (tNode !==
null)
{\n    ngDevMode &&\n    assertTNodeType(\n      tNode,\n      TNodeType.AnyRNode |
TNodeType.AnyContainer | TNodeType.Icu | TNodeType.Projection);\n\n    const tNodeType = tNode.type;\n    if
(tNodeType & TNodeType.AnyRNode) {\n      return getNativeByTNode(tNode, lView);\n    } else if (tNodeType
& TNodeType.Container) {\n      return getBeforeNodeForView(-1, lView[tNode.index]);\n    } else if (tNodeType
& TNodeType.ElementContainer) {\n      const eIcuContainerChild = tNode.child;\n      if (eIcuContainerChild !==
null) {\n        return getFirstNativeNode(lView, eIcuContainerChild);\n      } else {\n        const rNodeOrLContainer
= lView[tNode.index];\n        if (isLContainer(rNodeOrLContainer)) {\n          return getBeforeNodeForView(-1,
rNodeOrLContainer);\n        } else {\n          return unwrapRNode(rNodeOrLContainer);\n        }\n      }\n    } else if
(tNodeType & TNodeType.Icu) {\n      let nextRNode = icuContainerIterate(tNode as TIcuContainerNode,
lView);\n      let rNode: RNode|null = nextRNode();\n      // If the ICU container has no nodes, than we use the ICU
anchor as the node.\n      return rNode || unwrapRNode(lView[tNode.index]);\n    } else {\n      const
projectionNodes = getProjectionNodes(lView, tNode);\n      if (projectionNodes !== null) {\n        if
(Array.isArray(projectionNodes)) {\n          return projectionNodes[0];\n        }\n        const parentView =
getLViewParent(lView[DECLARATION_COMPONENT_VIEW]);\n        ngDevMode &&
assertParentView(parentView);\n        return getFirstNativeNode(parentView!, projectionNodes);\n      } else {\n
return getFirstNativeNode(lView, tNode.next);\n    }\n  }\n}\n\nexport function
getProjectionNodes(lView: LView, tNode: TNode|null): TNode|RNode[]|null {\n  if (tNode !== null) {\n    const
componentView = lView[DECLARATION_COMPONENT_VIEW];\n    const componentHost =
componentView[T_HOST] as TElementNode;\n    const slotIdx = tNode.projection
as number;\n    ngDevMode && assertProjectionSlots(lView);\n    return componentHost.projection![slotIdx];\n  }\n
return null;\n}\n\nexport function getBeforeNodeForView(viewIndexInContainer: number, lContainer:
LContainer): RNode|null {\n  const nextViewIndex = CONTAINER_HEADER_OFFSET +
viewIndexInContainer + 1;\n  if (nextViewIndex < lContainer.length) {\n    const lView =
lContainer[nextViewIndex] as LView;\n    const firstTNodeOfView = lView[TVIEW].firstChild;\n    if
(firstTNodeOfView !== null) {\n      return getFirstNativeNode(lView, firstTNodeOfView);\n    }\n  }\n  return
lContainer[NATIVE];\n}\n\n/**\n * Removes a native node itself using a given renderer. To remove the node we
are looking up its\n * parent from the native tree as not all platforms / browsers support the equivalent of\n *
node.remove().\n *\n * @param renderer A renderer to be used\n *\n * @param rNode The native node that should be
removed\n *\n * @param isHostElement A flag indicating if a node to be removed
is a host of a component.\n */\nexport function nativeRemoveNode(renderer: Renderer, rNode: RNode,
isHostElement?: boolean): void {\n  ngDevMode && ngDevMode.rendererRemoveNode++;\n  const nativeParent =
nativeParentNode(renderer, rNode);\n  if (nativeParent) {\n    nativeRemoveChild(renderer, nativeParent, rNode,
isHostElement);\n  }\n}\n\n/**\n * Performs the operation of `action` on the node. Typically this involves
inserting or removing\n * nodes on the LView or projection boundary.\n */\nfunction applyNodes(\n  renderer:
Renderer, action: WalkTNodeTreeAction, tNode: TNode|null, lView: LView,\n  parentRElement: RElement|null,
beforeNode: RNode|null, isProjection: boolean) {\n  while (tNode != null) {\n    ngDevMode &&

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assertTNodeForLView(tNode, IView);\n ngDevMode &&\n assertTNodeType(\n tNode,\n TNodeType.AnyRNode | TNodeType.AnyContainer | TNodeType.Projection | TNodeType.Icu);\n const\n rawSlotValue = IView[tNode.index];\n const tNodeType\n = tNode.type;\n if (isProjection) {\n if (action === WalkTNodeTreeAction.Create) {\n rawSlotValue &&\n attachPatchData(unwrapRNode(rawSlotValue), IView);\n tNode.flags |= TNodeFlags.isProjected;\n }\n }\n if ((tNode.flags & TNodeFlags.isDetached) !== TNodeFlags.isDetached) {\n if (tNodeType &\n TNodeType.ElementContainer) {\n applyNodes(renderer, action, tNode.child, IView, parentRElement,\n beforeNode, false);\n applyToElementOrContainer(action, renderer, parentRElement, rawSlotValue,\n beforeNode);\n } else if (tNodeType & TNodeType.Icu) {\n const nextRNode = icuContainerIterate(tNode\n as TIcuContainerNode, IView);\n let rNode: RNode|null;\n while (rNode = nextRNode()) {\n applyToElementOrContainer(action, renderer, parentRElement, rNode, beforeNode);\n }\n applyToElementOrContainer(action, renderer, parentRElement, rawSlotValue, beforeNode);\n } else if\n (tNodeType & TNodeType.Projection)\n {\n applyProjectionRecursive(\n renderer, action, IView, tNode as TProjectionNode, parentRElement,\n beforeNode);\n } else {\n ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.Container);\n applyToElementOrContainer(action, renderer, parentRElement, rawSlotValue,\n beforeNode);\n }\n }\n tNode = isProjection ? tNode.projectionNext : tNode.next;\n }\n\n\n`applyView` performs operation on the view as specified in `action` (insert, detach, destroy)\n\n * Inserting a view\n without projection or containers at top level is simple. Just iterate over the\n * root nodes of the View, and for each\n node perform the `action`.\n * Things get more complicated with containers and projections. That is because\n coming across:\n * - Container: implies that we have to insert/remove/destroy the views of that container as well\n * which in turn can have their own Containers at the View roots.\n * - Projection:\n implies that we have to insert/remove/destroy the nodes of the projection. The\n * complication is that the\n nodes we are projecting can themselves have Containers\n * or other Projections.\n * As you can see\n this is a very recursive problem. Yes recursion is not most efficient but the\n * code is complicated enough that\n trying to implemented with recursion becomes unmaintainable.\n * @param tView The `TView` which needs to\n be inserted, detached, destroyed\n * @param IView The LView which needs to be inserted, detached, destroyed.\n * @param renderer Renderer to use\n * @param action action to perform (insert, detach, destroy)\n * @param\n parentRElement parent DOM element for insertion (Removal does not need it).\n * @param beforeNode Before\n which node the insertions should happen.\n *\nfunction applyView(\n tView: TView, IView: LView, renderer:\n Renderer, action: WalkTNodeTreeAction.Destroy,\n parentRElement: null, beforeNode: null): void;\nfunction\n applyView(\n tView: TView, IView: LView, renderer: Renderer, action: WalkTNodeTreeAction,\n parentRElement: RElement|null, beforeNode: RNode|null): void;\nfunction applyView(\n tView: TView, IView:\n LView, renderer: Renderer, action: WalkTNodeTreeAction,\n parentRElement: RElement|null, beforeNode:\n RNode|null): void {\n applyNodes(renderer, action, tView.firstChild, IView, parentRElement, beforeNode,\n false);\n}\n\n`applyProjection` performs operation on the projection.\n\n * Inserting a projection requires\n us to locate the projected nodes from the parent component. The\n * complication is that those nodes themselves\n could be re-projected from their parent component.\n * @param tView The `TView` of `LView` which needs to\n be inserted, detached, destroyed\n * @param IView The `LView` which needs to be inserted, detached, destroyed.\n * @param tProjectionNode node to project\n *\nexport function applyProjection(tView: TView, IView: LView,\n tProjectionNode: TProjectionNode)\n {\n const renderer = IView[RENDERER];\n const parentRNode = getParentRElement(tView, tProjectionNode,\n IView);\n const parentTNode = tProjectionNode.parent || IView[T_HOST];\n let beforeNode =\n getInsertInFrontOfRNode(parentTNode, tProjectionNode, IView);\n applyProjectionRecursive(\n renderer,\n WalkTNodeTreeAction.Create, IView, tProjectionNode, parentRNode, beforeNode);\n}\n\n`applyProjectionRecursive` performs operation on the projection specified by `action` (insert,\n * detach, destroy)\n\n * Inserting a projection requires us to locate the projected nodes from the parent component. The\n * complication is that those nodes themselves could be re-projected from their parent component.\n * @param

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renderer Render to use\n * @param action action to perform (insert, detach, destroy)\n * @param IView The LView
which needs to be inserted, detached, destroyed.\n * @param tProjectionNode node to project\n * @param
parentRElement parent DOM element for
insertion/removal.\n * @param beforeNode Before which node the insertions should happen.\n */\nfunction
applyProjectionRecursive(\n  renderer: Renderer, action: WalkTNodeTreeAction, IView: LView, tProjectionNode:
TProjectionNode,\n  parentRElement: RElement|null, beforeNode: RNode|null) {\n  const componentLView =
IView[DECLARATION_COMPONENT_VIEW];\n  const componentNode = componentLView[T_HOST] as
TElementNode;\n  ngDevMode &&\n    assertEquals(typeof tProjectionNode.projection, 'number', 'expecting
projection index');\n  const nodeToProjectOrRNodes = componentNode.projection![tProjectionNode.projection];\n
if (Array.isArray(nodeToProjectOrRNodes)) {\n    // This should not exist, it is a bit of a hack. When we bootstrap a
top level node and we\n    // need to support passing projectable nodes, so we cheat and put them in the TNode\n    //
of the Host TView. (Yes we put instance info at the T Level). We can get away with it\n    // because we know that
that TView is not shared
and therefore it will not be a problem.\n    // This should be refactored and cleaned up.\n    for (let i = 0; i <
nodeToProjectOrRNodes.length; i++) {\n      const rNode = nodeToProjectOrRNodes[i];\n      applyToElementOrContainer(action, renderer, parentRElement, rNode, beforeNode);\n    }\n  } else {\n    let
nodeToProject: TNode|null = nodeToProjectOrRNodes;\n    const projectedComponentLView =
componentLView[PARENT] as LView;\n    applyNodes(\n      renderer, action, nodeToProject,
projectedComponentLView, parentRElement, beforeNode, true);\n  }\n}\n\n/**\n * `applyContainer` performs an
operation on the container and its views as specified by\n * `action` (insert, detach, destroy)\n *\n * Inserting a
Container is complicated by the fact that the container may have Views which\n * themselves have containers or
projections.\n *\n * @param renderer Renderer to use\n * @param action action to perform (insert, detach,
destroy)\n * @param IContainer The LContainer which needs to be
inserted, detached, destroyed.\n * @param parentRElement parent DOM element for insertion/removal.\n *\n *
@param beforeNode Before which node the insertions should happen.\n */\nfunction applyContainer(\n  renderer:
Renderer, action: WalkTNodeTreeAction, IContainer: LContainer,\n  parentRElement: RElement|null, beforeNode:
RNode|null|undefined) {\n  ngDevMode && assertEquals(LContainer(IContainer);\n  const anchor = IContainer[NATIVE];\n
// LContainer has its own before node.\n  const native = unwrapRNode(IContainer);\n  // An LContainer can be
created dynamically on any node by injecting ViewContainerRef.\n  // Asking for a ViewContainerRef on an
element will result in a creation of a separate anchor\n  // node (comment in the DOM) that will be different from the
LContainer's host node. In this\n  // particular case we need to execute action on 2 nodes:\n  // - container's host node
(this is done in the executeActionOnElementOrContainer)\n  // - container's host node (this is done here)\n
if (anchor !== native) {\n    // This is very strange to me (Misko). I would expect that the native is same as anchor.
I\n    // don't see a reason why they should be different, but they are.\n    // If they are we need to process the
second anchor as well.\n    applyToElementOrContainer(action, renderer, parentRElement, anchor, beforeNode);\n  }\n
for (let i = CONTAINER_HEADER_OFFSET; i < IContainer.length; i++) {\n    const IView = IContainer[i] as
LView;\n    applyView(IView[TVIEW], IView, renderer, action, parentRElement, anchor);\n  }\n}\n\n/**\n * Writes
class/style to element.\n *\n * @param renderer Renderer to use.\n * @param isClassBased `true` if it should be
written to `class` (`false` to write to `style`)\n * @param rNode The Node to write to.\n * @param prop Property to
write to. This would be the class/style name.\n * @param value Value to write. If `null`/`undefined`/`false` this is
considered a remove (set/add\n * otherwise).\n */\nexport function applyStyling(\n
  renderer: Renderer, isClassBased: boolean, rNode: RElement, prop: string, value: any) {\n  if (isClassBased) {\n
// We actually want JS true/false here because any truthy value should add the class\n  if (!value) {\n
ngDevMode && ngDevMode.rendererRemoveClass++;\n    renderer.removeClass(rNode, prop);\n  } else {\n
ngDevMode && ngDevMode.rendererAddClass++;\n    renderer.addClass(rNode, prop);\n  }\n} else {\n  let
flags = prop.indexOf('-') === -1 ? undefined : RendererStyleFlags2.DashCase as number;\n  if (value === null /**\n
value === undefined */) {\n    ngDevMode && ngDevMode.rendererRemoveStyle++;\n
renderer.removeStyle(rNode, prop, flags);\n  } else {\n    // A value is important if it ends with `!important`. The

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style\n // parser strips any semicolons at the end of the value.\n const isImportant = typeof value === 'string' ?
value.endsWith('!important') : false;\n if (isImportant) {\n // !important has
to be stripped from the value for it to be valid.\n value = value.slice(0, -10);\n flags! |=
RendererStyleFlags2.Important;\n }\n ngDevMode && ngDevMode.rendererSetStyle++;\n
renderer.setStyle(rNode, prop, value, flags);\n }\n }\n}\n\n/**\n * Write `cssText` to `RElement`.\n *\n * This
function does direct write without any reconciliation. Used for writing initial values, so\n * that static styling values
do not pull in the style parser.\n *\n * @param renderer Renderer to use\n * @param element The element which
needs to be updated.\n *\n * @param newValue The new class list to write.\n */\nexport function
writeDirectStyle(renderer: Renderer, element: RElement, newValue: string) {\n ngDevMode &&
assertString(newValue, '\\`newValue\\` should be a string');\n renderer.setAttribute(element, 'style', newValue);\n
ngDevMode && ngDevMode.rendererSetStyle++;\n}\n\n/**\n * Write `className` to `RElement`.\n *\n * This
function does direct write without any
reconciliation. Used for writing initial values, so\n * that static styling values do not pull in the style parser.\n *\n *
@param renderer Renderer to use\n * @param element The element which needs to be updated.\n *\n * @param
newValue The new class list to write.\n */\nexport function writeDirectClass(renderer: Renderer, element:
RElement, newValue: string) {\n ngDevMode && assertString(newValue, '\\`newValue\\` should be a string');\n
if (newValue === "") {\n // There are tests in `google3` which expect `element.getAttribute('class')` to be `null`.\n
renderer.removeAttribute(element, 'class');\n } else {\n renderer.setAttribute(element, 'class', newValue);\n }\n
ngDevMode && ngDevMode.rendererSetClassName++;\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n */\n * @fileoverview\n * A module to facilitate
use of a Trusted Types policy internally within\n * Angular. It lazily constructs the Trusted Types policy, providing
helper\n * utilities for promoting strings to Trusted Types. When Trusted Types are not\n * available, strings are
used as a fallback.\n *\n * @security All use of this module is security-sensitive and should go through\n * security
review.\n */\nimport { global } from './global';\nimport { TrustedHTML, TrustedScript, TrustedScriptURL,
TrustedTypePolicy, TrustedTypePolicyFactory } from './trusted_type_defs';\n\n/**\n * The Trusted Types policy, or
null if Trusted Types are not\n * enabled/supported, or undefined if the policy has not been created yet.\n */\nlet
policy: TrustedTypePolicy|null|undefined;\n\n/**\n * Returns the Trusted Types policy, or null if Trusted Types are
not\n * enabled/supported. The first call to this function will create the policy.\n */\nfunction getPolicy():
TrustedTypePolicy|null {\n if (policy === undefined) {\n policy = null;\n if (global.trustedTypes)
{\n try {\n policy = (global.trustedTypes as TrustedTypePolicyFactory).createPolicy('angular', {\n
createHTML: (s: string) => s,\n createScript: (s: string) => s,\n createScriptURL: (s: string) => s,\n
});\n } catch {\n // trustedTypes.createPolicy throws if called with a name that is\n // already registered,
even in report-only mode. Until the API changes,\n // catch the error not to break the applications functionally.
In such\n // cases, the code will fall back to using strings.\n }\n }\n }\n return policy;\n}\n\n/**\n *
Unsafely promote a string to a TrustedHTML, falling back to strings when\n * Trusted Types are not available.\n *\n *
@security This is a security-sensitive function; any use of this function\n * must go through security review. In
particular, it must be assured that the\n * provided string will never cause an XSS vulnerability if used in a context\n *
that will be interpreted
as HTML by a browser, e.g. when assigning to\n * element.innerHTML.\n */\nexport function
trustedHTMLFromString(html: string): TrustedHTML|string {\n return getPolicy()?.createHTML(html) ||
html;\n}\n\n/**\n * Unsafely promote a string to a TrustedScript, falling back to strings when\n * Trusted Types are
not available.\n *\n * @security In particular, it must be assured that the provided string will\n * never cause an XSS
vulnerability if used in a context that will be\n * interpreted and executed as a script by a browser, e.g. when calling
eval.\n */\nexport function trustedScriptFromString(script: string): TrustedScript|string {\n return
getPolicy()?.createScript(script) || script;\n}\n\n/**\n * Unsafely promote a string to a TrustedScriptURL, falling
back to strings\n * when Trusted Types are not available.\n *\n * @security This is a security-sensitive function; any
use of this function\n * must go through security review. In particular, it must be assured that the\n * provided

```



string will never cause an XSS vulnerability if used in a context that will cause a browser to load and execute a resource, e.g. when assigning to `script.src`.

`export function trustedScriptURLFromString(url: string): TrustedScriptURL {`  
 `return getPolicy()?.createScriptURL(url) || url;`  
`}`

Unsafely call the Function constructor with the given string arguments. It is only available in development mode, and should be stripped out of production code.

@security This is a security-sensitive function; any use of this function must go through security review. In particular, it must be assured that it is only called from development code, as use in production code can lead to XSS vulnerabilities.

`export function newTrustedFunctionForDev(...args: string[]): Function {`  
 `if (typeof ngDevMode === 'undefined') {`  
 `throw new Error('newTrustedFunctionForDev should never be called in production');`  
 `}`  
 `if (!global.trustedTypes) {`  
 `// In environments that don't support Trusted Types, fall back to the most straightforward implementation:`  
 `return new Function(...args);`  
 `}`  
 `// Chrome currently does not support passing TrustedScript to the Function constructor. The following implements the workaround proposed on the page below, where the Chromium bug is also referenced:`  
 `// https://github.com/w3c/webappsec-trusted-types/wiki/Trusted-Types-for-function-constructor`  
 `const fnArgs = args.slice(0, -1).join(',');`  
 `const fnBody = args[args.length - 1];`  
 `const body = `(function anonymous(${fnArgs}) { ${fnBody} })`;`  
 `// Using eval directly confuses the compiler and prevents this module from being stripped out of JS binaries even if not used. The global['eval'] indirection fixes that.`  
 `const fn = global['eval'](trustedScriptFromString(body) as string) as Function;`  
 `if (fn.bind === undefined) {`  
 `// Workaround for a browser bug that only exists in Chrome 83, where passing a TrustedScript to eval just returns the TrustedScript back without evaluating it. In that case, fall back to the most straightforward implementation:`  
 `return new Function(...args);`  
 `}`  
 `// To completely mimic the behavior of calling "new Function", two more things need to happen:`  
 `// 1. Stringifying the resulting function should return its source code`  
 `fn.toString = () => body;`  
 `// 2. When calling the resulting function, `this` should refer to `global``  
 `return fn.bind(global);`  
`}`

When Trusted Types support in Function constructors is widely available, the implementation of this function can be simplified to:

`return new Function(...args.map(a => trustedScriptFromString(a)));`

\*/

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```

import { RuntimeError,
  RuntimeErrorCode } from '../errors';
import { getTemplateLocationDetails } from
  '../render3/instructions/element_validation';
import { TNodeType } from '../render3/interfaces/node';
import { RComment, RElement } from '../render3/interfaces/renderer_dom';
import { RENDERER } from
  '../render3/interfaces/view';
import { nativeRemoveNode } from '../render3/node_manipulation';
import { getLView,
  getSelectedTNode } from '../render3/state';
import { getNativeByTNode } from '../render3/util/view_utils';
import { trustedHTMLFromString } from '../util/security/trusted_types';

Validation function invoked at runtime
for each binding that might potentially
represent a security-sensitive attribute of an <iframe>.
See `IFRAME_SECURITY_SENSITIVE_ATTRS` in
`packages/compiler/src/schema/dom_security_schema.ts`
script for the full list
of such attributes.

@codeGenApi
export function
validateIframeAttribute(attrValue: any, tagName: string, attrName: string) {
  const
  IView = getLView();
  const tNode = getSelectedTNode(!);
  const element = getNativeByTNode(tNode, IView)
  as RElement | RComment;

  // Restrict any dynamic bindings of security-sensitive attributes/properties
  // on an <iframe> for security reasons.
  if (tNode.type === TNodeType.Element && tagName.toLowerCase() ===
  'iframe') {
    const iframe = element as HTMLIFrameElement;

    // Unset previously applied `src` and `srcdoc`
    if we come across a situation when
    // a security-sensitive attribute is set later via an attribute/property binding.
    iframe.src = "";
    iframe.srcdoc = trustedHTMLFromString("") as unknown as string;

    // Also remove the
    <iframe> from the document.
    nativeRemoveNode(IView[RENDERER], iframe);

    const errorMessage =
    ngDevMode &&
    `Angular has detected that the \`${attrName}\` was applied ` +
    ` as a binding to an
    <iframe>${getTemplateLocationDetails(IView)}. ` +
    ` For security reasons, the
    \`${attrName}\` can be set on an <iframe> ` +
    ` as a static attribute only. \`${attrName}\` To fix this,
    switch the \`${attrName}\` binding to a static attribute ` +
    ` in a template or in host bindings section.`;
  }
}

```

```

throw new RuntimeError(RuntimeErrorCode.UNSAFE_IFRAME_ATTRS, errorMessage);\n }
return
attrValue;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n*/\n * Most of the use of `document` in Angular is from within the DI system so it is possible to simply\n *
inject the `DOCUMENT` token and are done.\n * Ivy is special because it does not rely upon the DI and must
get hold of the document some other\n * way.\n * The solution is to define `getDocument()` and
`setDocument()` top-level functions for ivy.\n * Wherever ivy needs the global document, it calls `getDocument()`
instead.\n * When running ivy outside of a browser environment, it is necessary to call `setDocument()` to\n *
tell ivy what the global `document` is.\n * Angular does this for us in each of the standard platforms (`Browser`,
`Server`, and `WebWorker`)\n * by calling `setDocument()` when providing the `DOCUMENT` token.\n */\nlet
DOCUMENT: Document|undefined = undefined;\n\n*/\n * Tell ivy what the `document` is for this platform.\n *\n * It is only necessary to call this if the current platform is not a browser.\n * @param document The object
representing the global `document` in this environment.\n */\nexport function setDocument(document:
Document|undefined): void {\n  DOCUMENT = document;\n}\n\n*/\n * Access the object that represents the
`document` for this platform.\n *\n * Ivy calls this whenever it needs to access the `document` object.\n * For
example to create the renderer or to do sanitization.\n */\nexport function getDocument(): Document {\n  if
(DOCUMENT
!== undefined) {\n    return DOCUMENT;\n  } else if (typeof document !== 'undefined') {\n    return document;\n
}\n  // No `document` can be found. This should only happen if we are running ivy outside Angular and\n  // the
current platform is not a browser. Since this is not a supported scenario at the moment\n  // this should not happen in
Angular apps.\n  // Once we support running ivy outside of Angular we will need to publish `setDocument()` as a\n
// public API. Meanwhile we just return `undefined` and let the application fail.\n  return undefined;\n}\n", "/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n*/\n * @fileoverview\n
* A module to facilitate use of a Trusted Types policy internally within\n * Angular specifically for
bypassSecurityTrust* and custom sanitizers. It\n * lazily constructs the Trusted Types policy,
providing helper utilities for\n * promoting strings to Trusted Types. When Trusted Types are not available,\n *
strings are used as a fallback.\n * @security All use of this module is security-sensitive and should go through\n *
security review.\n */\nimport {global} from './global';\nimport {TrustedHTML, TrustedScript, TrustedScriptURL,
TrustedTypePolicy, TrustedTypePolicyFactory} from './trusted_type_defs';\n\n*/\n * The Trusted Types policy, or
null if Trusted Types are not\n * enabled/supported, or undefined if the policy has not been created yet.\n */\nlet
policy: TrustedTypePolicy|null|undefined;\n\n*/\n * Returns the Trusted Types policy, or null if Trusted Types are
not\n * enabled/supported. The first call to this function will create the policy.\n */\nfunction getPolicy():
TrustedTypePolicy|null {\n  if (policy === undefined) {\n    policy = null;\n    if (global.trustedTypes) {\n      try {\n
        policy = (global.trustedTypes as TrustedTypePolicyFactory)\n
          .createPolicy('angular#unsafe-bypass', {\n
            createHTML: (s: string) => s,\n
            createScript: (s: string) => s,\n
            createScriptURL: (s: string) => s,\n
          });\n      } catch {\n
        // trustedTypes.createPolicy throws if called with a name that is\n        // already registered, even in report-only
mode. Until the API changes,\n        // catch the error not to break the applications functionally. In such\n        //
cases, the code will fall back to using strings.\n      }\n    }\n  }\n  return policy;\n}\n\n*/\n * Unsafely promote a
string to a TrustedHTML, falling back to strings when\n * Trusted Types are not available.\n * @security This is a
security-sensitive function; any use of this function\n * must go through security review. In particular, it must be
assured that it\n * is only passed strings that come directly from custom sanitizers or the\n * bypassSecurityTrust*
functions.\n\n */\nexport function trustedHTMLFromStringBypass(html: string): TrustedHTML|string {\n  return
getPolicy()?.createHTML(html) || html;\n}\n\n*/\n * Unsafely promote a string to a TrustedScript, falling back to
strings when\n * Trusted Types are not available.\n * @security This is a security-sensitive function; any use of this
function\n * must go through security review. In particular, it must be assured that it\n * is only passed strings that

```

```

come directly from custom sanitizers or the\n * bypassSecurityTrust* functions.\n *^\nexport function
trustedScriptFromStringBypass(script: string): TrustedScript|string {\n return getPolicy()?.createScript(script) ||
script;\n}\n\n/**\n * Unsafely promote a string to a TrustedScriptURL, falling back to strings\n * when Trusted
Types are not available.\n * @security This is a security-sensitive function; any use of this function\n * must go
through security review. In particular, it must be assured that it\n * is only passed strings that come directly
from custom sanitizers or the\n * bypassSecurityTrust* functions.\n *^\nexport function
trustedScriptURLFromStringBypass(url: string): TrustedScriptURL|string {\n return
getPolicy()?.createScriptURL(url) || url;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *^\n\n\nexport const enum BypassType {\n Url = 'URL',\n Html = 'HTML',\n
ResourceUrl = 'ResourceURL',\n Script = 'Script',\n Style = 'Style',\n}\n\n/**\n * Marker interface for a value that's
safe to use in a particular context.\n *\n * @publicApi\n *^\nexport interface SafeValue {}\n\n/**\n * Marker
interface for a value that's safe to use as HTML.\n *\n * @publicApi\n *^\nexport interface SafeHtml extends
SafeValue {}\n\n/**\n * Marker interface for a value that's safe to use as style (CSS).\n *\n * @publicApi\n
*^\nexport interface SafeStyle extends SafeValue
{\n}\n\n/**\n * Marker interface for a value that's safe to use as JavaScript.\n *\n * @publicApi\n *^\nexport interface
SafeScript extends SafeValue {\n}\n\n/**\n * Marker interface for a value that's safe to use as a URL linking to a
document.\n *\n * @publicApi\n *^\nexport interface SafeUrl extends SafeValue {\n}\n\n/**\n * Marker interface for
a value that's safe to use as a URL to load executable code from.\n *\n * @publicApi\n *^\nexport interface
SafeResourceUrl extends SafeValue {\n}\n\nabstract class SafeValueImpl implements SafeValue {\n
constructor(public changingThisBreaksApplicationSecurity: string) {\n\n abstract getTypeName(): string;\n\n
toString() {\n return `SafeValue must use [property]=binding: ${this.changingThisBreaksApplicationSecurity}`\n
+\n ` (see https://g.co/ng/security#xss)`;\n }\n}\n\n\nclass SafeHtmlImpl extends SafeValueImpl implements
SafeHtml {\n override getTypeName() {\n return BypassType.Html;\n }\n}\n\n\nclass SafeStyleImpl extends
SafeValueImpl
implements SafeStyle {\n override getTypeName() {\n return BypassType.Style;\n }\n}\n\n\nclass SafeScriptImpl
extends SafeValueImpl implements SafeScript {\n override getTypeName() {\n return BypassType.Script;\n
}\n}\n\n\nclass SafeUrlImpl extends SafeValueImpl implements SafeUrl {\n override getTypeName() {\n return
BypassType.Url;\n }\n}\n\n\nclass SafeResourceUrlImpl extends SafeValueImpl implements SafeResourceUrl {\n
override getTypeName() {\n return BypassType.ResourceUrl;\n }\n}\n}\n\nexport function unwrapSafeValue(value:
SafeValue): string;\nexport function unwrapSafeValue<T>(value: T): T;\nexport function
unwrapSafeValue<T>(value: T|SafeValue): T {\n return value instanceof SafeValueImpl ?
value.changingThisBreaksApplicationSecurity as any as T :\n value as any as
T;\n}\n\n\nexport function allowSanitizationBypassAndThrow(\n value: any, type: BypassType.Html): value is
SafeHtml;\nexport function allowSanitizationBypassAndThrow(\n
value: any, type: BypassType.ResourceUrl): value is SafeResourceUrl;\nexport function
allowSanitizationBypassAndThrow(\n value: any, type: BypassType.Script): value is SafeScript;\nexport function
allowSanitizationBypassAndThrow(\n value: any, type: BypassType.Style): value is SafeStyle;\nexport function
allowSanitizationBypassAndThrow(value: any, type: BypassType.Url): value is SafeUrl;\nexport function
allowSanitizationBypassAndThrow(value: any, type: BypassType): boolean;\nexport function
allowSanitizationBypassAndThrow(value: any, type: BypassType): boolean {\n const actualType =
getSanitizationBypassType(value);\n if (actualType !== null && actualType !== type) {\n // Allow ResourceURLs
in URL contexts, they are strictly more trusted.\n if (actualType === BypassType.ResourceUrl && type ===
BypassType.Url) return true;\n throw new Error(\n `Required a safe ${type}, got a ${actualType} (see
https://g.co/ng/security#xss)`);\n }\n return actualType
=== type;\n}\n\n\nexport function getSanitizationBypassType(value: any): BypassType|null {\n return value
instanceof SafeValueImpl && value.getTypeName() as BypassType || null;\n}\n\n/**\n * Mark `html` string as
trusted.\n *\n * This function wraps the trusted string in `String` and brands it in a way which makes it\n *

```

```

recognizable to {@link htmlSanitizer} to be trusted implicitly.\n *\n * @param trustedHtml `html` string which
needs to be implicitly trusted.\n * @returns a `html` which has been branded to be implicitly trusted.\n */\nexport
function bypassSanitizationTrustHtml(trustedHtml: string): SafeHtml {\n  return new
SafeHtmlImpl(trustedHtml);\n}\n/**\n * Mark `style` string as trusted.\n *\n * This function wraps the trusted string
in `String` and brands it in a way which makes it\n * recognizable to {@link styleSanitizer} to be trusted
implicitly.\n *\n * @param trustedStyle `style` string which needs to be implicitly trusted.\n * @returns a `style`
hich has been branded
to be implicitly trusted.\n */\nexport function bypassSanitizationTrustStyle(trustedStyle: string): SafeStyle {\n
return new SafeStyleImpl(trustedStyle);\n}\n/**\n * Mark `script` string as trusted.\n *\n * This function wraps the
trusted string in `String` and brands it in a way which makes it\n * recognizable to {@link scriptSanitizer} to be
trusted implicitly.\n *\n * @param trustedScript `script` string which needs to be implicitly trusted.\n * @returns a
`script` which has been branded to be implicitly trusted.\n */\nexport function
bypassSanitizationTrustScript(trustedScript: string): SafeScript {\n  return new
SafeScriptImpl(trustedScript);\n}\n/**\n * Mark `url` string as trusted.\n *\n * This function wraps the trusted string
in `String` and brands it in a way which makes it\n * recognizable to {@link urlSanitizer} to be trusted implicitly.\n
*\n * @param trustedUrl `url` string which needs to be implicitly trusted.\n * @returns a `url` which has been
branded to be implicitly
trusted.\n */\nexport function bypassSanitizationTrustUrl(trustedUrl: string): SafeUrl {\n  return new
SafeUrlImpl(trustedUrl);\n}\n/**\n * Mark `url` string as trusted.\n *\n * This function wraps the trusted string in
`String` and brands it in a way which makes it\n * recognizable to {@link resourceUrlSanitizer} to be trusted
implicitly.\n *\n * @param trustedResourceUrl `url` string which needs to be implicitly trusted.\n * @returns a `url`
which has been branded to be implicitly trusted.\n */\nexport function
bypassSanitizationTrustResourceUrl(trustedResourceUrl: string): SafeResourceUrl {\n  return new
SafeResourceUrlImpl(trustedResourceUrl);\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {trustedHTMLFromString} from
'./util/security/trusted_types';\n\n/**\n * This helper is used to get hold of an
inert tree of DOM elements containing dirty HTML\n * that needs sanitizing.\n * Depending upon browser support
we use one of two strategies for doing this.\n * Default: DOMParser strategy\n * Fallback: InertDocument strategy\n
*/\nexport function getInertBodyHelper(defaultDoc: Document): InertBodyHelper {\n  const inertDocumentHelper
= new InertDocumentHelper(defaultDoc);\n  return isDOMParserAvailable() ? new
DOMParserHelper(inertDocumentHelper) : inertDocumentHelper;\n}\n\nexport interface InertBodyHelper {\n
/**\n * Get an inert DOM element containing DOM created from the dirty HTML string provided.\n */\n
getInertBodyElement: (html: string) => HTMLElement | null;\n}\n\n/**\n * Uses DOMParser to create and fill an
inert body element.\n * This is the default strategy used in browsers that support it.\n */\nexport class DOMParserHelper
implements InertBodyHelper {\n  constructor(private inertDocumentHelper: InertBodyHelper) {}\n\n  getInertBodyElement(html: string): HTMLElement|null {\n
    // We add these extra elements to ensure that the rest of the content is parsed as expected\n    // e.g. leading
whitespace is maintained and tags like `` do not get hoisted to the\n    // `` tag. Note that the ``
tag is closed implicitly to prevent unclosed tags\n    // in `html` from consuming the otherwise explicit ``
tag.\n    html = '<body><remove></remove>' + html;\n    try {\n      const body = new window.DOMParser()\n
        .parseFromString(trustedHTMLFromString(html) as string, 'text/html')\n        .body as
HTMLBodyElement;\n      if (body === null) {\n        // In some browsers (e.g. Mozilla/5.0 iPad AppleWebKit
Mobile) the `body` property only\n        // becomes available in the following tick of the JS engine. In that case we
fall back to\n        // the `inertDocumentHelper` instead.\n        return
this.inertDocumentHelper.getInertBodyElement(html);\n      }\n      body.removeChild(body.firstChild!);\n      return
body;\n    } catch {\n      return null;\n    }\n  }\n}\n\n/**\n * Use an HTML5 `template` element, if supported, or an
inert body element created via\n * `createHtmlDocument` to create and fill an inert DOM element.\n * This is the

```

```

fallback strategy if the browser does not support DOMParser.\n *\n\nclass InertDocumentHelper implements
InertBodyHelper {\n private inertDocument: Document;\n\n constructor(private defaultDoc: Document) {\n
this.inertDocument = this.defaultDoc.implementation.createHTMLDocument('sanitization-inert');\n\n if
(this.inertDocument.body == null) {\n // usually there should be only one body element in the document, but IE
doesn't have any, so\n // we need to create one.\n const inertHtml =
this.inertDocument.createElement('html');\n this.inertDocument.appendChild(inertHtml);\n const
inertBodyElement = this.inertDocument.createElement('body');\n inertHtml.appendChild(inertBodyElement);\n
}\n }\n\n getInertBodyElement(html:
string): HTMLInputElement|null {\n // Prefer using <template> element if supported.\n const templateEl =
this.inertDocument.createElement('template');\n if ('content' in templateEl) {\n templateEl.innerHTML =
trustedHTMLFromString(html) as string;\n return templateEl;\n }\n}\n // Note that previously we used to do
something like `this.inertDocument.body.innerHTML = html`\n // and we returned the inert `body` node. This was
changed, because IE seems to treat setting\n // `innerHTML` on an inserted element differently, compared to one
that hasn't been inserted\n // yet. In particular, IE appears to split some of the text into multiple text nodes rather\n
// than keeping them in a single one which ends up messing with Ivy's i18n parsing further\n // down the line. This
has been worked around by creating a new inert `body` and using it as\n // the root node in which we insert the
HTML.\n const inertBody = this.inertDocument.createElement('body');\n
inertBody.innerHTML = trustedHTMLFromString(html) as string;\n\n // Support: IE 11 only\n // strip
custom-namespaced attributes on IE<=11\n if ((this.defaultDoc as any).documentMode) {\n
this.stripCustomNsAttrs(inertBody);\n }\n\n return inertBody;\n }\n\n /**\n * When IE11 comes across an
unknown namespaced attribute e.g. 'xlink:foo' it adds 'xmlns:ns1'\n * attribute to declare ns1 namespace and
prefixes the attribute with 'ns1' (e.g.\n * 'ns1:xlink:foo').\n *\n * This is undesirable since we don't want to allow
any of these custom attributes. This method\n * strips them all.\n *\n *\n private stripCustomNsAttrs(el: Element)
{\n const elAttrs = el.attributes;\n // loop backwards so that we can support removals.\n for (let i =
elAttrs.length - 1; 0 < i; i--) {\n const attrib = elAttrs.item(i);\n const attrName = attrib!.name;\n if
(attrName === 'xmlns:ns1' || attrName.indexOf('ns1:') === 0) {\n el.removeAttribute(attrName);\n
}\n }\n let childNode = el.firstChild as Node | null;\n while (childNode) {\n if (childNode.nodeType
=== Node.ELEMENT_NODE) this.stripCustomNsAttrs(childNode as Element);\n childNode =
childNode.nextSibling;\n }\n }\n}\n\n /**\n * We need to determine whether the DOMParser exists in the global
context and\n * supports parsing HTML; HTML parsing support is not as wide as other formats, see\n *
https://developer.mozilla.org/en-US/docs/Web/API/DOMParser#Browser\_compatibility.\n *\n * @suppress
{uselessCode}\n *\n\n export function isDOMParserAvailable() {\n try {\n return !!new
window.DOMParser().parseFromString(\n trustedHTMLFromString("") as string, 'text/html');\n } catch {\n
return false;\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n\n /**\n * A pattern that
recognizes a commonly useful subset of URLs that are safe.\n *\n * This regular expression matches a subset of
URLs that will not cause script\n * execution if used in URL context within a HTML document. Specifically, this\n
* regular expression matches if (comment from here on and regex copied from\n * Soy's EscapingConventions):\n *
(1) Either an allowed protocol (http, https, mailto or ftp).\n * (2) or no protocol. A protocol must be followed by a
colon. The below\n * allows that by allowing colons only after one of the characters [/?#].\n * A colon after a
hash (#) must be in the fragment.\n * Otherwise, a colon after a (?) must be in a query.\n * Otherwise, a colon
after a single solidus (/) must be in a path.\n * Otherwise, a colon after a double solidus (//) must be in the
authority\n * (before port).\n *\n * The pattern disallows &, used in HTML entity declarations before\n * one of
the characters in [/?#]. This disallows HTML entities used in the\n *
protocol name, which should never happen, e.g. \"h&#116;tp\" for \"http\".\n * It also disallows HTML entities in
the first path part of a relative path,\n * e.g. \"foo&lt;bar/baz\". Our existing escaping functions should not
produce\n * that. More importantly, it disallows masking of a colon,\n * e.g. \"javascript&#58;...\".\n *\n * This

```

```

regular expression was taken from the Closure sanitization library.\n *\nconst SAFE_URL_PATTERN =
/^(?:(:?https?)mailto|data|ftp|tel|file|sms):[^\&:\/?#]*(?:[\/?#]?)$/gi;\n\nexport function _sanitizeUrl(url: string): string
{\n url = String(url);\n if (url.match(SAFE_URL_PATTERN)) return url;\n\n if (typeof ngDevMode ===
'undefined' || ngDevMode) {\n console.warn(`WARNING: sanitizing unsafe URL value ${url}`) (see
https://g.co/ng/security#xss`);\n }\n\n return 'unsafe:' + url;\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE
file at https://angular.io/license\n *\n\nimport {TrustedHTML} from './util/security/trusted_type_defs';\nimport
{trustedHTMLFromString} from './util/security/trusted_types';\n\nimport {getInertBodyHelper, InertBodyHelper}
from './inert_body';\nimport {_sanitizeUrl} from './url_sanitizer';\n\nfunction tagSet(tags: string): {[k: string]:
boolean} {\n const res: {[k: string]: boolean} = {};\n for (const t of tags.split(',')) res[t] = true;\n return
res;\n}\n\nfunction merge(...sets: {[k: string]: boolean}[]): {[k: string]: boolean} {\n const res: {[k: string]:
boolean} = {};\n for (const s of sets) {\n for (const v in s) {\n if (s.hasOwnProperty(v)) res[v] = true;\n }\n }\n return res;\n}\n\n// Good source of info about elements and attributes\n//
https://html.spec.whatwg.org/#semantics\n// https://simon.html5.org/html-elements\n\n// Safe Void Elements -
HTML5\n// https://html.spec.whatwg.org/#void-elements\nconst VOID_ELEMENTS =
tagSet('area,br,col,hr,img,wbr');\n\n// Elements that you can, intentionally, leave open (and which close themselves)\n//
https://html.spec.whatwg.org/#optional-tags\nconst OPTIONAL_END_TAG_BLOCK_ELEMENTS =
tagSet('colgroup,dd,dt,li,p,tbody,td,tfoot,th,thead,tr');\nconst OPTIONAL_END_TAG_INLINE_ELEMENTS =
tagSet('rp,rt');\nconst OPTIONAL_END_TAG_ELEMENTS =\nmerge(OPTIONAL_END_TAG_INLINE_ELEMENTS, OPTIONAL_END_TAG_BLOCK_ELEMENTS);\n\n// Safe Block Elements - HTML5\nconst BLOCK_ELEMENTS = merge(\n
OPTIONAL_END_TAG_BLOCK_ELEMENTS,\n tagSet(\n 'address,article,' +\n
'aside,blockquote,caption,center,del,details,dialog,dir,div,dl,figure,figcaption,footer,h1,h2,h3,h4,h5,' +\n
'h6,header,hgroup,hr,ins,main,map,menu,nav,ol,pre,section,summary,table,ul');\n\n// Inline Elements -
HTML5\nconst INLINE_ELEMENTS = merge(\n OPTIONAL_END_TAG_INLINE_ELEMENTS,\n tagSet(\n
'a,abbr,acronym,audio,b,' +\n
'bdi,bdo,big,br,cite,code,del,dfn,em,font,i,img,ins,kbd,label,map,mark,picture,q,ruby,rp,rt,s,'
+\n 'samp,small,source,span,strike,strong,sub,sup,time,track,tt,u,var,video');\n\nexport const
VALID_ELEMENTS =\n merge(VOID_ELEMENTS, BLOCK_ELEMENTS, INLINE_ELEMENTS,
OPTIONAL_END_TAG_ELEMENTS);\n\n// Attributes that have href and hence need to be sanitized\nexport const
URI_ATTRS = tagSet('background,cite,href,itemtype,longdesc,poster,src,xlink:href');\n\nconst HTML_ATTRS =
tagSet(\n
'abbr,accesskey,align,alt,autoplay,axis,bgcolor,border,cellpadding,cellspacing,class,clear,color,cols,colspan,' +\n
'compact,controls,coords,datetime,default,dir,download,face,headers,height,hidden,hreflang,hspace,' +\n
'ismap,itemscope,itemprop,kind,label,lang,language,loop,media,muted,nohref,nowrap,open,preload,rel,rev,role,rows
,rowspan,rules,' +\n
'scope,scrolling,shape,size,sizes,span,srclang,srcset,start,summary,tabindex,target,title,translate,type,usemap,' +\n
'valign,value,vspace,width');\n\n// Accessibility attributes as per WAI-ARIA 1.1 (W3C Working Draft 14
December 2018)\nconst ARIA_ATTRS = tagSet(\n 'aria-activedescendant,aria-atomic,aria-autocomplete,aria-
busy,aria-checked,aria-colcount,aria-colindex,' +\n 'aria-colspan,aria-controls,aria-current,aria-describedby,aria-
details,aria-disabled,aria-dropeffect,' +\n 'aria-errormessage,aria-expanded,aria-flowto,aria-grabbed,aria-
haspopup,aria-hidden,aria-invalid,' +\n 'aria-keyshortcuts,aria-label,aria-labelledby,aria-level,aria-live,aria-
modal,aria-multiline,' +\n 'aria-multiselectable,aria-orientation,aria-owns,aria-placeholder,aria-posinset,aria-
pressed,aria-readonly,' +\n 'aria-relevant,aria-required,aria-roledescription,aria-rowcount,aria-rowindex,aria-
rowspan,aria-selected,' +\n 'aria-setsize,aria-sort,aria-valuemax,aria-valuemin,aria-valuenow,aria-valuetext');\n\n//
NB: This currently consciously doesn't support SVG. SVG sanitization has had several security\n// issues in the past,

```

so it seems safer to leave it out if possible. If support for binding SVG via innerHTML is required, SVG attributes should be added here. NB: Sanitization does not allow <form> elements or other active elements (<button> etc). Those can be sanitized, but they increase security surface area without a legitimate use case, so they are left out here.

```

export const VALID_ATTRS = merge(URI_ATTRS,
HTML_ATTRS, ARIA_ATTRS);
Elements whose content should not be traversed/preserved, if the elements
themselves are invalid. Typically, <invalid>Some content</invalid> would traverse (and in this case
preserve) `Some content`, but strip `invalid-element` opening/closing tags. For some elements, though, we
don't want to preserve the content, if the elements themselves are going to be removed.
const
SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS = tagSet('script,style,template');
SanitizingHtmlSerializer serializes a DOM fragment, stripping out any unsafe elements and unsafe
attributes.
class SanitizingHtmlSerializer {
  // Explicitly track if something was stripped, to avoid accidentally warning of sanitization just
  // because
  // characters were re-encoded.
  public sanitizedSomething = false;
  private buf: string[] = [];
  sanitizeChildren(el: Element): string {
    // This cannot use a TreeWalker, as it has to run on Angular's various
    // DOM adapters.
    // However this code never accesses properties off of `document` before deleting its contents
    // again, so it shouldn't be vulnerable to DOM clobbering.
    let current: Node = el.firstChild!;
    let
    traverseContent = true;
    while (current) {
      if (current.nodeType === Node.ELEMENT_NODE) {
        traverseContent = this.startElement(current as Element);
      } else if (current.nodeType === Node.TEXT_NODE) {
        this.chars(current.nodeValue!);
      } else {
        // Strip non-element, non-text nodes.
        this.sanitizedSomething = true;
      }
      if (traverseContent && current.firstChild) {
        current
        = current.firstChild!;
        continue;
      }
      while (current) {
        // Leaving the element. Walk up and to the
        // right, closing tags as we go.
        if (current.nodeType === Node.ELEMENT_NODE) {
          this.endElement(current as Element);
        }
        let next = this.checkClobberedElement(current,
        current.nextSibling!);
        if (next) {
          current = next;
          break;
        }
        current =
        this.checkClobberedElement(current, current.parentNode!);
      }
    }
    return this.buf.join("");
  }
  // Sanitizes an opening element tag (if valid) and returns whether the element's contents should
  // be traversed.
  // Element content must always be traversed (even if the element itself is not
  // valid/safe), unless the element is one
  // of `SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS`.
  // @param element The element to
  // sanitize.
  // @return True if the element's contents should be traversed.
  private
  startElement(element: Element): boolean {
    const tagName = element.nodeName.toLowerCase();
    if
    (!VALID_ELEMENTS.hasOwnProperty(tagName)) {
      this.sanitizedSomething = true;
      return
      !SKIP_TRAVERSING_CONTENT_IF_INVALID_ELEMENTS.hasOwnProperty(tagName);
    }
    this.buf.push('<');
    this.buf.push(tagName);
    const elAttrs = element.attributes;
    for (let i = 0; i <
    elAttrs.length; i++) {
      const elAttr = elAttrs.item(i);
      const attrName = elAttr!.name;
      const lower =
      attrName.toLowerCase();
      if (!VALID_ATTRS.hasOwnProperty(lower)) {
        this.sanitizedSomething =
        true;
        continue;
      }
      let value = elAttr!.value;
      // TODO(martinprobst): Special case image URIs for
      // data:image/...
      if (URI_ATTRS[lower]) value = _sanitizeUrl(value);
      this.buf.push(' ', attrName, '=',
      encodeEntities(value), '"');
    }
    this.buf.push('>');
    return true;
  }
  private endElement(current:
  Element) {
    const tagName = current.nodeName.toLowerCase();
    if (VALID_ELEMENTS.hasOwnProperty(tagName)
    && !VOID_ELEMENTS.hasOwnProperty(tagName)) {
      this.buf.push('</');
      this.buf.push(tagName);
    }
    this.buf.push('>');
  }
  private chars(chars: string) {
    this.buf.push(encodeEntities(chars));
  }
  checkClobberedElement(node: Node, nextNode: Node): Node {
    if (nextNode &&
    (node.compareDocumentPosition(nextNode) &&
    Node.DOCUMENT_POSITION_CONTAINED_BY)
    === Node.DOCUMENT_POSITION_CONTAINED_BY) {
      throw new Error(`Failed to sanitize html because
      the element is clobbered: ${
      (node as Element).outerHTML}`);
    }
    return nextNode;
  }
}
Regular Expressions for parsing tags and attributes
const SURROGATE_PAIR_REGEXP = /[\uD800-
\uDBFF][\uDC00-\uDFFF]/g;
! to ~ is the ASCII range.
const NON_ALPHANUMERIC_REGEXP = /([^\#\-
```

```

~ [|])/g;\n\n/**\n * Escapes all potentially dangerous characters, so that the\n
 * resulting string can be safely inserted into attribute or\n
 * element text.\n
 * @param value\n
 */\nfunction\n
encodeEntities(value: string) {\n
  return value.replace(/&/g, '&amp;');\n
}\n
SURROGATE_PAIR_REGEXP,\n
function(match: string) {\n
  const hi = match.charCodeAt(0);\n
  const low = match.charCodeAt(1);\n
  return '&#x' + (((hi - 0xD800) * 0x400) + (low - 0xDC00) + 0x10000) +\n
  ';\n
}\n
NON_ALPHANUMERIC_REGEXP,\n
function(match: string) {\n
  return '&#x' + match.charCodeAt(0) + ';\n
}\n
}\n
.replace(/</g, '&lt;');\n
.replace(/>/g, '&gt;');\n
}\n\nlet\n
inertBodyHelper: InertBodyHelper;\n\n/**\n
 * Sanitizes the given unsafe, untrusted HTML fragment, and returns\n
 * HTML text that is safe to add to\n
 * the DOM in a browser environment.\n
 */\nexport function\n
_sanitizeHtml(defaultDoc: any, unsafeHtmlInput: string): TrustedHTML|string {\n
  let inertBodyElement:\n
  HTMLElement|null\n
  = null;\n
  try {\n
    inertBodyHelper = inertBodyHelper || getInertBodyHelper(defaultDoc);\n
    // Make sure\n
    unsafeHtml is actually a string (TypeScript types are not enforced at runtime).\n
    let unsafeHtml =\n
    unsafeHtmlInput ? String(unsafeHtmlInput) : '';\n
    inertBodyElement =\n
    inertBodyHelper.getInertBodyElement(unsafeHtml);\n\n
    // mXSS protection. Repeatedly parse the document to\n
    make sure it stabilizes, so that a browser\n
    // trying to auto-correct incorrect HTML cannot cause formerly inert\n
    HTML to become dangerous.\n
    let mXSSAttempts = 5;\n
    let parsedHtml = unsafeHtml;\n\n
    do {\n
      if\n
      (mXSSAttempts === 0) {\n
        throw new Error('Failed to sanitize html because the input is unstable');\n
      }\n
      mXSSAttempts--;\n
      unsafeHtml = parsedHtml;\n
      parsedHtml = inertBodyElement!.innerHTML;\n
      inertBodyElement = inertBodyHelper.getInertBodyElement(unsafeHtml);\n
    } while (unsafeHtml !==\n
    parsedHtml);\n\n
    const sanitizer = new SanitizingHtmlSerializer();\n
    const safeHtml = sanitizer.sanitizeChildren(\n
      getTemplateContent(inertBodyElement!) as Element ||\n
      inertBodyElement);\n
    if ((typeof ngDevMode === 'undefined' || ngDevMode) && sanitizer.sanitizedSomething)\n
    {\n
      console.warn(\n
        'WARNING: sanitizing HTML stripped some content, see\n
        https://g.co/ng/security#xss');\n
    }\n\n
    return trustedHTMLFromString(safeHtml);\n
  } finally {\n
    // In case\n
    anything goes wrong, clear out inertElement to reset the entire DOM structure.\n
    if (inertBodyElement) {\n
      const parent = getTemplateContent(inertBodyElement) || inertBodyElement;\n
      while (parent.firstChild) {\n
        parent.removeChild(parent.firstChild);\n
      }\n
    }\n
  }\n
}\n\nexport function getTemplateContent(el: Node):\n
Node|null {\n
  return 'content' in (el as any /** Microsoft/TypeScript#21517 */) && isTemplateElement(el) ?\n
  el.content :\n
  null;\n
}\n\nfunction isTemplateElement(el: Node): el is HTMLTemplateElement\n
{\n
  return el.nodeType === Node.ELEMENT_NODE && el.nodeName === 'TEMPLATE';\n
}\n\n"/**\n
 * @license\n
 * Copyright Google LLC All Rights Reserved.\n
 * Use of this source code is governed by an MIT-\n
 * style license that can be\n
 * found in the LICENSE file at https://angular.io/license\n
 */\n\n * A\n
SecurityContext marks a location that has dangerous security implications, e.g. a DOM property\n
 * like\n
 * `innerHTML` that could cause Cross Site Scripting (XSS) security bugs when improperly\n
 * handled.\n
 * See\n
 * DomSanitizer for more details on security in Angular applications.\n
 */\n * @publicApi\n
 */\nexport enum\n
SecurityContext {\n
  NONE = 0,\n
  HTML = 1,\n
  STYLE = 2,\n
  SCRIPT = 3,\n
  URL = 4,\n
  RESOURCE_URL =\n
  5,\n
}\n\n"/**\n
 * @license\n
 * Copyright Google LLC All Rights Reserved.\n
 * Use of this source code is\n
 * governed by an MIT-style license that can be\n
 * found in the LICENSE file at https://angular.io/license\n
 */\n\n * import {RuntimeError, RuntimeErrorCode} from './errors';\n
import\n
  {getDocument} from './render3/interfaces/document';\n
import {SANITIZER} from\n
  './render3/interfaces/view';\n
import {getLView} from './render3/state';\n
import {renderStringify} from\n
  './render3/util/stringify_utils';\n
import {TrustedHTML, TrustedScript, TrustedScriptURL} from\n
  './util/security/trusted_type_defs';\n
import {trustedHTMLFromString, trustedScriptURLFromString} from\n
  './util/security/trusted_types';\n
import {trustedHTMLFromStringBypass, trustedScriptFromStringBypass,\n
  trustedScriptURLFromStringBypass} from './util/security/trusted_types_bypass';\n
import\n
  {allowSanitizationBypassAndThrow, BypassType, unwrapSafeValue} from './bypass';\n
import {_sanitizeHtml as\n
  _sanitizeHtml} from './html_sanitizer';\n
import {Sanitizer} from './sanitizer';\n
import {SecurityContext} from

```



```

./security';\nimport { _sanitizeUrl as _sanitizeUrl } from './url_sanitizer';\n\n\n/**\n * An `html` sanitizer which
converts untrusted `html` **string** into trusted string by removing\n * dangerous
content.\n *\n * This method parses the `html` and locates potentially dangerous content (such as urls and\n *
javascript) and removes it.\n *\n * It is possible to mark a string as trusted by calling { @link
bypassSanitizationTrustHtml}.\n *\n * @param unsafeHtml untrusted `html`, typically from the user.\n * @returns
`html` string which is safe to display to user, because all of the dangerous javascript\n * and urls have been
removed.\n *\n * @codeGenApi\n */\nexport function sanitizeHtml(unsafeHtml: any): TrustedHTML|string {\n
const sanitizer = getSanitizer();\n if (sanitizer) {\n return
trustedHTMLFromStringBypass(sanitizer.sanitize(SecurityContext.HTML, unsafeHtml) || "");\n }\n if
(allowSanitizationBypassAndThrow(unsafeHtml, BypassType.Html)) {\n return
trustedHTMLFromStringBypass(unwrapSafeValue(unsafeHtml));\n }\n return _sanitizeHtml(getDocument(),
renderStringify(unsafeHtml));\n}\n\n\n/**\n * A `style` sanitizer which converts untrusted `style` **string**
into trusted string by removing\n * dangerous content.\n *\n * It is possible to mark a string as trusted by calling
{ @link bypassSanitizationTrustStyle}.\n *\n * @param unsafeStyle untrusted `style`, typically from the user.\n *
@returns `style` string which is safe to bind to the `style` properties.\n *\n * @codeGenApi\n */\nexport function
sanitizeStyle(unsafeStyle: any): string {\n const sanitizer = getSanitizer();\n if (sanitizer) {\n return
sanitizer.sanitize(SecurityContext.STYLE, unsafeStyle) || ""; }\n if
(allowSanitizationBypassAndThrow(unsafeStyle, BypassType.Style)) {\n return unwrapSafeValue(unsafeStyle);\n
}\n return renderStringify(unsafeStyle);\n}\n\n\n/**\n * A `url` sanitizer which converts untrusted `url` **string**
into trusted string by removing\n * dangerous\n * content.\n *\n * This method parses the `url` and locates
potentially dangerous content (such as javascript) and\n * removes it.\n *\n * It is possible to mark a string as trusted
by calling
{ @link bypassSanitizationTrustUrl}.\n *\n * @param unsafeUrl untrusted `url`, typically from the user.\n *
@returns `url` string which is safe to bind to the `src` properties such as `

```

```

RuntimeErrorCode.UNSAFE_VALUE_IN_SCRIPT,\n    ngDevMode && 'unsafe value used in a script
context');\n}\n\n/**\n * A template tag function for promoting the associated constant literal to a\n * TrustedHTML.
Interpolation is explicitly not allowed.\n *\n * @param html constant template literal containing trusted HTML.\n *
@return TrustedHTML wrapping `html`.\n *\n * @security This is a security-sensitive
function and should only be used to\n * convert constant values of attributes and properties found in\n *
application-provided Angular templates to TrustedHTML.\n *\n * @codeGenApi\n * ^\nexport function
trustConstantHtml(html: TemplateStringsArray): TrustedHTML|string {\n // The following runtime check ensures
that the function was called as a\n // template tag (e.g. trustConstantHtml`content`), without any interpolation\n //
(e.g. not trustConstantHtml`content ${variable}`). A TemplateStringsArray\n // is an array with a `raw` property
that is also an array. The associated\n // template literal has no interpolation if and only if the length of the\n //
TemplateStringsArray is 1.\n if (ngDevMode && (!Array.isArray(html) || !Array.isArray(html.raw) || html.length
!== 1)) {\n   throw new Error(`Unexpected interpolation in trusted HTML constant: ${html.join('?')}`);\n }
}\n return trustedHTMLFromString(html[0]);\n}\n\n/**\n * A template tag function for promoting the
associated constant literal to a\n * TrustedScriptURL. Interpolation is explicitly not allowed.\n *\n * @param url
constant template literal containing a trusted script URL.\n * @returns TrustedScriptURL wrapping `url`.\n *\n *
@security This is a security-sensitive function and should only be used to\n * convert constant values of attributes
and properties found in\n * application-provided Angular templates to TrustedScriptURL.\n *\n * @codeGenApi\n *
^\nexport function trustConstantResourceUrl(url: TemplateStringsArray): TrustedScriptURL|string {\n // The
following runtime check ensures that the function was called as a\n // template tag (e.g.
trustConstantResourceUrl`content`), without any\n // interpolation (e.g. not trustConstantResourceUrl`content
${variable}`). A\n // TemplateStringsArray is an array with a `raw` property that is also an\n // array. The
associated template literal has no interpolation if and only if\n // the length of the TemplateStringsArray is 1.\n
if (ngDevMode && (!Array.isArray(url) || !Array.isArray(url.raw) || url.length !== 1)) {\n   throw new
Error(`Unexpected interpolation in trusted URL constant: ${url.join('?')}`);\n }
}\n return
trustedScriptURLFromString(url[0]);\n}\n\n/**\n * Detects which sanitizer to use for URL property, based on tag
name and prop name.\n *\n * The rules are based on the RESOURCE_URL context config from\n *
`packages/compiler/src/schema/dom_security_schema.ts`.\n * If tag and prop names don't match Resource URL
schema, use URL sanitizer.\n * ^\nexport function getUrlSanitizer(tag: string, prop: string) {\n if ((prop === 'src'
&&\n   (tag === 'embed' || tag === 'frame' || tag === 'iframe' || tag === 'media' ||\n     tag === 'script')) ||\n (prop === 'href' && (tag === 'base' || tag === 'link')))\n   return sanitizeResourceUrl;\n }\n return
sanitizeUrl;\n}\n\n/**\n * Sanitizes URL, selecting sanitizer function based on tag and property names.\n *\n * This
function is used in case
we can't define security context at compile time, when only prop\n * name is available. This happens when we
generate host bindings for Directives/Components. The\n * host element is unknown at compile time, so we defer
calculation of specific sanitizer to\n * runtime.\n *\n * @param unsafeUrl untrusted `url`, typically from the user.\n *
@param tag target element tag name.\n * @param prop name of the property that contains the value.\n * @returns
`url` string which is safe to bind.\n *\n * @codeGenApi\n * ^\nexport function sanitizeUrlOrResourceUrl(unsafeUrl:
any, tag: string, prop: string): any {\n return getUrlSanitizer(tag, prop)(unsafeUrl);\n}\n\nexport function
validateAgainstEventProperties(name: string) {\n if (name.toLowerCase().startsWith('on')) {\n   const
errorMessage =\n     `Binding to event property '${name}' is disallowed for security reasons, ` +\n     `please use
(${name.slice(2)})=...` +\n     `\\nIf '${name}' is a directive input, make sure the directive
is imported by the ` +\n     `current module.`;\n   throw new
RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING, errorMessage);\n }\n}\n\nexport function
validateAgainstEventAttributes(name: string) {\n if (name.toLowerCase().startsWith('on')) {\n   const
errorMessage =\n     `Binding to event attribute '${name}' is disallowed for security reasons, ` +\n     `please use
(${name.slice(2)})=...`;\n   throw new RuntimeError(RuntimeErrorCode.INVALID_EVENT_BINDING,
errorMessage);\n }\n}\n\nfunction getSanitizer(): Sanitizer|null {\n const IView = getLView();\n return IView &&
IView[SANITIZER];\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this

```

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```

import {Type} from './interface/type';
import {assertLessThan} from './util/assert';
import {defineInjectable} from './interface/defs';

/**
 * Creates a token that can be used in a DI Provider.
 * Use an `InjectionToken` whenever the type you are injecting is not reified (does not have a runtime representation) such as when injecting an interface, callable type, array or parameterized type.
 * `InjectionToken` is parameterized on `T` which is the type of object which will be returned by the `Injector`. This provides an additional level of type safety.
 * interface MyInterface {...}
 * const myInterface = injector.get(new InjectionToken<MyInterface>('SomeToken'));
 * // myInterface is inferred to be MyInterface.
 * When creating an `InjectionToken`, you can optionally specify a factory function which returns (possibly by creating) a default value of the parameterized type `T`. This sets up the `InjectionToken` using this factory as a provider as if it was defined explicitly in the application's root injector. If the factory function, which takes zero arguments, needs to inject dependencies, it can do so using the `inject` function.
 * As you can see in the Tree-shakable InjectionToken example below.
 * Additionally, if a `factory` is specified you can also specify the `providedIn` option, which overrides the above behavior and marks the token as belonging to a particular `@NgModule`. As mentioned above, `root` is the default value for `providedIn`.
 * @usageNotes
 * ### Basic Examples
 * ### Plain InjectionToken
 * @example core/di/ts/injector_spec.ts region='InjectionToken'
 * ### Tree-shakable InjectionToken
 * @example core/di/ts/injector_spec.ts region='ShakableInjectionToken'
 * @publicApi
 * export class InjectionToken<T> {
 *   /** @internal readonly ngMetadataName = 'InjectionToken';
 *   readonly prov: unknown;
 *   /** @param _desc Description for the token, used only for debugging purposes, it should but does not need to be unique
 *   @param options Options for the token's usage, as described above
 *   constructor(protected _desc: string, options?: {
 *     providedIn?: Type<any>|'root'|'platform'|'any'|null,
 *     factory: () => T
 *   }) {
 *     this.prov = undefined;
 *     if (typeof options === 'number') {
 *       (typeof ngDevMode === 'undefined' || ngDevMode) && assertLessThan(options, 0, 'Only negative numbers are supported here');
 *       // This is a special hack to assign __NG_ELEMENT_ID__ to this instance.
 *       // See `InjectorMarkers` (this as any).__NG_ELEMENT_ID__ = options;
 *     } else if (options !== undefined) {
 *       this.prov = defineInjectable({
 *         token: this,
 *         providedIn: options.providedIn || 'root',
 *         factory: options.factory,
 *       });
 *     }
 *   }
 *   /** @internal
 *   get multi(): InjectionToken<Array<T>> {
 *     return this as InjectionToken<Array<T>>;
 *   }
 *   toString(): string {
 *     return `InjectionToken ${this._desc}`;
 *   }
 * }
 * export interface InjectableDefToken<T> extends InjectionToken<T> {
 *   prov: unknown;
 * }
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 * import {InjectionToken} from './injection_token';
 * A multi-provider token for initialization functions that will run upon construction of an environment injector.
 * @publicApi
 * export const ENVIRONMENT_INITIALIZER = new InjectionToken<() => void>('ENVIRONMENT_INITIALIZER');
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 * import {InjectionToken} from './injection_token';
 * import {Injector} from './injector';
 * import {InjectorMarkers} from './injector_marker';
 * An InjectionToken that gets the current `Injector` for `createInjector()`-style injectors.
 * Requesting this token instead of `Injector` allows `StaticInjector` to be tree-shaken from a project.
 * @publicApi
 * export const INJECTOR = new InjectionToken<Injector>('INJECTOR', // Disable tslint because this is const enum which gets inlined not top level prop access.
 * // tslint:disable-next-line: no-toplevel-property-access
 * InjectorMarkers.Injector as any, // Special value used by Ivy to identify `Injector`.
 * );
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
 * import {Type} from './interface/type';
 * import {InjectionToken} from './injection_token';
 * export const INJECTOR_DEF_TYPES = new InjectionToken<Type<unknown>>('INJECTOR_DEF_TYPES');
 * @license
 * Copyright Google

```

LLC All Rights Reserved.\n

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*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n *\nimport {stringify} from './util/stringify';\nimport {Injector} from\n './injector';\nimport {THROW_IF_NOT_FOUND} from './injector_compatibility';\n\nexport class NullInjector\n implements Injector {\n  get(token: any, notFoundValue: any = THROW_IF_NOT_FOUND): any {\n    if\n (notFoundValue === THROW_IF_NOT_FOUND) {\n      const error = new Error(`NullInjectorError: No provider\n for ${stringify(token)}!`);\n      error.name = 'NullInjectorError';\n      throw error;\n    }\n    return\n notFoundValue;\n  }\n}\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this\n source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n *\nexport {EMPTY_ARRAY} from './util/empty';\n",/**\n * @license\n * Copyright\n Google LLC All Rights Reserved.\n *\n * Use of
```

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this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n *\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from\n './interface/type';\nimport {GetComponentDef} from './render3/definition';\nimport {getFactoryDef} from\n './render3/definition_factory';\nimport {throwCyclicDependencyError, throwInvalidProviderError} from\n './render3/errors_di';\nimport {stringifyForError} from './render3/util/stringify_utils';\nimport {deepForEach} from\n './util/array_utils';\nimport {getClosureSafeProperty} from './util/property';\nimport {stringify} from\n './util/stringify';\nimport {EMPTY_ARRAY} from './view';\nimport {resolveForwardRef} from\n './forward_ref';\nimport {ENVIRONMENT_INITIALIZER} from './initializer_token';\nimport {inject as inject}\n from './injector_compatibility';\nimport {getInjectorDef, InjectorType, InjectorTypeWithProviders} from\n './interface/defs';\nimport {ClassProvider, ConstructorProvider,
```

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ExistingProvider, FactoryProvider, ImportedNgModuleProviders, ModuleWithProviders, Provider,\n StaticClassProvider, TypeProvider, ValueProvider} from './interface/provider';\nimport {INJECTOR_DEF_TYPES}\n from './internal_tokens';\n\n/**\n * A source of providers for the `importProvidersFrom` function.\n *\n * @developerPreview\n * @publicApi\n *\nexport type ImportProvidersSource =\n\nType<unknown>|ModuleWithProviders<unknown>|Array<ImportProvidersSource>;\n\n/**\n * Collects providers\n from all NgModules and standalone components, including transitively imported\n * ones.\n *\n * Providers\n extracted via `importProvidersFrom` are only usable in an application injector or\n * another environment injector\n (such as a route injector). They should not be used in component\n * providers.\n *\n * More information about\n standalone components can be found in [this\n * guide](guide/standalone-components).\n *\n * @usageNotes\n *\n * The results of the `importProvidersFrom` call can be
```

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used in the `bootstrapApplication` call:\n *\n```\ntypescript\n * await bootstrapApplication(RootComponent, {\n * providers: [\n *   importProvidersFrom(NgModuleOne, NgModuleTwo)\n * ]\n * });\n *\n```\n *\n * You can also\n use the `importProvidersFrom` results in the `providers` field of a route, when a\n * standalone component is used:\n *\n```\ntypescript\n * export const ROUTES: Route[] = [\n *   {\n *     path: 'foo',\n *     providers: [\n *       importProvidersFrom(NgModuleOne, NgModuleTwo)\n *     ],\n *     component: YourStandaloneComponent\n *   }\n * ];\n *\n```\n *\n * @returns Collected providers from the specified list of types.\n *\n * @publicApi\n *\n * @developerPreview\n *\nexport function importProvidersFrom(...sources: ImportProvidersSource[]):\n\nImportedNgModuleProviders {\n  return {\n    providers: internalImportProvidersFrom(true, sources);\n  }\n}\n\nexport\n function internalImportProvidersFrom(\n  checkForStandaloneCmp: boolean, ...sources: ImportProvidersSource[]):\n\nProvider[] {\n  const providersOut: SingleProvider[] = [];\n  const dedup = new Set<Type<unknown>>(); // already\n seen types\n  let injectorTypesWithProviders: InjectorTypeWithProviders<unknown>[]|undefined;\n  deepForEach(sources, source => {\n    if ((typeof ngDevMode === 'undefined' || ngDevMode) &&\n checkForStandaloneCmp) {\n      const cmpDef = GetComponentDef(source);\n      if (cmpDef?.standalone) {\n        throw new RuntimeError(\n          RuntimeErrorCode.IMPORT_PROVIDERS_FROM_STANDALONE,\n          `\nImporting providers supports NgModule or ModuleWithProviders but got a standalone component\n \"${\n stringifyForError(source)}\"`);\n      }\n    }\n  });\n  // Narrow `source` to access the internal type analogue for\n `ModuleWithProviders`\n  const internalSource = source as Type<unknown>|
```

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InjectorTypeWithProviders<unknown>;\n  if (walkProviderTree(internalSource, providersOut, [], dedup)) {\n
injectorTypesWithProviders ||= [];\n  injectorTypesWithProviders.push(internalSource);\n
  }\n  });\n  // Collect all providers from `ModuleWithProviders` types.\n  if (injectorTypesWithProviders !==
undefined) {\n  processInjectorTypesWithProviders(injectorTypesWithProviders, providersOut);\n  }\n  return
providersOut;\n}\n\n/**\n * Collects all providers from the list of `ModuleWithProviders` and appends them to the
provided\n * array.\n */\nfunction processInjectorTypesWithProviders(\n  typesWithProviders:
InjectorTypeWithProviders<unknown>[], providersOut: Provider[]): void {\n  for (let i = 0; i <
typesWithProviders.length; i++) {\n    const {ngModule, providers} = typesWithProviders[i];\n
    deepForEach(providers!, provider => {\n      ngDevMode && validateProvider(provider, providers ||
EMPTY_ARRAY, ngModule);\n      providersOut.push(provider);\n    });\n  }\n}\n\n/**\n * Internal type for a
single provider in a deep provider array.\n */\nexport type SingleProvider =
TypeProvider|ValueProvider|ClassProvider|ConstructorProvider|\n
ExistingProvider|FactoryProvider|StaticClassProvider;\n\n/**\n * The logic visits an `InjectorType`, an
`InjectorTypeWithProviders`, or a standalone\n * `ComponentType`, and all of its transitive providers and collects
providers.\n * If an `InjectorTypeWithProviders` that declares providers besides the type is specified,\n * the
function will return "true" to indicate that the providers of the type definition need\n * to be processed. This
allows us to process providers of injector types after all imports of\n * an injector definition are processed.
(following View Engine semantics: see FW-1349)\n */\nexport function walkProviderTree(\n  container:
Type<unknown>|InjectorTypeWithProviders<unknown>, providersOut: SingleProvider[],\n  parents:
Type<unknown>[],\n  dedup: Set<Type<unknown>>): container is InjectorTypeWithProviders<unknown> {\n
  container = resolveForwardRef(container);\n  if (!container) return false;\n  // The actual type which had the
definition. Usually
`container`, but may be an unwrapped type\n  // from `InjectorTypeWithProviders`.\n  let defType:
Type<unknown>|null = null;\n  let injDef = getInjectorDef(container);\n  const cmpDef = !injDef &&
getComponentDef(container);\n  if (!injDef && !cmpDef) {\n    // `container` is not an injector type or a component
type. It might be:\n    // * An `InjectorTypeWithProviders` that wraps an injector type.\n    // * A standalone
directive or pipe that got pulled in from a standalone component's\n    // dependencies.\n    // Try to unwrap it as an
`InjectorTypeWithProviders` first.\n    const ngModule: Type<unknown>|undefined =\n      (container as
InjectorTypeWithProviders<any>).ngModule as Type<unknown>|undefined;\n    injDef =
getInjectorDef(ngModule);\n    if (injDef) {\n      defType = ngModule!;\n    } else {\n      // Not a component or
injector type, so ignore it.\n      return false;\n    } else if (cmpDef && !cmpDef.standalone) {\n      return false;\n
    } else {\n
      defType = container as Type<unknown>;\n    }\n  }\n  // Check for circular dependencies.\n  if (ngDevMode &&
parents.indexOf(defType) !== -1) {\n    const defName = stringify(defType);\n    const path =
parents.map(stringify);\n    throwCyclicDependencyError(defName, path);\n  }\n  // Check for multiple imports of
the same module\n  const isDuplicate = dedup.has(defType);\n  if (cmpDef) {\n    if (isDuplicate) {\n      // This
component definition has already been processed.\n      return false;\n    }\n    dedup.add(defType);\n    if
(cmpDef.dependencies) {\n      const deps =\n        typeof cmpDef.dependencies === 'function' ?
cmpDef.dependencies() : cmpDef.dependencies;\n      for (const dep of deps) {\n        walkProviderTree(dep,
providersOut, parents, dedup);\n      }\n    } else if (injDef) {\n      // First, include providers from any imports.\n
if (injDef.imports !== null && !isDuplicate) {\n        // Before processing defType's imports, add it to the set of
parents.\n        This way, if it ends\n        // up deeply importing itself, this can be detected.\n        ngDevMode &&
parents.push(defType);\n        // Add it to the set of dedups. This way we can detect multiple imports of the same
module\n        dedup.add(defType);\n      }\n      let importTypesWithProviders:
(InjectorTypeWithProviders<any>|[])|undefined;\n      try {\n        deepForEach(injDef.imports, imported => {\n
if (walkProviderTree(imported, providersOut, parents, dedup)) {\n          importTypesWithProviders ||= [];\n
          // If the processed import is an injector type with providers, we store it in the\n          // list of import
types with

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providers, so that we can process those afterwards.\n      importTypesWithProviders.push(imported);\n    });\n  } finally {\n    // Remove it from the parents set when finished.\n    ngDevMode && parents.pop();\n  }\n  // Imports which are declared with providers (TypeWithProviders) need to be processed\n  // after all imported modules are processed. This is similar to how View Engine\n  // processes/merges module imports in the metadata resolver. See: FW-1349.\n  if (importTypesWithProviders !== undefined) {\n    processInjectorTypesWithProviders(importTypesWithProviders, providersOut);\n  }\n  if (!isDuplicate)\n  {\n    // Track the InjectorType and add a provider for it.\n    // It's important that this is done after the def's imports.\n    const factory = getFactoryDef(defType) || (() => new defType!());\n    // Append extra providers to make more info available for consumers (to retrieve an injector\n    // type), as well as internally (to calculate an injection scope correctly and eagerly\n    // instantiate a `defType` when an injector is created).\n    providersOut.push(\n      // Provider to create `defType` using its factory.\n      {provide: defType, useFactory: factory, deps: EMPTY_ARRAY},\n    );\n    // Make this `defType` available to an internal logic that calculates injector scope.\n    {provide: INJECTOR_DEF_TYPES, useValue: defType, multi: true},\n    // Provider to eagerly instantiate `defType` via `ENVIRONMENT_INITIALIZER`.\n    {provide: ENVIRONMENT_INITIALIZER, useValue: () => inject(defType!), multi: true} /\n  );\n  }\n  // Next, include providers listed on the definition itself.\n  const defProviders = injDef.providers;\n  if (defProviders != null && !isDuplicate) {\n    const injectorType = container as InjectorType<any>;\n    deepForEach(defProviders, provider => {\n      ngDevMode && validateProvider(provider, defProviders as SingleProvider[], injectorType);\n      providersOut.push(provider);\n    });\n  } else {\n    // Should not happen, but just in case.\n    return false;\n  }\n  return (\n    defType !== container &&\n    (container as InjectorTypeWithProviders<any>).providers !== undefined);\n}\n\nfunction validateProvider(\n  provider: SingleProvider, providers: SingleProvider[], containerType: Type<unknown>): void {\n  if (isTypeProvider(provider) || isValueProvider(provider) || isFactoryProvider(provider) ||\n  isExistingProvider(provider)) {\n    return;\n  }\n  // Here we expect the provider to be a `useClass` provider (by elimination).\n  const classRef = resolveForwardRef(\n    provider && ((provider as StaticClassProvider | ClassProvider).useClass || provider.provide));\n  if (!classRef) {\n    throwInvalidProviderError(containerType, providers, provider);\n  }\n}\n\nexport const USE_VALUE =\n  getClosureSafeProperty<ValueProvider>({provide: String, useValue: getClosureSafeProperty});\n\nexport function isValueProvider(value: SingleProvider): value is ValueProvider {\n  return value !== null && typeof value === 'object' && USE_VALUE in value;\n}\n\nexport function isExistingProvider(value: SingleProvider): value is ExistingProvider {\n  return !!(value && (value as ExistingProvider).useExisting);\n}\n\nexport function isFactoryProvider(value: SingleProvider): value is FactoryProvider {\n  return !!(value && (value as FactoryProvider).useFactory);\n}\n\nexport function isTypeProvider(value: SingleProvider): value is TypeProvider {\n  return typeof value === 'function';\n}\n\nexport function isClassProvider(value: SingleProvider): value is ClassProvider {\n  return !!(value as StaticClassProvider | ClassProvider).useClass;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {InjectionToken} from './injection_token';\n\nexport type InjectorScope = 'root'|'platform'|'environment';\n\n/**\n * An internal token whose presence in an injector indicates that the injector should treat itself\n * as a root scoped injector when processing requests for unknown tokens which may indicate\n * they are provided in the root scope.\n */\nexport const INJECTOR_SCOPE = new InjectionToken<InjectorScope|null>('Set Injector scope.);\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport './util/ng_dev_mode';\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport {OnDestroy} from './interface/lifecycle_hooks';\nimport {Type} from './interface/type';\nimport {GetComponentDef} from './render3/definition';\nimport {FactoryFn, getFactoryDef} from './render3/definition_factory';\nimport {throwCyclicDependencyError, throwInvalidProviderError,

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throwMixedMultiProviderError} from './render3/errors_di';\nimport {newArray} from './util/array_utils';\nimport
{EMPTY_ARRAY} from './util/empty';\nimport {stringify} from './util/stringify';\n\nimport {resolveForwardRef}
from './forward_ref';\nimport {ENVIRONMENT_INITIALIZER}
from './initializer_token';\nimport {setInjectImplementation} from './inject_switch';\nimport {InjectionToken} from
'/injection_token';\nimport {Injector} from './injector';\nimport {catchInjectorError, injectArgs,
NG_TEMP_TOKEN_PATH, setCurrentInjector, THROW_IF_NOT_FOUND, inject} from
'/injector_compatibility';\nimport {INJECTOR} from './injector_token';\nimport {getInheritedInjectableDef,
getInjectableDef, InjectorType, InjectableDeclaration} from './interface/defs';\nimport {InjectFlags} from
'/interface/injector';\nimport {ClassProvider, ConstructorProvider, ImportedNgModuleProviders, Provider,
StaticClassProvider} from './interface/provider';\nimport {INJECTOR_DEF_TYPES} from
'/internal_tokens';\nimport {NullInjector} from './null_injector';\nimport {importProvidersFrom, isExistingProvider,
isFactoryProvider, isTypeProvider, isValueProvider, SingleProvider} from './provider_collection';\nimport
{ProviderToken} from './provider_token';\nimport {INJECTOR_SCOPE, InjectorScope}
from './scope';\n\n/**\n * Marker which indicates that a value has not yet been created from the factory function.\n
*\nconst NOT_YET = {};\n\n/**\n * Marker which indicates that the factory function for a token is in the process
of being called.\n *\n * If the injector is asked to inject a token with its value set to CIRCULAR, that indicates\n *
injection of a dependency has recursively attempted to inject the original token, and there is\n * a circular
dependency among the providers.\n *\nconst CIRCULAR = {};\n\n/**\n * A lazily initialized NullInjector.\n
*\nlet NULL_INJECTOR: Injector|undefined = undefined;\n\nexport function getNullInjector(): Injector {\n if
(NULL_INJECTOR === undefined) {\n NULL_INJECTOR = new NullInjector();\n }\n return
NULL_INJECTOR;\n}\n\n/**\n * An entry in the injector which tracks information about the given token,
including a possible\n * current value.\n *\ninterface Record<T> {\n factory: (() => T)|undefined;\n value: T|{};\n
multi:
any[]|undefined;\n}\n\n/**\n * An `Injector` that's part of the environment injector hierarchy, which exists outside
of the\n * component tree.\n *\n * @developerPreview\n *\nexport abstract class EnvironmentInjector implements
Injector {\n /**\n * Retrieves an instance from the injector based on the provided token.\n * @returns The
instance from the injector if defined, otherwise the `notFoundValue`.\n * @throws When the `notFoundValue` is
`undefined` or `Injector.THROW_IF_NOT_FOUND`.\n *\n abstract get<T>(token: ProviderToken<T>,
notFoundValue?: T, flags?: InjectFlags): T;\n /**\n * @deprecated from v4.0.0 use ProviderToken<T>\n *
@suppress {duplicate}\n *\n abstract get(token: any, notFoundValue?: any): any;\n\n /**\n * Runs the given
function in the context of this `EnvironmentInjector`.\n *\n * Within the function's stack frame, `inject` can be
used to inject dependencies from this\n * injector. Note that `inject` is only usable synchronously, and
cannot be used in any\n * asynchronous callbacks or after any `await` points.\n *\n * @param fn the closure to
be run in the context of this injector\n * @returns the return value of the function, if any\n *\n abstract
runInContext<ReturnT>(fn: () => ReturnT): ReturnT;\n\n abstract destroy(): void;\n\n /**\n * @internal\n *\n
abstract onDestroy(callback: () => void): void;\n}\n\nexport class R3Injector extends EnvironmentInjector {\n /**\n
* Map of tokens to records which contain the instances of those tokens.\n * - `null` value implies that we don't
have the record. Used by tree-shakable injectors\n * to prevent further searches.\n *\n private records = new
Map<ProviderToken<any>, Record<any>|null>();\n\n /**\n * Set of values instantiated by this injector which
contain `ngOnDestroy` lifecycle hooks.\n *\n private _ngOnDestroyHooks = new Set<OnDestroy>();\n\n private
_onDestroyHooks: Array<() => void> = [];\n\n /**\n * Flag indicating that
this injector was previously destroyed.\n *\n get destroyed(): boolean {\n return this._destroyed;\n }\n\n private
_destroyed = false;\n\n private injectorDefTypes: Set<Type<unknown>>;\n\n constructor(\n providers:
Array<Provider|ImportedNgModuleProviders>, readonly parent: Injector,\n readonly source: string|null, readonly
scopes: Set<InjectorScope>) {\n super();\n // Start off by creating Records for every provider.\n
forEachSingleProvider(providers, provider => this.processProvider(provider));\n\n // Make sure the INJECTOR
token provides this injector.\n this.records.set(INJECTOR, makeRecord(undefined, this));\n\n // And
`EnvironmentInjector` if the current injector is supposed to be env-scoped.\n if (scopes.has('environment')) {\n

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this.records.set(EnvironmentInjector, makeRecord(undefined, this));\n }\n\n // Detect whether this injector has
the APP_ROOT_SCOPE token and thus should provide\n // any injectable scoped to APP_ROOT_SCOPE.\n
const record = this.records.get(INJECTOR_SCOPE) as Record<InjectorScope|null>;\n if (record != null &&
typeof record.value === 'string') {\n this.scopes.add(record.value as InjectorScope);\n }\n\n
this.injectorDefTypes =\n new Set(this.get(INJECTOR_DEF_TYPES.multi, EMPTY_ARRAY,
InjectFlags.Self));\n }\n\n /**\n * Destroy the injector and release references to every instance or provider
associated with it.\n *\n * Also calls the `OnDestroy` lifecycle hooks of every instance that was created for which
a\n * hook was found.\n */\n override destroy(): void {\n this.assertNotDestroyed();\n\n // Set destroyed =
true first, in case lifecycle hooks re-enter destroy().\n this._destroyed = true;\n try {\n // Call all the lifecycle
hooks.\n for (const service of this._ngOnDestroyHooks) {\n service.ngOnDestroy();\n }\n for (const
hook of this._onDestroyHooks) {\n hook();\n }\n } finally {\n // Release
all references.\n this.records.clear();\n this._ngOnDestroyHooks.clear();\n this.injectorDefTypes.clear();\n
this._onDestroyHooks.length = 0;\n }\n }\n\n override onDestroy(callback: () => void): void {\n
this._onDestroyHooks.push(callback);\n }\n\n override runInContext<ReturnT>(fn: () => ReturnT): ReturnT {\n
this.assertNotDestroyed();\n\n const previousInjector = setCurrentInjector(this);\n const
previousInjectImplementation = setInjectImplementation(undefined);\n try {\n return fn();\n } finally {\n
setCurrentInjector(previousInjector);\n setInjectImplementation(previousInjectImplementation);\n }\n }\n\n
override get<T>(token: ProviderToken<T>, notFoundValue: any = THROW_IF_NOT_FOUND,\n flags =
InjectFlags.Default): T {\n this.assertNotDestroyed();\n // Set the injection context.\n const previousInjector =
setCurrentInjector(this);\n const previousInjectImplementation = setInjectImplementation(undefined);\n
try {\n // Check for the SkipSelf flag.\n if (!(flags & InjectFlags.SkipSelf)) {\n // SkipSelf isn't set,
check if the record belongs to this injector.\n let record: Record<T>|undefined|null = this.records.get(token);\n
if (record === undefined) {\n // No record, but maybe the token is scoped to this injector. Look for an
injectable\n // def with a scope matching this injector.\n const def = couldBeInjectableType(token) &&
getInjectableDef(token);\n if (def && this.injectableDefInScope(def)) {\n // Found an injectable def and
it's scoped to this injector. Pretend as if it was here\n // all along.\n record =
makeRecord(injectableDefOrInjectorDefFactory(token), NOT_YET);\n } else {\n record = null;\n
}\n this.records.set(token, record);\n }\n // If a record was found, get the instance for it and return it.\n
if (record != null /* NOT null || undefined */) {\n return this.hydrate(token, record);\n }\n }\n\n //
Select the next injector based on the Self flag - if self is set, the next injector is\n // the NullInjector, otherwise it's
the parent.\n const nextInjector = !(flags & InjectFlags.Self) ? this.parent : getNullInjector();\n // Set the
notFoundValue based on the Optional flag - if optional is set and notFoundValue\n // is undefined, the value is
null, otherwise it's the notFoundValue.\n notFoundValue = (flags & InjectFlags.Optional) && notFoundValue
=== THROW_IF_NOT_FOUND ?\n null : notFoundValue;\n return nextInjector.get(token,
notFoundValue);\n } catch (e: any) {\n if (e.name === 'NullInjectorError') {\n const path: any[] =
e[NG_TEMP_TOKEN_PATH] = e[NG_TEMP_TOKEN_PATH] || [];\n path.unshift(stringify(token));\n if
(previousInjector) {\n // We still have a parent injector,
keep throwing\n throw e;\n } else {\n // Format & throw the final error message when we don't have
any previous injector\n return catchInjectorError(e, token, 'R3InjectorError', this.source);\n }\n } else
{\n throw e;\n }\n } finally {\n // Lastly, restore the previous injection context.\n
setInjectImplementation(previousInjectImplementation);\n setCurrentInjector(previousInjector);\n }\n }\n\n
/** @internal */\n resolveInjectorInitializers() {\n const previousInjector = setCurrentInjector(this);\n const
previousInjectImplementation = setInjectImplementation(undefined);\n try {\n const initializers =
this.get(ENVIRONMENT_INITIALIZER.multi, EMPTY_ARRAY, InjectFlags.Self);\n if (ngDevMode &&
!Array.isArray(initializers)) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_MULTI_PROVIDER,\n 'Unexpected type of the
`ENVIRONMENT_INITIALIZER` token value '

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+\n      `(expected an array, but got ${typeof initializers}).` +\n      `Please check that the
`ENVIRONMENT_INITIALIZER` token is configured as a '+\n      `multi: true` provider.`);\n    }\n    for
(const initializer of initializers) {\n      initializer();\n    }\n  } finally {\n
setCurrentInjector(previousInjector);\n    setInjectImplementation(previousInjectImplementation);\n  }\n}\n\n
override toString() {\n  const tokens: string[] = [];\n  const records = this.records;\n  for (const token of
records.keys()) {\n    tokens.push(stringify(token));\n  }\n  return `R3Injector[${tokens.join(', ')}];\n}\n\n
private assertNotDestroyed(): void {\n  if (this._destroyed) {\n    throw new RuntimeError(\n
RuntimeErrorCode.INJECTOR_ALREADY_DESTROYED,\n      ngDevMode && `Injector has already been
destroyed.`);\n  }\n}\n\n/**\n * Process a `SingleProvider` and add it.\n */\n private processProvider(provider:
SingleProvider): void {\n  // Determine the token from the provider. Either it's its own token, or has a {provide:
...}\n  // property.\n  provider = resolveForwardRef(provider);\n  let token: any =\n    isTypeProvider(provider)
? provider : resolveForwardRef(provider && provider.provide);\n\n  // Construct a `Record` for the provider.\n
const record = providerToRecord(provider);\n\n  if (!isTypeProvider(provider) && provider.multi === true) {\n
  // If the provider indicates that it's a multi-provider, process it specially.\n  // First check whether it's been defined
already.\n  let multiRecord = this.records.get(token);\n  if (multiRecord) {\n    // It has. Throw a nice error
if\n    if (ngDevMode && multiRecord.multi === undefined) {\n      throwMixedMultiProviderError();\n
    }\n  } else {\n    multiRecord = makeRecord(undefined, NOT_YET, true);\n    multiRecord.factory = () =>
injectArgs(multiRecord!.multi!);\n
    this.records.set(token, multiRecord);\n  }\n  token = provider;\n  multiRecord.multi!.push(provider);\n
} else {\n  const existing = this.records.get(token);\n  if (ngDevMode && existing && existing.multi !==
undefined) {\n    throwMixedMultiProviderError();\n  }\n  this.records.set(token, record);\n}\n\n
private hydrate<T>(token: ProviderToken<T>, record: Record<T>): T {\n  if (ngDevMode && record.value ===
CIRCULAR) {\n    throwCyclicDependencyError(stringify(token));\n  } else if (record.value === NOT_YET) {\n
    record.value = CIRCULAR;\n    record.value = record.factory!();\n  }\n  if (typeof record.value === 'object'
&& record.value && hasOnDestroy(record.value)) {\n    this._ngOnDestroyHooks.add(record.value);\n  }\n
return record.value as T;\n}\n\n private injectableDefInScope(def: InjectableDeclaration<any>): boolean {\n  if
(!def.providedIn) {\n    return false;\n  }\n  const providedIn
= resolveForwardRef(def.providedIn);\n  if (typeof providedIn === 'string') {\n    return providedIn === 'any' ||
(this.scopes.has(providedIn));\n  } else {\n    return this.injectorDefTypes.has(providedIn);\n  }\n}\n}\n\n
function injectableDefOrInjectorDefFactory(token: ProviderToken<any>): FactoryFn<any> {\n  // Most
tokens will have an injectable def directly on them, which specifies a factory directly.\n  const injectableDef =
getInjectableDef(token);\n  const factory = injectableDef !== null ? injectableDef.factory :
getFactoryDef(token);\n  if (factory !== null) {\n    return factory;\n  }\n  // InjectionTokens should have an
injectable def (prov) and thus should be handled above.\n  // If it's missing that, it's an error.\n  if (token instanceof
InjectionToken) {\n    throw new RuntimeError(\n      RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n
ngDevMode && `Token ${stringify(token)} is missing a prov definition.`);\n  }\n  // Undecorated types can
sometimes
be created if they have no constructor arguments.\n  if (token instanceof Function) {\n    return
getUndecoratedInjectableFactory(token);\n  }\n  // There was no way to resolve a factory for this token.\n  throw
new RuntimeError(RuntimeErrorCode.INVALID_INJECTION_TOKEN, ngDevMode &&
'unreachable');\n}\n\nfunction getUndecoratedInjectableFactory(token: Function) {\n  // If the token has parameters
then it has dependencies that we cannot resolve implicitly.\n  const paramLength = token.length;\n  if (paramLength
> 0) {\n    const args: string[] = newArray(paramLength, '?');\n    throw new RuntimeError(\n
RuntimeErrorCode.INVALID_INJECTION_TOKEN,\n      ngDevMode && `Can't resolve all parameters for
${stringify(token)}: (${args.join(', ')}).`);\n  }\n  // The constructor function appears to have no parameters.\n  //
This might be because it inherits from a super-class. In which case, use an injectable\n  // def from an ancestor if
there is one.\n  // Otherwise this really

```

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is a simple class with no dependencies, so return a factory that
// just instantiates the zero-arg constructor.
const inheritedInjectableDef = getInheritedInjectableDef(token);
if (inheritedInjectableDef !== null) {
  return () => inheritedInjectableDef.factory(token as Type<any>);
} else {
  return () => new (token as Type<any>)();
}

function providerToRecord(provider: SingleProvider): Record<any> {
  if (isValueProvider(provider)) {
    return makeRecord(undefined, provider.useValue);
  } else {
    const factory: (() => any)|undefined = providerToFactory(provider);
    return makeRecord(factory, NOT_YET);
  }
}

* Converts a `SingleProvider` into a factory function.
* @param provider provider to convert to factory
* ^\nextport function providerToFactory(
  provider: SingleProvider, ngModuleType?: InjectorType<any>,
  providers?: any[]): () => any {
  let factory: (() => any)|undefined = undefined;
  if (ngDevMode && isImportedNgModuleProviders(provider)) {
    throwInvalidProviderError(undefined, providers, provider);
  }
  if (isTypeProvider(provider)) {
    const unwrappedProvider = resolveForwardRef(provider);
    return getFactoryDef(unwrappedProvider) ||
    injectableDefOrInjectorDefFactory(unwrappedProvider);
  } else {
    if (isValueProvider(provider)) {
      factory = () => resolveForwardRef(provider.useValue);
    } else if (isFactoryProvider(provider)) {
      factory = () => provider.useFactory(...injectArgs(provider.deps || []));
    } else if (isExistingProvider(provider)) {
      factory = () => inject(resolveForwardRef(provider.useExisting));
    } else {
      const classRef = resolveForwardRef(
        provider && ((provider as StaticClassProvider | ClassProvider).useClass ||
        provider.provider));
      if (ngDevMode && !classRef) {
        throwInvalidProviderError(ngModuleType, providers, provider);
      }
      if (hasDeps(provider)) {
        factory = () => new (classRef)(...injectArgs(provider.deps));
      } else {
        return getFactoryDef(classRef) ||
        injectableDefOrInjectorDefFactory(classRef);
      }
    }
  }
  return factory;
}

function makeRecord<T>(
  factory: (() => T)|undefined, value: T|{, multi: boolean = false): Record<T> {
  return {
    factory: factory,
    value: value,
    multi: multi ? [] : undefined,
  };
}

function hasDeps(
  value: ClassProvider|ConstructorProvider|StaticClassProvider): value is ClassProvider&{
  deps: any[]} {
  return !!(value as any).deps;
}

function hasOnDestroy(
  value: any): value is OnDestroy {
  return value !== null && typeof value === 'object' &&
  typeof (value as OnDestroy).ngOnDestroy === 'function';
}

function couldBeInjectableType(
  value: any): value is ProviderToken<any> {
  return (typeof value === 'function' ||
  (typeof value === 'object' && value instanceof InjectionToken));
}

function isImportedNgModuleProviders(
  provider|ImportedNgModuleProviders): provider is ImportedNgModuleProviders {
  return !!(provider as ImportedNgModuleProviders).providers;
}

function forEachSingleProvider(
  providers: Array<Provider|ImportedNgModuleProviders>,
  fn: (provider: SingleProvider) => void): void {
  for (const provider of providers) {
    if (Array.isArray(provider)) {
      forEachSingleProvider(provider, fn);
    } else if (isImportedNgModuleProviders(provider)) {
      forEachSingleProvider(provider.providers, fn);
    } else {
      fn(provider);
    }
  }
}

"/*
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
https://angular.io/license
 */
import {ChangeDetectorRef} from './change_detection/change_detection';
import {Injector} from './di/injector';
import {EnvironmentInjector} from './di/r3_injector';
import {Type} from './interface/type';
import {ElementRef} from './element_ref';
import {NgModuleRef} from './ng_module_factory';
import {ViewRef} from './view_ref';

* Represents a component created by a `ComponentFactory`.
* Provides access to the component instance and related objects,
* and provides the means of destroying the instance.
* @publicApi
* ^\nextport abstract class ComponentRef<C> {
  /**
   * Updates a specified input name to a new value. Using this method will properly mark for check
   * component using the `OnPush` change detection strategy. It will also assure that the
   * `OnChanges` lifecycle hook runs when a dynamically created component is change-detected.
   * @param name The name of an input.
   * @param value The new value of an input.
   */
  abstract setInput(name: string, value: unknown): void;

  /**
   * The host or anchor [element](guide/glossary#element) for this component instance.
   */
  abstract getLocation(): ElementRef;
}

```

```

/**\n
 * The [dependency injector](guide/glossary#injector) for this component instance.\n *^/n abstract get injector():
Injector;\n\n /**\n * This component instance.\n *^/n abstract get instance(): C;\n\n /**\n * The [host
view](guide/glossary#view-tree) defined by the template\n * for this component instance.\n *^/n abstract get
hostView(): ViewRef;\n\n /**\n * The change detector for this component instance.\n *^/n abstract get
changeDetectorRef(): ChangeDetectorRef;\n\n /**\n * The type of this component (as created by a
`ComponentFactory` class).\n *^/n abstract get componentType(): Type<any>;\n\n /**\n * Destroys the
component instance and all of the data structures associated with it.\n *^/n abstract destroy(): void;\n\n /**\n * A
lifecycle hook that provides additional developer-defined cleanup\n * functionality for the component.\n *
@param callback A handler function that cleans up developer-defined data\n * associated with this component.
Called when the `destroy()` method is invoked.\n *^/n abstract onDestroy(callback: Function): void;\n\n\n/**\n *
Base class for a factory that can create a component dynamically.\n * Instantiate a factory for a given type of
component with `resolveComponentFactory()`.\n * Use the resulting `ComponentFactory.create()` method to create
a component of that type.\n *^/n * @see [Dynamic Components](guide/dynamic-component-loader)\n *^/n *
@publicApi\n *^/n * @deprecated Angular no longer requires Component factories. Please use other APIs where\n *
Component class can be used directly.\n *^/nexport abstract class ComponentFactory<C> {\n /**\n * The
component's HTML selector.\n *^/n abstract get selector(): string;\n /**\n * The type of component the factory
will create.\n *^/n abstract get componentType(): Type<any>;\n /**\n * Selector for all <ng-content> elements in
the component.\n *^/n abstract get ngContentSelectors(): string[];\n /**\n * The inputs of
the component.\n *^/n abstract get inputs(): {propName: string, templateName: string}[];\n /**\n * The outputs
of the component.\n *^/n abstract get outputs(): {propName: string, templateName: string}[];\n /**\n * Creates a
new component.\n *^/n abstract create(\n injector: Injector, projectableNodes?: any[][], rootSelectorOrNode?:
string|any,\n environmentInjector?: EnvironmentInjector|NgModuleRef<any>): ComponentRef<C>;\n\n\n",/**\n *
* @license\n * Copyright Google LLC All Rights Reserved.\n *^/n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *^/n\nimport {Type} from
'./interface/type';\nimport {stringify} from './util/stringify';\nimport {ComponentFactory} from
'./component_factory';\nexport function noComponentFactoryError(component: Function) {\n const error =
Error(`No component factory found for ${\n stringify(component)}. Did you add it to
@NgModule.entryComponents?`);\n
(error as any)[ERROR_COMPONENT] = component;\n return error;\n}\n\nconst ERROR_COMPONENT =
'ngComponent';\nexport function getComponent(error: Error): Type<any> {\n return (error as
any)[ERROR_COMPONENT];\n}\n\n\nclass _NullComponentFactoryResolver implements
ComponentFactoryResolver {\n resolveComponentFactory<T>(component: {new(...args: any[]): T}):
ComponentFactory<T> {\n throw noComponentFactoryError(component);\n }}\n\n\n/**\n * A simple registry
that maps `Components` to generated `ComponentFactory` classes\n * that can be used to create instances of
components.\n * Use to obtain the factory for a given component type,\n * then use the factory's `create()` method to
create a component of that type.\n *^/n * Note: since v13, dynamic component creation via\n *
[`ViewContainerRef.createComponent`](api/core/ViewContainerRef#createComponent)\n * does not require
resolving component factory: component class can be used directly.\n *^/n * @publicApi\n *^/n *
@deprecated Angular no longer requires Component factories. Please use other APIs where\n * Component class
can be used directly.\n *^/nexport abstract class ComponentFactoryResolver {\n static NULL:
ComponentFactoryResolver = (/ * @__PURE__ */ new _NullComponentFactoryResolver());\n /**\n * Retrieves
the factory object that creates a component of the given type.\n * @param component The component type.\n *^/n
abstract resolveComponentFactory<T>(component: Type<T>): ComponentFactory<T>;\n\n\n",/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *^/n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *^/n\nimport {TNode} from
'./render3/interfaces/node';\nimport {RElement} from './render3/interfaces/renderer_dom';\nimport {LView} from
'./render3/interfaces/view';\nimport {getCurrentTNode, getLView} from './render3/state';\nimport

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{getNativeByTNode} from './render3/util/view_utils';\n\n/**\n * Creates an ElementRef from the most recent node.\n * @returns The ElementRef instance to use\n * ^\nexport function injectElementRef(): ElementRef {\n  return createElementRef(getCurrentTNode()),\n  getLView();\n}\n\n/**\n * Creates an ElementRef given a node.\n * @param tNode The node for which you'd like an ElementRef\n * @param lView The view to which the node belongs\n * @returns The ElementRef instance to use\n * ^\nexport function createElementRef(tNode: TNode, lView: LView): ElementRef {\n  return new ElementRef(getNativeByTNode(tNode, lView) as RElement);\n}\n\n/**\n * A wrapper around a native element inside of a View.\n * An `ElementRef` is backed by a render-specific element. In the browser, this is usually a DOM\n * element.\n * @security Permitting direct access to the DOM can make your application more vulnerable to\n * XSS attacks. Carefully review any use of `ElementRef` in your code. For more detail, see the\n * [Security Guide](https://g.co/ng/security).\n\n * @publicApi\n * ^\n// Note: We don't expose things like `Injector`, `ViewContainer`, ... here,\n// i.e. users have to ask for what they need. With that, we can build better analysis tools\n// and could do better codegen in the future.\nexport class ElementRef<T = any> {\n  /**\n   * The underlying native element or `null` if direct access to native elements is not supported\n   * (e.g. when the application runs in a web worker).\n   *\n   * <div class=\"callout is-critical\">\n   * <header>Use with caution</header>\n   * <p>\n   * Use this API as the last resort when direct access to DOM is needed. Use templating and\n   * data-binding provided by Angular instead. Alternatively you can take a look at {@link\n   * Renderer2}\n   * which provides API that can safely be used even when direct access to native elements is not\n   * supported.\n   * </p>\n   * <p>\n   * Relying on direct DOM access creates tight coupling between your application and rendering\n   * layers which will make it impossible to separate the two and deploy your application into a\n   * web worker.\n   * </p>\n   * </div>\n   *\n   * ^\n  public nativeElement: T;\n\n  constructor(nativeElement: T) {\n    this.nativeElement = nativeElement;\n  }\n\n  /**\n   * @internal\n   * @nocollapse\n   * ^\n  static __NG_ELEMENT_ID__: () => ElementRef = injectElementRef;\n}\n\n/**\n * Unwraps `ElementRef` and return the `nativeElement`.\n * @param value value to unwrap\n * @returns `nativeElement` if `ElementRef` otherwise returns value as is.\n * ^\nexport function unwrapElementRef<T, R>(value: T|ElementRef<R>): T|R {\n  return value instanceof ElementRef ? value.nativeElement : value;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\n\nimport {InjectionToken} from './di/injection_token';\n\nimport {isLView} from './render3/interfaces/type_checks';\nimport {RENDERER} from './render3/interfaces/view';\nimport {getCurrentTNode, getLView} from './render3/state';\nimport {getComponentLViewByIndex} from './render3/util/view_utils';\n\nimport {RendererStyleFlags2, RendererType2} from './api_flags';\n\nexport const Renderer2Interceptor = new InjectionToken<Renderer2[]>('Renderer2Interceptor');\n\n/**\n * Creates and initializes a custom renderer that implements the `Renderer2` base class.\n * @publicApi\n * ^\nexport abstract class RendererFactory2 {\n  /**\n   * Creates and initializes a custom renderer for a host DOM element.\n   * @param hostElement The element to render.\n   * @param type The base class to implement.\n   * @returns The new custom renderer instance.\n   *\n   * ^\n  abstract createRenderer(hostElement: any, type: RendererType2|null): Renderer2;\n\n  /**\n   * A callback invoked when rendering has begun.\n   * ^\n  abstract begin?(): void;\n\n  /**\n   * A callback invoked when rendering has completed.\n   * ^\n  abstract end?(): void;\n\n  /**\n   * Use with animations test-only mode. Notifies the test when rendering has completed.\n   * @returns The asynchronous result of the developer-defined function.\n   * ^\n  abstract whenRenderingDone?(): Promise<any>;\n}\n\n/**\n * Extend this base class to implement custom rendering. By default, Angular\n * renders a template into DOM. You can use custom rendering to intercept\n * rendering calls, or to render to something other than DOM.\n * ^\n * Create your custom renderer using `RendererFactory2`.\n * ^\n * Use a custom renderer to bypass Angular's templating and\n * make custom UI changes that can't be expressed declaratively.\n * ^\n * For example if you need to set a property or an attribute whose name is\n * not statically known, use the `setProperty()` or\n * `setAttribute()` method.\n * ^\n * @publicApi\n */

```

```

*\nexport abstract class Renderer2 {\n /**\n * Use to store arbitrary developer-defined data
on a renderer instance,\n * as an object containing key-value pairs.\n * This is useful for renderers that delegate
to other renderers.\n */\n abstract get data(): {[key: string]: any};\n\n /**\n * Implement this callback to destroy
the renderer or the host element.\n */\n abstract destroy(): void;\n\n /**\n * Implement this callback to create an
instance of the host element.\n * @param name An identifying name for the new element, unique within the
namespace.\n * @param namespace The namespace for the new element.\n * @returns The new element.\n */\n
abstract createElement(name: string, namespace?: string|null): any;\n\n /**\n * Implement this callback to add a
comment to the DOM of the host element.\n * @param value The comment text.\n * @returns The modified
element.\n */\n abstract createComment(value: string): any;\n\n /**\n * Implement this callback to add text to the
DOM of the host element.\n * @param value The text string.\n * @returns The
modified element.\n */\n abstract createText(value: string): any;\n\n /**\n * If null or undefined, the view engine
won't call it.\n * This is used as a performance optimization for production mode.\n */\n // TODO(issue/24571):
remove '!\n destroyNode!: ((node: any) => void)|null;\n\n /**\n * Appends a child to a given parent node in the
host element DOM.\n * @param parent The parent node.\n * @param newChild The new child node.\n */\n
abstract appendChild(parent: any, newChild: any): void;\n\n /**\n * Implement this callback to insert a child node at
a given position in a parent node\n * in the host element DOM.\n * @param parent The parent node.\n *
@param newChild The new child nodes.\n * @param refChild The existing child node before which `newChild` is
inserted.\n * @param isMove Optional argument which signifies if the current `insertBefore` is a result of a\n *
move. Animation uses this information to trigger move animations. In the past the
Animation\n * would always assume that any `insertBefore` is a move. This is not strictly true because\n *
with runtime i18n it is possible to invoke `insertBefore` as a result of i18n and it should\n * not trigger an
animation move.\n */\n abstract insertBefore(parent: any, newChild: any, refChild: any, isMove?: boolean):
void;\n\n /**\n * Implement this callback to remove a child node from the host element's DOM.\n * @param parent
The parent node.\n * @param oldChild The child node to remove.\n * @param isHostElement Optionally signal
to the renderer whether this element is a host element\n * or not\n */\n abstract removeChild(parent: any,
oldChild: any, isHostElement?: boolean): void;\n\n /**\n * Implement this callback to prepare an element to be
bootstrapped\n * as a root element, and return the element instance.\n * @param selectorOrNode The DOM
element.\n * @param preserveContent Whether the contents of the root element\n * should be preserved,
or cleared upon bootstrap (default behavior).\n * Use with `ViewEncapsulation.ShadowDom` to allow simple
native\n * content projection via `` elements.\n * @returns The root element.\n */\n abstract
selectRootElement(selectorOrNode: string|any, preserveContent?: boolean): any;\n\n /**\n * Implement this
callback to get the parent of a given node\n * in the host element's DOM.\n * @param node The child node to
query.\n * @returns The parent node, or null if there is no parent.\n * For WebWorkers, always returns true.\n *
This is because the check is synchronous,\n * and the caller can't rely on checking for null.\n */\n abstract
parentNode(node: any): any;\n\n /**\n * Implement this callback to get the next sibling node of a given node\n * in
the host element's DOM.\n * @returns The sibling node, or null if there is no sibling.\n * For WebWorkers,
always returns a value.\n * This is because the check is synchronous,\n * and the caller can't
rely on checking for null.\n */\n abstract nextSibling(node: any): any;\n\n /**\n * Implement this callback to set
an attribute value for an element in the DOM.\n * @param el The element.\n * @param name The attribute
name.\n * @param value The new value.\n * @param namespace The namespace.\n */\n abstract
setAttribute(el: any, name: string, value: string, namespace?: string|null): void;\n\n /**\n * Implement this callback
to remove an attribute from an element in the DOM.\n * @param el The element.\n * @param name The attribute
name.\n * @param namespace The namespace.\n */\n abstract removeAttribute(el: any, name: string,
namespace?: string|null): void;\n\n /**\n * Implement this callback to add a class to an element in the DOM.\n *
@param el The element.\n * @param name The class name.\n */\n abstract addClass(el: any, name: string):
void;\n\n /**\n * Implement this callback to remove a class from an element in the DOM.\n * @param el The
element.\n * @param name The class name.\n */\n abstract removeClass(el: any, name: string): void;\n\n /**\n
* Implement this callback to set a CSS style for an element in the DOM.\n * @param el The element.\n *

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@param style The name of the style.\n * @param value The new value.\n * @param flags Flags for style
variations. No flags are set by default.\n */\n abstract setStyle(el: any, style: string, value: any, flags?:
RendererStyleFlags2): void;\n\n /**\n * Implement this callback to remove the value from a CSS style for an
element in the DOM.\n * @param el The element.\n * @param style The name of the style.\n * @param flags
Flags for style variations to remove, if set. ???\n */\n abstract removeStyle(el: any, style: string, flags?:
RendererStyleFlags2): void;\n\n /**\n * Implement this callback to set the value of a property of an element in the
DOM.\n * @param el The element.\n * @param name The property name.\n * @param value The new value.\n
*/\n abstract setProperty(el: any, name: string, value: any): void;\n\n /**\n * Implement this callback to set the
value of a node in the host element.\n * @param node The node.\n * @param value The new value.\n */\n
abstract setValue(node: any, value: string): void;\n\n /**\n * Implement this callback to start an event listener.\n
*/\n * @param target The context in which to listen for events. Can be\n * the entire window or document, the body of
the document, or a specific\n * DOM element.\n * @param eventName The event to listen for.\n * @param
callback A handler function to invoke when the event occurs.\n * @returns An \"unlisten\" function for disposing
of this handler.\n */\n abstract listen(\n   target: 'window'|'document'|'body'|any, eventName: string,\n   callback: (event: any) => boolean | void): () => void;\n\n /**\n * @internal\n * @nocollapse\n */\n static
__NG_ELEMENT_ID__: () => Renderer2 = () => injectRenderer2();\n}\n\n/** Injects
a Renderer2 for the current component. */\nexport function injectRenderer2(): Renderer2 {\n // We need the
Renderer to be based on the component that it's being injected into, however since\n // DI happens before we've
entered its view, `getLView` will return the parent view instead.\n const IView = getLView();\n const tNode =
getCurrentTNode(!);\n const nodeAtIndex = getComponentLViewByIndex(tNode.index, IView);\n return
(isLView(nodeAtIndex) ? nodeAtIndex : IView)[RENDERER] as Renderer2;\n}\n\n", "/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n
*/\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { defineInjectable } from
'./di/interface/defs';\nimport { SecurityContext } from './security';\n\n/**\n * Sanitizer is used by the views to sanitize
potentially dangerous values.\n */\n * @publicApi\n */\nexport abstract class Sanitizer {\n   abstract sanitize(context:
SecurityContext,
value: {})string|null): string|null;\n\n /** @nocollapse */\n   static prov = /** @pureOrBreakMyCode */
defineInjectable({\n     token: Sanitizer,\n     providedIn: 'root',\n     factory: () => null,\n   });\n\n", "/**\n * @license\n
*/\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license
that can be\n */\n * found in the LICENSE file at https://angular.io/license\n */\n\n/**\n * @description Represents the
version of Angular\n */\n * @publicApi\n */\nexport class Version {\n   public readonly major: string;\n   public
readonly minor: string;\n   public readonly patch: string;\n\n   constructor(public full: string) {\n     this.major =
full.split('.')[0];\n     this.minor = full.split('.')[1];\n     this.patch = full.split('.')[2].slice(2).join('.');\n   }\n}\n\n", "/**\n *
*/\n * @publicApi\n */\nexport const VERSION = new Version('14.3.0');\n\n", "/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n */\n * Use of this source code is governed
by an MIT-style license that can be\n */\n * found in the LICENSE file at https://angular.io/license\n */\n\n// This
default value is when checking the hierarchy for a token.\n\n// It means both:\n// - the token is not provided by the
current injector,\n// - only the element injectors should be checked (ie do not check module injectors)\n\n//
mod1\n//   \n//   el1 mod2\n//   \n//   el2\n\n// When requesting el2.injector.get(token), we should
check in the following order and return the\n// first found value:\n// - el2.injector.get(token, default)\n// -
el1.injector.get(token, NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR) -> do not check the module\n// -
mod2.injector.get(token, default)\n\nexport const NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR =
{\n};\n\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is
governed by an MIT-style license that can be\n */\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nexport const ERROR_ORIGINAL_ERROR = 'ngOriginalError';\n\nexport function wrappedError(message:
string, originalError: any): Error {\n   const msg = `${message} caused by: ${\n     originalError instanceof Error ?
originalError.message : originalError}`;\n   const error = Error(msg);\n   (error as
any)[ERROR_ORIGINAL_ERROR] = originalError;\n   return error;\n}\n\nexport function getOriginalError(error:

```

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Error): Error {\n return (error as any)[ERROR_ORIGINAL_ERROR];\n}\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n\nimport {getOriginalError} from
'./util/errors';\n\n/*\n * Provides a hook for centralized exception handling.\n *\n * The default implementation of
`ErrorHandler` prints error messages to the `console`. To\n * intercept error handling, write a custom exception
handler that replaces this default as\n * appropriate

for your app.\n *\n * @usageNotes\n * ### Example\n *\n * ```\n * class MyErrorHandler implements
ErrorHandler {\n *   handleError(error) {\n *     // do something with the exception\n *   }\n * }\n *\n *
@NgModule({\n *   providers: [{provide: ErrorHandler, useClass: MyErrorHandler}]\n * })\n * class MyModule
{\n *   ```\n *\n * @publicApi\n *\n * \nexport class ErrorHandler {\n *   /*\n *     @internal\n *     @\n console: Console =
console;\n\n handleError(error: any): void {\n *   const originalError = this._findOriginalError(error);\n\n
this._console.error('ERROR', error);\n *   if (originalError) {\n *     this._console.error('ORIGINAL ERROR',
originalError);\n *   }\n * }\n *\n * /*\n *     @internal\n *     @\n _findOriginalError(error: any): Error|null {\n *   let e = error &&
getOriginalError(error);\n *   while (e && getOriginalError(e)) {\n *     e = getOriginalError(e);\n *   }\n\n return e ||
null;\n * }\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nexport function normalizeDebugBindingName(name: string) {\n // Attribute names
with `$` (eg `x-y$`) are valid per spec, but unsupported by some browsers\n * name =
camelCaseToDashCase(name.replace(/[$@]/g, '_'));\n * return `ng-reflect-${name}`;\n * }\n\nconst
CAMEL_CASE_REGEXP = /[A-Z]/g;\n\nfunction camelCaseToDashCase(input: string): string {\n * return
input.replace(CAMEL_CASE_REGEXP, (...m: any[]) => '-' + m[1].toLowerCase());\n * }\n\nexport function
normalizeDebugBindingValue(value: any): string {\n * try {\n *   // Limit the size of the value as otherwise the DOM
just gets polluted.\n *   return value != null ? value.toString().slice(0, 30) : value;\n * } catch (e) {\n *   return '[ERROR]
Exception while trying to serialize the value';\n * }\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style
license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {RuntimeError,
RuntimeErrorCode} from './errors';\nimport {Type} from './interface/type';\nimport {getComponentDef} from
'./definition';\nimport {TNode} from './interfaces/node';\nimport {LView, TVIEW} from './interfaces/view';\nimport
{INTERPOLATION_DELIMITER} from './util/misc_utils';\nimport {stringifyForError} from
'./util/stringify_utils';\n\n/** Verifies that a given type is a Standalone Component. *\n\nexport function
assertStandaloneComponentType(type: Type<unknown>) {\n * assertComponentDef(type);\n * const componentDef =
getComponentDef(type)!;\n * if (!componentDef.standalone) {\n *   throw new RuntimeError(\n
RuntimeErrorCode.TYPE_IS_NOT_STANDALONE,\n *     `The ${stringifyForError(type)} component is not
marked as standalone,`\n *     `but Angular expects to have a standalone component here.``\n *     `Please
make sure the ${stringifyForError(type)}
component has`\n *     `the `standalone: true` flag in the decorator.`);\n * }\n * }\n\n/** Verifies whether a
given type is a component *\n\nexport function assertComponentDef(type: Type<unknown>) {\n * if
(!getComponentDef(type)) {\n *   throw new RuntimeError(\n
RuntimeErrorCode.MISSING_GENERATED_DEF,\n *     `The ${stringifyForError(type)} is not an Angular
component,`\n *     `make sure it has the `@Component` decorator.`);\n * }\n * }\n\n/** Called when there are
multiple component selectors that match a given node *\n\nexport function throwMultipleComponentError(\n
tNode: TNode, first: Type<unknown>, second: Type<unknown>): never {\n * throw new RuntimeError(\n
RuntimeErrorCode.MULTIPLE_COMPONENTS_MATCH,\n *   `Multiple components match node with tagname
${tNode.value}:`\n *   ` ${stringifyForError(first)} and`\n *   ` ${stringifyForError(second)}`);\n * }\n * }\n\n/**
Throws an ExpressionChangedAfterChecked error if checkNoChanges mode is on. *\n\nexport
function throwErrorIfNoChangesMode(\n *   creationMode: boolean, oldValue: any, currValue: any, propName?:
string): never {\n *   const field = propName ? ` for ${propName}` : '';\n *   let msg =\n
`ExpressionChangedAfterItHasBeenCheckedError: Expression has changed after it was checked. Previous

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value${\n      field}: '${oldValue}'. Current value: '${currValue}';\n if (creationMode) {\n  msg +=\n  ` It seems like the view has been created after its parent and its children have been dirty checked.`\n  ` Has it been created in a change detection hook?`\n } throw new
RuntimeError(RuntimeErrorCode.EXPRESSION_CHANGED_AFTER_CHECKED, msg);\n}\n\nfunction
constructDetailsForInterpolation(\n  lView: LView, rootIndex: number, expressionIndex: number, meta: string,
changedValue: any) {\n  const [propName, prefix, ...chunks] = meta.split(INTERPOLATION_DELIMITER);\n  oldValue = prefix, newValue = prefix;\n  for (let i = 0; i < chunks.length; i++) {\n
  const slotIdx = rootIndex + i;\n  oldValue += `${lView[slotIdx]}${chunks[i]}`;\n  newValue += `${slotIdx ===
expressionIndex ? changedValue : lView[slotIdx]}${chunks[i]}`;\n } return {propName, oldValue,
newValue};\n}\n\n/**\n * Constructs an object that contains details for the
ExpressionChangedAfterItHasBeenCheckedError:\n * - propertyName (for property bindings or interpolations)\n * -
old and new values, enriched using information from metadata\n * More information on the metadata storage
format can be found in `storePropertyBindingMetadata`\n * function description.\n */\nexport function
getExpressionChangedErrorDetails(\n  lView: LView, bindingIndex: number, oldValue: any,\n  newValue: any):
{propertyName?: string, oldValue: any, newValue: any} {\n  const tData = lView[TVIEW].data;\n  const metadata =
tData[bindingIndex];\n  if (typeof metadata === 'string') {\n    // metadata for property interpolation\n    if
(metadata.indexOf(INTERPOLATION_DELIMITER) > -1) {\n
      return constructDetailsForInterpolation(\n        lView, bindingIndex, bindingIndex, metadata, newValue);\n
    }\n    // metadata for property binding\n    return {propertyName: metadata, oldValue, newValue};\n  }\n  // metadata
is not available for this expression, check if this expression is a part of the\n  // property interpolation by going from
the current binding index left and look for a string that\n  // contains INTERPOLATION_DELIMITER, the layout in
tView.data for this case will look like this:\n  // [..., 'idPrefix and suffix', null, null, null, ...]\n  if (metadata ===
null) {\n    let idx = bindingIndex - 1;\n    while (typeof tData[idx] !== 'string' && tData[idx + 1] === null) {\n
    idx--;\n  }\n  const meta = tData[idx];\n  if (typeof meta === 'string') {\n    const matches = meta.match(new
RegExp(INTERPOLATION_DELIMITER, 'g'));\n    // first interpolation delimiter separates property name from
interpolation parts (in case of\n    // property interpolations),
so we subtract one from total number of found delimiters\n    if (matches && (matches.length - 1) > bindingIndex
- idx) {\n      return constructDetailsForInterpolation(lView, idx, bindingIndex, meta, newValue);\n    }\n  }\n  return {propertyName: undefined, oldValue, newValue};\n}\n\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {assertNotEqual} from '../util/assert';\nimport
{CharCode} from '../util/char_code';\n\n/**\n * Returns an index of `classToSearch` in `className` taking
token boundaries into account.\n * `classIndexof('AB A', 'A', 0)` will be 3 (not 0 since `AB!===A`)\n *
@param className A string containing classes (whitespace separated)\n * @param classToSearch A class name to
locate\n * @param startingIndex Starting location of search\n * @returns an index of the located
class (or -1 if not found)\n */\nexport function classIndexof(\n  className: string, classToSearch: string,
startingIndex: number): number {\n  ngDevMode && assertNotEqual(classToSearch, "", 'can not look for ""
string.);\n  let end = className.length;\n  while (true) {\n    const foundIndex = className.indexof(classToSearch,
startingIndex);\n    if (foundIndex === -1) return foundIndex;\n    if (foundIndex === 0 ||
className.charCodeAt(foundIndex - 1) <= CharCode.SPACE) {\n      // Ensure that it has leading whitespace\n
const length = classToSearch.length;\n      if (foundIndex + length === end ||\n
className.charCodeAt(foundIndex + length) <= CharCode.SPACE) {\n        // Ensure that it has trailing
whitespace\n        return foundIndex;\n      }\n    } // False positive, keep searching from where we left off.\n
startingIndex = foundIndex + 1;\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n
* Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport '../util/ng_dev_mode';\nimport {assertDefined, assertEquals, assertNotEqual} from
'../util/assert';\nimport {AttributeMarker, TAttributes, TNode, TNodeType, unusedValueExportToPlacateAjd as

```



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unused1 } from './interfaces/node';\nimport {CssSelector, CssSelectorList, SelectorFlags,
unusedValueExportToPlacateAjd as unused2} from './interfaces/projection';\nimport {classIndexOf} from
'./styling/class_differ';\nimport {isNameOnlyAttributeMarker} from './util/attrs_utils';\n\nconst
unusedValueToPlacateAjd = unused1 + unused2;\n\nconst NG_TEMPLATE_SELECTOR = 'ng-template';\n\n/**\n * Search the `TAttributes` to see if it contains `cssClassToMatch` (case insensitive)\n * \n * @param attrs
`TAttributes` to search through.\n * @param cssClassToMatch class to match (lowercase)\n * @param
isProjectionMode Whether or not class matching should look into the attribute `class` in\n
 * addition to the `AttributeMarker.Classes`.\n */\nfunction isCssClassMatching(\n  attrs: TAttributes,
cssClassToMatch: string, isProjectionMode: boolean): boolean {\n  // TODO(misko): The fact that this function
needs to know about `isProjectionMode` seems suspect.\n  // It is strange to me that sometimes the class information
comes in form of `class` attribute\n  // and sometimes in form of `AttributeMarker.Classes`. Some investigation is
needed to determine\n  // if that is the right behavior.\n  ngDevMode &&\n    assertEquals(\n
cssClassToMatch, cssClassToMatch.toLowerCase(), 'Class name expected to be lowercase.);\n  let i = 0;\n  while (i
< attrs.length) {\n    let item = attrs[i++];\n    if (isProjectionMode && item === 'class') {\n      item = attrs[i] as
string;\n      if (classIndexOf(item.toLowerCase(), cssClassToMatch, 0) !== -1) {\n        return true;\n      }\n    } else
if (item === AttributeMarker.Classes) {\n      // We found the classes section. Start
searching for the class.\n      while (i < attrs.length && typeof (item = attrs[i++]) === 'string') {\n        // while we
have strings\n        if (item.toLowerCase() === cssClassToMatch) return true;\n      }\n      return false;\n    }\n  }\n  return false;\n}\n\n/**\n * Checks whether the `tNode` represents an inline template (e.g. `*ngFor`).\n * \n * @param
tNode current TNode\n */\nexport function isInlineTemplate(tNode: TNode): boolean {\n  return tNode.type ===
TNodeType.Container && tNode.value !== NG_TEMPLATE_SELECTOR;\n}\n\n/**\n * Function that checks
whether a given tNode matches tag-based selector and has a valid type.\n * \n * Matching can be performed in 2
modes: projection mode (when we project nodes) and regular\n * directive matching mode:\n * - in the "directive
matching" mode we do `_not_` take TContainer's tagName into account if it is\n * different from
NG_TEMPLATE_SELECTOR (value different from NG_TEMPLATE_SELECTOR indicates that a\n * tag name
was extracted from
 * syntax so we would match the same directive twice);\n * - in the "projection" mode, we use a tag name
potentially extracted from the * syntax processing\n * (applicable to TNodeType.Container only).\n */\nfunction
hasTagAndTypeMatch(\n  tNode: TNode, currentSelector: string, isProjectionMode: boolean): boolean {\n  const
tagNameToCompare =\n    tNode.type === TNodeType.Container && !isProjectionMode ?
NG_TEMPLATE_SELECTOR : tNode.value;\n  return currentSelector === tagNameToCompare;\n}\n\n/**\n * A
utility function to match an Ivy node static data against a simple CSS selector\n * \n * @param node static data of the
node to match\n * @param selector The selector to try matching against the node.\n * @param isProjectionMode if
`true` we are matching for content projection, otherwise we are doing\n * directive matching.\n * @returns true if
node matches the selector.\n */\nexport function isNodeMatchingSelector(\n  tNode: TNode, selector: CssSelector,
isProjectionMode: boolean):
boolean {\n  ngDevMode && assertDefined(selector[0], 'Selector should have a tag name');\n  let mode:
SelectorFlags = SelectorFlags.ELEMENT;\n  const nodeAttrs = tNode.attrs || [];\n  // Find the index of first
attribute that has no value, only a name.\n  const nameOnlyMarkerIdx = getNameOnlyMarkerIndex(nodeAttrs);\n  // When processing `:not` selectors, we skip to the next `:not` if the\n  // current one doesn't match\n  let
skipToNextSelector = false;\n  for (let i = 0; i < selector.length; i++) {\n    const current = selector[i];\n    if (typeof
current === 'number') {\n      // If we finish processing a :not selector and it hasn't failed, return false\n      if
(!skipToNextSelector && !isPositive(mode) && !isPositive(current)) {\n        return false;\n      }\n      // If we are
skipping to the next :not() and this mode flag is positive,\n      // it's a part of the current :not() selector, and we
should keep skipping\n      if (skipToNextSelector && isPositive(current))
continue;\n      skipToNextSelector = false;\n      mode = (current as number) | (mode & SelectorFlags.NOT);\n    }\n    continue;\n  }\n  if (skipToNextSelector) continue;\n  if (mode & SelectorFlags.ELEMENT) {\n    mode =
SelectorFlags.ATTRIBUTE | mode & SelectorFlags.NOT;\n    if (current !== " && !hasTagAndTypeMatch(tNode,

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current, isProjectionMode) ||\n    current === " && selector.length === 1) {\n    if (isPositive(mode)) return
false;\n    skipToNextSelector = true;\n    }\n    } else {\n    const selectorAttrValue = mode &
SelectorFlags.CLASS ? current : selector[++i];\n\n    // special case for matching against classes when a tNode has
been instantiated with\n    // class and style values as separate attribute values (e.g. ['title', CLASS, 'foo'])\n    if
((mode & SelectorFlags.CLASS) && tNode.attrs !== null) {\n    if (!isCssClassMatching(tNode.attrs,
selectorAttrValue as string, isProjectionMode)) {\n    if (isPositive(mode))
return false;\n    skipToNextSelector = true;\n    }\n    continue;\n    }\n\n    const attrName = (mode &
SelectorFlags.CLASS) ? 'class' : current;\n    const attrIndexInNode =\n    findAttrIndexInNode(attrName,
nodeAttrs, isInlineTemplate(tNode), isProjectionMode);\n\n    if (attrIndexInNode === -1) {\n    if
(isPositive(mode)) return false;\n    skipToNextSelector = true;\n    continue;\n    }\n\n    if (selectorAttrValue
!== ") {\n    let nodeAttrValue: string;\n    if (attrIndexInNode > nameOnlyMarkerIdx) {\n    nodeAttrValue
= ";\n    } else {\n    ngDevMode &&\n    assertNotEqual(\n    nodeAttrs[attrIndexInNode],
AttributeMarker.NamespaceURI,\n    'We do not match directives on namespaced attributes');\n    // we
lowercase the attribute value to be able to match\n    // selectors without case-sensitivity\n    // (selectors are
already in lowercase when
generated)\n    nodeAttrValue = (nodeAttrs[attrIndexInNode + 1] as string).toLowerCase();\n    }\n\n    const compareAgainstClassName = mode & SelectorFlags.CLASS ? nodeAttrValue : null;\n    if
(compareAgainstClassName &&\n    classIndexOf(compareAgainstClassName, selectorAttrValue as string,
0) !== -1 ||\n    mode & SelectorFlags.ATTRIBUTE && selectorAttrValue !== nodeAttrValue) {\n    if
(isPositive(mode)) return false;\n    skipToNextSelector = true;\n    }\n    }\n    }\n    }\n\n    return
isPositive(mode) || skipToNextSelector;\n\n}\n\nfunction isPositive(mode: SelectorFlags): boolean {\n    return (mode
& SelectorFlags.NOT) === 0;\n}\n\n/**\n * Examines the attribute's definition array for a node to find the index of
the\n * attribute that matches the given `name`.\n * NOTE: This will not match namespaced attributes.\n *\n * Attribute matching depends upon `isInlineTemplate` and `isProjectionMode`.\n *\n * The following table summarizes
which types of attributes we attempt to match:\n *\n */

```

		Modes		Normal Attributes		Bindings Attributes		Template Attributes	
		YES	NO	YES	NO	YES	NO	YES	NO
Directive	NO	NO	YES	NO	YES	NO	YES	NO	NO
		YES	NO	YES	NO	YES	NO	YES	NO
		YES	NO	YES	NO	YES	NO	YES	NO

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@param name the name of the attribute to find\n * @param attrs the
attribute array to examine\n * @param isInlineTemplate true if the node being matched is an inline template (e.g.
`*ngFor`)\n * rather than a manually expanded template node (e.g. `<ng-template>`).\n * @param isProjectionMode
true if we are matching against content projection otherwise we are\n * matching against directives.\n */\nfunction
findAttrIndexInNode(\n    name: string, attrs: TAttributes|null, isInlineTemplate: boolean,\n    isProjectionMode:
boolean): number {\n    if (attrs === null) return -1;\n\n    let i = 0;\n\n    if (isProjectionMode || isInlineTemplate) {\n
let bindingsMode = false;\n    while (i < attrs.length) {\n    const maybeAttrName = attrs[i];\n    if
(maybeAttrName
=== name) {\n    return i;\n    } else if (\n    maybeAttrName === AttributeMarker.Bindings ||
maybeAttrName === AttributeMarker.I18n) {\n    bindingsMode = true;\n    } else if (\n    maybeAttrName
=== AttributeMarker.Classes || maybeAttrName === AttributeMarker.Styles) {\n    let value = attrs[++i];\n    //
We should skip classes here because we have a separate mechanism for\n    // matching classes in projection

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mode.\n    while (typeof value === 'string') {\n        value = attrs[++i];\n    }\n    continue;\n } else if
(maybeAttrName === AttributeMarker.Template) {\n    // We do not care about Template attributes in this
scenario.\n    break;\n } else if (maybeAttrName === AttributeMarker.NamespaceURI) {\n    // Skip the
whole namespaced attribute and value. This is by design.\n    i += 4;\n    continue;\n }\n // In binding
mode there are only names, rather than name-value pairs.\n
    i += bindingsMode ? 1 : 2;\n }\n // We did not match the attribute\n return -1;\n } else {\n return
matchTemplateAttribute(attrs, name);\n }\n}\n\nexport function isNodeMatchingSelectorList(\n tNode: TNode,
selector: CssSelectorList, isProjectionMode: boolean = false): boolean {\n for (let i = 0; i < selector.length; i++) {\n
    if (isNodeMatchingSelector(tNode, selector[i], isProjectionMode)) {\n        return true;\n    }\n }\n\n return
false;\n }\n\nexport function getProjectAsAttrValue(tNode: TNode): CssSelector|null {\n const nodeAttrs =
tNode.attrs;\n if (nodeAttrs != null) {\n    const ngProjectAsAttrIdx =
nodeAttrs.indexOf(AttributeMarker.ProjectAs);\n    // only check for ngProjectAs in attribute names, don't
accidentally match attribute's value\n    // (attribute names are stored at even indexes)\n    if ((ngProjectAsAttrIdx &
1) === 0) {\n        return nodeAttrs[ngProjectAsAttrIdx + 1] as CssSelector;\n    }\n }\n return null;\n }\n\nfunction
getNameOnlyMarkerIndex(nodeAttrs:
TAttributes) {\n for (let i = 0; i < nodeAttrs.length; i++) {\n    const nodeAttr = nodeAttrs[i];\n    if
(isNameOnlyAttributeMarker(nodeAttr)) {\n        return i;\n    }\n }\n return nodeAttrs.length;\n }\n\nfunction
matchTemplateAttribute(attrs: TAttributes, name: string): number {\n let i =
attrs.indexOf(AttributeMarker.Template);\n if (i > -1) {\n    i++;
while (i < attrs.length) {\n        const attr =
attrs[i];\n        // Return in case we checked all template attrs and are switching to the next section in the
// attrs
array (that starts with a number that represents an attribute marker).\n        if (typeof attr === 'number') return -1;\n
if (attr === name) return i;\n        i++;\n    }\n }\n return -1;\n }\n\n/**\n * Checks whether a selector is inside a
CssSelectorList\n * @param selector Selector to be checked.\n * @param list List in which to look for the
selector.\n */\nexport function isSelectorInSelectorList(selector: CssSelector,
list: CssSelectorList): boolean {\n selectorListLoop: for (let i = 0; i < list.length; i++) {\n    const
currentSelectorInList = list[i];\n    if (selector.length !== currentSelectorInList.length) {\n        continue;\n    }\n for
(let j = 0; j < selector.length; j++) {\n        if (selector[j] !== currentSelectorInList[j]) {\n            continue
selectorListLoop;\n        }\n    }\n return true;\n }\n return false;\n }\n\nfunction
maybeWrapInNotSelector(isNegativeMode: boolean, chunk: string): string {\n return isNegativeMode ? `:not( +
chunk.trim() + `)`: chunk;\n }\n\nfunction stringifyCSSSelector(selector: CssSelector): string {\n let result =
selector[0] as string;\n let i = 1;\n let mode = SelectorFlags.ATTRIBUTE;\n let currentChunk = ";\n let
isNegativeMode = false;\n while (i < selector.length) {\n    let valueOrMarker = selector[i];\n    if (typeof
valueOrMarker === 'string') {\n        if (mode & SelectorFlags.ATTRIBUTE) {\n            const attrValue = selector[++i]
as string;\n
            currentChunk +=`\n            `[ + valueOrMarker + (attrValue.length > 0 ? `=${`" + attrValue + "` : `") + `];\n        }
else if (mode & SelectorFlags.CLASS) {\n            currentChunk += `.` + valueOrMarker;\n        } else if (mode &
SelectorFlags.ELEMENT) {\n            currentChunk += ` ` + valueOrMarker;\n        }\n    } else {\n        // Append
current chunk to the final result in case we come across SelectorFlag, which\n        // indicates that the previous
section of a selector is over. We need to accumulate content\n        // between flags to make sure we wrap the chunk
later in :not() selector if needed, e.g.\n        // ```\n        // [", Flags.CLASS, '.classA', Flags.CLASS | Flags.NOT,
'.classB', '.classC']\n        // ```\n        // should be transformed to `.classA :not(.classB .classC)`.\n        // Note: for
negative selector part, we accumulate content between flags until we find the\n        // next negative flag. This is
needed to support a case where
`:not(` rule contains more than\n        // one chunk, e.g. the following selector:\n        // ```\n        // [",
Flags.ELEMENT | Flags.NOT, 'p', Flags.CLASS, 'foo', Flags.CLASS | Flags.NOT, 'bar']\n        // ```\n        // should be
stringified to `:not(p.foo):not(bar)`\n        //\n        if (currentChunk !== " && !isPositive(valueOrMarker)) {\n
result += maybeWrapInNotSelector(isNegativeMode, currentChunk);\n        currentChunk = ";\n    }\n    mode =
valueOrMarker;\n    // According to CssSelector spec, once we come across `SelectorFlags.NOT` flag, the

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negative\n // mode is maintained for remaining chunks of a selector.\n isNegativeMode = isNegativeMode ||
!isPositive(mode);\n }\n i++;\n }\n if (currentChunk !== "") {\n result +=
maybeWrapInNotSelector(isNegativeMode, currentChunk);\n }\n return result;\n}\n\n/**\n * Generates string
representation of CSS selector in parsed form.\n *\n * ComponentDef and DirectiveDef are generated with the
selector
in parsed form to avoid doing\n * additional parsing at runtime (for example, for directive matching). However in
some cases (for\n * example, while bootstrapping a component), a string version of the selector is required to
query\n * for the host element on the page. This function takes the parsed form of a selector and returns\n * its string
representation.\n *\n * @param selectorList selector in parsed form\n * @returns string representation of a given
selector\n */\nexport function stringifyCSSSelectorList(selectorList: CssSelectorList): string {\n return
selectorList.map(stringifyCSSSelector).join(',');\n}\n\n/**\n * Extracts attributes and classes information from a
given CSS selector.\n *\n * This function is used while creating a component dynamically. In this case, the host
element\n * (that is created dynamically) should contain attributes and classes specified in component's CSS\n *
selector.\n *\n * @param selector CSS selector in parsed form (in a form of array)\n * @returns
object with `attrs` and `classes` fields that contain extracted information\n */\nexport function
extractAttrsAndClassesFromSelector(selector: CssSelector):\n { attrs: string[], classes: string[] } {\n const attrs:
string[] = [];\n const classes: string[] = [];\n let i = 1;\n let mode = SelectorFlags.ATTRIBUTE;\n while (i <
selector.length) {\n let valueOrMarker = selector[i];\n if (typeof valueOrMarker === 'string') {\n if (mode
=== SelectorFlags.ATTRIBUTE) {\n if (valueOrMarker !== "") {\n attrs.push(valueOrMarker,
selector[++i] as string);\n }\n } else if (mode === SelectorFlags.CLASS) {\n
classes.push(valueOrMarker);\n }\n } else {\n // According to CssSelector spec, once we come across
`SelectorFlags.NOT` flag, the negative\n // mode is maintained for remaining chunks of a selector. Since
attributes and classes are\n // extracted only for `"positive"` part of the selector, we can stop here.\n if
(!isPositive(mode)) break;\n mode = valueOrMarker;\n }\n i++;\n }\n return { attrs, classes};\n}\n\n",
/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nexport interface
NO_CHANGE {\n // This is a brand that ensures that this type can never match anything else\n __brand__:
'NO_CHANGE';\n}\n\n/** A special value which designates that a value has not changed. */\nexport const
NO_CHANGE: NO_CHANGE =\n (typeof ngDevMode === 'undefined' || ngDevMode) ? { __brand__:
'NO_CHANGE' } : ({} as NO_CHANGE);\n\n",
/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {assertGreaterThan} from '../util/assert';\nimport {assertIndexInDeclRange}
from '../assert';\nimport {executeCheckHooks,
executeInitAndCheckHooks} from '../hooks';\nimport {FLAGS, InitPhaseState, LView, LViewFlags, TView} from
'../interfaces/view';\nimport {getLView, getSelectedIndex, getTView, isInCheckNoChangesMode,
setSelectedIndex} from '../state';\n\n/**\n * Advances to an element for later binding instructions.\n *\n * Used in
conjunction with instructions like {@link property} to act on elements with specified\n * indices, for example those
created with {@link element} or {@link elementStart}.\n *\n * ``ts\n * (rf: RenderFlags, ctx: any) => {\n * if (rf
& 1) {\n * text(0, 'Hello');\n * text(1, 'Goodbye')\n * element(2, 'div');\n * }\n * if (rf & 2) {\n *
advance(2); // Advance twice to the <div>.\n * property('title', 'test');\n * }\n * }\n * ``\n *\n * @param delta
Number of elements to advance forwards by.\n *\n * @codeGenApi\n */\nexport function advance(delta: number):
void {\n ngDevMode && assertGreaterThan(delta, 0, 'Can only advance forward');\n
selectIndexInternal(\n getTView(), getLView(), getSelectedIndex() + delta, !!ngDevMode &&
isInCheckNoChangesMode());\n}\n\nexport function selectIndexInternal(\n tView: TView, lView: LView, index:
number, checkNoChangesMode: boolean) {\n ngDevMode && assertIndexInDeclRange(lView, index);\n\n //
Flush the initial hooks for elements in the view that have been added up to this point.\n // PERF WARNING: do
NOT extract this to a separate function without running benchmarks\n if (!checkNoChangesMode) {\n const
hooksInitPhaseCompleted =\n (lView[FLAGS] & LViewFlags.InitPhaseStateMask) ===

```

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InitPhaseState.InitPhaseCompleted;\n  if (hooksInitPhaseCompleted) {\n    const preOrderCheckHooks =
tView.preOrderCheckHooks;\n    if (preOrderCheckHooks !== null) {\n      executeCheckHooks(IView,
preOrderCheckHooks, index);\n    } else {\n      const preOrderHooks = tView.preOrderHooks;\n      if
(preOrderHooks !== null) {\n        executeInitAndCheckHooks(IView,
preOrderHooks, InitPhaseState.OnInitHooksToBeRun, index);\n      } }\n\n  }\n\n  // We must set the selected
index *after* running the hooks, because hooks may have side-effects\n  // that cause other template functions to
run, thus updating the selected index, which is global\n  // state. If we run `setSelectedIndex` *before* we run the
hooks, in some cases the selected index\n  // will be altered by the time we leave the `advance` instruction.\n
setSelectedIndex(index);\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { resolveForwardRef } from './forward_ref';\nimport { inject,
invalidFactoryDep } from './injector_compatibility';\nimport { defineInjectable, defineInjector } from
'./interface/defs';\n\n/**\n * A mapping of the @angular/core API surface used in generated expressions to the
actual symbols.\n\n *\n * This should be kept up to date with the public exports of @angular/core.\n */\nexport const
angularCoreDiEnv: {[name: string]: Function} = {\n  'defineInjectable': defineInjectable,\n  'defineInjector':
defineInjector,\n  'inject': inject,\n  'invalidFactoryDep': invalidFactoryDep,\n  'resolveForwardRef':
resolveForwardRef,\n};\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport { getCompilerFacade, JitCompilerUsage, R3InjectableMetadataFacade }
from './../compiler/compiler_facade';\nimport { Type } from './../interface/type';\nimport { NG_FACTORY_DEF }
from './../render3/fields';\nimport { getClosureSafeProperty } from './../util/property';\nimport { resolveForwardRef }
from './forward_ref';\nimport { Injectable } from './injectable';\nimport { NG_PROV_DEF } from
'./interface/defs';\nimport { ClassSansProvider, ExistingSansProvider, FactorySansProvider, ValueProvider, ValueSansProvider } from
'./interface/provider';\nimport { angularCoreDiEnv } from './environment';\nimport { convertDependencies,
reflectDependencies } from './util';\n\n\n/**\n * Compile an Angular injectable according to its `Injectable`
metadata, and patch the resulting\n * injectable def (`prov`) onto the injectable type.\n */\nexport function
compileInjectable(type: Type<any>, meta?: Injectable): void {\n  let ngInjectableDef: any = null;\n  let
ngFactoryDef: any = null;\n\n  // if NG_PROV_DEF is already defined on this class then don't overwrite it\n  if
(!type.hasOwnProperty(NG_PROV_DEF)) {\n    Object.defineProperty(type, NG_PROV_DEF, {\n      get: () =>
{\n        if (ngInjectableDef === null) {\n          const compiler =\n            getCompilerFacade({ usage:
JitCompilerUsage.Decorator, kind: 'injectable', type });\n          ngInjectableDef = compiler.compileInjectable(\n
angularCoreDiEnv,\n          `ng://${type.name}/prov.js`, getInjectableMetadata(type, meta));\n        }\n        return ngInjectableDef;\n      },\n    });\n  }\n\n  // if NG_FACTORY_DEF is already defined on this class then don't overwrite it\n  if
(!type.hasOwnProperty(NG_FACTORY_DEF)) {\n    Object.defineProperty(type, NG_FACTORY_DEF, {\n      get: () => {\n        if (ngFactoryDef === null) {\n          const compiler =\n            getCompilerFacade({ usage:
JitCompilerUsage.Decorator, kind: 'injectable', type });\n          ngFactoryDef =
compiler.compileFactory(angularCoreDiEnv, `ng://${type.name}/fac.js`, {\n            name: type.name,\n            type,\n            typeArgumentCount: 0, // In JIT mode types are not available nor used.\n            deps:
reflectDependencies(type),\n            target: compiler.FactoryTarget.Injectable\n          });\n        }\n        return
ngFactoryDef;\n      },\n    });\n\n    // Leave this configurable so that the factories from directives or pipes can take
precedence.\n\n    configurable: true\n  });\n}\n\n\ntype useClassProvider = Injectable&ClassSansProvider&{deps?:
any[]};\n\nconst USE_VALUE =\n  getClosureSafeProperty<ValueProvider>({ provide: String, useValue:
getClosureSafeProperty });\n\nfunction isUseClassProvider(meta: Injectable): meta is UseClassProvider {\n  return
(meta as UseClassProvider).useClass !== undefined;\n}\n\nfunction isUseValueProvider(meta: Injectable): meta is

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Injectable&ValueSansProvider {\n return USE_VALUE in meta;\n}\n\nfunction isUseFactoryProvider(meta:
Injectable): meta is Injectable&FactorySansProvider {\n return (meta as FactorySansProvider).useFactory !==
undefined;\n}\n\nfunction isUseExistingProvider(meta: Injectable): meta is Injectable&ExistingSansProvider {\n
return (meta as ExistingSansProvider).useExisting !== undefined;\n}\n\nfunction getInjectableMetadata(type:
Type<any>, srcMeta?: Injectable): R3InjectableMetadataFacade {\n // Allow the compilation of a class with a
`@Injectable()` decorator
  without parameters\n const meta: Injectable = srcMeta || {providedIn: null};\n const compilerMeta:
R3InjectableMetadataFacade = {\n name: type.name,\n type: type,\n typeArgumentCount: 0,\n providedIn:
meta.providedIn,\n };\n if ((isUseClassProvider(meta) || isUseFactoryProvider(meta)) && meta.deps !==
undefined) {\n compilerMeta.deps = convertDependencies(meta.deps);\n }\n // Check to see if the user explicitly
provided a `useXxxx` property.\n if (isUseClassProvider(meta)) {\n compilerMeta.useClass = meta.useClass;\n }
else if (isUseValueProvider(meta)) {\n compilerMeta.useValue = meta.useValue;\n } else if
(isUseFactoryProvider(meta)) {\n compilerMeta.useFactory = meta.useFactory;\n } else if
(isUseExistingProvider(meta)) {\n compilerMeta.useExisting = meta.useExisting;\n }\n return
compilerMeta;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can
be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {Type} from
'./interface/type';\nimport {makeDecorator, TypeDecorator} from './util/decorators';\nimport {ClassSansProvider,
ConstructorSansProvider, ExistingSansProvider, FactorySansProvider, StaticClassSansProvider,
ValueSansProvider} from './interface/provider';\nimport {compileInjectable} from './jit/injectable';\n\nexport
{compileInjectable};\n\n/**\n * Injectable providers used in `@Injectable` decorator.\n *\n * @publicApi\n
*\n\nexport type InjectableProvider = ValueSansProvider|ExistingSansProvider|StaticClassSansProvider|\n
ConstructorSansProvider|FactorySansProvider|ClassSansProvider;\n\n/**\n * Type of the Injectable decorator /
constructor function.\n *\n * @publicApi\n *\n\nexport interface InjectableDecorator {\n /**\n * Decorator that
marks a class as available to be\n * provided and injected as a dependency.\n *\n * @see [Introduction to
Services and DI](guide/architecture-services)\n
* @see [Dependency Injection Guide](guide/dependency-injection)\n *\n * @usageNotes\n *\n * Marking a
class with `@Injectable` ensures that the compiler\n * will generate the necessary metadata to create the class's\n
* dependencies when the class is injected.\n *\n * The following example shows how a service class is properly\n
* marked so that a supporting service can be injected upon creation.\n *\n * <code-example
path=\"core/di/ts/metadata_spec.ts\" region=\"Injectable\"></code-example>\n *\n *\n\n  () : TypeDecorator;\n
(options?: {providedIn: Type<any>|'root'|'platform'|'any'|null}&\n InjectableProvider): TypeDecorator;\n new():
Injectable;\n new(options?: {providedIn: Type<any>|'root'|'platform'|'any'|null}&\n InjectableProvider):
Injectable;\n}\n\n/**\n * Type of the Injectable metadata.\n *\n * @publicApi\n *\n\nexport interface Injectable {\n
/**\n * Determines which injectors will provide the injectable.\n *\n * - `Type<any>`
- associates the injectable with an `@NgModule` or other `InjectorType`,\n * - 'null': Equivalent to `undefined`.
The injectable is not provided in any scope automatically\n * and must be added to a `providers` array of an
[@NgModule](api/core/NgModule#providers),\n * [@Component](api/core/Directive#providers) or
[@Directive](api/core/Directive#providers).\n *\n * The following options specify that this injectable should be
provided in one of the following\n * injectors:\n * - 'root': The application-level injector in most apps.\n * -
'platform': A special singleton platform injector shared by all\n * applications on the page.\n * - 'any': Provides a
unique instance in each lazy loaded module while all eagerly loaded\n * modules share one instance.\n *\n *\n\n  providedIn?: Type<any>|'root'|'platform'|'any'|null;\n}\n\n/**\n * Injectable decorator and metadata.\n *\n *
@Annotation\n * @publicApi\n *\n\nexport const Injectable: InjectableDecorator = makeDecorator(\n
Injectable', undefined, undefined, undefined,\n (type: Type<any>, meta: Injectable) => compileInjectable(type
as any, meta));\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {flatten} from './util/array_utils';\nimport {EMPTY_ARRAY} from './util/empty';\nimport {stringify}

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from './util/stringify';\n\nimport {Injector} from './injector';\nimport {StaticProvider} from
 './interface/provider';\nimport {importProvidersFrom} from './provider_collection';\nimport {getNullInjector,
 R3Injector} from './r3_injector';\nimport {InjectorScope} from './scope';\n\n/**\n * Create a new `Injector` which is
 configured using a `defType` of `InjectorType<any>`\n * s.\n * @publicApi\n * ^\nexport function createInjector(\n
 defType: /* InjectorType<any> */ any, parent: Injector|null = null,\n  additionalProviders:
  StaticProvider[]|null = null, name?: string): Injector {\n  const injector =\n
 createInjectorWithoutInjectorInstances(defType, parent, additionalProviders, name);\n
 injector.resolveInjectorInitializers();\n  return injector;\n}\n\n/**\n * Creates a new injector without eagerly
 resolving its injector types. Can be used in places\n * where resolving the injector types immediately can lead to an
 infinite loop. The injector types\n * should be resolved at a later point by calling `_resolveInjectorDefTypes`\n *
.\n * ^\nexport function createInjectorWithoutInjectorInstances(\n  defType: /* InjectorType<any> */ any, parent:
 Injector|null = null,\n  additionalProviders: StaticProvider[]|null = null, name?: string,\n  scopes = new
 Set<InjectorScope>()): R3Injector {\n  const providers = [\n    additionalProviders || EMPTY_ARRAY,\n
 importProvidersFrom(defType),\n  ];\n  name = name || (typeof defType === 'object' ? undefined :
 stringify(defType));\n\n  return new R3Injector(providers,
    parent || getNullInjector(), name || null, scopes);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
 Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
 LICENSE file at https://angular.io/license\n * ^\n\nimport {createInjector} from './create_injector';\nimport
 {THROW_IF_NOT_FOUND, inject} from './injector_compatibility';\nimport {InjectorMarkers} from
 './injector_marker';\nimport {INJECTOR} from './injector_token';\nimport {defineInjectable} from
 './interface/defs';\nimport {InjectFlags} from './interface/injector';\nimport {StaticProvider} from
 './interface/provider';\nimport {NullInjector} from './null_injector';\nimport {ProviderToken} from
 './provider_token';\n\n/**\n * Concrete injectors implement this interface. Injectors are configured\n * with
 [providers](guide/glossary#provider) that associate\n * dependencies of various types with [injection
 tokens](guide/glossary#di-token).\n * @see ["DI Providers"]\n(guide/dependency-injection-providers).\n
 * @see `StaticProvider`\n * @usageNotes\n * The following example creates a service injector instance.\n
 * @example core/di/ts/provider_spec.ts region='ConstructorProvider'\n * ### Usage example\n *
 { @example core/di/ts/injector_spec.ts region='Injector'}\n * `Injector` returns itself when given `Injector` as a
 token:\n * { @example core/di/ts/injector_spec.ts region='injectInjector'}\n * @publicApi\n * ^\nexport
 abstract class Injector {\n  static THROW_IF_NOT_FOUND = THROW_IF_NOT_FOUND;\n  static NULL:
 Injector = /* @__PURE__ */ new NullInjector();\n\n  /**\n   * Retrieves an instance from the injector based on the
 provided token.\n   * @returns The instance from the injector if defined, otherwise the `notFoundValue`.\n   *
 @throws When the `notFoundValue` is `undefined` or `Injector.THROW_IF_NOT_FOUND`.\n   * ^\n  abstract
 get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T;\n\n  /**\n
   * @deprecated from v4.0.0 use ProviderToken<T>\n   * @suppress {duplicate}\n   * ^\n  abstract get(token: any,
 notFoundValue?: any): any;\n\n  /**\n   * @deprecated from v5 use the new signature Injector.create(options)\n
   * ^\n  static create(providers: StaticProvider[], parent?: Injector): Injector;\n\n  /**\n   * Creates a new injector
 instance that provides one or more dependencies,\n   * according to a given type or types of `StaticProvider`.\n
   * @param options An object with the following properties:\n   * * `providers`: An array of providers of the
 [StaticProvider type](api/core/StaticProvider).\n   * * `parent`: (optional) A parent injector.\n   * * `name`: (optional)
 A developer-defined identifying name for the new injector.\n   * @returns The new injector instance.\n
   * ^\n  static create(options: {providers: StaticProvider[], parent?: Injector, name?: string}): Injector;\n\n
  static create(\n    options: StaticProvider[]|{providers: StaticProvider[],
    parent?: Injector, name?: string},\n    parent?: Injector): Injector {\n    if (Array.isArray(options)) {\n
      return createInjector({name: ""}, parent, options, "");\n    } else {\n      const name = options.name ?? "";\n
      return createInjector({name}, options.parent, options.providers, name);\n    }\n  }\n\n  /** @nocollapse\n
   * ^\n  static prov =\n  /** @pureOrBreakMyCode */ defineInjectable({\n    token: Injector,\n    providedIn: 'any',\n    factory: () =>
 inject(INJECTOR),\n  });\n\n  /**\n   * @internal\n   * @nocollapse\n   * ^\n  static __NG_ELEMENT_ID__ =

```

```

InjectorMarkers.Injector;\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Type} from './interface/type';\nimport {ERROR_ORIGINAL_ERROR,
wrappedError} from './util/errors';\nimport {stringify} from './util/stringify';\n\nimport {ReflectiveInjector}
from './reflective_injector';\nimport {ReflectiveKey} from './reflective_key';\n\nfunction
findFirstClosedCycle(keys: any[]): any[] {\n  const res: any[] = [];\n  for (let i = 0; i < keys.length; ++i) {\n    if
(res.indexOf(keys[i]) > -1) {\n      res.push(keys[i]);\n      return res;\n    }\n    res.push(keys[i]);\n  }\n  return
res;\n}\n\nfunction constructResolvingPath(keys: any[]): string {\n  if (keys.length > 1) {\n    const reversed =
findFirstClosedCycle(keys.slice().reverse());\n    const tokenStrs = reversed.map(k => stringify(k.token));\n    return
' (' + tokenStrs.join(' -> ') + ')';\n  }\n  return '';\n}\n\nexport interface InjectionError extends Error {\n  keys:
ReflectiveKey[];\n  injectors: ReflectiveInjector[];\n  constructResolvingMessage: (keys: ReflectiveKey[]) =>
string;\n  addKey(injector: ReflectiveInjector, key: ReflectiveKey): void;\n}\n\nfunction injectionError(\n  injector:
ReflectiveInjector, key: ReflectiveKey,\n  constructResolvingMessage:
(keys: ReflectiveKey[]) => string,\n  originalError?: Error): InjectionError {\n  const keys = [key];\n  const errMsg
= constructResolvingMessage(keys);\n  const error =\n    (originalError ? wrappedError(errMsg, originalError) :
Error(errMsg)) as InjectionError;\n  error.addKey = addKey;\n  error.keys = keys;\n  error.injectors = [injector];\n
error.constructResolvingMessage = constructResolvingMessage;\n  (error as any)[ERROR_ORIGINAL_ERROR] =
originalError;\n  return error;\n}\n\nfunction addKey(this: InjectionError, injector: ReflectiveInjector, key:
ReflectiveKey): void {\n  this.injectors.push(injector);\n  this.keys.push(key);\n  // Note: This updated message
won't be reflected in the `stack` property\n  this.message = this.constructResolvingMessage(this.keys);\n}\n\n/*\n * Thrown when trying to retrieve a dependency by key from {@link Injector}, but the\n * {@link Injector} does not
have a {@link Provider} for the given key.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * class A {\n *   constructor(b:B) {\n *     }\n *     expect(() => Injector.resolveAndCreate([A]).toThrowError());\n * }\n *\n * ```\n *\n * \nexport function noProviderError(injector: ReflectiveInjector, key: ReflectiveKey): InjectionError {\n
return injectionError(injector, key, function(keys: ReflectiveKey[]) {\n  const first = stringify(keys[0].token);\n
return `No provider for ${first}!${constructResolvingPath(keys)} `;\n });\n}\n\n/*\n * Thrown when dependencies
form a cycle.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * var injector =
Injector.resolveAndCreate([\n *   {provide: \"one\", useFactory: (two) => \"two\", deps: [[new Inject(\"two\")]]},\n *   {
provide: \"two\", useFactory: (one) => \"one\", deps: [[new Inject(\"one\")]]}\n * ]);\n *\n * expect(() =>
injector.get(\"one\")).toThrowError();\n *\n * ```\n *\n * Retrieving `A` or `B` throws a `CyclicDependencyError` as the
graph above cannot be constructed.\n *\n * \nexport function cyclicDependencyError(\n  injector: ReflectiveInjector, key: ReflectiveKey): InjectionError {\n  return injectionError(injector, key,
function(keys: ReflectiveKey[]) {\n    return `Cannot instantiate cyclic
dependency!${constructResolvingPath(keys)} `;\n  });\n}\n\n/*\n * Thrown when a constructing type returns with
an Error.\n *\n * The `InstantiationError` class contains the original error plus the dependency graph which caused\n
* this object to be instantiated.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * class A {\n *
constructor() {\n *   throw new Error('message');\n * }\n *\n * }\n *\n * var injector =
Injector.resolveAndCreate([A]);\n *\n * try {\n *   injector.get(A);\n * } catch (e) {\n *   expect(e instanceof
InstantiationError).toBe(true);\n *   expect(e.originalException.message).toEqual(\"message\");\n *   expect(e.originalStack).toBeDefined();\n * }\n *\n * ```\n *\n * \nexport function instantiationError(\n  injector:
ReflectiveInjector, originalException: any, originalStack: any,\n  key: ReflectiveKey): InjectionError {\n  return injectionError(injector, key, function(keys: ReflectiveKey[]) {\n
const first = stringify(keys[0].token);\n  return `${originalException.message}: Error during instantiation of
${first}!${\n    constructResolvingPath(keys)} `;\n  }, originalException);\n}\n\n/*\n * Thrown when an object
other than {@link Provider} (or `Type`) is passed to {@link Injector}\n * creation.\n *\n * @usageNotes\n * ###
Example\n *\n * ```typescript\n * expect(() => Injector.resolveAndCreate([\"not a type\"]))\n * .toThrowError();\n *\n * ```\n
*\n * \nexport function invalidProviderError(provider: any) {\n  return Error(\n    `Invalid provider - only instances of
Provider and Type are allowed, got: ${provider}`);\n}\n\n/*\n * Thrown when the class has no annotation

```



```

information.\n *\n * Lack of annotation information prevents the { @link Injector } from determining which
dependencies\n * need to be injected into the constructor.\n *\n * @usageNotes\n * ### Example\n
*\n * ```typescript\n * class A {\n *   constructor(b) {\n * }\n *\n * expect(() =>
Injector.resolveAndCreate([A])).toThrowError();\n * ```\n *\n * This error is also thrown when the class not marked
with { @link Injectable } has parameter types.\n *\n * ```typescript\n * class B {\n *\n * class A {\n *
constructor(b:B) {} // no information about the parameter types of A is available at runtime.\n * }\n *\n * expect(()
=> Injector.resolveAndCreate([A,B])).toThrowError();\n * ```\n *\n * ^\nexport function
noAnnotationError(typeOrFunc: Type<any>|Function, params: any[][]): Error {\n  const signature: string[] = [];\n
for (let i = 0, ii = params.length; i < ii; i++) {\n    const parameter = params[i];\n    if (!parameter || parameter.length
== 0) {\n      signature.push('?');\n    } else {\n      signature.push(parameter.map(stringify).join(' '));\n    }\n  }\n
return Error(\n    'Cannot resolve all parameters for \'' + stringify(typeOrFunc) + '\'' +\n    signature.join(',
') + ') . '\n    'Make sure that all the parameters are decorated with Inject or have valid type annotations and that \''
+\n    stringify(typeOrFunc) + '\'' is decorated with Injectable.);\n}\n\n/**\n * Thrown when getting an object by
index.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * class A {\n *\n * var injector =
Injector.resolveAndCreate([A]);\n *\n * expect(() => injector.getAt(100)).toThrowError();\n * ```\n *\n * ^\nexport
function outOfBoundsError(index: number) {\n  return Error(`Index ${index} is out-of-bounds.`);\n}\n\n// TODO:
add a working example after alpha38 is released\n\n/**\n * Thrown when a multi provider and a regular provider are
bound to the same token.\n *\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * expect(() =>
Injector.resolveAndCreate([\n *   { provide: 'Strings', useValue: 'string1', multi: true },\n *   { provide:
'Strings', useValue: 'string2', multi: false }\n * ])).toThrowError();\n * ```\n *\n * ^\nexport function
mixingMultiProvidersWithRegularProvidersError(provider1: any, provider2: any): Error {\n  return
Error(`Cannot mix multi providers and regular providers, got: ${provider1} ${provider2}`);\n}\n\n"/**\n *\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n * ^\nimport { RuntimeError,
RuntimeErrorCode } from './errors';\nimport { stringify } from './util/stringify';\nimport { resolveForwardRef } from
 './forward_ref';\n\n/**\n * A unique object used for retrieving items from the { @link ReflectiveInjector }.\n *\n *
Keys have:\n * - a system-wide unique `id`.\n * - a `token`.\n *\n * `Key` is used internally by { @link
ReflectiveInjector } because its system-wide unique `id` allows\n * the\n * injector to store created objects in a more
efficient way.\n *\n * `Key` should not be created directly. { @link ReflectiveInjector } creates keys automatically
when\n * resolving\n * providers.\n *\n * @deprecated No replacement\n * @publicApi\n *\n * ^\nexport class
ReflectiveKey {\n  public readonly displayName: string;\n  /**\n   * Private\n   * ^\n   constructor(public token:
Object, public id: number) {\n    if (!token) {\n      throw new RuntimeError(\n
RuntimeErrorCode.MISSING_INJECTION_TOKEN, ngDevMode && 'Token must be defined!');\n    }\n    this.displayName =
stringify(this.token);\n  }\n\n  /**\n   * Retrieves a `Key` for a token.\n   * ^\n   static get(token:
Object): ReflectiveKey {\n    return _globalKeyRegistry.get(resolveForwardRef(token));\n  }\n\n  /**\n   * @returns
the number of keys registered in the system.\n   * ^\n   static get numberOfKeys(): number {\n    return
_globalKeyRegistry.numberOfKeys;\n  }\n}\n\nexport class KeyRegistry {\n  private _allKeys = new Map<Object,
ReflectiveKey>();\n  get(token: Object): ReflectiveKey {\n    if (token instanceof ReflectiveKey) return token;\n    if
(this._allKeys.has(token))\n      {\n        return this._allKeys.get(token)!;\n      }\n    const newKey = new ReflectiveKey(token,
ReflectiveKey.numberOfKeys);\n    this._allKeys.set(token, newKey);\n    return newKey;\n  }\n  get
numberOfKeys(): number {\n    return this._allKeys.size;\n  }\n}\n\nconst _globalKeyRegistry = new
KeyRegistry();\n"/**\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n * ^\nimport { Type } from './interface/type';\nimport { resolveForwardRef } from './forward_ref';\nimport
{ InjectionToken } from './injection_token';\nimport { ClassProvider, ExistingProvider, FactoryProvider, Provider,
TypeProvider, ValueProvider } from './interface/provider';\nimport { getReflect } from './jit/util';\nimport { Inject,
Optional, Self, SkipSelf } from './metadata';\nimport { invalidProviderError,

```

```

mixingMultiProvidersWithRegularProvidersError, noAnnotationError }
from './reflective_errors';\nimport {ReflectiveKey} from './reflective_key';\n\ninterface NormalizedProvider
extends TypeProvider, ValueProvider, ClassProvider, ExistingProvider,\n                                                                    FactoryProvider
{\n\n}
\n\n * `Dependency` is used by the framework to extend DI.\n * This is internal to Angular and should not be
used directly.\n *^\nexport class ReflectiveDependency {\n  constructor(\n    public key: ReflectiveKey, public
optional: boolean, public visibility: Self|SkipSelf|null) {\n\n  }\n  static fromKey(key: ReflectiveKey):
ReflectiveDependency {\n    return new ReflectiveDependency(key, false, null);\n  }\n}\n\nconst _EMPTY_LIST:
any[] = [];\n\n\n * An internal resolved representation of a `Provider` used by the `Injector`. \n *
\n * @usageNotes\n * This is usually created automatically by `Injector.resolveAndCreate`. \n * It can be created
manually, as follows:\n * \n * ### Example\n * \n * ```typescript\n * var resolvedProviders = Injector.resolve({
provide: 'message', useValue: 'Hello' });\n * var injector = Injector.fromResolvedProviders(resolvedProviders);\n *
expect(injector.get('message')).toEqual('Hello');\n * \n * ```\n * \n * @publicApi\n *^\nexport interface
ResolvedReflectiveProvider {\n  / **\n   * A key, usually a `Type<any>`. \n   *^\n  key: ReflectiveKey;\n  / **\n   *
Factory function which can return an instance of an object represented by a key. \n   *^\n  resolvedFactories:
ResolvedReflectiveFactory[];\n  / **\n   * Indicates if the provider is a multi-provider or a regular provider. \n   *^\n
  multiProvider: boolean;\n}\n\nexport class ResolvedReflectiveProvider_ implements ResolvedReflectiveProvider
{\n  readonly resolvedFactory: ResolvedReflectiveFactory;\n  constructor(\n    public key: ReflectiveKey, public
resolvedFactories: ResolvedReflectiveFactory[],\n    public multiProvider: boolean) {\n    this.resolvedFactory =
this.resolvedFactories[0];\n  }\n}\n\n\n * An internal resolved representation
of a factory function created by resolving `Provider`. \n * @publicApi\n *^\nexport class ResolvedReflectiveFactory
{\n  constructor(\n    / **\n     * Factory function which can return an instance of an object represented by a key. \n
    *^\n    public factory: Function,\n    / **\n     * Arguments (dependencies) to the `factory` function. \n
    *^\n    public dependencies: ReflectiveDependency[]) {\n\n  }\n}\n\n\n * Resolve a single provider. \n *^\nfunction
resolveReflectiveFactory(provider: NormalizedProvider): ResolvedReflectiveFactory {\n  let factoryFn: Function;\n
let resolvedDeps: ReflectiveDependency[];\n  if (provider.useClass) {\n    const useClass =
resolveForwardRef(provider.useClass);\n    factoryFn = getReflect().factory(useClass);\n    resolvedDeps =
_dependenciesFor(useClass);\n  } else if (provider.useExisting) {\n    factoryFn = (aliasInstance: any) =>
aliasInstance;\n    resolvedDeps = [ReflectiveDependency.fromKey(ReflectiveKey.get(provider.useExisting))];\n
  } else if (provider.useFactory) {\n    factoryFn = provider.useFactory;\n    resolvedDeps =
constructDependencies(provider.useFactory, provider.deps);\n  } else {\n    factoryFn = () => provider.useValue;\n
resolvedDeps = _EMPTY_LIST;\n  }\n  return new ResolvedReflectiveFactory(factoryFn, resolvedDeps);\n}\n\n\n * Converts the `Provider` into `ResolvedProvider`. \n * \n * `Injector` internally only uses
`ResolvedProvider`, `Provider` contains convenience provider\n * syntax. \n *^\nfunction
resolveReflectiveProvider(provider: NormalizedProvider): ResolvedReflectiveProvider {\n  return new
ResolvedReflectiveProvider_(\n    ReflectiveKey.get(provider.provide), [resolveReflectiveFactory(provider)],\n
provider.multi || false);\n}\n\n\n * Resolve a list of Providers. \n *^\nexport function
resolveReflectiveProviders(providers: Provider[]): ResolvedReflectiveProvider[] {\n  const normalized =
_normalizeProviders(providers, []);\n  const resolved = normalized.map(resolveReflectiveProvider);\n  const
resolvedProviderMap = mergeResolvedReflectiveProviders(resolved, new Map());\n  return
Array.from(resolvedProviderMap.values());\n}\n\n\n * Merges a list of ResolvedProviders into a list where each
key is contained exactly once and \n * multi providers have been merged. \n *^\nexport function
mergeResolvedReflectiveProviders(\n  providers: ResolvedReflectiveProvider[],\n  normalizedProvidersMap:
Map<number, ResolvedReflectiveProvider>):\n  Map<number, ResolvedReflectiveProvider> {\n  for (let i = 0; i <
providers.length; i++) {\n    const provider = providers[i];\n    const existing =
normalizedProvidersMap.get(provider.key.id);\n    if (existing) {\n      if (provider.multiProvider !==
existing.multiProvider) {\n        throw mixingMultiProvidersWithRegularProvidersError(existing, provider);\n
      }\n      if (provider.multiProvider) {\n        for (let j = 0; j < provider.resolvedFactories.length; j++) {\n
existing.resolvedFactories.push(provider.resolvedFactories[j]);\n        }\n      }\n    }\n  }\n}\n

```

```

    } else {
      normalizedProvidersMap.set(provider.key.id, provider);
    } else {
      let
resolvedProvider: ResolvedReflectiveProvider;
      if (provider.multiProvider) {
        resolvedProvider = new
ResolvedReflectiveProvider_(
          provider.key, provider.resolvedFactories.slice(), provider.multiProvider);
      } else {
        resolvedProvider = provider;
      }
      normalizedProvidersMap.set(provider.key.id,
resolvedProvider);
    }
  }
  return normalizedProvidersMap;
}

function _normalizeProviders(
  providers:
Provider[], res: NormalizedProvider[]): NormalizedProvider[] {
  providers.forEach(b => {
    if (b instanceof
Type) {
      res.push({provide: b, useClass: b} as NormalizedProvider);
    } else if (b && typeof b == 'object'
&& (b as any).provide !== undefined) {
      res.push(b as NormalizedProvider);
    } else if (Array.isArray(b)) {
      _normalizeProviders(b,
res);
    } else {
      throw invalidProviderError(b);
    }
  });
  return res;
}

export function
constructDependencies(
  typeOrFunc: any, dependencies?: any[]): ReflectiveDependency[] {
  if
(!dependencies) {
    return _dependenciesFor(typeOrFunc);
  } else {
    const params: any[][] =
dependencies.map(t => [t]);
    return dependencies.map(t => _extractToken(typeOrFunc, t, params));
  }
}

function _dependenciesFor(
  typeOrFunc: any): ReflectiveDependency[] {
  const params =
getReflect().parameters(typeOrFunc);
  if (!params) return [];
  if (params.some(p => p == null)) {
    throw
noAnnotationError(typeOrFunc, params);
  }
  return params.map(p => _extractToken(typeOrFunc, p,
params));
}

function _extractToken(
  typeOrFunc: any, metadata: any[]|any, params: any[][]):
ReflectiveDependency {
  let token: any = null;
  let optional = false;
  if (!Array.isArray(metadata)) {
    if
(metadata instanceof Inject) {
      return
_createDependency(metadata.token, optional, null);
    } else {
      return _createDependency(metadata, optional,
null);
    }
  }
  let visibility: Self|SkipSelf|null = null;
  for (let i = 0; i < metadata.length; ++i) {
    const
paramMetadata = metadata[i];
    if (paramMetadata instanceof Type) {
      token = paramMetadata;
    } else
if (paramMetadata instanceof Inject) {
      token = paramMetadata.token;
    } else
if (paramMetadata instanceof Optional) {
      optional = true;
    } else
if (paramMetadata instanceof Self || paramMetadata instanceof
SkipSelf) {
      visibility = paramMetadata;
    } else
if (paramMetadata instanceof InjectionToken) {
      token =
paramMetadata;
    }
  }
  token = resolveForwardRef(token);
  if (token != null) {
    return
_createDependency(token, optional, visibility);
  } else {
    throw noAnnotationError(typeOrFunc, params);
  }
}

function _createDependency(
  token: any, optional: boolean,
visibility: Self|SkipSelf|null): ReflectiveDependency {
  return new
ReflectiveDependency(ReflectiveKey.get(token), optional, visibility);
}

/**
 * @license
 * Copyright
Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
found in the LICENSE file at https://angular.io/license
 */
import {Injector} from './injector';
import
{THROW_IF_NOT_FOUND} from './injector_compatibility';
import {Provider} from
 './interface/provider';
import {Self, SkipSelf} from './metadata';
import {cyclicDependencyError,
instantiationError, noProviderError, outOfBoundsError} from './reflective_errors';
import {ReflectiveKey} from
 './reflective_key';
import {ReflectiveDependency, ResolvedReflectiveFactory, ResolvedReflectiveProvider,
resolveReflectiveProviders} from './reflective_provider';

// Threshold for the dynamic version
const
UNDEFINED = {};

/**
 * A ReflectiveDependency injection container used for instantiating
objects and resolving
 * dependencies.
 * An `Injector` is a replacement for a `new` operator, which can
automatically resolve the
 * constructor dependencies.
 * In typical use, application code asks for the
dependencies in the constructor and they are
 * resolved by the `Injector`.
 * @usageNotes
 * ### Example
 * The following example creates an `Injector` configured to create `Engine` and `Car`.
 * ```typescript
 * @Injectable()
 * class Engine {
 * }
 * @Injectable()
 * class Car {
 *   constructor(public engine: Engine)
 * }
 * var injector = ReflectiveInjector.resolveAndCreate([Car, Engine]);
 * var car = injector.get(Car);
 * expect(car instanceof Car).toBe(true);
 * expect(car.engine instanceof Engine).toBe(true);
 * ```
 * Notice,
we don't use the `new` operator because we explicitly want to have the `Injector`
 * resolve all of the object's
dependencies automatically.
 * TODO: delete in v14.
 * @deprecated

```

from v5 - slow and brings in a lot of code, Use `Injector.create` instead.

```

    * @publicApi
    * ^\nexport abstract class ReflectiveInjector implements Injector {
    * /**
    * * Turns an array of provider definitions into an array of resolved providers.
    * * A resolution is a process of flattening multiple nested arrays and converting individual
    * * providers into an array of `ResolvedReflectiveProvider`s.
    * * @usageNotes
    * * ### Example
    * * ```typescript
    * * @Injectable()
    * * class Engine {}
    * * @Injectable()
    * * class Car {
    * *   constructor(public engine: Engine) {}
    * * }
    * * var providers = ReflectiveInjector.resolve([Car, [Engine]]);
    * * expect(providers.length).toEqual(2);
    * * expect(providers[0] instanceof ResolvedReflectiveProvider).toBe(true);
    * * expect(providers[0].key.displayName).toBe("Car");
    * * expect(providers[0].dependencies.length).toEqual(1);
    * * expect(providers[0].factory).toBeDefined();
    * * expect(providers[1].key.displayName).toBe("Engine");
    * * });
    * * ```
    * * ^\n static resolve(providers: Provider[]): ResolvedReflectiveProvider[] {
    *   return resolveReflectiveProviders(providers);
    * }
    * /**
    * * Resolves an array of providers and creates an injector from those providers.
    * * The passed-in providers can be an array of `Type`, `Provider`,
    * * or a recursive array of more providers.
    * * @usageNotes
    * * ### Example
    * * ```typescript
    * * @Injectable()
    * * class Engine {}
    * * @Injectable()
    * * class Car {
    * *   constructor(public engine: Engine) {}
    * * }
    * * var injector = ReflectiveInjector.resolveAndCreate([Car, Engine]);
    * * expect(injector.get(Car) instanceof Car).toBe(true);
    * * ```
    * * ^\n static resolveAndCreate(providers: Provider[], parent?: Injector): ReflectiveInjector {
    *   const ResolvedReflectiveProviders = ReflectiveInjector.resolve(providers);
    *   return ReflectiveInjector.fromResolvedProviders(ResolvedReflectiveProviders, parent);
    * }
    * /**
    * * Creates an injector from previously resolved providers.
    * * This API is the recommended way to construct injectors in performance-sensitive parts.
    * * @usageNotes
    * * ### Example
    * * ```typescript
    * * @Injectable()
    * * class Engine {}
    * * @Injectable()
    * * class Car {
    * *   constructor(public engine: Engine) {}
    * * }
    * * var providers = ReflectiveInjector.resolve([Car, Engine]);
    * * var injector = ReflectiveInjector.fromResolvedProviders(providers);
    * * expect(injector.get(Car) instanceof Car).toBe(true);
    * * ```
    * * ^\n static fromResolvedProviders(providers: ResolvedReflectiveProvider[], parent?: Injector):
    *   ReflectiveInjector {
    *   return new ReflectiveInjector_(providers, parent);
    * }
    * /**
    * * Parent of this injector.
    * * <!-- TODO: Add a link to the section of the user guide talking about hierarchical injection.
    * * -->
    * * ^\n abstract get parent(): Injector | null;
    * * /**
    * * Resolves an array of providers and creates a child injector from those providers.
    * * <!-- TODO: Add a link to the section of the user guide talking about hierarchical injection.
    * * -->
    * * The passed-in providers can be an array of `Type`, `Provider`,
    * * or a recursive array of more providers.
    * * @usageNotes
    * * ### Example
    * * ```typescript
    * * class ParentProvider {}
    * * class ChildProvider {}
    * * var parent = ReflectiveInjector.resolveAndCreate([ParentProvider]);
    * * var child = parent.resolveAndCreateChild([ChildProvider]);
    * * expect(child.get(ParentProvider) instanceof ParentProvider).toBe(true);
    * * expect(child.get(ChildProvider) instanceof ChildProvider).toBe(true);
    * * expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));
    * * ```
    * * ^\n abstract resolveAndCreateChild(providers: Provider[]): ReflectiveInjector;
    * /**
    * * Creates a child injector from previously resolved providers.
    * * <!-- TODO: Add a link to the section of the user guide talking about hierarchical injection.
    * * -->
    * * This API is the recommended way to construct injectors in performance-sensitive parts.
    * * @usageNotes
    * * ### Example
    * * ```typescript
    * * class ParentProvider {}
    * * class ChildProvider {}
    * * var parentProviders = ReflectiveInjector.resolve([ParentProvider]);
    * * var childProviders = ReflectiveInjector.resolve([ChildProvider]);
    * * var parent = ReflectiveInjector.fromResolvedProviders(parentProviders);
    * * var child = parent.createChildFromResolved(childProviders);
    * * expect(child.get(ParentProvider) instanceof ParentProvider).toBe(true);
    * * expect(child.get(ChildProvider) instanceof ChildProvider).toBe(true);
    * * expect(child.get(ParentProvider)).toBe(parent.get(ParentProvider));
    * * ```
    * * ^\n abstract createChildFromResolved(providers:

```

```

ResolvedReflectiveProvider[]): ReflectiveInjector;\n\n /**\n * Resolves a provider and instantiates an object in
the context of the injector.\n *\n * The created object does not get cached by the injector.\n *\n *
@usageNotes\n * ### Example\n *\n * ```typescript\n * @Injectable()\n * class Engine {\n * }\n *\n * @Injectable()\n * class Car {\n *   constructor(public engine:Engine) {\n * }\n *\n * var injector =
ReflectiveInjector.resolveAndCreate([Engine]);\n *\n * var car = injector.resolveAndInstantiate(Car);\n *\n *
expect(car.engine).toBe(injector.get(Engine));\n *\n * expect(car).not.toBe(injector.resolveAndInstantiate(Car));\n *\n *
```*\n */\n\n abstract resolveAndInstantiate(provider: Provider): any;\n\n /**\n * Instantiates an object using a
resolved provider in the context of the injector.\n *\n * The created object does not get cached by the injector.\n
*\n * @usageNotes\n * ### Example\n *\n * ```typescript\n * @Injectable()\n * class Engine {\n * }\n *\n * @Injectable()\n * class Car {\n *   constructor(public
engine:Engine) {\n * }\n *\n * var injector = ReflectiveInjector.resolveAndCreate([Engine]);\n *\n * var
carProvider = ReflectiveInjector.resolve([Car])[0];\n *\n * var car = injector.instantiateResolved(carProvider);\n *\n *
expect(car.engine).toBe(injector.get(Engine));\n *\n *
expect(car).not.toBe(injector.instantiateResolved(carProvider));\n *\n * ```*\n */\n\n abstract
instantiateResolved(provider: ResolvedReflectiveProvider): any;\n\n\n abstract get(token: any, notFoundValue?:
any): any;\n\n\n\nexport class ReflectiveInjector_ implements ReflectiveInjector {\n  private static INJECTOR_KEY
= (/* @__PURE__ */ ReflectiveKey.get(Injector));\n  /** @internal */\n  _constructionCounter: number = 0;\n  /**
@internal */\n  public _providers: ResolvedReflectiveProvider[];\n  public readonly parent: Injector|null;\n\n  keyIds: number[];\n  objs: any[];\n  /**\n *
Private\n */\n  constructor(_providers: ResolvedReflectiveProvider[], _parent?: Injector) {\n    this._providers =
_providers;\n    this.parent = _parent || null;\n\n    const len = _providers.length;\n\n    this.keyIds = [];\n    this.objs =
[];\n\n    for (let i = 0; i < len; i++) {\n      this.keyIds[i] = _providers[i].key.id;\n      this.objs[i] = UNDEFINED;\n
}\n  }\n\n  get(token: any, notFoundValue: any = THROW_IF_NOT_FOUND): any {\n    return
this._getByKey(ReflectiveKey.get(token), null, notFoundValue);\n  }\n\n  resolveAndCreateChild(providers:
Provider[]): ReflectiveInjector {\n    const ResolvedReflectiveProviders = ReflectiveInjector.resolve(providers);\n
return this.createChildFromResolved(ResolvedReflectiveProviders);\n  }\n\n  createChildFromResolved(providers:
ResolvedReflectiveProvider[]): ReflectiveInjector {\n    const inj = new ReflectiveInjector_(providers);\n    (inj as
{parent: Injector | null}).parent = this;\n    return inj;\n  }\n\n  resolveAndInstantiate(provider:
Provider): any {\n    return this.instantiateResolved(ReflectiveInjector.resolve([provider])[0]);\n  }\n\n  instantiateResolved(provider: ResolvedReflectiveProvider): any {\n    return this._instantiateProvider(provider);\n
}\n\n  getProviderAtIndex(index: number): ResolvedReflectiveProvider {\n    if (index < 0 || index >=
this._providers.length) {\n      throw outOfBoundsError(index);\n    }\n    return this._providers[index];\n  }\n\n  /**
@internal */\n  _new(provider: ResolvedReflectiveProvider): any {\n    if (this._constructionCounter++ >
this._getMaxNumberOfObjects()) {\n      throw cyclicDependencyError(this, provider.key);\n    }\n    return
this._instantiateProvider(provider);\n  }\n\n  private _getMaxNumberOfObjects(): number {\n    return
this.objs.length;\n  }\n\n  private _instantiateProvider(provider: ResolvedReflectiveProvider): any {\n    if
(provider.multiProvider) {\n      const res = [];\n      for (let i = 0; i < provider.resolvedFactories.length;
++i) {\n        res[i] = this._instantiate(provider, provider.resolvedFactories[i]);\n      }\n      return res;\n    } else {\n
return this._instantiate(provider, provider.resolvedFactories[0]);\n    }\n  }\n\n  private _instantiate(\n    provider:
ResolvedReflectiveProvider,\n    ResolvedReflectiveFactory: ResolvedReflectiveFactory): any {\n    const factory
= ResolvedReflectiveFactory.factory;\n\n    let deps: any[];\n    try {\n      deps =\n
ResolvedReflectiveFactory.dependencies.map(dep => this._getByReflectiveDependency(dep));\n    } catch (e: any)
{\n      if (e.addKey) {\n        e.addKey(this, provider.key);\n      }\n      throw e;\n    }\n\n    let obj: any;\n    try {\n
obj = factory(...deps);\n    } catch (e) {\n      throw instantiationError(this, e, (e as Error).stack, provider.key);\n
}\n\n    return obj;\n  }\n\n  private _getByReflectiveDependency(dep: ReflectiveDependency): any {\n    return
this._getByKey(dep.key, dep.visibility, dep.optional
? null : THROW_IF_NOT_FOUND);\n  }\n\n  private _getByKey(key: ReflectiveKey, visibility: Self|SkipSelf|null,
notFoundValue: any): any {\n    if (key === ReflectiveInjector_.INJECTOR_KEY) {\n      return this;\n    }\n    if

```

```

(visibility instanceof Self) {\n    return this._getByKeySelf(key, notFoundValue);\n\n } else {\n    return
this._getByKeyDefault(key, notFoundValue, visibility);\n } }\n\n private _getObjByKeyId(keyId: number):
any {\n    for (let i = 0; i < this.keyIds.length; i++) {\n        if (this.keyIds[i] === keyId) {\n            if (this.objs[i] ===
UNDEFINED) {\n                this.objs[i] = this._new(this._providers[i]);\n            }\n\n            return this.objs[i];\n        }\n    }\n\n    return UNDEFINED;\n }\n\n /** @internal *\n _throwOrNull(key: ReflectiveKey, notFoundValue: any):
any {\n    if (notFoundValue !== THROW_IF_NOT_FOUND) {\n        return notFoundValue;\n    } else {\n        throw
noProviderError(this, key);\n    }\n }\n\n /** @internal *\n _getByKeySelf(key:
ReflectiveKey, notFoundValue: any): any {\n    const obj = this._getObjByKeyId(key.id);\n    return (obj !==
UNDEFINED) ? obj : this._throwOrNull(key, notFoundValue);\n }\n\n /** @internal *\n _getByKeyDefault(key:
ReflectiveKey, notFoundValue: any, visibility: Self|SkipSelf|null): any {\n    let inj: Injector|null;\n\n    if (visibility
instanceof SkipSelf) {\n        inj = this.parent;\n    } else {\n        inj = this;\n    }\n\n    while (inj instanceof
ReflectiveInjector_) {\n        const inj_ = <ReflectiveInjector_>inj;\n        const obj = inj_._getObjByKeyId(key.id);\n
        if (obj !== UNDEFINED) return obj;\n        inj = inj_.parent;\n    }\n\n    if (inj !== null) {\n        return
inj.get(key.token, notFoundValue);\n    } else {\n        return this._throwOrNull(key, notFoundValue);\n    }\n }\n\n
get displayName(): string {\n    const providers =\n        _mapProviders(this, (b: ResolvedReflectiveProvider) => '\n'
+ b.key.displayName + "\n")\n        .join(',
');\n    return `ReflectiveInjector(providers: [${providers}]);\n }\n\n toString(): string {\n    return
this.displayName;\n }\n\n\nfunction _mapProviders(injector: ReflectiveInjector_, fn: Function): any[] {\n    const
res: any[] = [];\n    for (let i = 0; i < injector._providers.length; ++i) {\n        res[i] =
fn(injector.getProviderAtIndex(i));\n    }\n    return res;\n }\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n**\n * @module\n * @description\n * The `di` module provides
dependency injection container services.\n *\n\nexport * from './metadata';\nexport {InjectFlags} from
'./interface/injector';\nexport {defineInjectable, defineInjectable, defineInjector, InjectableType, InjectorType} from
'./interface/defs';\nexport {forwardRef, resolveForwardRef, ForwardRefFn} from './forward_ref';\nexport
{Injectable, InjectableDecorator,
InjectableProvider} from './injectable';\nexport {Injector} from './injector';\nexport {EnvironmentInjector} from
'./r3_injector';\nexport {importProvidersFrom, ImportProvidersSource} from './provider_collection';\nexport
{ENVIRONMENT_INITIALIZER} from './initializer_token';\nexport {ProviderToken} from
'./provider_token';\nexport {inject, inject, InjectOptions, invalidFactoryDep} from './injector_compatibility';\nexport
{INJECTOR} from './injector_token';\nexport {ReflectiveInjector} from './reflective_injector';\nexport
{ClassProvider, ModuleWithProviders, ClassSansProvider, ImportedNgModuleProviders, ConstructorProvider,
ConstructorSansProvider, ExistingProvider, ExistingSansProvider, FactoryProvider, FactorySansProvider, Provider,
StaticClassProvider, StaticClassSansProvider, StaticProvider, TypeProvider, ValueProvider, ValueSansProvider}
from './interface/provider';\nexport {ResolvedReflectiveFactory, ResolvedReflectiveProvider} from
'./reflective_provider';\nexport
{ReflectiveKey} from './reflective_key';\nexport {InjectionToken} from './injection_token';\n", "/*\n * @license\n
* Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n**\n * This file should not be
necessary because node resolution should just default to `./di/index`!\n *\n * However it does not seem to work and
it breaks:\n * - //packages/animations/browser/test:test_web_chromium-local\n * - //packages/compiler-
cli/test:extract_i18n\n * - //packages/compiler-cli/test:ngc\n * - //packages/compiler-cli/test:perform_watch\n * -
//packages/compiler-cli/test/diagnostics:check_types\n * - //packages/compiler-cli/test/transformers:test\n * -
//packages/compiler/test:test\n * - //tools/public_api_guard:core_api\n *\n * Remove this file once the above is
solved or wait until `ngc` is deleted and then it should be\n * safe to delete this file.\n
*\n\nexport * from './di/index';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport {InjectFlags, resolveForwardRef} from './../di';\n\nimport

```

```

{assertInjectImplementationNotEqual} from '././di/inject_switch';\nimport {inject} from
'././di/injector_compatibility';\nimport {ProviderToken} from '././di/provider_token';\nimport
{getOrCreateInjectable} from './di';\nimport {TDirectiveHostNode} from './interfaces/node';\nimport
{getCurrentTNode, getLView} from './state';\n\n/**\n * Returns the value associated to the given token from the
injectors.\n * \n * `directiveInject` is intended to be used for directive, component and pipe factories.\n * All other
injection use `inject` which does not walk the node injector tree.\n * \n * Usage example (in factory function):\n * \n
* ```ts\n * class SomeDirective {\n *   constructor(directive:
DirectiveA) {\n *     static dir = defineDirective({\n *       type: SomeDirective,\n *       factory: () => new
SomeDirective(directiveInject(DirectiveA))\n *     });\n *   }\n *   /**\n *    @param token the type or token to inject\n *
@param flags Injection flags\n * @returns the value from the injector or `null` when not found\n * \n *
@codeGenApi\n * \nexport function directiveInject<T>(token: ProviderToken<T>): T;\nexport function
directiveInject<T>(token: ProviderToken<T>, flags: InjectFlags): T;\nexport function directiveInject<T>(token:
ProviderToken<T>, flags = InjectFlags.Default): T|null {\n  const lView = getLView();\n  // Fall back to inject() if
view hasn't been created. This situation can happen in tests\n  // if inject utilities are used before bootstrapping.\n  if
(lView === null) {\n    // Verify that we will not get into infinite loop.\n    ngDevMode &&
assertInjectImplementationNotEqual(directiveInject);\n    return inject(token, flags);\n  }\n  const tNode = getCurrentTNode();\n  return getOrCreateInjectable<T>(\n    tNode as TDirectiveHostNode,
lView, resolveForwardRef(token), flags);\n}\n\n/**\n * Throws an error indicating that a factory function could not
be generated by the compiler for a\n * particular class.\n * \n * This instruction allows the actual error message to be
optimized away when ngDevMode is turned\n * off, saving bytes of generated code while still providing a good
experience in dev mode.\n * \n * The name of the class is not mentioned here, but will be in the generated factory
function name\n * and thus in the stack trace.\n * \n * @codeGenApi\n * \nexport function invalidFactory(): never
{\n  const msg =\n    ngDevMode ? `This constructor was not compatible with Dependency Injection.` : 'invalid';\n  throw new Error(msg);\n}\n\n",\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE
file at https://angular.io/license\n * \nimport './ng_dev_mode';\nimport {newTrustedFunctionForDev} from
'./security/trusted_types';\n\n/**\n * THIS FILE CONTAINS CODE WHICH SHOULD BE TREE SHAKEN AND
NEVER CALLED FROM PRODUCTION CODE!!!\n * \n\n/**\n * Creates an `Array` construction with a given
name. This is useful when\n * looking for memory consumption to see what time of array it is.\n * \n * \n * @param
name Name to give to the constructor\n * @returns A subclass of `Array` if possible. This can only be done in\n *
environments which support `class` construct.\n * \nexport function createNamedArrayType(name: string): typeof
Array {\n  // This should never be called in prod mode, so let's verify that is the case.\n  if (ngDevMode) {\n    try
{\n      // If this function were compromised the following could lead to arbitrary\n      // script execution. We bless it
with Trusted Types anyway since this\n      // function is stripped out of production binaries.\n      return
(newTrustedFunctionForDev('Array', `return class ${name} extends Array{}`))(Array);\n    } catch (e) {\n      // If it
does not work just give up and fall back to regular Array.\n      return Array;\n    }\n  } else {\n    throw new Error(\n
'Looks like we are in `prod mode`, but we are creating a named Array type, which is wrong! Check your
code');\n  }\n}\n\n",\n\n/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *
\nimport {KeyValueArray} from '././util/array_utils';\nimport {assertNumber, assertNumberInRange} from
'././util/assert';\n\n/**\n * Value stored in the `TData` which is needed to re-concatenate the styling.\n * \n * See:
`TStylingKeyPrimitive` and `TStylingStatic`\n * \nexport type TStylingKey =
TStylingKeyPrimitive|TStylingStatic;\n\n/**\n * The primitive portion (`TStylingStatic` removed) of the value
stored in the `TData` which is\n * needed to re-concatenate the styling.\n * \n * - `string`: Stores the property name.
Used with `styleProp`/`classProp` instruction.\n * - `null`: Represents map, so there is no name. Used with
`styleMap`/`classMap`.\n * - `false`: Represents an ignore case. This happens when `styleProp`/`classProp`
instruction\n * is combined with directive which shadows its input `@Input('class')`. That way the binding\n *
should not participate in the styling resolution.\n * \nexport type TStylingKeyPrimitive = string|null|false;\n\n/**\n *

```

Store the static values for the styling binding. The `TStylingStatic` is just `KeyValueArray` where key (stored at location 0) contains the `TStylingKey` (stored at location 1). In other words this wraps the `TStylingKey` such that the contains the wrapped value. When instructions are resolving styling they may need to look forward or backwards in the linked list to resolve the value. For this reason we have to make sure that the linked list also contains the static values. However the list only has space for one item per styling instruction. For this reason we store the static values here as part of the `TStylingKey`. This means that the resolution function when looking for a value needs to first look at the binding value, and then at `TStylingKey` (if it exists). Imagine we have:

```

<div
class="TEMPLATE" my-dir>
  @Directive({
    host: {
      class: 'DIR',
      [class.dynamic]: 'exp' //
classProp('dynamic', ctx.exp);
    })
  // assume binding location: 10 for `classProp('dynamic', ctx.exp);
  tData[10] =
<TStylingStatic>
  ': 'dynamic', // This is the wrapped value of `TStylingKey`
  'DIR': true, // This is the
default static value of directive binding
];
  tData[10
+ 1] = 0; // We don't have prev/next
  IView[10] = undefined; // assume `ctx.exp` is `undefined`
  IView[10 + 1] = undefined; // Just normalized `IView[10]`
  // So when the function is resolving styling
value, it first needs to look into the linked list
(there is none) and then into the static `TStylingStatic` too see if
there is a default value for `dynamic` (there is not). Therefore it is safe to remove it.
  If setting `true`
case:
  IView[10] = true; // assume `ctx.exp` is `true`
  IView[10 + 1] = true; // Just normalized
`IView[10]`
  // So when the function is resolving styling value, it first needs to look into the linked list
(there is none) and then into `TNode.residualClass` (TNode.residualStyle) which contains
  tNode.residualClass =
  'TEMPLATE': true,
];
  // This means that it is safe to add class.
  export interface TStylingStatic extends KeyValueArray<any>
  {
    // This is a branded number which contains previous and next index.
    // When we come across
styling instructions we need to store the `TStylingKey` in the correct
order so that we can re-concatenate the
styling value in the desired priority.
    // The insertion can happen either at the
- end of template as in the
case of coming across additional styling instruction in the template
- in front of the template in the case of
coming across additional instruction in the
`hostBindings`.
    // We use `TStylingRange` to store the
previous and next index into the `TData` where the template
bindings can be found.
    // bit 0 is used to
mark that the previous index has a duplicate for current value.
    // bit 1 is used to mark that the next index has a
duplicate for the current value.
    // bits 2-16 are used to encode the next/tail of the template.
    // bits 17-32 are
used to encode the previous/head of template.
    // NODE: *duplicate* false implies
that it is statically known that this binding will not collide
with other bindings and therefore there is no need to
check other bindings. For example the
bindings in `<div [style.color]=`exp` [style.width]=`exp`>` will never
collide and will have
their bits set accordingly. Previous duplicate means that we may need to check previous if
the
current binding is `null`. Next duplicate means that we may need to check next bindings if the
current
binding is not `null`.
    // NOTE: `0` has special significance and represents `null` as in no additional pointer.
  }
  export interface TStylingRange {
    __brand__: 'TStylingRange';
  }
  // Shift and masks constants for
encoding two numbers into and duplicate info into a single number.
  export const enum StylingRange {
    //
Number of bits to shift for the previous pointer
    PREV_SHIFT = 17,
    // Previous pointer mask.
    PREV_MASK = 0xFFFE0000,
    //
Number of bits to shift for the next pointer
    NEXT_SHIFT = 2,
    // Next pointer mask.
    NEXT_MASK = 0x001FFFC,
    // Mask to remove negative bit.
(interpret number as positive)
    UNSIGNED_MASK = 0x7FFF,
  }
  // This bit is set if the previous
bindings contains a binding which could possibly cause a
duplicate. For example: `<div [style]=`map`
[style.width]=`width`>`, the `width` binding will
have previous duplicate set. The implication is that if
`width` binding becomes `null`, it is
necessary to defer the value to `map.width`. (Because `width` overwrites
`map.width`.)
  // This bit is set to if the next binding contains a
binding which could possibly cause a
duplicate. For example: `<div [style]=`map` [style.width]=`width`>`,
the `map` binding will
have next duplicate set. The implication is that if `map.width` binding becomes not

```



```

`null`, it\n * is necessary to defer the value to `width`. (Because `width` overwrites `map.width`.)\n
*/\n NEXT_DUPLICATE = 0x01,\n}\n\n\nexport function toTStylingRange(prev: number, next: number):\n
TStylingRange {\n ngDevMode && assertNumberInRange(prev, 0, StylingRange.UNSIGNED_MASK);\n
ngDevMode && assertNumberInRange(next, 0, StylingRange.UNSIGNED_MASK);\n return (prev <<\n
StylingRange.PREV_SHIFT | next << StylingRange.NEXT_SHIFT) as any;\n}\n\n\nexport function\n
getTStylingRangePrev(tStylingRange: TStylingRange): number {\n ngDevMode && assertNumber(tStylingRange,\n
'expected number');\n return ((tStylingRange as any as number) >> StylingRange.PREV_SHIFT) &\n
StylingRange.UNSIGNED_MASK;\n}\n\n\nexport function getTStylingRangePrevDuplicate(tStylingRange:\n
TStylingRange): boolean {\n ngDevMode && assertNumber(tStylingRange, 'expected number');\n return\n
((tStylingRange as any as number) & StylingRange.PREV_DUPLICATE) ==\n
StylingRange.PREV_DUPLICATE;\n}\n\n\nexport function setTStylingRangePrev(\n tStylingRange:\n
TStylingRange, previous: number): TStylingRange {\n ngDevMode && assertNumber(tStylingRange,\n
'expected number');\n ngDevMode && assertNumberInRange(previous, 0, StylingRange.UNSIGNED_MASK);\n
return (((tStylingRange as any as number) & ~StylingRange.PREV_MASK) |\n (previous <<\n
StylingRange.PREV_SHIFT)) as any;\n}\n\n\nexport function setTStylingRangePrevDuplicate(tStylingRange:\n
TStylingRange): TStylingRange {\n ngDevMode && assertNumber(tStylingRange, 'expected number');\n return\n
((tStylingRange as any as number) | StylingRange.PREV_DUPLICATE) as any;\n}\n\n\nexport function\n
getTStylingRangeNext(tStylingRange: TStylingRange): number {\n ngDevMode && assertNumber(tStylingRange,\n
'expected number');\n return ((tStylingRange as any as number) & StylingRange.NEXT_MASK) >>\n
StylingRange.NEXT_SHIFT;\n}\n\n\nexport function setTStylingRangeNext(tStylingRange: TStylingRange, next:\n
number): TStylingRange {\n ngDevMode && assertNumber(tStylingRange, 'expected number');\n ngDevMode\n
&& assertNumberInRange(next, 0, StylingRange.UNSIGNED_MASK);\n return (((tStylingRange\n
as any as number) & ~StylingRange.NEXT_MASK) | /\n next << StylingRange.NEXT_SHIFT) as\n
any;\n}\n\n\nexport function getTStylingRangeNextDuplicate(tStylingRange: TStylingRange): boolean {\n\n
ngDevMode && assertNumber(tStylingRange, 'expected number');\n return ((tStylingRange as any as number) &\n
StylingRange.NEXT_DUPLICATE) ===\n StylingRange.NEXT_DUPLICATE;\n}\n\n\nexport function\n
setTStylingRangeNextDuplicate(tStylingRange: TStylingRange): TStylingRange {\n ngDevMode &&\n
assertNumber(tStylingRange, 'expected number');\n return ((tStylingRange as any as number) |\n
StylingRange.NEXT_DUPLICATE) as any;\n}\n\n\nexport function getTStylingRangeTail(tStylingRange:\n
TStylingRange): number {\n ngDevMode && assertNumber(tStylingRange, 'expected number');\n const next =\n
getTStylingRangeNext(tStylingRange);\n return next === 0 ? getTStylingRangePrev(tStylingRange) :\n
next;\n}\n\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source\n
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n\n*/\n * Patch a `debug` property on top of the existing object.\n * \n * NOTE: always call this method with\n
`ngDevMode && attachDebugObject(...)`\n * \n * @param obj Object to patch\n * @param debug Value to patch\n
*/\n\n\nexport function attachDebugObject(obj: any, debug: any): void {\n if (ngDevMode) {\n\n
Object.defineProperty(obj, 'debug', {value: debug, enumerable: false});\n } else {\n throw new Error(\n
'This method should be guarded with `ngDevMode` so that it can be tree shaken in production!');\n }\n}\n\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is\n
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\n\nimport {Injector} from './di/injector';\nimport {Type} from './interface/type';\nimport {SchemaMetadata}\n
from './metadata/schema';\nimport {Sanitizer} from './sanitization/sanitizer';\nimport {KeyValueArray} from

```

```

'././util/array_utils';\nimport {assertDefined} from '././util/assert';\nimport {createNamedArrayType} from
'././util/named_array_type';\nimport {assertNodeInjector} from './assert';\nimport {getInjectorIndex,
getParentInjectorLocation} from './di';\nimport {CONTAINER_HEADER_OFFSET,
HAS_TRANSPLANTED_VIEWS, LContainer,
MOVED_VIEWS, NATIVE} from './interfaces/container';\nimport {ComponentTemplate, DirectiveDef,
DirectiveDefList, PipeDefList, ViewQueriesFunction} from './interfaces/definition';\nimport
{NO_PARENT_INJECTOR, NodeInjectorOffset} from './interfaces/injector';\nimport {AttributeMarker,
InsertBeforeIndex, PropertyAliases, TConstants, TContainerNode, TElementNode, TNode as ITNode, TNodeFlags,
TNodeProviderIndexes, TNodeType, toTNodeTypeAsString} from './interfaces/node';\nimport {SelectorFlags}
from './interfaces/projection';\nimport {LQueries, TQueries} from './interfaces/query';\nimport {Renderer,
RendererFactory} from './interfaces/renderer';\nimport {RComment, RElement, RNode} from
'./interfaces/renderer_dom';\nimport {getTStylingRangeNext, getTStylingRangeNextDuplicate,
getTStylingRangePrev, getTStylingRangePrevDuplicate, TStylingKey, TStylingRange} from
'./interfaces/styling';\nimport {CHILD_HEAD, CHILD_TAIL, CLEANUP, CONTEXT, DebugNode,
DECLARATION_VIEW, DestroyHookData,
FLAGS, HEADER_OFFSET, HookData, HOST, HostBindingOpCodes, ID, INJECTOR, LContainerDebug as
ILContainerDebug, LView, LViewDebug as ILViewDebug, LViewDebugRange, LViewDebugRangeContent,
LViewFlags, NEXT, NodeInjectorDebug, PARENT, QUERIES, RENDERER, RENDERER_FACTORY,
SANITIZER, T_HOST, TData, TView as ITView, TVIEW, TView, TViewType, TViewTypeAsString} from
'./interfaces/view';\nimport {attachDebugObject} from './util/debug_utils';\nimport {getParentInjectorIndex,
getParentInjectorView} from './util/injector_utils';\nimport {unwrapRNode} from './util/view_utils';\n\n * This
file contains conditionally attached classes which provide human readable (debug) level\n * information for
`LView`, `LContainer` and other internal data structures. These data structures\n * are stored internally as array
which makes it very difficult during debugging to reason about the\n * current state of the system.\n *\n * Patching
the array with extra property does change the array's hidden class' but
it does not\n * change the cost of access, therefore this patching should not have significant if any impact in\n *
`ngDevMode` mode. (see: https://jsperf.com/array-vs-monkey-patch-array)\n *\n * So instead of seeing:\n * ```\n *
Array(30) [Object, 659, null, ...]\n * ```\n *\n * You get to see:\n * ```\n * LViewDebug {\n *   views: [...],\n *
  flags: {attached: true, ...}\n *   nodes: [\n *     {html: '<div id="123">', ..., nodes: [\n *       {html: '<span>', ...,
nodes: null}\n *     ]}\n *   ]\n * }\n * ```\n *\n * \n\nlet LVIEW_COMPONENT_CACHE: Map<string|null,
Array<any>>|undefined;\nlet LVIEW_EMBEDDED_CACHE: Map<string|null, Array<any>>|undefined;\nlet
LVIEW_ROOT: Array<any>|undefined;\nlet LVIEW_COMPONENT: Array<any>|undefined;\nlet
LVIEW_EMBEDDED: Array<any>|undefined;\n\ninterface TViewDebug extends ITView {\n  type:
TViewType;\n}\n\n * This function clones a blueprint and creates LView.\n *\n * Simple slice will keep the
same type, and we need it to be LView\n *\n * \n\nexport function
cloneToLViewFromTViewBlueprint<T>(tView: TView): LView<T> {\n  const debugTView = tView as
TViewDebug;\n  const IView = getLViewToClone(debugTView.type, tView.template && tView.template.name);\n
return IView.concat(tView.blueprint) as any;\n}\n\n\nclass LRootView extends Array {} \nclass LComponentView
extends Array {} \nclass LEmbeddedView extends Array {} \n\nfunction getLViewToClone(type: TViewType,
name: string|null): Array<any> {\n  switch (type) {\n    case TViewType.Root:\n      if (LVIEW_ROOT ===
undefined) LVIEW_ROOT = new LRootView();\n      return LVIEW_ROOT;\n    case TViewType.Component:\n
if (!ngDevMode || !ngDevMode.namedConstructors) {\n      if (LVIEW_COMPONENT === undefined)\n        LVIEW_COMPONENT = new LComponentView();\n      return LVIEW_COMPONENT;\n    }\n    if
(LVIEW_COMPONENT_CACHE === undefined) LVIEW_COMPONENT_CACHE = new Map();\n    let
componentArray = LVIEW_COMPONENT_CACHE.get(name);\n    if (componentArray === undefined) {\n
componentArray
= new (createNamedArrayType('LComponentView' + nameSuffix(name)))();\n
LVIEW_COMPONENT_CACHE.set(name, componentArray);\n    }\n    return componentArray;\n    case

```

```

TViewType.Embedded:\n    if (!ngDevMode || !ngDevMode.namedConstructors) {\n        if
(LVIEW_EMBEDDED === undefined) LVIEW_EMBEDDED = new LEmbeddedView();\n        return
LVIEW_EMBEDDED;\n    }\n    if (LVIEW_EMBEDDED_CACHE === undefined)
LVIEW_EMBEDDED_CACHE = new Map();\n    let embeddedArray =
LVIEW_EMBEDDED_CACHE.get(name);\n    if (embeddedArray === undefined) {\n        embeddedArray =
new (createNamedArrayType('LEmbeddedView' + nameSuffix(name)))();\n
LVIEW_EMBEDDED_CACHE.set(name, embeddedArray);\n    }\n    return embeddedArray;\n
}\n}\n\nfunction nameSuffix(text: string|null|undefined): string {\n    if (text == null) return '';\n    const index =
text.lastIndexOf('_Template');\n    return '_' + (index === -1 ? text : text.slice(0, index));\n}\n\n/**\n * This class is a
debug version
of Object literal so that we can have constructor name show up\n * in\n * debug tools in ngDevMode.\n */\nexport
const TViewConstructor = class TView implements ITView {\n    constructor(\n        public type: TViewType,\n
public blueprint: LView,\n        public template: ComponentTemplate<{}>|null,\n        public queries: TQueries|null,\n
public viewQuery: ViewQueriesFunction<{}>|null,\n        public declTNode: ITNode|null,\n        public data:
TData,\n        public bindingStartIndex: number,\n        public expandoStartIndex: number,\n        public
hostBindingOpCodes: HostBindingOpCodes|null,\n        public firstCreatePass: boolean,\n        public firstUpdatePass:
boolean,\n        public staticViewQueries: boolean,\n        public staticContentQueries: boolean,\n        public
preOrderHooks: HookData|null,\n        public preOrderCheckHooks: HookData|null,\n        public contentHooks:
HookData|null,\n        public contentCheckHooks: HookData|null,\n        public viewHooks: HookData|null,\n
public viewCheckHooks: HookData|null,\n        public destroyHooks: DestroyHookData|null,\n        public cleanup:
any[]|null,\n        public contentQueries: number[]|null,\n        public components: number[]|null,\n        public
directiveRegistry: DirectiveDefList|null,\n        public pipeRegistry: PipeDefList|null,\n        public firstChild:
ITNode|null,\n        public schemas: SchemaMetadata[]|null,\n        public consts: TConstants|null,\n        public
incompleteFirstPass: boolean,\n        public _decls: number,\n        public _vars: number,\n        (n ) { }\n    get template_():
string {\n        const buf: string[] = [];\n        processTNodeChildren(this.firstChild, buf);\n        return buf.join('');\n    }\n
get type_(): string {\n        return TViewTypeAsString[this.type] || `TViewType.${this.type}`;\n    }\n};\n\nclass
TNode implements ITNode {\n    constructor(\n        public tView_: TView,\n\n        //\n
public type: TNodeType,\n\n        //\n        public index: number,\n\n        //\n        public insertBeforeIndex:
InsertBeforeIndex,\n\n        //\n        public injectorIndex: number,\n\n        //\n
public directiveStart: number,\n\n        //\n        public directiveEnd: number,\n\n        //\n        public directiveStylingLast: number,\n\n        //\n        public propertyBindings:
number[]|null,\n\n        //\n        public flags: TNodeFlags,\n\n        //\n
public providerIndexes: TNodeProviderIndexes,\n\n        //\n        public value: string|null,\n\n        //\n
public attrs: (string|AttributeMarker|(string|SelectorFlags)[])[]|null,\n\n        //\n        public mergedAttrs: (string|AttributeMarker|(string|SelectorFlags)[])[]|null, //\n        public localNames:
(string|number)[]|null,\n\n        //\n        public initialInputs: (string[]|null)[]|null|undefined,\n\n        //\n        public inputs: PropertyAliases|null,\n\n        //\n        public outputs: PropertyAliases|null,\n\n        //\n        public tViews: ITView|ITView[]|null,\n\n        //\n        public next:
ITNode|null,\n\n        //\n        public projectionNext: ITNode|null,\n\n        //\n        public child: ITNode|null,\n\n        //\n        public parent:
TElementNode|TContainerNode|null,\n\n        //\n        public projection: number|(ITNode|RNode[])[]|null,\n\n        //\n        public
styles: string|null,\n\n        //\n        public stylesWithoutHost: string|null,\n\n        //\n        public residualStyles: KeyValueArray<any>|undefined|null,\n\n        //\n        public classes:
string|null,\n\n        //\n        public classesWithoutHost: string|null,\n\n        //\n
public residualClasses: KeyValueArray<any>|undefined|null,\n\n        //\n        public classBindings:
TStylingRange,\n\n        //\n        public styleBindings: TStylingRange,

```

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//\n ) {} \n\n /** \n * Return a human debug version of the set of `NodeInjector`s which will be consulted when\n * resolving tokens from this `TNode`. \n * \n * When debugging applications, it is often difficult to determine\n which `NodeInjector`s will be\n * consulted. This method shows a list of\n `DebugNode`s representing the `TNode`s which will be\n * consulted in order when resolving a token starting at\n this `TNode`. \n * \n * The original data is stored in `LView` and `TView` with a lot of offset indexes, and so it is\n * difficult to reason about. \n * \n * @param IView The `LView` instance for this `TNode`. \n */\n debugNodeInjectorPath(IView: LView): DebugNode[] {\n  const path: DebugNode[] = [];\n  let injectorIndex =\n  getInjectorIndex(this, IView);\n  if (injectorIndex === -1) {\n    // Looks like the current `TNode` does not have\n    `NodeInjector` associated with it => look for\n    // parent NodeInjector.\n    const parentLocation =\n    getParentInjectorLocation(this, IView);\n    if (parentLocation !== NO_PARENT_INJECTOR) {\n      // We\n      found a parent, so start searching from the parent location.\n      injectorIndex =\n      getParentInjectorIndex(parentLocation);\n      IView = getParentInjectorView(parentLocation, IView);\n    } else\n    {\n      // No parents have been found, so there are no `NodeInjector`s to consult.\n    }\n  }\n  while (injectorIndex !==\n  -1) {\n    ngDevMode && assertNodeInjector(IView, injectorIndex);\n    const tNode =\n    IView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] as TNode;\n    path.push(buildDebugNode(tNode, IView));\n    const parentLocation = IView[injectorIndex +\n    NodeInjectorOffset.PARENT];\n    if (parentLocation === NO_PARENT_INJECTOR) {\n      injectorIndex = -\n      1;\n    } else {\n      injectorIndex = getParentInjectorIndex(parentLocation);\n      IView =\n      getParentInjectorView(parentLocation, IView);\n    }\n  }\n  return path;\n}\n\n get type_(): string {\n  return\n  toTNodeTypeAsString(this.type) || `TNodeType.${this.type}`;\n}\n\n get flags_(): string {\n  const flags:\n  string[] = [];\n  if (this.flags & TNodeFlags.hasClassInput) flags.push('TNodeFlags.hasClassInput');\n  if\n  (this.flags & TNodeFlags.hasContentQuery) flags.push('TNodeFlags.hasContentQuery');\n  if\n  (this.flags & TNodeFlags.hasStyleInput) flags.push('TNodeFlags.hasStyleInput');\n  if (this.flags &\n  TNodeFlags.hasHostBindings) flags.push('TNodeFlags.hasHostBindings');\n  if (this.flags &\n  TNodeFlags.isComponentHost) flags.push('TNodeFlags.isComponentHost');\n  if (this.flags &\n  TNodeFlags.isDirectiveHost) flags.push('TNodeFlags.isDirectiveHost');\n  if (this.flags & TNodeFlags.isDetached)\n  flags.push('TNodeFlags.isDetached');\n  if (this.flags & TNodeFlags.isProjected)\n  flags.push('TNodeFlags.isProjected');\n  return flags.join('|');\n}\n\n get template_(): string {\n  if (this.type &\n  TNodeType.Text) return this.value!;\n  const buf: string[] = [];\n  const tagName = typeof this.value === 'string'\n  && this.value || this.type_;\n  buf.push('<', tagName);\n  if (this.flags) {\n    buf.push(' ', this.flags_);\n  }\n  if\n  (this.attrs) {\n    for (let i = 0; i < this.attrs.length;) {\n      const attrName = this.attrs[i++];\n      if (typeof attrName === 'number')\n        break;\n      const attrValue = this.attrs[i++];\n      buf.push(' ',\n      attrName as string, '=', attrValue as string, '\"');\n    }\n    buf.push('>');\n  }\n  processTNodeChildren(this.child, buf);\n  buf.push('</', tagName, '>');\n  return buf.join('');\n}\n\n get\n  styleBindings_(): DebugStyleBindings {\n  return toDebugStyleBinding(this, false);\n}\n\n get\n  classBindings_(): DebugStyleBindings {\n  return toDebugStyleBinding(this, true);\n}\n\n get\n  providerIndexStart_(): number {\n  return this.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n}\n\n get\n  providerIndexEnd_(): number {\n  return this.providerIndexStart_ +\n  (this.providerIndexes >>>\n  TNodeProviderIndexes.CptViewProvidersCountShift);\n}\n\n}\n\nexport const TNodeDebug = TNode;\nexport type\n  TNodeDebug = TNode;\n\nexport interface DebugStyleBindings extends\n  Array<KeyValueArray<any>|DebugStyleBinding|string|null> {}\n\nexport\n  interface DebugStyleBinding {\n  key: TStylingKey;\n  index: number;\n  isTemplate: boolean;\n  prevDuplicate:\n  boolean;\n  nextDuplicate: boolean;\n  prevIndex: number;\n  nextIndex: number;\n}\n\nfunction\n  toDebugStyleBinding(tNode: TNode, isClassBased: boolean): DebugStyleBindings {\n  const tData =\n  tNode.tView_.data;\n  const bindings: DebugStyleBindings = [] as any;\n  const range = isClassBased ?\n  tNode.classBindings : tNode.styleBindings;\n  const prev = getTStylingRangePrev(range);\n  const next =\n  getTStylingRangeNext(range);\n  let isTemplate = next !== 0;\n  let cursor = isTemplate ? next : prev;\n  while

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(cursor !== 0) {\n  const itemKey = tData[cursor] as TStylingKey;\n  const itemRange = tData[cursor + 1] as
TStylingRange;\n  bindings.unshift({\n    key: itemKey,\n    index: cursor,\n    isTemplate: isTemplate,\n    prevDuplicate: getTStylingRangePrevDuplicate(itemRange),\n    nextDuplicate:
getTStylingRangeNextDuplicate(itemRange),\n    nextIndex:
getTStylingRangeNext(itemRange),\n    prevIndex: getTStylingRangePrev(itemRange),\n  });\n  if (cursor ===
prev) isTemplate = false;\n  cursor = getTStylingRangePrev(itemRange);\n  }\n  bindings.push((isClassBased ?
tNode.residualClasses : tNode.residualStyles) || null);\n  return bindings;\n}\n\nfunction
processTNodeChildren(tNode: ITNode|null, buf: string[]) {\n  while (tNode) {\n    buf.push((tNode as any as
{template_: string}).template_);\n    tNode = tNode.next;\n  }\n}\n\nclass TViewData extends Array {}\nlet
TVIEWDATA_EMPTY: unknown[]; // can't initialize here or it will not be tree shaken, because\n
// `LView` constructor could have side-effects.\n/**\n * This function clones a blueprint and creates TData.\n *\n *
Simple slice will keep the same type, and we need it to be TData\n */\nexport function cloneToTViewData(list:
any[]): TData {\n  if (TVIEWDATA_EMPTY === undefined) TVIEWDATA_EMPTY = new TViewData();\n  return
TVIEWDATA_EMPTY.concat(list)\n  as any;\n}\n\nexport class LViewBlueprint extends Array {}\nexport class MatchesArray extends Array {}\nexport
class TViewComponents extends Array {}\nexport class TNodeLocalNames extends Array {}\nexport class
TNodeInitialInputs extends Array {}\nexport class LCleanup extends Array {}\nexport class TCleanup extends
Array {}\n\nexport function attachLViewDebug(IView: LView) {\n  attachDebugObject(IView, new
LViewDebug(IView));\n}\n\nexport function attachLContainerDebug(IContainer: LContainer) {\n
attachDebugObject(IContainer, new LContainerDebug(IContainer));\n}\n\nexport function toDebug<T>(obj:
LView<T>): ILViewDebug<T>;\nexport function toDebug<T>(obj: LView<T>|null):
ILViewDebug<T>|null;\nexport function toDebug<T>(obj: LView<T>|LContainer|null):
ILViewDebug<T>|ILContainerDebug|null;\nexport function toDebug(obj: any): any {\n  if (obj) {\n    const debug =
(obj as any).debug;\n    assertDefined(debug, 'Object does not have a debug representation.);\n    return debug;\n
  } else {\n    return obj;\n  }\n}\n\n/**\n * Use this method to unwrap a native element in `LView` and convert it
into HTML for easier\n * reading.\n *\n * @param value possibly wrapped native DOM node.\n *\n * @param
includeChildren If `true` then the serialized HTML form will include child elements\n * (same\n * as
`outerHTML`). If `false` then the serialized HTML form will only contain the element\n * itself\n * (will not
serialize child elements).\n */\nfunction toHtml(value: any, includeChildren: boolean = false): string|null {\n  const
node: Node|null = unwrapRNode(value) as any;\n  if (node) {\n    switch (node.nodeType) {\n      case
Node.TEXT_NODE:\n        return node.textContent;\n      case Node.COMMENT_NODE:\n        return `<!--
${(node as Comment).textContent}-->`;\n      case Node.ELEMENT_NODE:\n        const outerHTML = (node as
Element).outerHTML;\n        if (includeChildren) {\n          return outerHTML;\n        } else {\n          const
innerHTML = '>' + (node as
Element).innerHTML + '<';\n          return (outerHTML.split(innerHTML)[0] + '>');\n        }\n      }\n    }\n  }\n  return
null;\n}\n\nexport class LViewDebug<T = unknown> implements ILViewDebug<T> {\n  constructor(private
readonly _raw_IView: LView<T>) {} \n\n  /**\n   * Flags associated with the `LView` unpacked into a more
readable state.\n   */\n  get flags() {\n    const flags = this._raw_IView[FLAGS];\n    return {\n      __raw__flags__:
flags,\n      initState: flags & LViewFlags.initStateMask,\n      creationMode: !(flags &
LViewFlags.creationMode),\n      firstViewPass: !(flags & LViewFlags.firstViewPass),\n      checkAlways:
!(flags & LViewFlags.checkAlways),\n      dirty: !(flags & LViewFlags.dirty),\n      attached: !(flags &
LViewFlags.attached),\n      destroyed: !(flags & LViewFlags.destroyed),\n      isRoot: !(flags &
LViewFlags.isRoot),\n      indexWithinInitPhase: flags >> LViewFlags.indexWithinInitPhaseShift,\n    }; \n  }\n  get
parent(): ILViewDebug<T>|ILContainerDebug|null\n    {\n    return toDebug<T>(this._raw_IView[PARENT] as LView<T>|LContainer | null);\n  }\n  get hostHTML():
string|null {\n    return toHtml(this._raw_IView[HOST], true);\n  }\n  get html(): string {\n    return (this.nodes ||
[]).map(mapToHTML).join('');\n  }\n  get context(): T {\n    return this._raw_IView[CONTEXT];\n  }\n}\n\n/**\n *
The tree of nodes associated with the current `LView`. The nodes have been normalized into\n * a tree structure

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with relevant details pulled out for readability.\n
*/\n
get nodes(): DebugNode[] {\n
  const IView = this._raw_IView;\n
  const tNode = IView[TVIEW].firstChild;\n
  return toDebugNodes(tNode, IView);\n
}\n
get template(): string {\n
  return (this.tView as any as {template_: string}).template_;\n
}\n
get tView(): ITView {\n
  return this._raw_IView[TVIEW];\n
}\n
get cleanup(): any[]|null {\n
  return this._raw_IView[CLEANUP];\n
}\n
get injector(): Injector|null {\n
  return this._raw_IView[INJECTOR];\n
}\n
get rendererFactory(): RendererFactory {\n
  return this._raw_IView[RENDERER_FACTORY];\n
}\n
get renderer(): Renderer {\n
  return this._raw_IView[RENDERER];\n
}\n
get sanitizer(): Sanitizer|null {\n
  return this._raw_IView[SANITIZER];\n
}\n
get childHead(): ILViewDebug|ILContainerDebug|null {\n
  return toDebug(this._raw_IView[CHILD_HEAD]);\n
}\n
get next(): ILViewDebug<T>|ILContainerDebug|null {\n
  return toDebug<T>(this._raw_IView[NEXT] as LView<T>| LContainer | null);\n
}\n
get childTail(): ILViewDebug|ILContainerDebug|null {\n
  return toDebug(this._raw_IView[CHILD_TAIL]);\n
}\n
get declarationView(): ILViewDebug|null {\n
  return toDebug(this._raw_IView[DECLARATION_VIEW]);\n
}\n
get queries(): LQueries|null {\n
  return this._raw_IView[QUERIES];\n
}\n
get tHost(): ITNode|null {\n
  return this._raw_IView[T_HOST];\n
}\n
get id(): number {\n
  return this._raw_IView[ID];\n
}\n
}\n
get decls(): LViewDebugRange {\n
  return toLViewRange(this.tView, this._raw_IView, HEADER_OFFSET, this.tView.bindingStartIndex);\n
}\n
}\n
get vars(): LViewDebugRange {\n
  return toLViewRange(\n
    this.tView, this._raw_IView, this.tView.bindingStartIndex, this.tView.expandoStartIndex);\n
}\n
}\n
get expando(): LViewDebugRange {\n
  return toLViewRange(\n
    this.tView, this._raw_IView, this.tView.expandoStartIndex, this._raw_IView.length);\n
}\n
}\n
/**\n
 * Normalized view of child views (and containers) attached at this location.\n
 */\n
get childViews(): Array<ILViewDebug<T>|ILContainerDebug> {\n
  const childViews: Array<ILViewDebug<T>|ILContainerDebug> = [];\n
  let child = this.childHead;\n
  while (child) {\n
    childViews.push(child as ILViewDebug<T>| ILContainerDebug);\n
    child = child.next;\n
  }\n
  return childViews;\n
}\n
}\n
}\n
function mapToHTML(node: DebugNode): string {\n
  if (node.type === 'ElementContainer') {\n
    return (node.children || []).map(mapToHTML).join('');\n
  } else if (node.type === 'IcuContainer') {\n
    throw new Error('Not implemented');\n
  } else {\n
    return toHtml(node.native, true) || '';\n
  }\n
}\n
}\n
}\n
function toLViewRange(tView: TView, IView: LView, start: number, end: number): LViewDebugRange {\n
  let content: LViewDebugRangeContent[] = [];\n
  for (let index = start; index < end; index++) {\n
    content.push({index: index, t: tView.data[index], l: IView[index]});\n
  }\n
  return {start: start, end: end, length: end - start, content: content};\n
}\n
}\n
/**\n
 * Turns a flat list of nodes into a tree by walking the associated `TNode` tree.\n
 */\n
*/\n
@param tNode\n
@param IView\n
*/\n
export function toDebugNodes(tNode: ITNode|null, IView: LView): DebugNode[] {\n
  if (tNode) {\n
    const debugNodes: DebugNode[] = [];\n
    let tNodeCursor: ITNode|null = tNode;\n
    while (tNodeCursor) {\n
      debugNodes.push(buildDebugNode(tNodeCursor, IView));\n
      tNodeCursor = tNodeCursor.next;\n
    }\n
    return debugNodes;\n
  } else {\n
    return [];\n
  }\n
}\n
}\n
}\n
export function buildDebugNode(tNode: ITNode, IView: LView): DebugNode {\n
  const rawValue = IView[tNode.index];\n
  const native = unwrapRNode(rawValue);\n
  const factories: Type<any>[] = [];\n
  const instances: any[] = [];\n
  const tView = IView[TVIEW];\n
  for (let i = tNode.directiveStart; i < tNode.directiveEnd; i++) {\n
    const def = tView.data[i] as DirectiveDef<any>;\n
    factories.push(def.type);\n
    instances.push(IView[i]);\n
  }\n
  return {\n
    html: toHtml(native),\n
    type: toTNodeTypeAsString(tNode.type),\n
    tNode,\n
    native: native as any,\n
    children: toDebugNodes(tNode.child, IView),\n
    factories,\n
    instances,\n
    injector: buildNodeInjectorDebug(tNode, tView, IView),\n
    get injectorResolutionPath() {\n
      return (tNode as TNode).debugNodeInjectorPath(IView);\n
    },\n
  };\n
}\n
}\n
}\n
function buildNodeInjectorDebug(tNode: ITNode, tView: ITView, IView: LView): NodeInjectorDebug {\n
  const viewProviders: Type<any>[] = [];\n
  for (let i = (tNode as TNode).providerIndexStart_; i < (tNode as TNode).providerIndexEnd_; i++) {\n
    viewProviders.push(tView.data[i] as Type<any>);\n
  }\n
  const providers: Type<any>[] = [];\n
  for (let i = (tNode as TNode).providerIndexEnd_; i < (tNode as TNode).directiveEnd; i++) {\n
    providers.push(tView.data[i] as Type<any>);\n
  }\n
  const nodeInjectorDebug =

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{\n  bloom: toBloom(IView, tNode.injectorIndex),\n  cumulativeBloom: toBloom(tView.data,
tNode.injectorIndex),\n  providers,\n  viewProviders,\n  parentInjectorIndex: IView[(tNode as
TNode).providerIndexStart_ - 1],\n  };
\n  return nodeInjectorDebug;\n}\n\n/**\n * Convert a number at `idx`
location in `array` into binary representation.\n *\n * @param array\n * @param idx\n */
\nfunction binary(array:
any[], idx: number): string {\n  const value = array[idx];\n  // If not a number we print 8 `?` to retain alignment but
let user know that it was called on\n  // wrong type.\n  if (typeof value !== 'number') return '????????';\n  // We
prefix 0s so that we have constant length
  number\n  const text = '00000000' + value.toString(2);\n  return text.substring(text.length - 8);\n}\n\n/**\n *
Convert a bloom filter at location `idx` in `array` into binary representation.\n *\n * @param array\n * @param
idx\n */
\nfunction toBloom(array: any[], idx: number): string {\n  if (idx < 0) {\n    return
'NO_NODE_INJECTOR';\n  }\n  return `${binary(array, idx + 7)}_${binary(array, idx + 6)}_${binary(array, idx +
5)}_${binary(array, idx + 4)}_${binary(array, idx + 3)}_${binary(array, idx + 2)}_${binary(array, idx +
1)}_${binary(array, idx + 0)}`;\n}\n\nexport class LContainerDebug implements ILContainerDebug {\n
constructor(private readonly _raw_LContainer: LContainer) {}\n\n  get hasTransplantedViews(): boolean {\n
return this._raw_LContainer[HAS_TRANSPLANTED_VIEWS];\n  }\n  get views(): ILViewDebug[] {\n  return
this._raw_LContainer.slice(CONTAINER_HEADER_OFFSET)\n    .map(toDebug as (l: LView) =>
ILViewDebug);\n  }\n  get parent(): ILViewDebug|null
  {\n    return toDebug(this._raw_LContainer[PARENT]);\n  }\n  get movedViews(): LView[]|null {\n  return
this._raw_LContainer[MOVED_VIEWS];\n  }\n  get host(): RElement|RComment|LView {\n  return
this._raw_LContainer[HOST];\n  }\n  get native(): RComment {\n  return this._raw_LContainer[NATIVE];\n  }\n
  get next() {\n  return toDebug(this._raw_LContainer[NEXT]);\n  }\n}\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */
\nimport {Injector} from './di/injector';\nimport
{ErrorHandler} from './error_handler';\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport
{DoCheck, OnChanges, OnInit} from './interface/lifecycle_hooks';\nimport {SchemaMetadata} from
'./metadata/schema';\nimport {ViewEncapsulation} from './metadata/view';\nimport
{validateAgainstEventAttributes, validateAgainstEventProperties}
from './sanitization/sanitization';\nimport {Sanitizer} from './sanitization/sanitizer';\nimport {assertDefined,
assertEqual, assertGreaterThanOrEqual, assertIndexInRange, assertNotEqual, assertNotSame, assertSame,
assertString} from './util/assert';\nimport {escapeCommentText} from './util/dom';\nimport
{normalizeDebugBindingName, normalizeDebugBindingValue} from './util/ng_reflect';\nimport {stringify} from
'./util/stringify';\nimport {assertFirstCreatePass, assertFirstUpdatePass, assertLContainer, assertLView,
assertTNodeForLView, assertTNodeForTView} from './assert';\nimport {attachPatchData, readPatchedLView}
from './context_discovery';\nimport {getFactoryDef} from './definition_factory';\nimport {diPublicInInjector,
getNodeInjectable, getOrCreateNodeInjectorForNode} from './di';\nimport {throwMultipleComponentError} from
'./errors';\nimport {executeCheckHooks, executeInitAndCheckHooks, incrementInitPhaseFlags} from
'./hooks';\nimport
{CONTAINER_HEADER_OFFSET, HAS_TRANSPLANTED_VIEWS, LContainer, MOVED_VIEWS} from
'./interfaces/container';\nimport {ComponentDef, ComponentTemplate, DirectiveDef, DirectiveDefListOrFactory,
HostBindingsFunction, PipeDefListOrFactory, RenderFlags, ViewQueriesFunction} from
'./interfaces/definition';\nimport {NodeInjectorFactory} from './interfaces/injector';\nimport {getUniqueLViewId}
from './interfaces/lview_tracking';\nimport {AttributeMarker, InitialInputData, InitialInputs, LocalRefExtractor,
PropertyAliases, PropertyAliasValue, TAttributes, TConstantsOrFactory, TContainerNode, TDirectiveHostNode,
TElementContainerNode, TElementNode, TIcuContainerNode, TNode, TNodeFlags, TNodeType,
TProjectionNode} from './interfaces/node';\nimport {Renderer, RendererFactory} from
'./interfaces/renderer';\nimport {RComment, RElement, RNode, RText} from './interfaces/renderer_dom';\nimport
{SanitizerFn} from './interfaces/sanitization';\nimport {isComponentDef, isComponentHost, isContentQueryHost,

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isRootView} from './interfaces/type_checks';\nimport {CHILD_HEAD, CHILD_TAIL, CLEANUP, CONTEXT,
DECLARATION_COMPONENT_VIEW, DECLARATION_VIEW, EMBEDDED_VIEW_INJECTOR, FLAGS,
HEADER_OFFSET, HOST, HostBindingOpCodes, ID, InitPhaseState, INJECTOR, LView, LViewFlags, NEXT,
PARENT, RENDERER, RENDERER_FACTORY, SANITIZER, T_HOST, TData,
TRANSPLANTED_VIEWS_TO_REFRESH, TVIEW, TView, TViewType} from './interfaces/view';\nimport
{assertPureTNodeType, assertTNodeType} from './node_assert';\nimport {updateTextNode} from
'./node_manipulation';\nimport {isInlineTemplate, isNodeMatchingSelectorList} from
'./node_selector_matcher';\nimport {profiler, ProfilerEvent} from './profiler';\nimport {enterView,
getBindingsEnabled, getCurrentDirectiveIndex, getCurrentParentTNode, getCurrentTNode,
getCurrentTNodePlaceholderOk, getSelectedIndex, isCurrentTNodeParent, isInCheckNoChangesMode,
isInI18nBlock, leaveView, setBindingIndex, setBindingRootForHostBindings, setCurrentDirectiveIndex,
setCurrentQueryIndex,
setCurrentTNode, setIsInCheckNoChangesMode, setSelectedIndex} from './state';\nimport {NO_CHANGE} from
'./tokens';\nimport {mergeHostAttrs} from './util/attrs_utils';\nimport {INTERPOLATION_DELIMITER} from
'./util/misc_utils';\nimport {renderStringify, stringifyForError} from './util/stringify_utils';\nimport
{getFirstLContainer, getLViewParent, getNextLContainer} from './util/view_traversal_utils';\nimport
{getComponentLViewByIndex, getNativeByIndex, getNativeByTNode, isCreationMode, resetPreOrderHookFlags,
unwrapLView, updateTransplantedViewCount, viewAttachedToChangeDetector} from './util/view_utils';\n\nimport
{selectIndexInternal} from './advance';\nimport {directiveInject} from './di';\nimport
{handleUnknownPropertyError, isPropertyValid, matchingSchemas} from './element_validation';\nimport
{attachLContainerDebug, attachLViewDebug, cloneToLViewFromTViewBlueprint, cloneToTViewData,
LCleanup, LViewBlueprint, MatchesArray, TCleanup, TNodeDebug, TNodeInitialInputs,
TNodeLocalNames, TViewComponents, TViewConstructor} from './lview_debug';\n\n/**\n * Invoke
`HostBindingsFunction`s for view.\n * This methods executes `TView.hostBindingOpCodes`. It is used to
execute the\n * `HostBindingsFunction`s associated with the current `LView`.\n * @param tView Current
`TView`.\n * @param lView Current `LView`.\n */\nexport function processHostBindingOpCodes(tView: TView,
lView: LView): void {\n  const hostBindingOpCodes = tView.hostBindingOpCodes;\n  if (hostBindingOpCodes
=== null) return;\n  try {\n    for (let i = 0; i < hostBindingOpCodes.length; i++) {\n      const opCode =
hostBindingOpCodes[i] as number;\n      if (opCode < 0) {\n        // Negative numbers are element indexes.\n
setSelectedIndex(~opCode);\n      } else {\n        // Positive numbers are NumberTuple which store
bindingRootIndex and directiveIndex.\n        const directiveIdx = opCode;\n        const bindingRootIdx =
hostBindingOpCodes[++i] as number;\n        const
hostBindingFn = hostBindingOpCodes[++i] as HostBindingsFunction<any>;\n
setBindingRootForHostBindings(bindingRootIdx, directiveIdx);\n        const context = lView[directiveIdx];\n
hostBindingFn(RenderFlags.Update, context);\n      }\n    }\n  } finally {\n    setSelectedIndex(-1);\n  }\n}\n\n/**
Refreshes all content queries declared by directives in a given view *\nfunction refreshContentQueries(tView:
TView, lView: LView): void {\n  const contentQueries = tView.contentQueries;\n  if (contentQueries !== null) {\n
for (let i = 0; i < contentQueries.length; i += 2) {\n    const queryStartIdx = contentQueries[i];\n    const
directiveDefIdx = contentQueries[i + 1];\n    if (directiveDefIdx !== -1) {\n      const directiveDef =
tView.data[directiveDefIdx] as DirectiveDef<any>;\n      ngDevMode && assertDefined(directiveDef,
'DirectiveDef not found.);\n      ngDevMode &&\n      assertDefined(directiveDef.contentQueries,
'contentQueries function should
be defined');\n      setCurrentQueryIndex(queryStartIdx);\n      directiveDef.contentQueries!(RenderFlags.Update,
lView[directiveDefIdx], directiveDefIdx);\n    }\n  }\n}\n\n/** Refreshes child components in the current
view (update mode). *\nfunction refreshChildComponents(hostLView: LView, components: number[]): void {\n
for (let i = 0; i < components.length; i++) {\n  refreshComponent(hostLView, components[i]);\n}\n}\n\n/**
Renders child components in the current view (creation mode). *\nfunction renderChildComponents(hostLView:
LView, components: number[]): void {\n  for (let i = 0; i < components.length; i++) {\n

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renderComponent(hostLView, components[i]);\n }\n}\n\nexport function createLView<T>(\n  parentLView:
LView|null, tView: TView, context: T|null, flags: LViewFlags, host: RElement|null,\n  tHostNode: TNode|null,
rendererFactory: RendererFactory|null, renderer: Renderer|null,\n  sanitizer: Sanitizer|null, injector: Injector|null,\n  embeddedViewInjector:
Injector|null): LView {\n  const IView =\n    ngDevMode ? cloneToLViewFromTViewBlueprint(tView) :
tView.blueprint.slice() as LView;\n  IView[HOST] = host;\n  IView[FLAGS] = flags | LViewFlags.CreationMode |
LViewFlags.Attached | LViewFlags.FirstLViewPass;\n  if (embeddedViewInjector !== null ||\n    (parentLView
&& (parentLView[FLAGS] & LViewFlags.HasEmbeddedViewInjector))) {\n    IView[FLAGS] |=
LViewFlags.HasEmbeddedViewInjector;\n  }\n  resetPreOrderHookFlags(IView);\n  ngDevMode &&
tView.declTNode && parentLView && assertTNodeForLView(tView.declTNode, parentLView);\n
IView[PARENT] = IView[DECLARATION_VIEW] = parentLView;\n  IView[CONTEXT] = context;\n
IView[RENDERER_FACTORY] = (rendererFactory || parentLView &&
parentLView[RENDERER_FACTORY])!;\n  ngDevMode && assertDefined(IView[RENDERER_FACTORY],
'RendererFactory is required');\n  IView[RENDERER] = (renderer || parentLView &&
parentLView[RENDERER])!;\n  ngDevMode && assertDefined(IView[RENDERER], 'Renderer is
required');\n  IView[SANITIZER] = sanitizer || parentLView && parentLView[SANITIZER] || null!;\n
IView[INJECTOR as any] = injector || parentLView && parentLView[INJECTOR] || null;\n  IView[T_HOST] =
tHostNode;\n  IView[ID] = getUniqueLViewId();\n  IView[EMBEDDED_VIEW_INJECTOR as any] =
embeddedViewInjector;\n  ngDevMode && \n    assertEquals(\n      tView.type == TViewType.Embedded ?
parentLView !== null : true, true,\n      'Embedded views must have parentLView');\n  IView[DECLARATION_COMPONENT_VIEW] =\n    tView.type == TViewType.Embedded ?
parentLView![DECLARATION_COMPONENT_VIEW] : IView;\n  ngDevMode &&
attachLViewDebug(IView);\n  return IView;\n}\n\n/**\n * Create and stores the TNode, and hooks it up to the
tree.\n * @param tView The current `TView`.\n * @param index The index at which the TNode should be saved
(null if view, since they are not\n * saved).\n * @param type The type of TNode to create\n * @param native The
native element for this node, if applicable\n * @param name The tag name of the associated native element, if applicable\n * @param attrs Any attrs for the
native element, if applicable\n */\nexport function getOrCreateTNode(\n  tView: TView, index: number, type:
TNodeType.Element|TNodeType.Text, name: string|null,\n  attrs: TAttributes|null): TElementNode;\nexport
function getOrCreateTNode(\n  tView: TView, index: number, type: TNodeType.Container, name: string|null,\n
attrs: TAttributes|null): TContainerNode;\nexport function getOrCreateTNode(\n  tView: TView, index: number,
type: TNodeType.Projection, name: null,\n  attrs: TAttributes|null): TProjectionNode;\nexport function
getOrCreateTNode(\n  tView: TView, index: number, type: TNodeType.ElementContainer, name: string|null,\n
attrs: TAttributes|null): TElementContainerNode;\nexport function getOrCreateTNode(\n  tView: TView, index:
number, type: TNodeType.Icu, name: null,\n  attrs: TAttributes|null): TElementContainerNode;\nexport function
getOrCreateTNode(\n
  tView: TView, index: number, type: TNodeType, name: string|null, attrs: TAttributes|null):\n
TElementNode&TContainerNode&TElementContainerNode&TProjectionNode&TIcuContainerNode {\n
ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See `createContainerRef` in\n
  // `view_engine_compatibility` for additional context.\n  assertGreaterThanOrEqual(index,
HEADER_OFFSET, 'TNodes can\\'t be in the LView header.);\n  // Keep this function short, so that the VM will
inline it.\n  ngDevMode && assertPureTNodeType(type);\n  let tNode = tView.data[index] as TNode;\n  if (tNode
=== null) {\n    tNode = createTNodeAtIndex(tView, index, type, name, attrs);\n    if (isInI18nBlock()) {\n    // If
we are in i18n block then all elements should be pre declared through `Placeholder`\n    // See
`TNodeType.Placeholder` and `LFrame.inI18n` for more context.\n    // If the `TNode` was not pre-declared than it
means it was not mentioned which\n    means it was\n    // removed, so we mark it as detached.\n    tNode.flags |= TNodeFlags.isDetached;\n  }\n  }
else if (tNode.type & TNodeType.Placeholder) {\n    tNode.type = type;\n    tNode.value = name;\n    tNode.attrs =

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a container. The LContainer needs\n // to exist so the embedded views are properly attached by the container.\n
if (tView.staticViewQueries) {\n    executeViewQueryFn<T>(RenderFlags.Update, tView.viewQuery!, context);\n
}\n\n // Render child component views.\n    const components = tView.components;\n    if (components !== null)\n    {\n        renderChildComponents(IView, components);\n    }\n\n } catch (error) {\n    // If we didn't manage to get\n    past the first template pass due to\n    // an error, mark the view as corrupted so we can try to recover.\n    if\n    (tView.firstCreatePass) {\n        tView.incompleteFirstPass = true;\n
        tView.firstCreatePass = false;\n    }\n\n    throw error;\n } finally {\n    IView[FLAGS] &=\n    ~LViewFlags.CreationMode;\n    leaveView();\n }\n}\n\n/**\n * Processes a view in update mode. This includes a\n    number of steps in a specific order:\n    * - executing a template function in update mode;\n    * - executing hooks;\n    * - refreshing queries;\n    * - setting host bindings;\n    * - refreshing child (embedded and component) views.\n    */\nexport\nfunction refreshView<T>(\n    tView: TView, IView: LView, templateFn: ComponentTemplate<{\n    }>|null, context:\n    T) {\n    ngDevMode && assertEquals(isCreationMode(IView), false, 'Should be run in update mode');\n    const flags =\n    IView[FLAGS];\n    if ((flags & LViewFlags.Destroyed) === LViewFlags.Destroyed) return;\n    enterView(IView);\n    // Check no changes mode is a dev only mode used to verify that bindings have not changed\n    // since they were\n    assigned. We do not want to execute lifecycle hooks in that mode.\n    const isInCheckNoChangesPass = ngDevMode\n    && isInCheckNoChangesMode();\n
    try {\n        resetPreOrderHookFlags(IView);\n\n        setBindingIndex(tView.bindingStartIndex);\n        if (templateFn !==\n        null) {\n            executeTemplate(tView, IView, templateFn, RenderFlags.Update, context);\n        }\n\n        const\n        hooksInitPhaseCompleted =\n            (flags & LViewFlags.InitPhaseStateMask) ===\n            InitPhaseState.InitPhaseCompleted;\n\n        // execute pre-order hooks (OnInit, OnChanges, DoCheck)\n        // PERF\n        WARNING: do NOT extract this to a separate function without running benchmarks\n        if\n        (!isInCheckNoChangesPass) {\n            if (hooksInitPhaseCompleted) {\n                const preOrderCheckHooks =\n                tView.preOrderCheckHooks;\n                if (preOrderCheckHooks !== null) {\n                    executeCheckHooks(IView,\n                    preOrderCheckHooks, null);\n                }\n            } else {\n                const preOrderHooks = tView.preOrderHooks;\n                if\n                (preOrderHooks !== null) {\n                    executeInitAndCheckHooks(IView, preOrderHooks,\n                    InitPhaseState.OnInitHooksToBeRun, null);\n                }\n                incrementInitPhaseFlags(IView,\n                InitPhaseState.OnInitHooksToBeRun);\n            }\n        }\n\n        // First mark transplanted views that are declared in this\n        IView as needing a refresh at their\n        // insertion points. This is needed to avoid the situation where the template is\n        defined in this\n        // `LView` but its declaration appears after the insertion component.\n        markTransplantedViewsForRefresh(IView);\n        refreshEmbeddedViews(IView);\n\n        // Content query results must\n        be refreshed before content hooks are called.\n        if (tView.contentQueries !== null) {\n            refreshContentQueries(tView, IView);\n        }\n\n        // execute content hooks (AfterContentInit,\n        AfterContentChecked)\n        // PERF WARNING: do NOT extract this to a separate function without running\n        benchmarks\n        if (!isInCheckNoChangesPass) {\n            if (hooksInitPhaseCompleted) {\n                const\n                contentCheckHooks = tView.contentCheckHooks;\n                if (contentCheckHooks !== null) {\n                    executeCheckHooks(IView, contentCheckHooks);\n                }\n            }\n            } else {\n                const contentHooks = tView.contentHooks;\n                if (contentHooks !== null) {\n                    executeInitAndCheckHooks(\n                    IView, contentHooks, InitPhaseState.AfterContentInitHooksToBeRun);\n                }\n                incrementInitPhaseFlags(IView, InitPhaseState.AfterContentInitHooksToBeRun);\n            }\n        }\n\n        processHostBindingOpCodes(tView, IView);\n\n        // Refresh child component views.\n        const components =\n        tView.components;\n        if (components !== null) {\n            refreshChildComponents(IView, components);\n        }\n\n        //\n        View queries must execute after refreshing child components because a template in this view\n        // could be inserted\n        in a child component. If the view query executes before child component\n        // refresh, the template might not yet be\n        inserted.\n        const viewQuery = tView.viewQuery;\n        if (viewQuery !== null) {\n            executeViewQueryFn<T>(RenderFlags.Update, viewQuery, context);\n        }\n\n        // execute\n        view hooks (AfterViewInit, AfterViewChecked)\n        // PERF WARNING: do NOT extract this to a separate\n        function without running benchmarks\n        if (!isInCheckNoChangesPass) {\n            if (hooksInitPhaseCompleted) {\n                const viewCheckHooks = tView.viewCheckHooks;\n                if (viewCheckHooks !== null) {\n

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the first create pass didn't\n // complete successfully since we can't know for sure whether it's in a usable shape.\n if
(tView === null || tView.incompleteFirstPass) {\n // Declaration node here is null since this function is called
when we dynamically create a\n // component and hence there is no declaration.\n const declTNode = null;\n
return def.tView = createTView(\n      TViewType.Component, declTNode, def.template, def.decls, def.vars,
def.directiveDefs,\n      def.pipeDefs, def.viewQuery, def.schemas, def.consts);\n }\n\n return
tView;\n}\n\n\n/**\n * Creates a TView instance\n * @param type Type of `TView`.\n * @param declTNode
Declaration location of this `TView`.\n * @param templateFn Template function\n * @param decls The number of
nodes, local refs, and pipes in this template\n * @param directives Registry of directives for this view\n * @param
pipes Registry of pipes for this view\n * @param viewQuery View queries for this view\n * @param schemas
Schemas for this view\n * @param consts Constants for this view\n */\n\nexport function createTView(\n type:
TViewType, declTNode: TNode|null, templateFn: ComponentTemplate<any>|null, decls: number,\n vars:
number, directives: DirectiveDefListOrFactory|null, pipes: PipeDefListOrFactory|null,\n viewQuery:
ViewQueriesFunction<any>|null, schemas: SchemaMetadata[]|null,\n constsOrFactory:
TConstantsOrFactory|null): TView {\n ngDevMode && ngDevMode.tView++; \n const bindingStartIndex =
HEADER_OFFSET + decls;\n // This length does not yet contain host bindings from child directives because at this
point,\n // we don't know which directives are active on this
template. As soon as a directive is matched\n // that has a host binding, we will update the blueprint with that def's
hostVars count.\n const initialViewLength = bindingStartIndex + vars;\n const blueprint =
createViewBlueprint(bindingStartIndex, initialViewLength);\n const consts = typeof constsOrFactory ===
'function' ? constsOrFactory() : constsOrFactory;\n const tView = blueprint[TVIEW as any] = ngDevMode ?\n
new TViewConstructor(\n type, // type: TViewType,\n blueprint, // blueprint: LView,\n
templateFn, // template: ComponentTemplate<{}>|null,\n null, // queries: TQueries|null\n
viewQuery, // viewQuery: ViewQueriesFunction<{}>|null,\n declTNode, // declTNode: TNode|null,\n
cloneToTViewData(blueprint).fill(null, bindingStartIndex), // data: TData,\n bindingStartIndex,\n
// bindingStartIndex: number,\n initialViewLength,\n
// expandoStartIndex: number,\n null, // hostBindingOpCodes:
HostBindingOpCodes,\n true, // firstCreatePass: boolean,\n true, //
firstUpdatePass: boolean,\n false, // staticViewQueries: boolean,\n false,\n
// staticContentQueries: boolean,\n null, // preOrderHooks: HookData|null,\n null,\n
// preOrderCheckHooks: HookData|null,\n null, // contentHooks:
HookData|null,\n null, // contentCheckHooks: HookData|null,\n null,\n
// viewHooks: HookData|null,\n null, // viewCheckHooks: HookData|null,\n null,\n
//\n
destroyHooks: DestroyHookData|null,\n null, // cleanup: any[]|null,\n null,\n
// contentQueries: number[]|null,\n null, // components: number[]|null,\n type of
directives === 'function' ? /\n directives() : /\n directives, //
directiveRegistry: DirectiveDefList|null,\n type of pipes === 'function' ? pipes() : pipes, // pipeRegistry:
PipeDefList|null,\n null, // firstChild: TNode|null,\n schemas,\n
// schemas: SchemaMetadata[]|null,\n consts, // consts: TConstants|null\n
false, // incompleteFirstPass: boolean\n decls, //
ngDevMode only: decls\n
vars, // ngDevMode only: vars\n ): \n {\n type: type,\n blueprint:
blueprint,\n template: templateFn,\n queries: null,\n viewQuery: viewQuery,\n declTNode:
declTNode,\n data: blueprint.slice().fill(null, bindingStartIndex),\n bindingStartIndex: bindingStartIndex,\n
expandoStartIndex: initialViewLength,\n hostBindingOpCodes: null,\n firstCreatePass: true,\n
firstUpdatePass: true,\n staticViewQueries: false,\n staticContentQueries: false,\n preOrderHooks:
null,\n preOrderCheckHooks: null,\n contentHooks: null,\n contentCheckHooks: null,\n
viewHooks: null,\n viewCheckHooks: null,\n destroyHooks: null,\n cleanup: null,\n

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contentQueries: null,\n    components: null,\n    directiveRegistry: typeof directives === 'function' ? directives()
: directives,\n    pipeRegistry:
typeof pipes === 'function' ? pipes() : pipes,\n    firstChild: null,\n    schemas: schemas,\n    consts: consts,\n    incompleteFirstPass: false\n  });\n  if (ngDevMode) {\n    // For performance reasons it is important that the
tView retains the same shape during runtime.\n    // (To make sure that all of the code is monomorphic.) For this
reason we seal the object to\n    // prevent class transitions.\n    Object.seal(tView);\n  }\n  return
tView;\n}\n\nfunction createViewBlueprint(bindingStartIndex: number, initialViewLength: number): LView {\n
const blueprint = ngDevMode ? new LViewBlueprint() : [];\n  for (let i = 0; i < initialViewLength; i++) {\n
blueprint.push(i < bindingStartIndex ? null : NO_CHANGE);\n  }\n  return blueprint as LView;\n}\n\nfunction
createError(text: string, token: any) {\n  return new Error(`Renderer: ${text}
[${stringifyForError(token)}]`);\n}\n\n/**\n * Locates the host native element, used for bootstrapping existing
nodes
into rendering pipeline.\n *\n * @param rendererFactory Factory function to create renderer instance.\n * @param
elementOrSelector Render element or CSS selector to locate the element.\n * @param encapsulation View
Encapsulation defined for component that requests host element.\n */\nexport function locateHostElement(\n
renderer: Renderer, elementOrSelector: RElement|string,\n  encapsulation: ViewEncapsulation): RElement {\n
// When using native Shadow DOM, do not clear host element to allow native slot projection\n  const preserveContent
= encapsulation === ViewEncapsulation.ShadowDom;\n  return renderer.selectRootElement(elementOrSelector,
preserveContent);\n}\n\n/**\n * Saves context for this cleanup function in LView.cleanupInstances.\n *\n * On the
first template pass, saves in TView:\n * - Cleanup function\n * - Index of context we just saved in
LView.cleanupInstances\n *\n * This function can also be used to store instance specific cleanup fns. In that case the
`context`\n
* is `null` and the function is store in `LView` (rather than it `TView`).\n */\nexport function
storeCleanupWithContext(\n  tView: TView, lView: LView, context: any, cleanupFn: Function): void {\n  const
lCleanup = getOrCreateLViewCleanup(lView);\n  if (context === null) {\n    // If context is null that this is instance
specific callback. These callbacks can only be\n    // inserted after template shared instances. For this reason in
ngDevMode we freeze the TView.\n    if (ngDevMode) {\n      Object.freeze(getOrCreateTViewCleanup(tView));\n
    }\n    lCleanup.push(cleanupFn);\n  } else {\n    lCleanup.push(context);\n\n    if (tView.firstCreatePass) {\n
getOrCreateTViewCleanup(tView).push(cleanupFn, lCleanup.length - 1);\n    }\n  }\n}\n\n/**\n * Constructs a
TNode object from the arguments.\n *\n * @param tView `TView` to which this `TNode` belongs (used only in
`ngDevMode`)\n * @param tParent Parent `TNode`\n * @param type The type of the node\n * @param index The
index
of the TNode in TView.data, adjusted for HEADER_OFFSET\n * @param tagName The tag name of the node\n *
@param attrs The attributes defined on this node\n * @param tViews Any TViews attached to this node\n *
@returns the TNode object\n */\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.Container,\n  index: number, tagName: string|null, attrs:
TAttributes|null): TContainerNode;\n\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.Element|TNodeType.Text,\n  index: number, tagName:
string|null, attrs: TAttributes|null): TElementNode;\n\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.ElementContainer,\n  index: number, tagName: string|null,
attrs: TAttributes|null): TElementContainerNode;\n\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType.Icu, index: number,\n
tagName: string|null, attrs: TAttributes|null): TIcuContainerNode;\n\nexport function createTNode(\n  tView:
TView, tParent: TElementNode|TContainerNode|null, type: TNodeType.Projection,\n  index: number, tagName:
string|null, attrs: TAttributes|null): TProjectionNode;\n\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType, index: number,\n  tagName: string|null, attrs:
TAttributes|null): TNode;\n\nexport function createTNode(\n  tView: TView, tParent:
TElementNode|TContainerNode|null, type: TNodeType, index: number,\n  value: string|null, attrs:

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TAttributes|null): TNode {\n  ngDevMode && index !== 0 && // 0 are bogus nodes and they are OK. See
`createContainerRef` in\n          // `view_engine_compatibility` for additional context.\n
assertGreaterThanOrEqual(index, HEADER_OFFSET, 'TNodes can\\'t be in the LView header.);\n  ngDevMode
&& assertNotSame(attrs, undefined, '\\`undefined\\` is not valid
value for '\\`attrs\\`');\n  ngDevMode && ngDevMode.tNode++;\n  ngDevMode && tParent &&
assertTNodeForTView(tParent, tView);\n  let injectorIndex = tParent ? tParent.injectorIndex : -1;\n  const tNode =
ngDevMode ?\n    new TNodeDebug(\n      tView, // tView_: TView\n      type, // type:
TNodeType)\n      index, // index: number\n      null, // insertBeforeIndex: null|-1|number|number[]\n
injectorIndex, // injectorIndex: number\n      -1, // directiveStart: number\n      -1, //
directiveEnd: number\n      -1, // directiveStylingLast: number\n      null, // propertyBindings:
number[]|null\n      0, // flags: TNodeFlags\n      0, // providerIndexes: TNodeProviderIndexes\n
value, // value: string|null\n      attrs, // attrs:
(string|AttributeMarker|(string|SelectorFlags)[]|[]|null\n      null,
// mergedAttrs\n      null, // localNames: (string|number)[]|null\n      undefined, // initialInputs:
(string[]|null)[]|null|undefined\n      null, // inputs: PropertyAliases|null\n      null, // outputs:
PropertyAliases|null\n      null, // tViews: ITView|ITView[]|null\n      null, // next: ITNode|null\n
null, // projectionNext: ITNode|null\n      null, // child: ITNode|null\n      tParent, // parent:
TElementNode|TContainerNode|null\n      null, // projection: number|(ITNode|RNode)[]|null\n      null,
// styles: string|null\n      null, // stylesWithoutHost: string|null\n      undefined, // residualStyles:
string|null\n      null, // classes: string|null\n      null, // classesWithoutHost: string|null\n
undefined, // residualClasses: string|null\n      0
as any, // classBindings: TStylingRange;\n      0 as any, // styleBindings: TStylingRange;\n      ) :\n
{\n  type,\n  index,\n  insertBeforeIndex: null,\n  injectorIndex,\n  directiveStart: -1,\n
directiveEnd: -1,\n  directiveStylingLast: -1,\n  propertyBindings: null,\n  flags: 0,\n
providerIndexes: 0,\n  value: value,\n  attrs: attrs,\n  mergedAttrs: null,\n  localNames: null,\n
initialInputs: undefined,\n  inputs: null,\n  outputs: null,\n  tViews: null,\n  next: null,\n
projectionNext: null,\n  child: null,\n  parent: tParent,\n  projection: null,\n  styles: null,\n
stylesWithoutHost: null,\n  residualStyles: undefined,\n  classes: null,\n  classesWithoutHost: null,\n
residualClasses: undefined,\n  classBindings: 0 as any,\n  styleBindings: 0 as any,\n  };\n  if (ngDevMode)
{\n    // For performance reasons it is important that the tNode retains the same shape during runtime.\n    // (To
make sure that all of the code is monomorphic.) For this reason we seal the object to\n    // prevent class
transitions.\n    Object.seal(tNode);\n  }\n  return tNode;\n}\n\nfunction generatePropertyAliases(\n
inputAliasMap: {[publicName: string]: string}, directiveDefIdx: number,\n  propStore: PropertyAliases|null):
PropertyAliases|null {\n  for (let publicName in inputAliasMap) {\n    if
(inputAliasMap.hasOwnProperty(publicName)) {\n      propStore = propStore === null ? {} : propStore;\n      const
internalName = inputAliasMap[publicName];\n      if (propStore.hasOwnProperty(publicName)) {\n
propStore[publicName].push(directiveDefIdx, internalName);\n      } else {\n        (propStore[publicName] =
[directiveDefIdx, internalName]);\n      }\n    }\n  }\n  return propStore;\n}\n\n/**\n * Initializes data structures
required to work with directive
inputs and outputs.\n * Initialization is done for all directives matched on a given TNode.\n */\nexport function
initializeInputAndOutputAliases(tView: TView, tNode: TNode): void {\n  ngDevMode &&
assertFirstCreatePass(tView);\n  const start = tNode.directiveStart;\n  const end = tNode.directiveEnd;\n  const
tViewData = tView.data;\n  const tNodeAttrs = tNode.attrs;\n  const inputsFromAttrs: InitialInputData =
ngDevMode ? new TNodeInitialInputs() : [];\n  let inputsStore: PropertyAliases|null = null;\n  let outputsStore:
PropertyAliases|null = null;\n  for (let i = start; i < end; i++) {\n    const directiveDef = tViewData[i] as
DirectiveDef<any>;\n    const directiveInputs = directiveDef.inputs;\n    // Do not use unbound attributes as inputs to
structural directives, since structural\n    // directive inputs can only be set using microsyntax (e.g. `<div
*dir="exp">`).\n    // TODO(FW-1930): microsyntax expressions may also contain unbound/static attributes,

```

which\n // should

```
be set for inline templates.\n  const initialInputs = (tNodeAttrs !== null && !isInlineTemplate(tNode)) ?\n  generateInitialInputs(directiveInputs, tNodeAttrs) :\n  null;\n  inputsFromAttrs.push(initialInputs);\n  inputsStore = generatePropertyAliases(directiveInputs, i, inputsStore);\n  outputsStore =\n  generatePropertyAliases(directiveDef.outputs, i, outputsStore);\n  }\n  if (inputsStore !== null) {\n  if\n  (inputsStore.hasOwnProperty('class')) {\n  tNode.flags |= TNodeFlags.hasClassInput;\n  }\n  if\n  (inputsStore.hasOwnProperty('style')) {\n  tNode.flags |= TNodeFlags.hasStyleInput;\n  }\n  }\n  tNode.initialInputs = inputsFromAttrs;\n  tNode.inputs = inputsStore;\n  tNode.outputs = outputsStore;\n  }\n  }\n  /**\n  Mapping between attributes names that don't correspond to their element property names.\n  *\n  * Performance note:\n  this function is written as a series of if checks (instead of, say, a property\n  * object lookup) for performance reasons\n  - the series of `if` checks seems to be the fastest way of\n  * mapping property names. Do NOT change without\n  benchmarking.\n  *\n  * Note: this mapping has to be kept in sync with the equally named mapping in the template\n  *\n  * type-checking machinery of ngts.\n  */\n  function mapPropName(name: string): string {\n  if (name === 'class')\n  return 'className';\n  if (name === 'for') return 'htmlFor';\n  if (name === 'formaction') return 'formAction';\n  if\n  (name === 'innerHTML') return 'innerHTML';\n  if (name === 'readonly') return 'readOnly';\n  if (name ===\n  'tabindex') return 'tabIndex';\n  return name;\n  }\n  export function elementPropertyInternal<T>(\n  tView: TView,\n  tNode: TNode, lView: LView, propName: string, value: T, renderer: Renderer,\n  sanitizer:\n  SanitizerFn|null|undefined, nativeOnly: boolean): void {\n  ngDevMode && assertNotSame(value, NO_CHANGE\n  as any, 'Incoming value should never be NO_CHANGE.);\n  const element = getNativeByTNode(tNode, lView) as\n  RElement | RComment;\n\n  let inputData = tNode.inputs;\n  let dataValue: PropertyAliasValue|undefined;\n  if (!nativeOnly && inputData !==\n  null && (dataValue = inputData[propName])) {\n  setInputsForProperty(tView, lView, dataValue, propName,\n  value);\n  if (isComponentHost(tNode)) markDirtyIfOnPush(lView, tNode.index);\n  if (ngDevMode) {\n  setNgReflectProperties(lView, element, tNode.type, dataValue, value);\n  }\n  } else if (tNode.type &\n  TNodeType.AnyRNode) {\n  propName = mapPropName(propName);\n  if (ngDevMode) {\n  validateAgainstEventProperties(propName);\n  if (!isPropertyValid(element, propName, tNode.value,\n  tView.schemas)) {\n  handleUnknownPropertyError(propName, tNode.value, tNode.type, lView);\n  }\n  ngDevMode.renderer.setProperty++;\n  }\n  }\n  // It is assumed that the sanitizer is only added when the compiler\n  determines that the\n  // property is risky, so sanitization can be done without further checks.\n  value = sanitizer\n  !== null ? (sanitizer(value,\n  tNode.value || ", propName) as any) : value;\n  renderer.setProperty(element as RElement, propName, value);\n  } else if (tNode.type & TNodeType.AnyContainer) {\n  // If the node is a container and the property didn't\n  // match any of the inputs or schemas we should throw.\n  if (ngDevMode && !matchingSchemas(tView.schemas,\n  tNode.value)) {\n  handleUnknownPropertyError(propName, tNode.value, tNode.type, lView);\n  }\n  }\n  }\n  /**\n  If node is an OnPush component, marks its LView dirty.\n  */\n  export function markDirtyIfOnPush(lView:\n  LView, viewIndex: number): void {\n  ngDevMode && assertLView(lView);\n  const childComponentLView =\n  getComponentLViewByIndex(viewIndex, lView);\n  if (!(childComponentLView[FLAGS] &\n  LViewFlags.CheckAlways)) {\n  childComponentLView[FLAGS] |= LViewFlags.Dirty;\n  }\n  }\n  function\n  setNgReflectProperty(\n  lView: LView, element: RElement|RComment, type: TNodeType, attrName: string,\n  value: any) {\n  const renderer = lView[RENDERER];\n  attrName\n  = normalizeDebugBindingName(attrName);\n  const debugValue = normalizeDebugBindingValue(value);\n  if\n  (type & TNodeType.AnyRNode) {\n  if (value == null) {\n  renderer.removeAttribute((element as RElement),\n  attrName);\n  } else {\n  renderer.setAttribute((element as RElement), attrName, debugValue);\n  }\n  } else {\n  const textContent =\n  escapeCommentText(`bindings=${JSON.stringify({[attrName]: debugValue}, null,\n  2)}`);\n  renderer.setValue((element as RComment), textContent);\n  }\n  }\n  export function\n  setNgReflectProperties(\n  lView: LView, element: RElement|RComment, type: TNodeType, dataValue:\n  PropertyAliasValue,\n  value: any) {\n  if (type & (TNodeType.AnyRNode | TNodeType.Container)) {\n  /**\n  * dataValue is an array containing runtime input or output names for the directives:\n  * i+0: directive instance
```



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index\n * i+1: privateName\n *\n * e.g. [0, 'change', 'change-minified']\n * we want to set the reflected
property
with the privateName: dataValue[i+1]\n *\n for (let i = 0; i < dataValue.length; i += 2) {\n
setNgReflectProperty(IView, element, type, dataValue[i + 1] as string, value);\n }\n }\n}\n\n/**\n * Instantiate a
root component.\n *\nexport function instantiateRootComponent<T>(tView: TView, IView: LView, def:
ComponentDef<T>): T {\n const rootTNode = getCurrentTNode();\n if (tView.firstCreatePass) {\n if
(def.providersResolver) def.providersResolver(def);\n const directiveIndex = allocExpando(tView, IView, 1,
null);\n ngDevMode &&\n assertEquals(\n directiveIndex, rootTNode.directiveStart,\n 'Because
this is a root component the allocated expando should match the TNode component.);\n
configureViewWithDirective(tView, rootTNode, IView, directiveIndex, def);\n
initializeInputAndOutputAliases(tView, rootTNode);\n }\n const directive =\n getNodeInjectable(IView, tView,
rootTNode.directiveStart, rootTNode as TElementNode);\n
attachPatchData(directive, IView);\n const native = getNativeByTNode(rootTNode, IView);\n if (native) {\n
attachPatchData(native, IView);\n }\n return directive;\n }\n\n/**\n * Resolve the matched directives on a node.\n
*\nexport function resolveDirectives(\n tView: TView, IView: LView, tNode:
TElementNode|TContainerNode|TElementContainerNode,\n localRefs: string[]|null): boolean {\n // Please make
sure to have explicit type for `exportsMap`. Inferred type triggers bug in\n // tsickle.\n ngDevMode &&
assertFirstCreatePass(tView);\n\n let hasDirectives = false;\n if (getBindingsEnabled()) {\n const directiveDefs:
DirectiveDef<any>[]|null = findDirectiveDefMatches(tView, IView, tNode);\n const exportsMap: ({[key: string]:
number})|null = localRefs === null ? null : {'': -1};\n\n if (directiveDefs !== null) {\n hasDirectives = true;\n
initTNodeFlags(tNode, tView.data.length, directiveDefs.length);\n // When the same token is provided by several
directives on the same node, some rules apply in\n // the viewEngine:\n // - viewProviders have priority over
providers\n // - the last directive in NgModule.declarations has priority over the previous one\n // So to match
these rules, the order in which providers are added in the arrays is very\n // important.\n for (let i = 0; i <
directiveDefs.length; i++) {\n const def = directiveDefs[i];\n if (def.providersResolver)
def.providersResolver(def);\n }\n let preOrderHooksFound = false;\n let preOrderCheckHooksFound =
false;\n let directiveIdx = allocExpando(tView, IView, directiveDefs.length, null);\n ngDevMode &&\n
assertSame(\n directiveIdx, tNode.directiveStart,\n 'TNode.directiveStart should point to just
allocated space');\n\n for (let i = 0; i < directiveDefs.length; i++) {\n const def = directiveDefs[i];\n //
Merge the attrs in the order of matches. This
assumes that the first directive is the\n // component itself, so that the component has the least priority.\n
tNode.mergedAttrs = mergeHostAttrs(tNode.mergedAttrs, def.hostAttrs);\n\n
configureViewWithDirective(tView, tNode, IView, directiveIdx, def);\n saveNameToExportMap(directiveIdx,
def, exportsMap);\n\n if (def.contentQueries !== null) tNode.flags |= TNodeFlags.hasContentQuery;\n\n if
(def.hostBindings !== null || def.hostAttrs !== null || def.hostVars !== 0)\n tNode.flags |=
TNodeFlags.hasHostBindings;\n\n const lifeCycleHooks: OnChanges&OnInit&DoCheck =
def.type.prototype;\n // Only push a node index into the preOrderHooks array if this is the first\n // pre-
order hook found on this node.\n if (!preOrderHooksFound &&\n (lifeCycleHooks.ngOnChanges ||
lifeCycleHooks.ngOnInit || lifeCycleHooks.ngDoCheck)) {\n // We will push the actual hook function into this
array later during dir
instantiation.\n // We cannot do it now because we must ensure hooks are registered in the same\n //
order that directives are created (i.e. injection order).\n (tView.preOrderHooks || (tView.preOrderHooks =
[])).push(tNode.index);\n preOrderHooksFound = true;\n }\n\n if (!preOrderCheckHooksFound &&
(lifeCycleHooks.ngOnChanges || lifeCycleHooks.ngDoCheck)) {\n (tView.preOrderCheckHooks ||
(tView.preOrderCheckHooks = [])).push(tNode.index);\n preOrderCheckHooksFound = true;\n }\n\n
directiveIdx++;\n }\n\n initializeInputAndOutputAliases(tView, tNode);\n }\n if (exportsMap)
cacheMatchingLocalNames(tNode, localRefs, exportsMap);\n }\n // Merge the template attrs last so that they have
the highest priority.\n tNode.mergedAttrs = mergeHostAttrs(tNode.mergedAttrs, tNode.attrs);\n return

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hasDirectives;\n}\n\n/**\n * Add `hostBindings` to the `TView.hostBindingOpCodes`.\n *\n * @param tView `TView`\n * to which the `hostBindings` should be added.\n *\n * @param tNode `TNode` the element which contains the\n * directive\n *\n * @param IView `LView` current `LView`\n *\n * @param directiveIdx Directive index in view.\n *\n * @param directiveVarsIdx Where will the directive's vars be stored\n *\n * @param def `ComponentDef`/`DirectiveDef`, which contains the `hostVars`/`hostBindings` to add.\n *\n * @next export function\n * registerHostBindingOpCodes(\n *   tView: TView, tNode: TNode, IView: LView, directiveIdx: number,\n *   directiveVarsIdx: number,\n *   def: ComponentDef<any>|DirectiveDef<any>): void {\n *     ngDevMode &&\n *     assertFirstCreatePass(tView);\n *     const hostBindings = def.hostBindings;\n *     if (hostBindings) {\n *       let\n *       hostBindingOpCodes = tView.hostBindingOpCodes;\n *       if (hostBindingOpCodes === null) {\n *         hostBindingOpCodes = tView.hostBindingOpCodes = [] as any as HostBindingOpCodes;\n *       }\n *       const\n *       elementIdx = ~tNode.index;\n *       if (lastSelectedElementIdx(hostBindingOpCodes) != elementIdx) {\n *         //\n *         Conditionally\n *         add select element so that we are more efficient in execution.\n *         // NOTE: this is strictly not necessary and it\n *         trades code size for runtime perf.\n *         // (We could just always add it.)\n *         hostBindingOpCodes.push(elementIdx);\n *       }\n *       hostBindingOpCodes.push(directiveIdx, directiveVarsIdx,\n *       hostBindings);\n *     }\n *   }\n * }\n\n/**\n * Returns the last selected element index in the `HostBindingOpCodes`\n *\n * For\n * perf reasons we don't need to update the selected element index in `HostBindingOpCodes` only\n * if it changes.\n * This method returns the last index (or '0' if not found.)\n *\n * Selected element index are only the ones which are\n * negative.\n *\n * @next export function lastSelectedElementIdx(hostBindingOpCodes: HostBindingOpCodes): number {\n *   let i =\n *   hostBindingOpCodes.length;\n *   while (i > 0) {\n *     const value = hostBindingOpCodes[--i];\n *     if (typeof value ===\n *     'number' && value < 0) {\n *       return value;\n *     }\n *   }\n *   return 0;\n * }\n\n/**\n * Instantiate all the directives\n * that were previously resolved on the current node.\n *\n * @next export function instantiateAllDirectives(\n *   tView: TView,\n *   IView: LView, tNode: TDirectiveHostNode, native: RNode) {\n *   const start = tNode.directiveStart;\n *   const end =\n *   tNode.directiveEnd;\n *   if (!tView.firstCreatePass) {\n *     getOrCreateNodeInjectorForNode(tNode, IView);\n *   }\n *   attachPatchData(native, IView);\n *   const initialInputs = tNode.initialInputs;\n *   for (let i = start; i < end; i++) {\n *     const def = tView.data[i] as DirectiveDef<any>;\n *     const isComponent = isComponentDef(def);\n *     if\n *     (isComponent) {\n *       ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode);\n *       addComponentLogic(IView, tNode as TElementNode, def as ComponentDef<any>);\n *     }\n *     const directive =\n *     getNodeInjectable(IView, tView, i, tNode);\n *     attachPatchData(directive, IView);\n *     if (initialInputs !== null)\n *     {\n *       setInputsFromAttrs(IView, i - start, directive, def, tNode, initialInputs!);\n *     }\n *     if (isComponent) {\n *       const componentView = getComponentLViewByIndex(tNode.index, IView);\n *       componentView[CONTEXT]\n *       = directive;\n *     }\n *   }\n * }\n\nfunction invokeDirectivesHostBindings(tView: TView, IView: LView, tNode: TNode)\n {\n * const start = tNode.directiveStart;\n * const end = tNode.directiveEnd;\n * const elementIndex = tNode.index;\n * const currentDirectiveIndex = getCurrentDirectiveIndex();\n * try {\n *   setSelectedIndex(elementIndex);\n *   for (let\n *   dirIndex = start;\n *   dirIndex < end;\n *   dirIndex++) {\n *     const def = tView.data[dirIndex] as DirectiveDef<unknown>;\n *     const directive = IView[dirIndex];\n *     setCurrentDirectiveIndex(dirIndex);\n *     if (def.hostBindings !== null ||\n *     def.hostVars !== 0 || def.hostAttrs !== null) {\n *       invokeHostBindingsInCreationMode(def, directive);\n *     }\n *   }\n * } finally {\n *   setSelectedIndex(-1);\n *   setCurrentDirectiveIndex(currentDirectiveIndex);\n * }\n * }\n\n/**\n * Invoke the host bindings in creation mode.\n *\n * @param def `DirectiveDef`\n * which may contain the `hostBindings` function.\n *\n * @param directive Instance of directive.\n *\n * @next export function\n * invokeHostBindingsInCreationMode(def: DirectiveDef<any>, directive: any) {\n *   if (def.hostBindings !== null) {\n *     def.hostBindings!(RenderFlags.Create, directive);\n *   }\n * }\n\n/**\n * Matches the current node against all available\n * selectors.\n *\n * If a component is matched (at most one), it is returned in first position in the array.\n *\n * @next export function\n * findDirectiveDefMatches(\n *   tView: TView, viewData: LView,\n *   tNode:\n *   TElementNode|TContainerNode|TElementContainerNode): DirectiveDef<any>[]|null {\n *   ngDevMode &&\n *   assertFirstCreatePass(tView);\n *   ngDevMode && assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.AnyContainer);\n *   const registry = tView.directiveRegistry;\n *   let matches: any[]|null = null;\n *   if

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(registry) {\n  for (let i = 0; i < registry.length; i++) {\n    const def = registry[i] as ComponentDef<any>|
DirectiveDef<any>;\n    if (isNodeMatchingSelectorList(tNode,
def.selectors!, /* isProjectionMode */ false)) {\n      matches || (matches = ngDevMode ? new MatchesArray() :
[]);\n      diPublicInInjector(getOrCreateNodeInjectorForNode(tNode, viewData), tView, def.type);\n\n      if
(isComponentDef(def)) {\n        if (ngDevMode) {\n          assertTNodeType(\n            tNode,
TNodeType.Element,\n            `\"${tNode.value}\" tags cannot be used as component hosts. ` +\n
`Please use a different tag to activate the ${stringify(def.type)} component.`);\n          if (tNode.flags &
TNodeFlags.isComponentHost) {\n            // If another component has been matched previously, it's the first
element in the\n            // `matches` array, see how we store components/directives in `matches` below.\n
throwMultipleComponentError(tNode, matches[0].type, def.type);\n          }\n        }\n        markAsComponentHost(tView, tNode);\n        // The component is always stored
first with directives after.\n        matches.unshift(def);\n      } else {\n        matches.push(def);\n      }\n    }\n  }\n  return matches;\n}\n\n/**\n * Marks a given TNode as a component's host. This consists of:\n * - setting
appropriate TNode flags;\n * - storing index of component's host element so it will be queued for view refresh
during CD.\n */\nexport function markAsComponentHost(tView: TView, hostTNode: TNode): void {\n  ngDevMode && assertFirstCreatePass(tView);\n  hostTNode.flags |= TNodeFlags.isComponentHost;\n  (tView.components || (tView.components = ngDevMode ? new TViewComponents() : []))\n  .push(hostTNode.index);\n}\n\n/**\n * Caches local names and their matching directive indices for query and
template lookups.\n */\nfunction cacheMatchingLocalNames(\n  tNode: TNode, localRefs: string[]|null, exportsMap:
{[key: string]: number}): void {\n  if (localRefs) {\n    const localNames: (string|number)[] = tNode.localNames =
ngDevMode ? new TNodeLocalNames()
: [];\n    // Local names must be stored in tNode in the same order that localRefs are defined\n    // in the template
to ensure the data is loaded in the same slots as their refs\n    // in the template (for template queries).\n    for (let i =
0; i < localRefs.length; i += 2) {\n      const index = exportsMap[localRefs[i + 1]];\n      if (index == null)\n        throw new RuntimeError(\n          RuntimeErrorCode.EXPORT_NOT_FOUND,\n          ngDevMode && `Export
of name '${localRefs[i + 1]}' not found!`);\n      localNames.push(localRefs[i], index);\n    }\n  }\n}\n\n/**\n *
Builds up an export map as directives are created, so local refs can be quickly mapped\n * to their directive
instances.\n */\nfunction saveNameToExportMap(\n  directiveIdx: number, def:
DirectiveDef<any>|ComponentDef<any>,\n  exportsMap: {[key: string]: number}|null) {\n  if (exportsMap) {\n
if (def.exportAs) {\n    for (let i = 0; i < def.exportAs.length; i++) {\n      exportsMap[def.exportAs[i]]
= directiveIdx;\n    }\n  }\n  if (isComponentDef(def)) exportsMap[""] = directiveIdx;\n  }\n}\n\n/**\n *
Initializes the flags on the current node, setting all indices to the initial index,\n * the directive count to 0, and
adding the isComponent flag.\n * @param index the initial index\n */\nexport function initTNodeFlags(tNode:
TNode, index: number, numberOfDirectives: number) {\n  ngDevMode &&\n  assertNotEqual(\n    numberOfDirectives, tNode.directiveEnd - tNode.directiveStart,\n    `Reached the max number of directives`);\n  tNode.flags |= TNodeFlags.isDirectiveHost;\n  // When the first directive is created on a node, save the index\n
tNode.directiveStart = index;\n  tNode.directiveEnd = index + numberOfDirectives;\n  tNode.providerIndexes =
index;\n}\n\n/**\n * Setup directive for instantiation.\n * We need to create a `NodeInjectorFactory` which is
then inserted in both the `Blueprint` as well\n * as `LView`. `TVIEW` gets the `DirectiveDef`\n
*\n * @param tView `TVIEW`\n * @param tNode `TNode`\n * @param IView `LView`\n * @param directiveIndex
Index where the directive will be stored in the Expando.\n * @param def `DirectiveDef`\n */\nfunction
configureViewWithDirective<T>(\n  tView: TView, tNode: TNode, IView: LView, directiveIndex: number, def:
DirectiveDef<T>): void {\n  ngDevMode &&\n  assertGreaterThanOrEqual(directiveIndex, HEADER_OFFSET,
'Must be in Expando section');\n  tView.data[directiveIndex] = def;\n  const directiveFactory = (\n    def.factory ||
((def as {factory: Function}).factory = getFactoryDef(def.type, true));\n  // Even though `directiveFactory` will
already be using `directiveInject` in its generated code,\n  // we also want to support `inject()` directly from the
directive constructor context so we set\n  // `directiveInject` as the inject implementation here too.\n  const
nodeInjectorFactory =\n    new NodeInjectorFactory(directiveFactory, isComponentDef(def), directiveInject);\n}

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    tView.blueprint[directiveIndex] = nodeInjectorFactory;\n  IView[directiveIndex] = nodeInjectorFactory;\n\n  registerHostBindingOpCodes(\n    tView, tNode, IView, directiveIndex, allocExpando(tView, IView, def.hostVars,\n  NO_CHANGE),\n    def);\n\n\nfunction addComponentLogic<T>(IView: LView, hostTNode: TElementNode,\n  def: ComponentDef<T>): void {\n  const native = getNativeByTNode(hostTNode, IView) as RElement;\n  const\n  tView = getOrCreateComponentTView(def);\n  // Only component views should be added to the view tree\n  directly. Embedded views are\n  // accessed through their containers because they may be removed / re-added\n  later.\n  const rendererFactory = IView[RENDERER_FACTORY];\n  const componentView = addToViewTree(\n    IView,\n    createLView(\n      IView, tView, null, def.onPush ? LViewFlags.Dirty : LViewFlags.CheckAlways,\n  native,\n    hostTNode as TElementNode, rendererFactory, rendererFactory.createRenderer(native, def),\n  null, null, null));\n\n  // Component view will always be created before any injected LContainers,\n  // so this is a regular element, wrap it\n  with the component view\n  IView[hostTNode.index] = componentView;\n\n\n\nexport function\n  elementAttributeInternal(\n    tNode: TNode, IView: LView, name: string, value: any, sanitizer:\n  SanitizerFn|null|undefined,\n    namespace: string|null|undefined) {\n  if (ngDevMode) {\n    assertNotSame(value,\n  NO_CHANGE as any, 'Incoming value should never be NO_CHANGE.);\n  validateAgainstEventAttributes(name);\n  assertTNodeType(\n    tNode, TNodeType.Element,\n    `Attempted\n  to set attribute \\`${name}\\` on a container node. ` +\n    `Host bindings are not valid on ng-container or ng-\n  template.`);\n  }\n  const element = getNativeByTNode(tNode, IView) as RElement;\n  setElementAttribute(IView[RENDERER], element, namespace, tNode.value, name, value, sanitizer);\n\n\n\nexport\n  function setElementAttribute(\n    renderer: Renderer, element: RElement, namespace:\n  string|null|undefined, tagName: string|null,\n    name: string, value: any, sanitizer: SanitizerFn|null|undefined) {\n  if\n  (value == null) {\n    ngDevMode && ngDevMode.rendererRemoveAttribute++;\n    renderer.removeAttribute(element, name, namespace);\n  } else {\n    ngDevMode &&\n    ngDevMode.rendererSetAttribute++;\n    const strValue =\n    sanitizer == null ? renderStringify(value) :\n    sanitizer(value, tagName || "", name);\n    renderer.setAttribute(element, name, strValue as string, namespace);\n  }\n}\n\n\n\n* Sets initial input properties on directive instances from attribute data\n  * @param IView Current\n  LView that is being processed.\n  * @param directiveIndex Index of the directive in directives array\n  * @param\n  instance Instance of the directive on which to set the initial inputs\n  * @param def The directive def that contains\n  the list of inputs\n  * @param tNode The static data for this node\n  */\nfunction setInputsFromAttrs<T>(\n  IView:\n  LView, directiveIndex:\n  number, instance: T, def: DirectiveDef<T>, tNode: TNode,\n  initialInputData: InitialInputData): void {\n  const\n  initialInputs: InitialInputs|null = initialInputData![directiveIndex];\n  if (initialInputs !== null) {\n    const setInput =\n  def.setInput;\n    for (let i = 0; i < initialInputs.length;) {\n      const publicName = initialInputs[i++];\n      const\n  privateName = initialInputs[i++];\n      const value = initialInputs[i++];\n      if (setInput !== null) {\n        def.setInput!(instance, value, publicName, privateName);\n      } else {\n        (instance as any)[privateName] =\n  value;\n      }\n      if (ngDevMode) {\n        const nativeElement = getNativeByTNode(tNode, IView) as\n  RElement;\n        setNgReflectProperty(IView, nativeElement, tNode.type, privateName, value);\n      }\n    }\n  }\n}\n\n\n\n* Generates initialInputData for a node and stores it in the template's static storage\n  * so subsequent\n  template invocations don't have to recalculate it.\n  * @param\n  initialInputData\n  is an array containing values that need to be set as input properties\n  * for directives on this node, but only once on\n  creation. We need this array to support\n  * the case where you set an @Input property of a directive using attribute-\n  like syntax.\n  * e.g. if you have a `name` @Input, you can set it once like this:\n  * <my-component\n  name="Bess"></my-component>\n  * @param inputs The list of inputs from the directive def\n  * @param attrs\n  The static attrs on this node\n  */\nfunction generateInitialInputs(inputs: {[key: string]: string}, attrs: TAttributes):\n  InitialInputs\n  null {\n  let inputsToStore: InitialInputs|null = null;\n  let i = 0;\n  while (i < attrs.length) {\n    const attrName = attrs[i];\n    if (attrName === AttributeMarker.NamespaceURI) {\n      // We do not allow inputs\n  on namespaced attributes.\n      i += 4;\n      continue;\n    } else if (attrName === AttributeMarker.ProjectAs) {\n      // Skip over the `ngProjectAs` value.\n      i += 2;\n    }\n  }\n}\n
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    continue;\n  }\n\n  // If we hit any other attribute markers, we're done anyway. None of those are valid
inputs.\n  if (typeof attrName === 'number') break;\n\n  if (inputs.hasOwnProperty(attrName as string)) {\n    if
(inputsToStore === null) inputsToStore = [];\n    inputsToStore.push(attrName as string, inputs[attrName as
string], attrs[i + 1] as string);\n  }\n\n  i += 2;\n} \n return inputsToStore;\n}\n\n////////////////////////////////////\n\nViewContainer & View\n////////////////////////////////////\n\n// Not sure why I need to do `any` here but TS complains
later.\nconst LContainerArray: any = class LContainer extends Array {};\n\n/**\n * Creates a LContainer, either
from a container instruction, or for a ViewContainerRef.\n * @param hostNative The host element for the
LContainer\n * @param hostTNode The host TNode for the LContainer\n * @param currentView The parent view
of the LContainer\n * @param native The native comment element\n * @param isForViewContainerRef
Optional a flag indicating the ViewContainerRef case\n * @returns LContainer\n */\nexport function
createLContainer(\n  hostNative: RElement|RComment|LView, currentView: LView, native: RComment,\n  tNode: TNode): LContainer {\n  ngDevMode && assertLView(currentView);\n  // https://jsperf.com/array-literal-
vs-new-array-really\n  const IContainer: LContainer = new (ngDevMode ? LContainerArray : Array)(\n
hostNative, // host native\n    true, // Boolean `true` in this position signifies that this is an `LContainer`\n
false, // has transplanted views\n    currentView, // parent\n    null, // next\n    0, // transplanted
views to refresh count\n    tNode, // t_host\n    native, // native,\n    null, // view refs\n    null,
// moved views\n  );\n  ngDevMode &&\n    assertEquals(\n      IContainer.length,
CONTAINER_HEADER_OFFSET,\n      'Should allocate correct number of slots for LContainer
header.);\n  ngDevMode && attachLContainerDebug(IContainer);\n  return IContainer;\n}\n\n/**\n * Goes over
embedded views (ones created through ViewContainerRef APIs) and refreshes\n * them by executing an associated
template function.\n */\nfunction refreshEmbeddedViews(IView: LView) {\n  for (let IContainer =
getFirstLContainer(IView); IContainer !== null;\n    IContainer = getNextLContainer(IContainer)) {\n    for (let i =
CONTAINER_HEADER_OFFSET; i < IContainer.length; i++) {\n      const embeddedLView = IContainer[i];\n      const
embeddedTView = embeddedLView[TVIEW];\n      ngDevMode && assertDefined(embeddedTView,
'TView must be allocated');\n      if (viewAttachedToChangeDetector(embeddedLView)) {\n        refreshView(embeddedTView, embeddedLView, embeddedTView.template, embeddedLView[CONTEXT]);\n      }\n    }\n  }\n}\n\n/**\n * Mark transplanted views as needing to be refreshed at their insertion points.\n */\n * @param IView The `LView` that may have transplanted views.\n
*/\nfunction markTransplantedViewsForRefresh(IView: LView) {\n  for (let IContainer =
getFirstLContainer(IView); IContainer !== null;\n    IContainer = getNextLContainer(IContainer)) {\n    if
(!IContainer[HAS_TRANSPLANTED_VIEWS]) continue;\n    const movedViews =
IContainer[MOVED_VIEWS];\n    ngDevMode && assertDefined(movedViews, 'Transplanted View flags set but
missing MOVED_VIEWS');\n    for (let i = 0; i < movedViews.length; i++) {\n      const movedLView =
movedViews[i];\n      const insertionLContainer = movedLView[PARENT] as LContainer;\n      ngDevMode &&
assertLContainer(insertionLContainer);\n      // We don't want to increment the counter if the moved LView was
already marked for\n      // refresh.\n      if ((movedLView[FLAGS] & LViewFlags.RefreshTransplantedView) ===
0) {\n        updateTransplantedViewCount(insertionLContainer, 1);\n      }\n      // Note, it is possible that the
`movedViews` is tracking views that are transplanted *and*\n      // those that
aren't (declaration component === insertion component). In the latter case,\n      // it's fine to add the flag, as we will
clear it immediately in\n      // `refreshEmbeddedViews` for the view currently being refreshed.\n      movedLView[FLAGS] |= LViewFlags.RefreshTransplantedView;\n    }\n  }\n}\n\n/**\n * Refreshes
components by entering the component view and processing its bindings, queries, etc.\n */\n * @param
componentHostIdx Element index in LView[] (adjusted for HEADER_OFFSET)\n */\nfunction
refreshComponent(hostLView: LView, componentHostIdx: number): void {\n  ngDevMode &&
assertEqual(isCreationMode(hostLView), false, 'Should be run in update mode');\n  const componentView =
getComponentLViewByIndex(componentHostIdx, hostLView);\n  // Only attached components that are
CheckAlways or OnPush and dirty should be refreshed\n  if (viewAttachedToChangeDetector(componentView)) {\n    const tView = componentView[TVIEW];\n    if (componentView[FLAGS] & (LViewFlags.CheckAlways

```









```

./assert';\nimport {icuContainerIterate} from './i18n/i18n_tree_shaking';\nimport
{CONTAINER_HEADER_OFFSET} from './interfaces/container';\nimport {TicuContainerNode, TNode,
TNodeType} from './interfaces/node';\nimport
{RNode} from './interfaces/renderer_dom';\nimport {isLContainer} from './interfaces/type_checks';\nimport
{DECLARATION_COMPONENT_VIEW, LView, T_HOST, TVIEW, TView} from './interfaces/view';\nimport
{assertTNodeType} from './node_assert';\nimport {getProjectionNodes} from './node_manipulation';\nimport
{getLViewParent} from './util/view_traversal_utils';\nimport {unwrapRNode} from './util/view_utils';\n\n\n\nexport
function collectNativeNodes(\n  tView: TView, IView: LView, tNode: TNode|null, result: any[],\n  isProjection:
boolean = false): any[] {\n  while (tNode !== null) {\n    ngDevMode &&\n    assertTNodeType(\n
tNode,\n      TNodeType.AnyRNode | TNodeType.AnyContainer | TNodeType.Projection | TNodeType.Icu);\n\n
const INode = IView[tNode.index];\n    if (INode !== null) {\n      result.push(unwrapRNode(INode));\n    }\n\n //
A given INode can represent either a native node or a LContainer (when it is a host of a\n // ViewContainerRef).
When we find a LContainer we need to descend into it to collect root nodes\n // from the views in this container.\n
if (isLContainer(INode)) {\n    for (let i = CONTAINER_HEADER_OFFSET; i < INode.length; i++) {\n
const IViewInAContainer = INode[i];\n      const IViewFirstChildTNode =
IViewInAContainer[TVIEW].firstChild;\n      if (IViewFirstChildTNode !== null) {\n        collectNativeNodes(\n
IViewInAContainer[TVIEW], IViewInAContainer, IViewFirstChildTNode, result);\n      }\n    }\n\n
const tNodeType = tNode.type;\n    if (tNodeType & TNodeType.ElementContainer) {\n
collectNativeNodes(tView, IView, tNode.child, result);\n    } else if (tNodeType & TNodeType.Icu) {\n    const
nextRNode = icuContainerIterate(tNode as TicuContainerNode, IView);\n    let rNode: RNode|null;\n    while
(rNode = nextRNode()) {\n      result.push(rNode);\n    }\n    } else if (tNodeType & TNodeType.Projection) {\n
const nodesInSlot
= getProjectionNodes(IView, tNode);\n    if (Array.isArray(nodesInSlot)) {\n      result.push(...nodesInSlot);\n
} else {\n      const parentView = getLViewParent(IView[DECLARATION_COMPONENT_VIEW]);\n
ngDevMode && assertParentView(parentView);\n      collectNativeNodes(parentView[TVIEW], parentView,
nodesInSlot, result, true);\n    }\n    } tNode = isProjection ? tNode.projectionNext : tNode.next;\n  }\n\n
return
result;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {ChangeDetectorRef as viewEngine_ChangeDetectorRef} from
'./change_detection/change_detector_ref';\nimport {RuntimeError, RuntimeErrorCode} from './errors';\nimport
{EmbeddedViewRef as viewEngine_EmbeddedViewRef, InternalViewRef as viewEngine_InternalViewRef,
ViewRefTracker} from './linker/view_ref';\nimport {removeFromArray}
from './util/array_utils';\nimport {assertEqual} from './util/assert';\nimport {collectNativeNodes} from
'./collect_native_nodes';\nimport {checkNoChangesInternal, detectChangesInternal, markViewDirty,
storeCleanupWithContext} from './instructions/shared';\nimport {CONTAINER_HEADER_OFFSET,
VIEW_REFS} from './interfaces/container';\nimport {isLContainer} from './interfaces/type_checks';\nimport
{CONTEXT, FLAGS, LView, LViewFlags, PARENT, TVIEW} from './interfaces/view';\nimport {destroyLView,
detachView, renderDetachView} from './node_manipulation';\n\n\n// Needed due to tsickle downleveling where
multiple `implements` with classes creates\n// multiple @extends in Closure annotations, which is illegal. This
workaround fixes\n// the multiple @extends by making the annotation @implements instead\nexport interface
viewEngine_ChangeDetectorRef_interface extends viewEngine_ChangeDetectorRef {} \n\nexport class
ViewRef<T> implements viewEngine_EmbeddedViewRef<T>, viewEngine_InternalViewRef,\n
viewEngine_ChangeDetectorRef_interface {\n  private _appRef: ViewRefTracker|null =
null;\n  private _attachedToViewContainer = false;\n\n  get rootNodes(): any[] {\n    const IView = this._IView;\n
const tView = IView[TVIEW];\n    return collectNativeNodes(tView, IView, tView.firstChild, []);\n  }\n\n
constructor(\n    /**\n     * This represents `LView` associated with the component when ViewRef is a
ChangeDetectorRef.\n     * \n     * When ViewRef is created for a dynamic component, this also represents the
`LView` for the\n     * component.\n     * \n     * For a "regular" ViewRef created for an embedded view, this is

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the `LView` for the embedded
    * view.\n    *\n    * @internal\n    */\n    public _LView: LView,\n\n    /**\n     * This represents the `LView` associated with the point where `ChangeDetectorRef` was\n     * requested.\n     *\n     * This may be different from `_LView` if the `_cdRefInjectingView` is an embedded view.\n     */\n    private _cdRefInjectingView?: LView) {} \n\n    get context(): T {\n        return this._LView[CONTEXT] as unknown as T;\n    }\n\n    set context(value: T) {\n        this._LView[CONTEXT] = value as unknown as {};\n    }\n\n    get destroyed(): boolean {\n        return (this._LView[FLAGS] & LViewFlags.Destroyed) === LViewFlags.Destroyed;\n    }\n\n    destroy(): void {\n        if (this._appRef) {\n            this._appRef.detachView(this);\n        } else if (this._attachedToViewContainer) {\n            const parent = this._LView[PARENT];\n            if (isLContainer(parent)) {\n                const viewRefs = parent[VIEW_REFS] as ViewRef<unknown>[] | null;\n                const index = viewRefs ? viewRefs.indexOf(this) : -1;\n                if (index > -1) {\n                    ngDevMode &&\n                        assertEquals(\n                            index, parent.indexOf(this._LView) -\n                                CONTAINER_HEADER_OFFSET,\n                            'An attached view should be in the same position within its\n                                container as its ViewRef\n                                in the VIEW_REFS array.);\n                    detachView(parent, index);\n                    removeFromArray(viewRefs!, index);\n                }\n                this._attachedToViewContainer = false;\n            }\n            destroyLView(this._LView[TVIEW], this._LView);\n        }\n\n        onDestory(callback: Function) {\n            storeCleanupWithContext(this._LView[TVIEW], this._LView, null,\n                callback);\n        }\n\n        /**\n         * Marks a view and all of its ancestors dirty.\n         *\n         * This can be used to ensure an\n         * {@link ChangeDetectionStrategy#OnPush OnPush} component is\n         * checked when it needs to be re-rendered but\n         * the two normal triggers haven't marked it\n         * dirty (i.e. inputs haven't changed and events haven't fired in the\n         * view).\n         *\n         * <!-- TODO: Add a link to a chapter on OnPush components -->\n         *\n         * @usageNotes\n         * ###\n         * Example\n         *\n         * ```typescript\n         * @Component({\n         *   selector: 'app-root',\n         *   template: `Number of ticks:\n         *   {{numberOfTicks}}`\n         *   changeDetection: ChangeDetectionStrategy.OnPush,\n         * })\n         * class AppComponent {\n         *   numberOfTicks = 0;\n         *   constructor(private ref:\n         *   ChangeDetectorRef) {\n         *     setInterval(() => {\n         *       this.numberOfTicks++;\n         *       // the following is\n         *       required, otherwise the view will not be updated\n         *       this.ref.markForCheck();\n         *     }, 1000);\n         *   }\n         * }\n         * ```\n         *\n         * markForCheck(): void {\n         *   markViewDirty(this._cdRefInjectingView || this._LView);\n         * }\n         * }\n         * }\n         * \n         * Detaches the view from the change detection tree.\n         *\n         * Detached views will not be checked during change\n         * detection runs until they are\n         * re-attached, even if they are dirty. `detach` can be used in combination with\n         * {\n         *   @link ChangeDetectorRef#detectChanges detectChanges} to implement local change\n         *   detection checks.\n         *\n         * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n         *\n         * <!-- TODO: Add a live demo\n         * once ref.detectChanges is merged into master -->\n         *\n         * @usageNotes\n         * ###\n         * Example\n         *\n         * The following example defines a component with a large list of readonly data.\n         * Imagine the\n         * data changes constantly, many times per second. For performance reasons,\n         * we want to check and update the list\n         * every five seconds. We can do that by detaching\n         * the component's change detector and doing a local check\n         * every five seconds.\n         *\n         * ```typescript\n         * class DataProvider {\n         *   // in a real application the returned data\n         *   will be different every time\n         *   get data() {\n         *     return [1,2,3,4,5];\n         *   }\n         * }\n         *\n         * @Component({\n         *   selector: 'giant-list',\n         *   template: `\n         *     <li *ngFor="let d of dataProvider.data">Data {{d}}</li>\n         *   `,\n         * })\n         * class GiantList {\n         *   constructor(private ref: ChangeDetectorRef, private dataProvider:\n         *   DataProvider) {\n         *     ref.detach();\n         *     setInterval(() => {\n         *       this.ref.detectChanges();\n         *     }, 5000);\n         *   }\n         * }\n         *\n         * @Component({\n         *   selector: 'app',\n         *   providers: [DataProvider],\n         *   template: `\n         *     <giant-list><giant-list>\n         *   `,\n         * })\n         * class App {\n         * }\n         * ```\n         *\n         * detach(): void {\n         *   this._LView[FLAGS] &= ~LViewFlags.Attached;\n         * }\n         * }\n         * \n         * Re-attaches a view to the change detection tree.\n         *\n         * This can be used to re-attach views that\n         * were previously detached from the tree\n         * using {\n         *   @link ChangeDetectorRef#detach detach}. Views are attached\n         * to the tree by default.\n         *\n         * <!-- TODO: Add a link to a chapter on detach/reattach/local digest -->\n         *\n         * @usageNotes\n         * ###\n         * Example\n         *\n         * The following example creates a component displaying `live` data. The\n         * component will detach\n         * its change detector from the main change detector tree when the component's live\n         * property\n         * is set to false.\n         *\n         * ```typescript\n         * class DataProvider {\n         *   data = 1;\n         * }\n         *

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constructor() {\n *   setInterval(() => {\n *     this.data
= this.data * 2;\n *   }, 500);\n * }\n * }\n * @Component({\n *   selector: 'live-data',\n *   inputs:
['live'],\n *   template: 'Data: {{dataProvider.data}}'\n * })\n * class LiveData {\n *   constructor(private ref:
ChangeDetectorRef, private dataProvider: DataProvider) {\n *     \n *     set live(value) {\n *       if (value) {\n *
this.ref.reattach();\n *     } else {\n *       this.ref.detach();\n *     }\n *   }\n * }\n * }\n * @Component({\n *
selector: 'app-root',\n *   providers: [DataProvider],\n *   template: `\n *     Live Update: <input
type="checkbox" [(ngModel)]="live">\n *     <live-data [live]="live"><live-data>\n *     `,\n *   })\n * class
AppComponent {\n *   live = true;\n * }\n * ``\n * /\n * reattach(): void {\n *   this._IView[FLAGS] |=
LViewFlags.Attached;\n * }\n * }\n * /**\n * Checks the view and its children.\n * This can also be used in
combination with { @link ChangeDetectorRef#detach
detach} to implement\n * local change detection checks.\n * \n * <!-- TODO: Add a link to a chapter on
detach/reattach/local digest -->\n * <!-- TODO: Add a live demo once ref.detectChanges is merged into master --
>\n * \n * @usageNotes\n * ### Example\n * \n * The following example defines a component with a large list
of readonly data.\n * Imagine, the data changes constantly, many times per second. For performance reasons,\n *
we want to check and update the list every five seconds.\n * \n * We can do that by detaching the component's
change detector and doing a local change detection\n * check every five seconds.\n * \n * See { @link
ChangeDetectorRef#detach detach} for more information.\n * /\n * detectChanges(): void {\n *
detectChangesInternal(this._IView[TVIEW], this._IView, this.context as unknown as {});\n * }\n * }\n * /**\n * Checks
the change detector and its children, and throws if any changes are detected.\n * \n * This is used in development
mode to verify that running change detection doesn't\n * introduce other changes.\n * /\n * checkNoChanges():
void {\n *   if (ngDevMode) {\n *     checkNoChangesInternal(this._IView[TVIEW], this._IView, this.context as
unknown as {});\n *   }\n * }\n * }\n * attachToViewContainerRef() {\n *   if (this._appRef) {\n *     throw new
RuntimeError(\n *       RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n *       ngDevMode && 'This view is
already attached directly to the ApplicationRef!');\n *   }\n *   this._attachedToViewContainer = true;\n * }\n * }\n *
detachFromAppRef() {\n *   this._appRef = null;\n *   renderDetachView(this._IView[TVIEW], this._IView);\n * }\n * }\n *
attachToAppRef(appRef: ViewRefTracker) {\n *   if (this._attachedToViewContainer) {\n *     throw new
RuntimeError(\n *       RuntimeErrorCode.VIEW_ALREADY_ATTACHED,\n *       ngDevMode && 'This view is
already attached to a ViewContainer!');\n *   }\n *   this._appRef = appRef;\n * }\n * }\n * }\n * @internal *\n * export class
RootViewRef<T> extends
ViewRef<T> {\n *   constructor(public _view: LView) {\n *     super(_view);\n *   }\n * }\n * }\n * override detectChanges(): void
{\n *   const IView = this._view;\n *   const tView = IView[TVIEW];\n *   const context = IView[CONTEXT];\n *
detectChangesInternal(tView, IView, context, false);\n * }\n * }\n * override checkNoChanges(): void {\n *   if
(ngDevMode) {\n *     const IView = this._view;\n *     const tView = IView[TVIEW];\n *     const context =
IView[CONTEXT];\n *     checkNoChangesInternal(tView, IView, context, false);\n *   }\n * }\n * }\n * override get
context(): T {\n *   return null!;\n * }\n * }\n * }\n * "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n * import { ChangeDetectorRef } from
'./change_detection/change_detector_ref';\n * import { Injector } from './di/injector';\n * import { InjectFlags } from
'./di/interface/injector';\n * import { ProviderToken } from
'./di/provider_token';\n * import { EnvironmentInjector } from './di/r3_injector';\n * import { RuntimeError,
RuntimeErrorCode } from './errors';\n * import { Type } from './interface/type';\n * import { ComponentFactory as
AbstractComponentFactory, ComponentRef as AbstractComponentRef } from './linker/component_factory';\n * import
{ ComponentFactoryResolver as AbstractComponentFactoryResolver } from
'./linker/component_factory_resolver';\n * import { createElementRef, ElementRef } from
'./linker/element_ref';\n * import { NgModuleRef } from './linker/ng_module_factory';\n * import { RendererFactory2 }
from './render/api';\n * import { Sanitizer } from './sanitization/sanitizer';\n * import { assertDefined,
assertIndexInRange } from './util/assert';\n * import { VERSION } from './version';\n * import
{ NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR } from './view/provider_flags';\n * }\n * import

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{assertComponentType} from './assert';\nimport {getComponentDef} from './definition';\nimport
{diPublicInInjector, getOrCreateNodeInjectorForNode, NodeInjector}
from './di';\nimport {throwProviderNotFoundError} from './errors_di';\nimport {registerPostOrderHooks} from
 './hooks';\nimport {reportUnknownPropertyError} from './instructions/element_validation';\nimport
{addToViewTree, createLView, createTView, getOrCreateComponentTView, getOrCreateTNode, initTNodeFlags,
instantiateRootComponent, invokeHostBindingsInCreationMode, locateHostElement, markAsComponentHost,
markDirtyIfOnPush, registerHostBindingOpCodes, renderView, setInputsForProperty} from
 './instructions/shared';\nimport {ComponentDef, RenderFlags} from './interfaces/definition';\nimport
{PropertyAliasValue, TContainerNode, TElementContainerNode, TElementNode, TNode, TNodeType} from
 './interfaces/node';\nimport {Renderer, RendererFactory} from './interfaces/renderer';\nimport {RElement, RNode}
from './interfaces/renderer_dom';\nimport {CONTEXT, HEADER_OFFSET, LView, LViewFlags, TVIEW,
TViewType} from './interfaces/view';\nimport {MATH_ML_NAMESPACE, SVG_NAMESPACE} from
 './namespaces';\nimport
{createElementNode, writeDirectClass, writeDirectStyle} from './node_manipulation';\nimport
{extractAttrsAndClassesFromSelector, stringifyCSSSelectorList} from './node_selector_matcher';\nimport
{enterView, getCurrentTNode, getLView, leaveView, setSelectedIndex} from './state';\nimport
{computeStaticStyling} from './styling/static_styling';\nimport {setUpAttributes} from './util/attrs_utils';\nimport
{stringifyForError} from './util/stringify_utils';\nimport {getTNode} from './util/view_utils';\nimport {RootViewRef,
ViewRef} from './view_ref';\n\nexport class ComponentFactoryResolver extends
AbstractComponentFactoryResolver {\n  /**\n   * @param ngModule The NgModuleRef to which all resolved
factories are bound.\n   * \n   * constructor(private ngModule?: NgModuleRef<any>) {\n   *   super();\n   * }\n   * \n   * override
resolveComponentFactory<T>(component: Type<T>): AbstractComponentFactory<T> {\n   *   ngDevMode &&
assertComponentType(component);\n   *   const componentDef = getComponentDef(component)!;\n   *   \n   *   return new ComponentFactory(componentDef, this.ngModule);\n   * }\n   * \n   * function toRefArray(map: {[key:
string]: string}): {propName: string; templateName: string;}[] {\n   *   const array: {propName: string; templateName:
string;}[] = [];\n   *   for (let nonMinified in map) {\n   *     if (map.hasOwnProperty(nonMinified)) {\n   *       const minified =
map[nonMinified];\n   *       array.push({propName: minified, templateName: nonMinified});\n   *     }\n   *   }\n   *   return
array;\n   * }\n   * \n   * function getNamespace(elementName: string): string|null {\n   *   const name =
elementName.toLowerCase();\n   *   return name === 'svg' ? SVG_NAMESPACE : (name === 'math' ?
MATH_ML_NAMESPACE : null);\n   * }\n   * \n   * Injector that looks up a value using a specific injector, before
falling back to the module\n   * injector. Used primarily when creating components or embedded views
dynamically.\n   * \n   * class ChainedInjector implements Injector {\n   *   constructor(private injector: Injector, private
parentInjector: Injector) {\n   *   }\n   *   get<T>(token:
ProviderToken<T>, notFoundValue?: T, flags?: InjectFlags): T {\n   *     const value = this.injector.get<T|typeof
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR>(\n   *       token,\n   *       NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR, flags);\n   *     if (value !==
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR ||\n   *         notFoundValue ===
(NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR as unknown as T)) {\n   *       // Return the value from the
root element injector when\n   *       // - it provides it\n   *       // (value !==
NOT_FOUND_CHECK_ONLY_ELEMENT_INJECTOR)\n   *       // - the module injector should not be checked\n   *       \n   *       return value as T;\n   *     }\n   *     return this.parentInjector.get(token, notFoundValue, flags);\n   *   }\n   * }\n   * \n   * ComponentFactory interface
implementation.\n   * \n   * export class ComponentFactory<T> extends AbstractComponentFactory<T> {\n   *   override
selector: string;\n   *   override componentType: Type<any>;\n   *   override ngContentSelectors: string[];\n   *   isBoundToModule:
boolean;\n   *   override get inputs(): {propName: string; templateName: string;}[] {\n   *     return
toRefArray(this.componentDef.inputs);\n   *   }\n   *   override get outputs(): {propName: string; templateName:
string;}[] {\n   *     return toRefArray(this.componentDef.outputs);\n   *   }\n   * }\n   * \n   * /**\n   * @param componentDef The

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component definition.\n * @param NgModule The NgModuleRef to which the factory is bound.\n */\n
constructor(private componentDef: ComponentDef<any>, private NgModule?: NgModuleRef<any>) {\n  super();\n
  this.componentType = componentDef.type;\n  this.selector =
stringifyCSSSelectorList(componentDef.selectors);\n  this.ngContentSelectors =\n
componentDef.ngContentSelectors ? componentDef.ngContentSelectors : [];\n  this.isBoundToModule =
!!NgModule;\n } \n\n override create(\n  injector: Injector, projectableNodes?: any[] | undefined,\n
rootSelectorOrNode?: any, \n  environmentInjector?: NgModuleRef<any> | EnvironmentInjector | \n  undefined):
AbstractComponentRef<T>
{\n  environmentInjector = environmentInjector || this.ngModule;\n\n  let realEnvironmentInjector =
environmentInjector instanceof EnvironmentInjector ? \n  environmentInjector : \n
environmentInjector?.injector;\n\n  if (realEnvironmentInjector && this.componentDef.getStandaloneInjector !==
null) {\n  realEnvironmentInjector = this.componentDef.getStandaloneInjector(realEnvironmentInjector) | \n
realEnvironmentInjector;\n  }\n\n  const rootViewInjector = \n  realEnvironmentInjector ? new
ChainedInjector(injector, realEnvironmentInjector) : injector;\n\n  const rendererFactory =
rootViewInjector.get(RendererFactory2, null);\n  if (rendererFactory === null) {\n  throw new RuntimeError(\n
RuntimeErrorCode.RENDERER_NOT_FOUND, \n  NgModule && \n  'Angular was not able to
inject a renderer (RendererFactory2). ' + \n  'Likely this is due to a broken DI hierarchy. ' + \n
'Make sure that any injector used to create this component has a correct parent.);\n  }\n  const sanitizer =
rootViewInjector.get(Sanitizer, null);\n\n  const hostRenderer = rendererFactory.createRenderer(null,
this.componentDef);\n  // Determine a tag name used for creating host elements when this component is created\n
// dynamically. Default to 'div' if this component did not specify any tag name in its selector.\n  const elementName
= this.componentDef.selectors[0][0] as string || 'div';\n  const hostRNode = rootSelectorOrNode ? \n
locateHostElement(hostRenderer, rootSelectorOrNode, this.componentDef.encapsulation) : \n
createElementNode(hostRenderer, elementName, getNamespace(elementName));\n\n  const rootFlags =
this.componentDef.onPush ? LViewFlags.Dirty | LViewFlags.IsRoot : \n
LViewFlags.CheckAlways | LViewFlags.IsRoot;\n\n  // Create the root view. Uses empty TView and
ContentTemplate.\n  const
rootTVView = createTVView(TViewType.Root, null, null, 1, 0, null, null, null, null, null);\n  const rootLView =
createLView(\n  null, rootTVView, null, rootFlags, null, null, rendererFactory, hostRenderer, sanitizer,\n
rootViewInjector, null);\n\n  // rootView is the parent when bootstrapping\n  // TODO(misko): it looks like we are
entering view here but we don't really need to as\n  // `renderView` does that. However as the code is written it is
needed because\n  // `createRootComponentView` and `createRootComponent` both read global state. Fixing
those\n  // issues would allow us to drop this.\n  enterView(rootLView);\n\n  let component: T;\n  let
tElementNode: TElementNode;\n\n  try {\n  const componentView = createRootComponentView(\n
hostRNode, this.componentDef, rootLView, rendererFactory, hostRenderer);\n  if (hostRNode) {\n  if
(rootSelectorOrNode) {\n  setUpAttributes(hostRenderer, hostRNode, ['ng-version', VERSION.full]);\n
} else {\n  // If host element is created as a part of this function call (i.e. `rootSelectorOrNode`\n  // is
not defined), also apply attributes and classes extracted from component selector.\n  // Extract attributes and
classes from the first selector only to match VE behavior.\n  const {attrs, classes} = \n
extractAttrsAndClassesFromSelector(this.componentDef.selectors[0]);\n  if (attrs) {\n
setUpAttributes(hostRenderer, hostRNode, attrs);\n  }\n  if (classes && classes.length > 0) {\n
writeDirectClass(hostRenderer, hostRNode, classes.join(' '));\n  }\n  }\n  }\n\n  tElementNode =
getTNode(rootTVView, HEADER_OFFSET) as TElementNode;\n\n  if (projectableNodes !== undefined) {\n
const projection: (TNode | RNode[] | null)[] = tElementNode.projection = [];\n  for (let i = 0; i <
this.ngContentSelectors.length; i++) {\n  const nodesForSlot
= projectableNodes[i];\n  // Projectable nodes can be passed as array of arrays or an array of iterables
(ngUpgrade\n  // case). Here we do normalize passed data structure to be an array of arrays to avoid\n  //
complex checks down the line.\n  // We also normalize the length of the passed in projectable nodes (to match

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the number of\n      // <ng-container> slots defined by a component).\n      projection.push(nodesforSlot != null
? Array.from(nodesforSlot) : null);\n    }\n  }\n  // TODO: should LifecycleHooksFeature and other host
features be generated by the compiler and\n  // executed here?\n  // Angular 5 reference:
https://stackblitz.com/edit/lifecycle-hooks-vcref\n  component =\n    createRootComponent(componentView,
this.componentDef, rootLView, [LifecycleHooksFeature]);\n  renderView(rootTView, rootLView, null);\n  }
finally {\n    leaveView();\n  }\n  return new ComponentRef(\n    this.componentType,
component, createElementRef(tElementNode, rootLView), rootLView,\n    tElementNode);\n  }\n}\n\nconst
componentFactoryResolver: ComponentFactoryResolver = new ComponentFactoryResolver();\n\n/**\n * Creates a
ComponentFactoryResolver and stores it on the injector. Or, if the\n * ComponentFactoryResolver\n * already
exists, retrieves the existing ComponentFactoryResolver.\n * @returns The ComponentFactoryResolver instance
to use\n * ^\nexport function injectComponentFactoryResolver(): AbstractComponentFactoryResolver {\n  return
componentFactoryResolver;\n}\n\n/**\n * Represents an instance of a Component created via a {@link
ComponentFactory}.\n * @ComponentRef provides access to the Component Instance as well other objects
related to this\n * Component Instance and allows you to destroy the Component Instance via the {@link
#destroy}\n * method.\n * @^\nexport class ComponentRef<T> extends AbstractComponentRef<T> {\n  override
instance: T;\n  override hostView:
ViewRef<T>;\n  override changeDetectorRef: ChangeDetectorRef;\n  override componentType: Type<T>;\n\n
constructor(\n  componentType: Type<T>, instance: T, public location: ElementRef, private _rootLView:
LView,\n  private _tNode: TElementNode|TContainerNode|TElementContainerNode) {\n  super();\n  this.instance =
instance;\n  this.hostView = this.changeDetectorRef = new RootViewRef<T>(_rootLView);\n  this.componentType =
componentType;\n  }\n\n  override setInput(name: string, value: unknown): void {\n  const
inputData = this._tNode.inputs;\n  let dataValue: PropertyAliasValue|undefined;\n  if (inputData !== null &&
(dataValue = inputData[name])) {\n  const IView = this._rootLView;\n  setInputsForProperty(IView[TVIEW],
IView, dataValue, name, value);\n  markDirtyIfOnPush(IView, this._tNode.index);\n  } else {\n  if
(ngDevMode) {\n  const cmpNameForError = stringifyForError(this.componentType);\n  let message =\n  `Can't
set value of the '${name}' input on the '${cmpNameForError}' component. `;\n  message += `Make sure that the
'${\n  name}' property is annotated with @Input() or a mapped @Input('${name}') exists.`;\n  reportUnknownPropertyError(message);\n  }\n  }\n  }\n\n  override get injector(): Injector {\n  return new
NodeInjector(this._tNode, this._rootLView);\n  }\n\n  override destroy(): void {\n  this.hostView.destroy();\n  }\n\n
override onDestroy(callback: () => void): void {\n  this.hostView.onDestroy(callback);\n  }\n}\n\n/** Represents a
HostFeature function. *\ninterface HostFeature = (<T>(component: T, componentDef: ComponentDef<T>) =>
void);\n\n// TODO: A hack to not pull in the NullInjector from @angular/core.\nexport const NULL_INJECTOR:
Injector = {\n  get: (token: any, notFoundValue?: any) => {\n  throwProviderNotFoundError(token,
'NullInjector');\n  }\n};\n\n/**\n * Creates the root component view and the root component node.\n * @param
rNode
Render host element.\n * @param def ComponentDef\n * @param rootView The parent view where the host node
is stored\n * @param rendererFactory Factory to be used for creating child renderers.\n * @param hostRenderer The
current renderer\n * @param sanitizer The sanitizer, if provided\n * @returns Component view created\n * ^\nexport
function createRootComponentView(\n  rNode: RElement|null, def: ComponentDef<any>, rootView:
LView, rendererFactory: RendererFactory,\n  hostRenderer: Renderer, sanitizer?: Sanitizer|null): LView {\n  const
tView = rootView[TVIEW];\n  const index = HEADER_OFFSET;\n  ngDevMode &&
assertIndexInRange(rootView, index);\n  rootView[index] = rNode;\n  // '#host' is added here as we don't know the
real host DOM name (we don't want to read it) and at\n  // the same time we want to communicate the debug
`TNode` that this is a special `TNode`\n  // representing a host element.\n  const tNode: TElementNode =
getOrCreateTNode(tView, index, TNodeType.Element,
'#host', null);\n  const mergedAttrs = tNode.mergedAttrs = def.hostAttrs;\n  if (mergedAttrs !== null) {\n  computeStaticStyling(tNode, mergedAttrs, true);\n  if (rNode !== null) {\n  setUpAttributes(hostRenderer,

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rNode, mergedAttrs);\n    if (tNode.classes !== null) {\n        writeDirectClass(hostRenderer, rNode,\n        tNode.classes);\n    }\n    if (tNode.styles !== null) {\n        writeDirectStyle(hostRenderer, rNode, tNode.styles);\n    }\n}\n}\n}\n\nconst viewRenderer = rendererFactory.createRenderer(rNode, def);\nconst componentView =\ncreateLView(\n    rootView, getOrCreateComponentTView(def), null,\n    def.onPush ? LViewFlags.Dirty :\n    LViewFlags.CheckAlways, rootView[index], tNode,\n    rendererFactory, viewRenderer, sanitizer || null, null,\n    null);\n\nif (tView.firstCreatePass) {\n    diPublicInInjector(getOrCreateNodeInjectorForNode(tNode, rootView),\n    tView, def.type);\n    markAsComponentHost(tView, tNode);\n    initTNodeFlags(tNode, rootView.length,\n    1);\n}\n}\n\naddToViewTree(rootView, componentView);\n\n// Store component view at node index, with node as\nthe HOST\nreturn rootView[index] = componentView;\n}\n}\n\n/**\n * Creates a root component and sets it up with\nfeatures and host bindings.Shared by\n * renderComponent() and ViewContainerRef.createComponent().\n\n*/\nexport function createRootComponent<T>(\n    componentView: LView, componentDef: ComponentDef<T>,\n    rootLView: LView,\n    hostFeatures: HostFeature[]|null): any {\n    const tView = rootLView[TVIEW];\n    // Create\n    directive instance with factory() and store at next index in viewData\n    const component =\n    instantiateRootComponent(tView, rootLView, componentDef);\n    // Root view only contains an instance of this\n    component,\n    // so we use a reference to that component instance as a context.\n    componentView[CONTEXT] =\n    rootLView[CONTEXT] = component;\n    if (hostFeatures !== null) {\n        for (const feature of hostFeatures) {\n            feature(component, componentDef);\n        }\n    }\n}\n}\n\n// We want to generate an empty QueryList for root content queries for backwards\n// compatibility\nwith ViewEngine.\nif (componentDef.contentQueries) {\n    const tNode = getCurrentTNode();\n    ngDevMode\n    && assertDefined(tNode, 'TNode expected');\n    componentDef.contentQueries(RenderFlags.Create, component,\n    tNode.directiveStart);\n}\n}\n\nconst rootTNode = getCurrentTNode();\nngDevMode\n    &&\n    assertDefined(rootTNode, 'TNode should have been already created');\nif (tView.firstCreatePass &&\n    (componentDef.hostBindings !== null || componentDef.hostAttrs !== null)) {\n    setSelectedIndex(rootTNode.index);\n    const rootTView = rootLView[TVIEW];\n    registerHostBindingOpCodes(\n        rootTView, rootTNode, rootLView, rootTNode.directiveStart,\n        rootTNode.directiveEnd,\n        componentDef);\n    invokeHostBindingsInCreationMode(componentDef,\n    component);\n}\n}\n\nreturn component;\n}\n}\n\n/**\n * Used to enable lifecycle hooks on the root component.\n\n*/\n\nInclude\n\nthis feature when calling `renderComponent` if the root component\n * you are rendering has lifecycle hooks\n    defined. Otherwise, the hooks won't\n * be called properly.\n\n*/\n\nExample:\n\n```\n * renderComponent(AppComponent, {hostFeatures: [LifecycleHooksFeature]});\n\n*/\n\nexport function\n    LifecycleHooksFeature(): void {\n    const tNode = getCurrentTNode();\n    ngDevMode\n    && assertDefined(tNode,\n    'TNode is required');\n    registerPostOrderHooks(getLView()[TVIEW], tNode);\n}\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license\nthat can be\n * found in the LICENSE file at https://angular.io/license\n\n*/\n\nimport { RuntimeError,\n    RuntimeErrorCode } from '../errors';\nimport { Type, Writable } from '../interface/type';\nimport\n    { EMPTY_ARRAY, EMPTY_OBJ } from '../util/empty';\nimport { fillProperties } from '../util/property';\nimport\n    { ComponentDef, ContentQueriesFunction, DirectiveDef, DirectiveDefFeature,\n    HostBindingsFunction, RenderFlags, ViewQueriesFunction } from '../interfaces/definition';\nimport { TAttributes }\nfrom '../interfaces/node';\nimport { isComponentDef } from '../interfaces/type_checks';\nimport { mergeHostAttrs }\nfrom '../util/attrs_utils';\nimport { stringifyForError } from '../util/stringify_utils';\n\nexport function\n    getSuperType(type: Type<any>): Type<any>&\n    { cmp?: ComponentDef<any>, dir?: DirectiveDef<any> } {\n    return Object.getPrototypeOf(type.prototype).constructor;\n}\n}\n\nWritableDef =\n    Writable<DirectiveDef<any>|ComponentDef<any>>;\n\n/**\n * Merges the definition from a super class to a sub\n    class.\n * @param definition The definition that is a SubClass of another directive of component\n\n*/\n\n@codeGenApi\n * export function InheritDefinitionFeature(definition:\n    DirectiveDef<any>|ComponentDef<any>): void {\n    let superType = getSuperType(definition.type);\n    let\n    shouldInheritFields = true;\n    const inheritanceChain: WritableDef[] = [definition];\n}\n}\n
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while (superType) {\n  let superDef: DirectiveDef<any>|ComponentDef<any>|undefined = undefined;\n  if
(isComponentDef(definition)) {\n    // Don't use getComponentDef/getDirectiveDef. This logic relies on
inheritance.\n    superDef = superType.cmp || superType.dir;\n  } else {\n    if (superType.cmp) {\n      throw
new RuntimeError(\n        RuntimeErrorCode.INVALID_INHERITANCE,\n        ngDevMode &&\n
`Directives cannot inherit Components. Directive ${\n          stringifyForError(definition.type)} is attempting
to extend component ${\n            stringifyForError(superType)}`);\n    }\n    // Don't use
getComponentDef/getDirectiveDef. This logic relies on inheritance.\n    superDef = superType.dir;\n  }\n  if
(superDef) {\n    if (shouldInheritFields) {\n      inheritanceChain.push(superDef);\n      // Some fields in the
definition may be empty, if there were no values to put in them that\n
      // would've justified object creation. Unwrap them if necessary.\n      const writeableDef = definition as
WritableDef;\n      writeableDef.inputs = maybeUnwrapEmpty(definition.inputs);\n
writeableDef.declaredInputs = maybeUnwrapEmpty(definition.declaredInputs);\n      writeableDef.outputs =
maybeUnwrapEmpty(definition.outputs);\n      // Merge hostBindings\n      const superHostBindings =
superDef.hostBindings;\n      superHostBindings && inheritHostBindings(definition, superHostBindings);\n
// Merge queries\n      const superViewQuery = superDef.viewQuery;\n      const superContentQueries =
superDef.contentQueries;\n      superViewQuery && inheritViewQuery(definition, superViewQuery);\n
superContentQueries && inheritContentQueries(definition, superContentQueries);\n      // Merge inputs and
outputs\n      fillProperties(definition.inputs, superDef.inputs);\n      fillProperties(definition.declaredInputs,
superDef.declaredInputs);\n
      fillProperties(definition.outputs, superDef.outputs);\n      // Merge animations metadata.\n      // If
`superDef` is a Component, the `data` field is present (defaults to an empty object).\n      if
(isComponentDef(superDef) && superDef.data.animation) {\n        // If super def is a Component, the `definition`
is also a Component, since Directives can\n        // not inherit Components (we throw an error above and cannot
reach this code).\n        const defData = (definition as ComponentDef<any>).data;\n        defData.animation =
(defData.animation || []).concat(superDef.data.animation);\n      }\n      // Run parent features\n      const
features = superDef.features;\n      if (features) {\n        for (let i = 0; i < features.length; i++) {\n          const feature
= features[i];\n          if (feature && feature.ngInherit) {\n            (feature as DirectiveDefFeature)(definition);\n
          }\n          // If `InheritDefinitionFeature` is
a part of the current `superDef`, it means that this\n          // def already has all the necessary information inherited
from its super class(es), so we\n          // can stop merging fields from super classes. However we need to iterate
through the\n          // prototype chain to look for classes that might contain other `features` (like\n          //
NgOnChanges), which we should invoke for the original `definition`. We set the\n          // `shouldInheritFields` flag
to indicate that, essentially skipping fields inheritance\n          // logic and only invoking functions from the
`features` list.\n          if (feature === InheritDefinitionFeature) {\n            shouldInheritFields = false;\n          }\n
        }\n      }\n      superType = Object.getPrototypeOf(superType);\n    }\n  }\n  mergeHostAttrsAcrossInheritance(inheritanceChain);\n  // Merge the `hostAttrs` and `hostVars` from the
inherited parent to the base class.\n  // @param inheritanceChain A list
of `WritableDefs` starting at the top most type and listing\n  // sub-types in order. For each type take the `hostAttrs`
and `hostVars` and merge it with the child\n  // type.\n  function
mergeHostAttrsAcrossInheritance(inheritanceChain: WritableDef[]) {\n    let hostVars: number = 0;\n    let hostAttrs:
TAttributes|null = null;\n    // We process the inheritance order from the base to the leaves here.\n    for (let i =
inheritanceChain.length - 1; i >= 0; i--) {\n      const def = inheritanceChain[i];\n      // For each `hostVars`, we need to
add the superclass amount.\n      def.hostVars = (hostVars += def.hostVars);\n      // for each `hostAttrs` we need to
merge it with superclass.\n      def.hostAttrs =\n        mergeHostAttrs(def.hostAttrs, hostAttrs =
mergeHostAttrs(hostAttrs, def.hostAttrs));\n    }\n  }\n  function maybeUnwrapEmpty<T>(value: T[]): T[];\n  function
maybeUnwrapEmpty<T>(value: T): T;\n  function maybeUnwrapEmpty(value: any): any {\n    if (value ===
EMPTY_OBJ) {\n      return {};\n    } else if

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(value === EMPTY_ARRAY) {\n  return [];\n } else {\n  return value;\n }\n}\n\nfunction
inheritViewQuery(definition: WritableDef, superViewQuery: ViewQueriesFunction<any>) {\n  const
prevViewQuery = definition.viewQuery;\n  if (prevViewQuery) {\n    definition.viewQuery = (rf, ctx) => {\n
superViewQuery(rf, ctx);\n    prevViewQuery(rf, ctx);\n  };\n } else {\n  definition.viewQuery =
superViewQuery;\n }\n}\n\nfunction inheritContentQueries(\n  definition: WritableDef, superContentQueries:
ContentQueriesFunction<any>) {\n  const prevContentQueries = definition.contentQueries;\n  if
(prevContentQueries) {\n    definition.contentQueries = (rf, ctx, directiveIndex) => {\n    superContentQueries(rf,
ctx, directiveIndex);\n    prevContentQueries(rf, ctx, directiveIndex);\n  };\n } else {\n
definition.contentQueries = superContentQueries;\n }\n}\n\nfunction inheritHostBindings(\n  definition:
WritableDef, superHostBindings: HostBindingsFunction<any>) {\n  const
prevHostBindings = definition.hostBindings;\n  if (prevHostBindings) {\n    definition.hostBindings = (rf:
RenderFlags, ctx: any) => {\n    superHostBindings(rf, ctx);\n    prevHostBindings(rf, ctx);\n  };\n } else {\n
definition.hostBindings = superHostBindings;\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {ComponentDef, DirectiveDef} from
'./interfaces/definition';\nimport {isComponentDef} from './interfaces/type_checks';\nimport {getSuperType}
from './inherit_definition_feature';\n\n/**\n * Fields which exist on either directive or component definitions, and
need to be copied from\n * parent to child classes by the `CopyDefinitionFeature`.\n */\nconst
COPY_DIRECTIVE_FIELDS: (keyof DirectiveDef<unknown>>[] = [\n // The child class should use the providers
of its parent.\n 'providersResolver',\n\n // Not listed here are any fields which are handled by the `InheritDefinitionFeature`, such\n // as inputs, outputs,
and host binding functions.\n];\n\n/**\n * Fields which exist only on component definitions, and need to be copied
from parent to child\n * classes by the `CopyDefinitionFeature`.\n */\n * The type here allows any field of
`ComponentDef` which is not also a property of `DirectiveDef`,\n * since those should go in
`COPY_DIRECTIVE_FIELDS` above.\n */\nconst COPY_COMPONENT_FIELDS: Exclude<keyof
ComponentDef<unknown>, keyof DirectiveDef<unknown>>[] = [\n // The child class should use the template
function of its parent, including all template\n // semantics.\n 'template',\n 'decls',\n 'consts',\n 'vars',\n 'onPush',\n
'ngContentSelectors',\n // The child class should use the CSS styles of its parent, including all styling semantics.\n
'styles',\n 'encapsulation',\n\n // The child class should be checked by the runtime in the same way as its
parent.\n 'schemas',\n];\n\n/**\n * Copies the fields not handled by the `InheritDefinitionFeature` from the
supertype of a\n * definition.\n */\n * This exists primarily to support ngcc migration of an existing View Engine
pattern, where an\n * entire decorator is inherited from a parent to a child class. When ngcc detects this case, it\n *
generates a skeleton definition on the child class, and applies this feature.\n */\n * The `CopyDefinitionFeature` then
copies any needed fields from the parent class' definition,\n * including things like the component template
function.\n */\n * @param definition The definition of a child class which inherits from a parent class with its\n *
own definition.\n */\n * @codeGenApi\n */\nexport function CopyDefinitionFeature(definition:
DirectiveDef<any>|ComponentDef<any>): void {\n  let superType = getSuperType(definition.type)!;\n  let
superDef: DirectiveDef<any>|ComponentDef<any>|undefined = undefined;\n  if (isComponentDef(definition)) {\n
// Don't use getComponentDef/getDirectiveDef. This logic relies on inheritance.\n    superDef =
superType.cmp!;\n  } else {\n    // Don't use getComponentDef/getDirectiveDef. This logic relies on inheritance.\n
superDef = superType.dir!;\n  }\n\n // Needed because `definition` fields are readonly.\n  const defAny = (definition
as any);\n\n // Copy over any fields that apply to either directives or components.\n  for (const field of
COPY_DIRECTIVE_FIELDS) {\n    defAny[field] = superDef[field];\n  }\n\n if (isComponentDef(superDef)) {\n
// Copy over any component-specific fields.\n    for (const field of COPY_COMPONENT_FIELDS) {\n
defAny[field] = superDef[field];\n    }\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {global as _global} from './global';\n\n// When
Symbol.iterator doesn't exist,

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retrieves the key used in es6-shim\ndeclare const Symbol: any;\nlet _symbolIterator: any = null;\nexport function
getSymbolIterator(): string|symbol {\n if (!_symbolIterator) {\n const Symbol = _global['Symbol'];\n if (Symbol
&& Symbol.iterator) {\n _symbolIterator = Symbol.iterator;\n } else {\n // es6-shim specific logic\n
const keys = Object.getOwnPropertyNames(Map.prototype);\n for (let i = 0; i < keys.length; ++i) {\n const
key = keys[i];\n if (key !== 'entries' && key !== 'size' &&\n (Map as any).prototype[key] ===
Map.prototype['entries']) {\n _symbolIterator = key;\n }\n }\n }\n }\n return
_symbolIterator;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {getSymbolIterator} from './symbol';\n\nexport function isIterable(obj:
any): obj is Iterable<any> {\n return obj !== null && typeof obj === 'object' && (obj as any)[getSymbolIterator()]
!== undefined;\n}\n\nexport function isListLikeIterable(obj: any): boolean {\n if (!isJsObject(obj)) return false;\n
return Array.isArray(obj) ||\n (!obj instanceof Map) && // JS Map are iterables but return entries as [k, v]\n
getSymbolIterator() in obj); // JS Iterable have a Symbol.iterator prop\n\nexport function areIterablesEqual(\n
a: any, b: any, comparator: (a: any, b: any) => boolean): boolean {\n const iterator1 = a[getSymbolIterator()]();\n
const iterator2 = b[getSymbolIterator()]();\n\n while (true) {\n const item1 = iterator1.next();\n const item2 =
iterator2.next();\n if (item1.done && item2.done) return true;\n if (item1.done || item2.done) return false;\n if
(!comparator(item1.value, item2.value)) return false;\n }\n}\n\nexport function iterateListLike(obj: any, fn: (p: any)
=> any) {\n if (Array.isArray(obj))\n {\n for (let i = 0; i < obj.length; i++) {\n fn(obj[i]);\n }\n } else {\n const iterator =
obj[getSymbolIterator()]();\n let item: any;\n while (!(item = iterator.next()).done) {\n fn(item.value);\n
}\n }\n}\n\nexport function isJsObject(o: any): boolean {\n return o !== null && (typeof o === 'function' || typeof
o === 'object');\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {areIterablesEqual, isListLikeIterable} from './iterable';\n\nexport function devModeEqual(a: any, b:
any): boolean {\n const isListLikeIterableA = isListLikeIterable(a);\n const isListLikeIterableB =
isListLikeIterable(b);\n if (isListLikeIterableA && isListLikeIterableB) {\n return areIterablesEqual(a, b,
devModeEqual);\n } else {\n const isAObject = a && (typeof a === 'object' || typeof
a === 'function');\n const isBObject = b && (typeof b === 'object' || typeof b === 'function');\n if
(!isListLikeIterableA && isAObject && !isListLikeIterableB && isBObject) {\n return true;\n } else {\n
return Object.is(a, b);\n }\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {assertIndexInRange, assertLessThan, assertNotSame} from
'./util/assert';\nimport {devModeEqual} from './util/comparison';\nimport {getExpressionChangedErrorDetails,
throwErrorIfNoChangesMode} from './errors';\nimport {LView} from './interfaces/view';\nimport
{isInCheckNoChangesMode} from './state';\nimport {NO_CHANGE} from './tokens';\n\n// TODO(misko):
consider inlining\n/** Updates binding and returns the value. */\nexport function updateBinding(lView: LView,
bindingIndex: number, value: any): any {\n
return lView[bindingIndex] = value;\n}\n\n/** Gets the current binding value. */\nexport function
getBinding(lView: LView, bindingIndex: number): any {\n ngDevMode && assertIndexInRange(lView,
bindingIndex);\n ngDevMode &&\n assertNotSame(lView[bindingIndex], NO_CHANGE, 'Stored value should
never be NO_CHANGE.);\n return lView[bindingIndex];\n}\n\n/** Updates binding if changed, then returns
whether it was updated.\n *\n * This function also checks the `CheckNoChangesMode` and throws if changes are
made.\n *\n * Some changes (Objects/iterables) during `CheckNoChangesMode` are exempt to comply with VE\n *
behavior.\n *\n * @param lView current `LView`\n * @param bindingIndex The binding in the `LView` to check\n
* @param value New value to check against `lView[bindingIndex]`\n * @returns `true` if the bindings has changed.
(Throws if binding has changed during\n * `CheckNoChangesMode`)\n */\nexport function
bindingUpdated(lView: LView, bindingIndex: number, value: any):

```



the arguments changes, `NO\_CHANGE`

```
otherwise.\n *^/nextport function interpolationV(IView: LView, values: any[]): string|NO_CHANGE {\n ngDevMode && assertLessThan(2, values.length, 'should have at least 3 values');\n ngDevMode &&\n assertEqual(values.length % 2, 1, 'should have an odd number of values');\n let isBindingUpdated = false;\n let\n bindingIndex = getBindingIndex();\n\n for (let i = 1; i < values.length; i += 2) {\n // Check if bindings (odd\n indexes) have changed\n isBindingUpdated = bindingUpdated(IView, bindingIndex++, values[i]) ||\n isBindingUpdated;\n }\n setBindingIndex(bindingIndex);\n\n if (!isBindingUpdated) {\n return\n NO_CHANGE;\n }\n\n // Build the updated content\n let content = values[0];\n for (let i = 1; i < values.length;\n += 2) {\n content += renderStringify(values[i]) + values[i + 1];\n }\n\n return content;\n}\n\n/**\n * Creates an\n interpolation binding with 1 expression.\n *\n * @param prefix static value used for concatenation only.\n *\n * @param v0 value checked\n for change.\n *\n * @param suffix static value used for concatenation only.\n */\n\nexport function interpolation1(IView:\n LView, prefix: string, v0: any, suffix: string): string|\n NO_CHANGE {\n const different =\n bindingUpdated(IView, nextBindingIndex(), v0);\n return different ? prefix + renderStringify(v0) + suffix :\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 2 expressions.\n */\n\nexport function\n interpolation2(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, suffix: string): string|\n NO_CHANGE {\n const bindingIndex = getBindingIndex();\n const different = bindingUpdated2(IView, bindingIndex, v0, v1);\n\n incrementBindingIndex(2);\n\n return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + suffix :\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 3 expressions.\n */\n\nexport function\n interpolation3(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n suffix: string): string|\n NO_CHANGE\n {\n const bindingIndex = getBindingIndex();\n const different = bindingUpdated3(IView, bindingIndex, v0, v1,\n v2);\n\n incrementBindingIndex(3);\n\n return different ?\n prefix + renderStringify(v0) + i0 +\n renderStringify(v1) + i1 + renderStringify(v2) + suffix :\n NO_CHANGE;\n}\n\n/**\n * Create an interpolation\n binding with 4 expressions.\n */\n\nexport function interpolation4(\n IView: LView, prefix: string, v0: any, i0:\n string, v1: any, i1: string, v2: any, i2: string,\n v3: any, suffix: string): string|\n NO_CHANGE {\n const\n bindingIndex = getBindingIndex();\n const different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n\n incrementBindingIndex(4);\n\n return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n\n renderStringify(v2) + i2 + renderStringify(v3) + suffix :\n\n NO_CHANGE;\n}\n\n/**\n * Creates an\n interpolation binding with 5 expressions.\n */\n\nexport function interpolation5(\n IView:\n LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any,\n suffix: string): string|\n NO_CHANGE {\n const bindingIndex = getBindingIndex();\n let different =\n bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n\n different = bindingUpdated(IView, bindingIndex + 4, v4)\n || different;\n\n incrementBindingIndex(5);\n\n return different ? prefix + renderStringify(v0) + i0 +\n\n renderStringify(v1) + i1 +\n\n renderStringify(v2) + i2 + renderStringify(v3) + i3 + renderStringify(v4) + suffix\n :\n\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 6 expressions.\n */\n\nexport\n function interpolation6(\n IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): string|\n NO_CHANGE {\n const bindingIndex =\n getBindingIndex();\n let different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n\n different = bindingUpdated2(IView, bindingIndex + 4, v4, v5) || different;\n\n incrementBindingIndex(6);\n\n return\n different ?\n prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 + renderStringify(v2) + i2 +\n\n renderStringify(v3) + i3 + renderStringify(v4) + i4 + renderStringify(v5) + suffix :\n\n NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 7 expressions.\n */\n\nexport function interpolation7(\n IView: LView,\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5:\n any, i5: string, v6: any, suffix: string): string|\n NO_CHANGE {\n const bindingIndex = getBindingIndex();\n let\n different = bindingUpdated4(IView, bindingIndex, v0, v1, v2, v3);\n\n different = bindingUpdated3(IView,\n bindingIndex + 4, v4, v5, v6) || different;\n\n incrementBindingIndex(7);\n\n return different ? prefix +\n\n renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n\n renderStringify(v2)
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+ i2 + renderStringify(v3) + i3 + renderStringify(v4) + i4 +\n      renderStringify(v5) + i5 + renderStringify(v6) +
suffix :\n      NO_CHANGE;\n}\n\n/**\n * Creates an interpolation binding with 8 expressions.\n
*/\nexport function interpolation8(\n  IView: LView, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,
i2: string,\n  v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n  suffix: string):
string|\nNO_CHANGE {\n  const bindingIndex = getBindingIndex();\n  let different = bindingUpdated4(IView,
bindingIndex, v0, v1, v2, v3);\n  different = bindingUpdated4(IView, bindingIndex + 4, v4, v5, v6, v7) || different;\n
incrementBindingIndex(8);\n\n  return different ? prefix + renderStringify(v0) + i0 + renderStringify(v1) + i1 +\n
  renderStringify(v2) + i2 + renderStringify(v3) + i3 + renderStringify(v4) + i4 +\n      renderStringify(v5) + i5 +
renderStringify(v6) + i6 + renderStringify(v7)
+ suffix :\n      NO_CHANGE;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { SanitizerFn } from './interfaces/sanitization';\nimport { getBindingIndex,
getLView, getSelectedTNode, getTView } from './state';\nimport { NO_CHANGE } from './tokens';\nimport
{ interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7,
interpolation8, interpolationV } from './interpolation';\nimport { elementAttributeInternal,
storePropertyBindingMetadata } from './shared';\n\n\n/**\n * Update an interpolated attribute on an element
with single bound value surrounded by text.\n * Used when the value passed to a property has 1 interpolated
value in it:\n * \n * ``html\n * <div attr.title="prefix{{ v0 }}suffix"></div>\n * ``\n * \n * Its compiled
representation
is:\n * \n * ``ts\n * attributeInterpolate1('title', 'prefix', v0, 'suffix');\n * ``\n * \n * @param attrName The name of
the attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked
for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer
function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function
attributeInterpolate1(\n  attrName: string, prefix: string, v0: any, suffix: string, sanitizer?: SanitizerFn,\n
namespace?: string): typeof attributeInterpolate1 {\n  const IView = getLView();\n  const interpolatedValue =
interpolation1(IView, prefix, v0, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tNode =
getSelectedTNode();\n    elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer,
namespace);\n    ngDevMode &&\n      storePropertyBindingMetadata(\n        getTView().data, tNode,
'attr.' + attrName, getBindingIndex() - 1, prefix, suffix);\n  }\n  return attributeInterpolate1;\n}\n\n\n/**\n *
Update an interpolated attribute on an element with 2 bound values surrounded by text.\n * Used when the value
passed to a property has 2 interpolated values in it:\n * \n * ``html\n * <div attr.title="prefix{{ v0 }}-
{{ v1 }}suffix"></div>\n * ``\n * \n * Its compiled representation is:\n * \n * ``ts\n * attributeInterpolate2('title',
'prefix', v0, '-', v1, 'suffix');\n * ``\n * \n * @param attrName The name of the attribute to update\n * @param prefix
Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value
used for concatenation only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be
chained.\n * @codeGenApi\n */\nexport function attributeInterpolate2(\n  attrName: string,
prefix: string, v0: any, i0: string, v1: any, suffix: string,\n  sanitizer?: SanitizerFn, namespace?: string): typeof
attributeInterpolate2 {\n  const IView = getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0,
i0, v1, suffix);\n  if (interpolatedValue !== NO_CHANGE) {\n    const tNode = getSelectedTNode();\n
elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n    ngDevMode &&\n
storePropertyBindingMetadata(\n      getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 2, prefix,
i0, suffix);\n  }\n  return attributeInterpolate2;\n}\n\n\n/**\n * Update an interpolated attribute on an element with
3 bound values surrounded by text.\n * Used when the value passed to a property has 3 interpolated values in
it:\n * \n * ``html\n * <div attr.title="prefix{{ v0 }}-{{ v1 }}-{{ v2 }}suffix"></div>\n * ``\n * \n * Its compiled
representation is:\n * \n * ``ts\n * attributeInterpolate3(\n *   'title',
'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ``\n * \n * @param attrName The name of the attribute to update\n * @param
prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static

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value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function attributeInterpolate3(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate3 {\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 3, prefix, i0, i1,\n suffix);\n }\n return attributeInterpolate3;\n}\n\n/\*\*\n \* Update an interpolated attribute on an element with 4 bound values surrounded by text.\n \* Used when the value passed to a property has 4 interpolated values in it:\n \* `<div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n \* Its compiled representation is:\n \* `ts\n \* attributeInterpolate4(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n \*`\n \* @param attrName The name of the attribute to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function attributeInterpolate4(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, suffix: string, sanitizer?: SanitizerFn,\n namespace?: string): typeof attributeInterpolate4 {\n const IView = getLView();\n const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 4, prefix, i0, i1, i2,\n suffix);\n }\n return attributeInterpolate4;\n}\n\n/\*\*\n \* Update an interpolated attribute on an element with 5 bound values surrounded by text.\n \* Used when the value passed to a property has 5 interpolated values in it:\n \* `<div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix"></div>\n \* Its compiled representation is:\n \* `ts\n \* attributeInterpolate5(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n \*`\n \* @param attrName The name of the attribute to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function attributeInterpolate5(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, suffix: string, sanitizer?: SanitizerFn,\n namespace?: string): typeof attributeInterpolate5 {\n const IView = getLView();\n const interpolatedValue = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 5, prefix, i0, i1, i2,\n i3, suffix);\n }\n return attributeInterpolate5;\n}\n\n/\*\*\n \* Update an interpolated attribute on an element with 6 bound values surrounded by text.\n \* Used when the value passed to a property has 6 interpolated values in it:\n \* `<div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix"></div>\n \* Its

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compiled representation is:
\n * \n * ``ts\n * attributeInterpolate6(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n * ``\n * \n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * ^\nexport function attributeInterpolate6(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate6 {\n const IView = getLView();\n const interpolatedValue =\n interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n if (interpolatedValue !== NO_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 6, prefix, i0, i1, i2, v3, i3, i4, suffix);\n }\n return attributeInterpolate6;\n }\n\n**\n * \n * Update an interpolated attribute on an element with 7 bound values surrounded by text.\n * \n * Used when the value passed to a property has 7 interpolated values in it:\n * \n * ``html\n * <div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix"></div>\n * ``\n * \n * Its compiled representation is:\n * \n * ``ts\n * \n * attributeInterpolate7(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ``\n * \n * \n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * ^\nexport function attributeInterpolate7(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate7 {\n const IView = getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n if (interpolatedValue !== NO_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IView, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 7, prefix, i0, i1, i2, v3, i3, i4, i5, suffix);\n }\n return attributeInterpolate7;\n }\n\n**\n * \n * Update an interpolated attribute on an element with 8 bound values surrounded by text.\n * \n * Used when the value passed to a property has 8 interpolated values in it:\n * \n * ``html\n * <div attr.title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n * ``\n * \n * Its compiled representation is:\n * \n * ``ts\n * \n * attributeInterpolate8(\n * 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * ``\n * \n * \n * @param attrName The name of the attribute to update\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value

```

used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function attributeInterpolate8(\n attrName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, sanitizer?: SanitizerFn, namespace?: string): typeof attributeInterpolate8 {\n const IVIEW = getLView();\n const interpolatedValue = interpolation8(\n IVIEW, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IVIEW, attrName, interpolatedValue, sanitizer, namespace);\n ngDevMode &&\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName, getBindingIndex() - 8, prefix, i0, i1, i2,\n i3, i4, i5, i6, suffix);\n }\n return attributeInterpolate8;\n}\n\n/\*\*\n \* Update an interpolated attribute on an element with 9 or more bound values surrounded by text.\n \* Used when the number of interpolated values exceeds 8.\n \* ```html\n \* <div\n \* title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"></div>\n \* ```\n \* Its compiled representation is:\n \* ```ts\n \* attributeInterpolateV(\n \* 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']);\n \* ```\n \* @param attrName The name of the attribute to update.\n \* @param values The collection of values and the strings in-between those values, beginning with a string prefix and ending with a string suffix.\n \* (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function attributeInterpolateV(\n attrName: string, values: any[], sanitizer?: SanitizerFn,\n namespace?: string): typeof attributeInterpolateV {\n const IVIEW = getLView();\n const interpolated = interpolationV(IVIEW, values);\n if (interpolated !== NO\_CHANGE) {\n const tNode = getSelectedTNode();\n elementAttributeInternal(tNode, IVIEW, attrName, interpolated, sanitizer, namespace);\n if (ngDevMode) {\n const interpolationInBetween = [values[0]]; // prefix\n for (let i = 2; i < values.length; i += 2) {\n interpolationInBetween.push(values[i]);\n }\n storePropertyBindingMetadata(\n getTView().data, tNode, 'attr.' + attrName,\n getBindingIndex() - interpolationInBetween.length + 1, ...interpolationInBetween);\n }\n }\n return attributeInterpolateV;\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*/\nimport {getComponentViewByInstance} from './context\_discovery';\nimport {TVIEW} from './interfaces/view';\nimport {detectChangesInternal} from './shared';\n\n/\*\*\n \* Synchronously perform change detection on a component (and possibly its sub-components).\n \* This function triggers change detection in a synchronous way on a component.\n \* @param component The component which the change detection should be performed on.\n \*/\nexport function detectChanges(component: {}): void {\n const view = getComponentViewByInstance(component);\n detectChangesInternal(view[TVIEW], view, component);\n}\n\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*/\nimport {assertFirstCreatePass} from './assert';\nimport {attachPatchData} from './context\_discovery';\nimport {registerPostOrderHooks} from './hooks';\nimport {ComponentTemplate} from './interfaces/definition';\nimport {LocalRefExtractor, TAttributes, TContainerNode, TNodeType} from './interfaces/node';\nimport {isDirectiveHost} from './interfaces/type\_checks';\nimport {HEADER\_OFFSET, LView, RENDERER, TView, TViewType} from './interfaces/view';\nimport {appendChild} from './node\_manipulation';\nimport {getLView, getTView, setCurrentTNode} from './state';\nimport {getConstant} from './util/view\_utils';\nimport {addToViewTree, createDirectivesInstances, createLContainer, createTView, getOrCreateTNode, resolveDirectives, saveResolvedLocalsInData} from './shared';\n\nfunction templateFirstCreatePass(\n index: number, tView: TView, IVIEW: LView, templateFn: ComponentTemplate<any>|null,\n decls: number, vars: number, tagName?:



```

string|null, attrsIndex?: number|null,\n  localRefsIndex?: number|null): TContainerNode {\n  ngDevMode &&
assertFirstCreatePass(tView);\n  ngDevMode && ngDevMode.firstCreatePass++;\n
  const tViewConsts = tView.consts;\n  // TODO(pk): refactor getOrCreateTNode to have the \"create\" only
version\n  const tNode = getOrCreateTNode(\n    tView, index, TNodeType.Container, tagName || null,\n
  getConstant<TAttributes>(tViewConsts, attrsIndex));\n  resolveDirectives(tView, IView, tNode,
  getConstant<string[]>(tViewConsts, localRefsIndex));\n  registerPostOrderHooks(tView, tNode);\n  const
  embeddedTView = tNode.tViews = createTView(\n    TViewType.Embedded, tNode, templateFn, decls, vars,
  tView.directiveRegistry,\n    tView.pipeRegistry, null, tView.schemas, tViewConsts);\n  if (tView.queries !===
null) {\n    tView.queries.template(tView, tNode);\n    embeddedTView.queries =
  tView.queries.embeddedTView(tNode);\n  }\n  return tNode;\n}\n\n/**\n * Creates an LContainer for an ng-
template (dynamically-inserted view), e.g.\n * <ng-template #foo>\n *   <div></div>\n * </ng-template>\n *
@param index The index of the container in the data array\n
 * @param templateFn Inline template\n
 * @param decls The number of nodes, local refs, and pipes for this
template\n
 * @param vars The number of bindings for this template\n
 * @param tagName The name of the container element, if applicable\n
 * @param attrsIndex Index of template attributes in the `consts` array.\n
 * @param localRefs Index of the local references in the `consts` array.\n
 * @param localRefExtractor A function which extracts local-refs values from the template.\n
 * Defaults to the current element associated with the local-
ref.\n
 * @codeGenApi\n * ^\nexport function template(\n  index: number, templateFn:
ComponentTemplate<any>|null, decls: number, vars: number,\n  tagName?: string|null, attrsIndex?: number|null,
  localRefsIndex?: number|null,\n  localRefExtractor?: LocalRefExtractor) {\n  const IView = getLView();\n  const
  tView = getTView();\n  const adjustedIndex = index + HEADER_OFFSET;\n  const tNode =
  tView.firstCreatePass ? templateFirstCreatePass(\n
    adjustedIndex, tView, IView, templateFn, decls, vars,\n
  tagName, attrsIndex, localRefsIndex) :\n
    tView.data[adjustedIndex] as TContainerNode;\n
  setCurrentTNode(tNode, false);\n  const comment = IView[RENDERER].createComment(ngDevMode ?
'container' : '');\n  appendChild(tView, IView, comment, tNode);\n  attachPatchData(comment, IView);\n  add
  addToViewTree(IView, IView[adjustedIndex] = createLContainer(comment, IView, comment, tNode));\n  if
  (isDirectiveHost(tNode)) {\n    createDirectivesInstances(tView, IView, tNode);\n  }\n  if (localRefsIndex !===
null) {\n    saveResolvedLocalsInData(IView, tNode, localRefExtractor);\n  }\n}\n\n"/**\n * @license\n * Copyright
  Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
 * found in the LICENSE file at https://angular.io/license\n * ^\nimport {HEADER_OFFSET,
  LView, TView} from './interfaces/view';\nimport {getContextLView} from './state';\nimport {load} from
  './util/view_utils';\n\n/** Store a value in the `data` at a given `index`.\n * ^\nexport function store<T>(tView:
  TView, IView: LView, index: number, value: T): void {\n  // We don't store any static data for local variables, so the
  first time\n  // we see the template, we should store as null to avoid a sparse array\n  if (index >= tView.data.length)
  {\n    tView.data[index] = null;\n    tView.blueprint[index] = null;\n  }\n  IView[index] = value;\n}\n\n/**\n *
  Retrieves a local reference from the current contextViewData.\n
 * If the reference to retrieve is in a parent view, this instruction is used in conjunction\n
 * with a nextContext() call, which walks up the tree and updates the contextViewData instance.\n
 * @param index The index of the local ref in contextViewData.\n
 * @codeGenApi\n * ^\nexport function reference<T>(index: number) {\n  const contextLView =
  getContextLView();\n  return load<T>(contextLView, HEADER_OFFSET + index);\n}\n\n"/**\n * @license\n * Copyright
  Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
  that can be\n * found in the LICENSE file at https://angular.io/license\n * ^\nimport {bindingUpdated} from
  './bindings';\nimport {TNode} from './interfaces/node';\nimport {SanitizerFn} from
  './interfaces/sanitization';\nimport {LView, RENDERER, TView} from './interfaces/view';\nimport {getLView,
  getSelectedTNode, getTView, nextBindingIndex} from './state';\nimport {elementPropertyInternal,
  setInputsForProperty, storePropertyBindingMetadata} from './shared';\n\n/** Update a property on a selected
  element.\n
 * Operates on the element selected by index via the {@link select} instruction.\n
 * If the property

```

name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check

```
must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled\n *\n * @param propName Name of property. Because it is going to DOM, this is not subject to\n * renaming as part of minification.\n * @param value New value to write.\n * @param sanitizer An optional function used to sanitize the value.\n * @returns This function returns itself so that it may be chained\n * (e.g. `property('name', ctx.name)('title', ctx.title)`)\n *\n * @codeGenApi\n */\nexport function property<T>(\n  propName: string, value: T, sanitizer?: SanitizerFn|null): typeof property {\n  const IView = getLView();\n  const bindingIndex = nextBindingIndex();\n  if (bindingUpdated(IView, bindingIndex, value)) {\n    const tView = getTView();\n    const tNode = getSelectedTNode();\n    elementPropertyInternal(\n      tView, tNode, IView, propName, value, IView[RENDERER], sanitizer, false);\n    ngDevMode && storePropertyBindingMetadata(tView.data, tNode, propName,
```

```
bindingIndex);\n  }\n  return property;\n}\n\n/**\n * Given `

` and `MyDir` with `@Input('style')` we need to write to\n */\nexport function


```

```
setDirectiveInputsWhichShadowsStyling(\n  tView: TView, tNode: TNode, IView: LView, value: any, isClassBased: boolean) {\n  const inputs = tNode.inputs!;\n  const property = isClassBased ? 'class' : 'style';\n  // We support both 'class' and `className` hence the fallback.\n  setInputsForProperty(tView, IView, inputs[property], property, value);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {assertDefined, assertEqual, assertIndexInRange} from '../util/assert';\nimport {assertFirstCreatePass, assertHasParent} from './assert';\nimport {attachPatchData} from './context_discovery';\nimport {registerPostOrderHooks}
```

```
from './hooks';\nimport {hasClassInput, hasStyleInput, TAttributes, TElementNode, TNodeFlags, TNodeType} from './interfaces/node';\nimport {RElement} from './interfaces/renderer_dom';\nimport {isContentQueryHost, isDirectiveHost} from './interfaces/type_checks';\nimport {HEADER_OFFSET, LView, RENDERER, TView} from './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {appendChild, createElementNode, writeDirectClass, writeDirectStyle} from './node_manipulation';\nimport {decreaseElementDepthCount, getBindingIndex, getCurrentTNode, getElementDepthCount, getLView, getNamespace, getTView, increaseElementDepthCount, isCurrentTNodeParent, setCurrentTNode, setCurrentTNodeAsNotParent} from './state';\nimport {computeStaticStyling} from './styling/static_styling';\nimport {setUpAttributes} from './util/attrs_utils';\nimport {getConstant} from './util/view_utils';\nimport {validateElementIsKnown} from './element_validation';\nimport {setDirectiveInputsWhichShadowsStyling}
```

```
from './property';\nimport {createDirectivesInstances, executeContentQueries, getOrCreateTNode, resolveDirectives, saveResolvedLocalsInData} from './shared';\n\nfunction elementStartFirstCreatePass(\n  index: number, tView: TView, IView: LView, native: RElement, name: string,\n  attrsIndex?: number|null, localRefsIndex?: number): TElementNode {\n  ngDevMode && assertFirstCreatePass(tView);\n  ngDevMode && ngDevMode.firstCreatePass++;\n  const tViewConsts = tView.consts;\n  const attrs = getConstant<TAttributes>(tViewConsts, attrsIndex);\n  const tNode = getOrCreateTNode(tView, index, TNodeType.Element, name, attrs);\n  const hasDirectives =\n    resolveDirectives(tView, IView, tNode, getConstant<string[]>(tViewConsts, localRefsIndex));\n  if (ngDevMode) {\n    validateElementIsKnown(native, IView, tNode.value, tView.schemas, hasDirectives);\n  }\n  if (tNode.attrs !== null) {\n    computeStaticStyling(tNode, tNode.attrs, false);\n  }\n  if (tNode.mergedAttrs
```

```
!== null) {\n    computeStaticStyling(tNode, tNode.mergedAttrs, true);\n  }\n  if (tView.queries !== null) {\n    tView.queries.elementStart(tView, tNode);\n  }\n  return tNode;\n}\n\n/**\n * Create DOM element. The
```

```
instruction must later be followed by `elementEnd` call.\n *\n * @param index Index of the element in the LView array\n * @param name Name of the DOM Node\n * @param attrsIndex Index of the element's attributes in the `consts` array.\n * @param localRefsIndex Index of the element's local references in the `consts` array.\n * @returns
```

This function returns itself so that it may be chained.

```

    * Attributes and localRefs are passed as an array of
    strings where elements with an even index
    * hold an attribute name and elements with an odd index hold an
    attribute value, ex.: ['id', 'warning5', 'class', 'alert']
    * @codeGenApi
    */
    export function elementStart(
    index: number, name: string, attrsIndex?: number | null,
    localRefsIndex?: number): typeof
    elementStart {
    const IView = getLView();
    const tView = getTView();
    const adjustedIndex =
    HEADER_OFFSET + index;
    ngDevMode &&
    assertEquals(
    getBindingIndex(),
    tView.bindingStartIndex,
    'elements should be created before any bindings');
    ngDevMode &&
    assertIndexInRange(IView, adjustedIndex);
    const renderer = IView[RENDERER];
    const native =
    IView[adjustedIndex] = createElementNode(renderer, name, getNamespace());
    const tNode =
    tView.firstCreatePass ?
    elementStartFirstCreatePass(
    adjustedIndex, tView, IView, native, name,
    attrsIndex, localRefsIndex) :
    tView.data[adjustedIndex] as TElementNode;
    setCurrentTNode(tNode,
    true);
    const mergedAttrs = tNode.mergedAttrs;
    if (mergedAttrs !== null) {
    setUpAttributes(renderer,
    native, mergedAttrs);
    }
    const classes = tNode.classes;
    if (classes !== null) {
    writeDirectClass(renderer,
    native, classes);
    }
    const styles = tNode.styles;
    if
    (styles !== null) {
    writeDirectStyle(renderer, native, styles);
    }
    if ((tNode.flags &
    TNodeFlags.isDetached) !== TNodeFlags.isDetached) {
    // In the i18n case, the translation may have removed
    this element, so only add it if it is not
    // detached. See `TNodeType.Placeholder` and `LFrame.inI18n` for more
    context.
    appendChild(tView, IView, native, tNode);
    }
    // any immediate children of a component or
    template container must be pre-emptively
    // monkey-patched with the component view data so that the element
    can be inspected
    // later on using any element discovery utility methods (see `element_discovery.ts`)
    if
    (getElementDepthCount() === 0) {
    attachPatchData(native, IView);
    }
    increaseElementDepthCount();
    if (isDirectiveHost(tNode)) {
    createDirectivesInstances(tView, IView, tNode);
    }
    executeContentQueries(tView, tNode, IView);
    }
    if (localRefsIndex !== null) {
    saveResolvedLocalsInData(IView, tNode);
    }
    return
    elementStart;
    }
    /**
    * Mark the end of the element.
    * @returns This function returns itself so that it may be
    chained.
    * @codeGenApi
    */
    export function elementEnd(): typeof elementEnd {
    let currentTNode =
    getCurrentTNode();
    ngDevMode &&
    assertDefined(currentTNode, 'No parent node to close.');
```

if (isCurrentTNodeParent()) {
 setCurrentTNodeAsNotParent();
} else {
 ngDevMode &&
 assertHasParent(getCurrentTNode());
 currentTNode = currentTNode.parent!;
 setCurrentTNode(currentTNode, false);
}
const tNode = currentTNode;
ngDevMode &&
assertTNodeType(tNode, TNodeType.AnyRNode);
decreaseElementDepthCount();
const tView =
getTView();
if (tView.firstCreatePass) {
 registerPostOrderHooks(tView, currentTNode);
}
if
(isContentQueryHost(currentTNode)) {
 tView.queries!.elementEnd(currentTNode);
}
}
if
(tNode.classesWithoutHost != null && hasClassInput(tNode)) {
 setDirectiveInputsWhichShadowsStyling(tView,
 tNode, getLView(), tNode.classesWithoutHost, true);
}
if (tNode.stylesWithoutHost != null &&
hasStyleInput(tNode)) {
 setDirectiveInputsWhichShadowsStyling(tView, tNode, getLView(),
 tNode.stylesWithoutHost, false);
}
return elementEnd;
}
/\*\*
\* Creates an empty element using { @link
elementStart } and { @link elementEnd }
\* @param index Index of the element in the data array
\* @param Name of the DOM Node
\* @param attrsIndex Index of the element's attributes in the `const` array.
\* @param localRefsIndex Index of the element's local references in the `const` array.
\* @returns This function
returns itself so that it may be chained.
\* @codeGenApi
\*/
export function element(
index: number,
name: string, attrsIndex?: number | null,
localRefsIndex?: number): typeof element {
 elementStart(index, name,
 attrsIndex, localRefsIndex);
 elementEnd();
 return element;
}
}
/\*\*
\* @license
\* Copyright Google
LLC All Rights Reserved.
\* Use of this source code is governed by an MIT-style license that can be
found
in the LICENSE file at <https://angular.io/license>
\*/
import { assertEquals, assertIndexInRange } from
'../util/assert';
import { assertHasParent } from '../assert';
import { attachPatchData } from
'../context\_discovery';
import { registerPostOrderHooks } from '../hooks';
import { TAttributes,

```

TElementContainerNode, TNodeType} from './interfaces/node';\nimport {isContentQueryHost, isDirectiveHost}
from './interfaces/type_checks';\nimport {HEADER_OFFSET, LView, RENDERER, TView} from
 './interfaces/view';\nimport {assertTNodeType} from './node_assert';\nimport {appendChild} from
 './node_manipulation';\nimport {getBindingIndex, getCurrentTNode, getLView, getTView, isCurrentTNodeParent,
setCurrentTNode, setCurrentTNodeAsNotParent} from './state';\nimport {computeStaticStyling} from
 './styling/static_styling';\nimport {getConstant} from './util/view_utils';\n\nimport
 {createDirectivesInstances, executeContentQueries, getOrCreateTNode, resolveDirectives,
saveResolvedLocalsInData} from './shared';\n\nfunction elementContainerStartFirstCreatePass(\n  index: number,
tView: TView, lView: LView, attrsIndex?: number|null,\n  localRefsIndex?: number): TElementContainerNode
{\n  ngDevMode && ngDevMode.firstCreatePass++;\n  const tViewConsts = tView.consts;\n  const attrs =
getConstant<TAttributes>(tViewConsts, attrsIndex);\n  const tNode = getOrCreateTNode(tView, index,
TNodeType.ElementContainer, 'ng-container', attrs);\n\n  // While ng-container doesn't necessarily support styling,
we use the style context to identify\n  // and execute directives on the ng-container.\n  if (attrs !== null) {\n    computeStaticStyling(tNode, attrs, true);\n  }\n\n  const localRefs = getConstant<string[]>(tViewConsts,
localRefsIndex);\n  resolveDirectives(tView, lView, tNode, localRefs);\n\n  if (tView.queries !== null) {\n    tView.queries.elementStart(tView, tNode);\n  }\n\n  return tNode;\n}\n\n/**\n * Creates a logical container for other nodes (<ng-container>) backed by a
comment node in the DOM.\n * The instruction must later be followed by `elementContainerEnd()` call.\n *\n * @param index Index of the element in the LView array\n * @param attrsIndex Index of the container attributes in
the `consts` array.\n * @param localRefsIndex Index of the container's local references in the `consts` array.\n *
@returns This function returns itself so that it may be chained.\n *\n * Even if this instruction accepts a set of
attributes no actual attribute values are propagated to\n * the DOM (as a comment node can't have attributes).
Attributes are here only for directive\n * matching purposes and setting initial inputs of directives.\n *\n *
@codeGenApi\n */\nexport function elementContainerStart(\n  index: number, attrsIndex?: number|null,\n  localRefsIndex?: number): typeof elementContainerStart {\n  const lView = getLView();\n  const tView =
getTView();\n  const adjustedIndex = index + HEADER_OFFSET;\n\n  ngDevMode &&
assertIndexInRange(lView, adjustedIndex);\n  ngDevMode &&\n  assertEquals(\n    getBindingIndex(),
tView.bindingStartIndex,\n    'element containers should be created before any bindings');\n\n  const tNode =
tView.firstCreatePass ?\n    elementContainerStartFirstCreatePass(\n      adjustedIndex, tView, lView, attrsIndex,
localRefsIndex) :\n    tView.data[adjustedIndex] as TElementContainerNode;\n  setCurrentTNode(tNode, true);\n\n  ngDevMode && ngDevMode.rendererCreateComment++;\n  const native = lView[adjustedIndex] =\n    lView[RENDERER].createComment(ngDevMode ? 'ng-container' : '');\n  appendChild(tView, lView, native,
tNode);\n  attachPatchData(native, lView);\n\n  if (isDirectiveHost(tNode)) {\n    createDirectivesInstances(tView,
lView, tNode);\n    executeContentQueries(tView, tNode, lView);\n  }\n\n  if (localRefsIndex !== null) {\n    saveResolvedLocalsInData(lView, tNode);\n  }\n\n  return elementContainerStart;\n}\n\n/**\n * Mark the end of the <ng-container>.\n *\n * @returns This function
returns itself so that it may be chained.\n *\n * @codeGenApi\n */\nexport function elementContainerEnd(): typeof
elementContainerEnd {\n  let currentTNode = getCurrentTNode();\n  const tView = getTView();\n  if
(isCurrentTNodeParent()) {\n    setCurrentTNodeAsNotParent();\n  } else {\n    ngDevMode &&
assertHasParent(currentTNode);\n    currentTNode = currentTNode.parent!;\n    setCurrentTNode(currentTNode,
false);\n  }\n\n  ngDevMode && assertTNodeType(currentTNode, TNodeType.ElementContainer);\n\n  if
(tView.firstCreatePass) {\n    registerPostOrderHooks(tView, currentTNode);\n  } if
(isContentQueryHost(currentTNode)) {\n    tView.queries!.elementEnd(currentTNode);\n  }\n}\n\nreturn
elementContainerEnd;\n}\n\n/**\n * Creates an empty logical container using { @link elementContainerStart }\n *
and { @link elementContainerEnd }\n *\n * @param index Index of
the element in the LView array\n * @param attrsIndex Index of the container attributes in the `consts` array.\n *
@param localRefsIndex Index of the container's local references in the `consts` array.\n * @returns This function
returns itself so that it may be chained.\n *\n * @codeGenApi\n */\nexport function elementContainer(\n  index:

```

```

number, attrsIndex?: number|null, localRefsIndex?: number): typeof elementContainer {
  elementContainerStart(index, attrsIndex, localRefsIndex);
  elementContainerEnd();
  return elementContainer;
}
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import { OpaqueViewState } from '../interfaces/view';
import { getLView } from
'./state';
/**
 * Returns the current OpaqueViewState instance.
 * Used in conjunction with the
 * restoreView() instruction to save a snapshot
 * of the current view and restore it when listeners are invoked. This allows
 * walking the declaration view tree in
 * listeners to get vars from parent views.
 */
@codegenApi
export function getCurrentView():
OpaqueViewState {
  return getLView() as any as OpaqueViewState;
}
"/**
 * @license
 * Copyright
 * Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import { Observable, Subscribable } from
'rxjs';
/**
 * Determine if the argument is shaped like a Promise
 */
export function isPromise<T = any>(obj:
any): obj is Promise<T> {
  // allow any Promise/A+ compliant thenable.
  // It's up to the caller to ensure that
  obj.then conforms to the spec
  return !!obj && typeof obj.then === 'function';
}
/**
 * Determine if the
 * argument is a Subscribable
 */
export function isSubscribable(obj: any|Subscribable<any>): obj is
Subscribable<any>
{
  return !!obj && typeof obj.subscribe === 'function';
}
/**
 * Determine if the argument is an
 * Observable
 */
/* Strictly this tests that the `obj` is `Subscribable`, since `Observable`
 * types need additional
 * methods, such as `lift()`. But it is adequate for our
 * needs since within the Angular framework code we only ever
 * need to use the
 * `subscribe()` method, and RxJS has mechanisms to wrap `Subscribable` objects
 * into
 * `Observable` as needed.
 */
export const isObservable =
  isSubscribable as ((obj: any|Observable<any>) =>
obj is Observable<any>);
"/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import { assertIndexInRange } from '../util/assert';
import { isObservable } from
'../util/lang';
import { PropertyAliasValue, TNode, TNodeFlags, TNodeType } from
'../interfaces/node';
import
{ GlobalTargetResolver,
  Renderer } from '../interfaces/renderer';
import { RElement } from
'../interfaces/renderer_dom';
import
{ isDirectiveHost } from
'../interfaces/type_checks';
import { CLEANUP, CONTEXT, LView, RENDERER,
  TView } from
'../interfaces/view';
import { assertTNodeType } from
'./node_assert';
import { profiler,
  ProfilerEvent } from
'./profiler';
import { getCurrentDirectiveDef, getCurrentTNode, getLView, getTView } from
'./state';
import { getComponentLViewByIndex, getNativeByTNode, unwrapRNode } from
'./util/view_utils';
import { getOrCreateLViewCleanup, getOrCreateTVViewCleanup, handleError,
  loadComponentRenderer, markViewDirty } from
'./shared';
/**
 * Adds an event listener to the current
 * node.
 * If an output exists on one of the node's directives, it also subscribes to the output
 * and saves the
 * subscription for later cleanup.
 */
@param eventName Name of the event
@param listenerFn The function
to be called when event emits
@param useCapture Whether
or not to use capture in event listener
@param eventTargetResolver Function that returns global target
information in case this listener
should be attached to a global object like window, document or body
/**
 */
@codegenApi
export function listener(
  eventName: string, listenerFn: (e?: any) => any, useCapture?:
boolean,
  eventTargetResolver?: GlobalTargetResolver): typeof listener {
  const IView =
getLView<{}|null>();
  const tView = getTVView();
  const tNode = getCurrentTNode(!);
  listenerInternal(
    tView, IView, IView[RENDERER], tNode, eventName, listenerFn, !!useCapture,
    eventTargetResolver);
  return listener;
}
/**
 * Registers a synthetic host listener (e.g. `(@foo.start)`) on a component or directive.
 * This instruction is for compatibility purposes and is designed to ensure that a
 * synthetic host listener (e.g.
 * `@HostListener('@foo.start)`) properly gets rendered
 * in the component's renderer. Normally all
 * host listeners are evaluated with the
 * parent component's renderer, but, in the case of animation @triggers, they
 * need
 * to be evaluated with the sub component's renderer (because that's where the
 * animation triggers are

```

```

defined).\n *\n * Do not use this instruction as a replacement for `listener`. This instruction\n * only exists to ensure
compatibility with the ViewEngine's host binding behavior.\n *\n * @param eventName Name of the event\n *
@param listenerFn The function to be called when event emits\n * @param useCapture Whether or not to use
capture in event listener\n * @param eventTargetResolver Function that returns global target information in case
this listener\n * should be attached to a global object like window, document or body\n *\n * @codeGenApi\n
*\nexport function syntheticHostListener(\n  eventName: string, listenerFn: (e?: any) => any): typeof
syntheticHostListener {\n  const tNode = getCurrentTNode()!\n  const IView = getLView<{}|null>();\n  const
tView = getTView();\n  const currentDef = getCurrentDirectiveDef(tView.data);\n  const renderer =
loadComponentRenderer(currentDef, tNode, IView);\n  listenerInternal(tView, IView, renderer, tNode, eventName,
listenerFn, false);\n  return syntheticHostListener;\n}\n\n**\n * A utility function that checks if a given element has
already an event handler registered for an\n * event with a specified name. The TView.cleanup data structure is used
to find out which events\n * are registered for a given element.\n *\nfunction findExistingListener(\n  tView:
TView, IView: LView, eventName: string, tNodeIdx: number): ((e?: any) => any)|null {\n  const tCleanup =
tView.cleanup;\n  if (tCleanup != null) {\n    for (let i = 0; i < tCleanup.length - 1; i += 2) {\n      const
cleanupEventName = tCleanup[i];\n      if (cleanupEventName === eventName && tCleanup[i + 1] === tNodeIdx)
{\n        // We have found a matching event name on the same node but it might not have been\n        // registered
yet, so we must explicitly verify entries in the LView cleanup data\n        // structures.\n        const lCleanup =
IView[CLEANUP]!\n        const listenerIdxInLCleanup = tCleanup[i + 2];\n        return lCleanup.length >
listenerIdxInLCleanup ? lCleanup[listenerIdxInLCleanup] : null;\n      }\n      // TView.cleanup can have a mix of 4-
elements entries (for event handler cleanups) or\n      // 2-element entries (for directive and queries destroy hooks).
As such we can encounter\n      // blocks of 4 or 2 items in the tView.cleanup and this is why we iterate over 2
elements\n      // first and jump another 2 elements if we detect listeners cleanup (4 elements). Also check\n      //
documentation of TView.cleanup for more details of this data structure layout.\n      if (typeof cleanupEventName
=== 'string') {\n        i += 2;\n      }\n    }\n  }\n  return null;\n}\n\nfunction listenerInternal(\n  tView: TView,
IView: LView<{}|null>, renderer: Renderer, tNode: TNode, eventName:
string,\n  listenerFn: (e?: any) => any, useCapture: boolean,\n  eventTargetResolver?: GlobalTargetResolver):
void {\n  const isTNodeDirectiveHost = isDirectiveHost(tNode);\n  const firstCreatePass = tView.firstCreatePass;\n
const tCleanup: false|any[] = firstCreatePass && getOrCreateTViewCleanup(tView);\n  const context =
IView[CONTEXT];\n  // When the listener instruction was generated and is executed we know that there is either
a\n  // native listener or a directive output on this element. As such we we know that we will have to\n  // register a
listener and store its cleanup function on LView.\n  const lCleanup = getOrCreateLViewCleanup(IView);\n  ngDevMode
&& assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.AnyContainer);\n  let
processOutputs = true;\n  // Adding a native event listener is applicable when:\n  // - The corresponding TNode
represents a DOM element.\n  // - The event target has a resolver (usually resulting in a global object,\n  // such as
`window` or `document`).\n  if ((tNode.type & TNodeType.AnyRNode) || eventTargetResolver) {\n    const native
= getNativeByTNode(tNode, IView) as RElement;\n    const target = eventTargetResolver ?
eventTargetResolver(native) : native;\n    const lCleanupIndex = lCleanup.length;\n    const idxOrTargetGetter =
eventTargetResolver ?\n      (_IView: LView) => eventTargetResolver(unwrapRNode(_IView[tNode.index])) :\n
tNode.index;\n    // In order to match current behavior, native DOM event listeners must be added for all\n    //
events (including outputs).\n    // There might be cases where multiple directives on the same element try to
register an event\n    // handler function for the same event. In this situation we want to avoid registration of\n    //
several native listeners as each registration would be intercepted by NgZone and\n    // trigger change detection. This
would mean that a single user action would result in several\n    // change detections being invoked. To
avoid this situation we want to have only one call to\n    // native handler registration (for the same element and
same type of event).\n    // In order to have just one native event handler in presence of multiple handler
functions,\n    // we just register a first handler function as a native event listener and then chain\n    // (coalesce)
other handler functions on top of the first native handler function.\n    let existingListener = null;\n    // Please note
that the coalescing described here doesn't happen for events specifying an\n    // alternative target (ex.

```

```

(document:click)) - this is to keep backward compatibility with the
// view engine.
// Also, we don't have to
search for existing listeners is there are no directives
// matching on a given node as we can't register multiple
event handlers for the same event in
// a template (this would mean having duplicate attributes).
if
(!eventTargetResolver && isTNodeDirectiveHost) {
  existingListener
  = findExistingListener(tView, IView, eventName, tNode.index);
}
if (existingListener !== null) {
  //
  Attach a new listener to coalesced listeners list, maintaining the order in which
  // listeners are registered. For
  performance reasons, we keep a reference to the last
  // listener in that list (in `__ngLastListenerFn__` field), so
  we can avoid going through
  // the entire set each time we need to add a new listener.
  const lastListenerFn
  = (<any>existingListener).__ngLastListenerFn__ || existingListener;
  lastListenerFn.__ngNextListenerFn__ =
  listenerFn;
  (<any>existingListener).__ngLastListenerFn__ = listenerFn;
  processOutputs = false;
} else {
  listenerFn = wrapListener(tNode, IView, context, listenerFn, false /** preventDefault */);
  const
  cleanupFn = renderer.listen(target as RElement, eventName, listenerFn);
  ngDevMode &&
  ngDevMode.rendererAddEventListener++;
  ICleanup.push(listenerFn,
  cleanupFn);
  tCleanup && tCleanup.push(eventName, idxOrTargetGetter, ICleanupIndex, ICleanupIndex +
  1);
}
} else {
  // Even if there is no native listener to add, we still need to wrap the listener so that
  OnPush
  // ancestors are marked dirty when an event occurs.
  listenerFn = wrapListener(tNode, IView,
  context, listenerFn, false /** preventDefault */);
}
// subscribe to directive outputs
const outputs =
tNode.outputs;
let props: PropertyAliasValue|undefined;
if (processOutputs && outputs !== null && (props =
outputs[eventName])) {
  const propsLength = props.length;
  if (propsLength) {
    for (let i = 0; i <
    propsLength; i += 2) {
      const index = props[i] as number;
      ngDevMode && assertIndexInRange(IView,
      index);
      const minifiedName = props[i + 1];
      const directiveInstance = IView[index];
      const output
      = directiveInstance[minifiedName];
      if (ngDevMode && !isObservable(output))
        throw new Error(`@Output ${minifiedName} not initialized in '${
        directiveInstance.constructor.name}'`);
      const subscription = output.subscribe(listenerFn);
      const idx = ICleanup.length;
      ICleanup.push(listenerFn, subscription);
      tCleanup &&
      tCleanup.push(eventName, tNode.index, idx, -(idx + 1));
    }
  }
}
function
executeListenerWithErrorHandling(IView: LView, context: {}|null, listenerFn: (e?: any) => any, e: any):
boolean {
  try {
    profiler(ProfilerEvent.OutputStart, context, listenerFn);
    // Only explicitly returning false
    from a listener should preventDefault
    return listenerFn(e) !== false;
  } catch (error) {
    handleError(IView,
    error);
    return false;
  } finally {
    profiler(ProfilerEvent.OutputEnd, context, listenerFn);
  }
}
/**
 * Wraps an event listener with a function that marks ancestors dirty and prevents default behavior,
 * if applicable.
 *
 * @param tNode The TNode associated with this listener
 * @param IView The LView that contains this
  listener
 * @param listenerFn The listener function to call
 * @param wrapWithPreventDefault Whether or not to
  prevent default behavior
 * (the procedural renderer does this already, so in those cases, we should skip)
 */
function wrapListener(tNode: TNode, IView: LView<{}|null>, context: {}|null, listenerFn: (e?: any) =>
any, wrapWithPreventDefault: boolean): EventListener {
  // Note: we are performing most of the work in the
  listener function itself
  // to optimize listener registration.
  return function
  wrapListenerIn_markDirtyAndPreventDefault(e: any) {
    // Ivy uses `Function` as a special token that allows us to
    unwrap the function
    // so that it can be invoked programmatically by `DebugNode.triggerEventHandler`.
    if
    (e === Function) {
      return listenerFn;
    }
    // In order to be backwards compatible with View Engine,
    events on component
    host nodes
    // must also mark the component view itself dirty (i.e. the view that it owns).
    const startView =
    tNode.flags & TNodeFlags.isComponentHost ?
    getComponentLViewByIndex(tNode.index, IView) :
    IView;
    markViewDirty(startView);
    let result = executeListenerWithErrorHandling(IView, context,
    listenerFn, e);
    // A just-invoked listener function might have coalesced listeners so we need to check for
    // their presence and invoke as needed.
    let nextListenerFn =
    (<any>wrapListenerIn_markDirtyAndPreventDefault).__ngNextListenerFn__;
    while (nextListenerFn) {
      //
      We should prevent default if any of the listeners explicitly return false
      result =

```

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executeListenerWithErrorHandling(IView, context, nextListenerFn, e) && result;\n    nextListenerFn =
(<any>nextListenerFn).__ngNextListenerFn__;\n    }\n    if (wrapWithPreventDefault && result === false) {\n
e.preventDefault();\n    // Necessary for legacy browsers
that don't support preventDefault (e.g. IE)\n    e.returnValue = false;\n    }\n    return result;\n };\n\n", "/*\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n\nexport
{namespaceHTML, namespaceMathML, namespaceSVG} from './state';\n", "/*\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {nextContextImpl} from './state';\n\n/**\n *
Retrieves a context at the level specified and saves it as the global, contextViewData.\n * Will get the next level up
if level is not specified.\n *\n * This is used to save contexts of parent views so they can be bound in embedded
views, or\n * in conjunction with reference() to bind a ref from a parent view.\n *\n * @param
level The relative level of the view from which to grab context compared to contextVewData\n * @returns
context\n *\n * @codeGenApi\n */\n\nexport function nextContext<T = any>(level: number = 1): T {\n return
nextContextImpl(level);\n }\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {newArray} from '../util/array_utils';\nimport {TAttributes, TElementNode,
TNode, TNodeFlags, TNodeType} from './interfaces/node';\nimport {ProjectionSlots} from
 './interfaces/projection';\nimport {DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, T_HOST} from
 './interfaces/view';\nimport {applyProjection} from './node_manipulation';\nimport {getProjectAsAttrValue,
isNodeMatchingSelectorList, isSelectorInSelectorList} from './node_selector_matcher';\nimport {getLView,
getTView, setCurrentTNodeAsNotParent} from './state';\nimport {getOrCreateTNode}
from './shared';\n\n\n/**\n * Checks a given node against matching projection slots and returns the\n * determined
slot index. Returns \"null\" if no slot matched the given node.\n *\n * This function takes into account the parsed
ngProjectAs selector from the\n * node's attributes. If present, it will check whether the ngProjectAs selector\n *
matches any of the projection slot selectors.\n */\n\nexport function matchingProjectionSlotIndex(tNode: TNode,
projectionSlots: ProjectionSlots): number|\n    null {\n let wildcardNgContentIndex = null;\n const
ngProjectAsAttrVal = getProjectAsAttrValue(tNode);\n for (let i = 0; i < projectionSlots.length; i++) {\n const
slotValue = projectionSlots[i];\n // The last wildcard projection slot should match all nodes which aren't
matching\n // any selector. This is necessary to be backwards compatible with view engine.\n if (slotValue ===
*') {\n wildcardNgContentIndex = i;\n continue;\n }\n // If we
ran into an `ngProjectAs` attribute, we should match its parsed selector\n // to the list of selectors, otherwise we
fall back to matching against the node.\n if (ngProjectAsAttrVal === null ?\n
isNodeMatchingSelectorList(tNode, slotValue, /* isProjectionMode */ true) :\n
isSelectorInSelectorList(ngProjectAsAttrVal, slotValue)) {\n return i; // first matching selector \"captures\" a
given node\n }\n }\n return wildcardNgContentIndex;\n }\n\n\n/**\n * Instruction to distribute projectable nodes
among <ng-content> occurrences in a given template.\n *\n * It takes all the selectors from the entire component's
template and decides where\n * each projected node belongs (it re-distributes nodes among \"buckets\" where each
\"bucket\" is\n * backed by a selector).\n *\n * This function requires CSS selectors to be provided in 2 forms:
parsed (by a compiler) and text,\n * un-parsed form.\n *\n * The parsed form is needed for efficient matching of a
node against
a given CSS selector.\n * The un-parsed, textual form is needed for support of the ngProjectAs attribute.\n *\n *
Having a CSS selector in 2 different formats is not ideal, but alternatives have even more\n * drawbacks:\n * -
having only a textual form would require runtime parsing of CSS selectors;\n * - we can't have only a parsed as we
can't re-construct textual form from it (as entered by a\n * template author).\n *\n * @param projectionSlots? A
collection of projection slots. A projection slot can be based\n * on a parsed CSS selectors or set to the wildcard
selector (\"*\") in order to match\n * all nodes which do not match any selector. If not specified, a single
wildcard\n * selector projection slot will be defined.\n *\n * @codeGenApi\n */\n\nexport function

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projectionDef(projectionSlots?: ProjectionSlots): void {\n  const componentNode =
getLView()[DECLARATION_COMPONENT_VIEW][T_HOST] as TElementNode;\n\n  if
(!componentNode.projection) {\n    // If no explicit
    projection slots are defined, fall back to a single\n    // projection slot with the wildcard selector.\n    const
numProjectionSlots = projectionSlots ? projectionSlots.length : 1;\n    const projectionHeads: (TNode|null)[] =
componentNode.projection =\n      newArray(numProjectionSlots, null! as TNode);\n    const tails: (TNode|null)[]
= projectionHeads.slice();\n\n    let componentChild: TNode|null = componentNode.child;\n\n    while
(componentChild !== null) {\n      const slotIndex =\n        projectionSlots ?
matchingProjectionSlotIndex(componentChild, projectionSlots) : 0;\n\n      if (slotIndex !== null) {\n        if
(tails[slotIndex]) {\n          tails[slotIndex]!.projectionNext = componentChild;\n        } else {\n
projectionHeads[slotIndex] = componentChild;\n        } tails[slotIndex] = componentChild;\n      }\n\n      componentChild = componentChild.next;\n    }\n  }\n}\n\n/**\n * Inserts previously re-distributed projected
nodes. This instruction
must be preceded by a call\n * to the projectionDef instruction.\n * @param nodeIndex\n * @param
selectorIndex:\n *   - 0 when the selector is `` (or unspecified as this is the default value),\n *   - 1 based
index of the selector from the { @link projectionDef}\n * @codeGenApi\n */\nexport function projection(\n
nodeIndex: number, selectorIndex: number = 0, attrs?: TAttributes): void {\n  const lView = getLView();\n  const
tView = getTView();\n  const tProjectionNode =\n    getOrCreateTNode(tView, HEADER_OFFSET + nodeIndex,
TNodeType.Projection, null, attrs || null);\n\n  // We can't use viewData[HOST_NODE] because projection nodes
can be nested in embedded views.\n  if (tProjectionNode.projection === null) tProjectionNode.projection =
selectorIndex;\n\n  // `` has no content\n  setCurrentTNodeAsNotParent();\n\n  if
((tProjectionNode.flags & TNodeFlags.isDetached) !== TNodeFlags.isDetached) {\n    // re-distribution of
projectable nodes is
stored on a component's view level\n    applyProjection(tView, lView, tProjectionNode);\n  }\n}\n\n",/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {SanitizerFn} from
'./interfaces/sanitization';\nimport {RENDERER} from './interfaces/view';\nimport {getBindingIndex, getLView,
getSelectedTNode, getTView} from './state';\nimport {NO_CHANGE} from './tokens';\nimport {interpolation1,
interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8,
interpolationV} from './interpolation';\nimport {elementPropertyInternal, storePropertyBindingMetadata} from
'./shared';\n\n/**\n * Update an interpolated property on an element with a lone bound value\n * Used
when the value passed to a property has 1 interpolated value in it, an no additional text\n * surrounds that
interpolated value:\n * ``html\n * <div title="{v0}"></div>\n * ``\n * Its compiled representation is:\n *
``ts\n * propertyInterpolate('title', v0);\n * ``\n * If the property name also exists as an input property on
one of the element's directives,\n * the component property will be set instead of the element property. This check
must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *
@param propName The name of the property to update\n * @param prefix Static value used for concatenation
only.\n * @param v0 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@param sanitizer An optional sanitizer function\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function propertyInterpolate(\n  propName: string, v0: any, sanitizer?: SanitizerFn): typeof
propertyInterpolate {\n  return propertyInterpolate1(propName, "", v0, "", sanitizer);\n}\n\npropertyInterpolate;\n\n/**\n * Update an interpolated property on an element with single bound value
surrounded by text.\n * Used when the value passed to a property has 1 interpolated value in it:\n * ``html\n *
<div title="prefix{v0}suffix"></div>\n * ``\n * Its compiled representation is:\n * ``ts\n *
propertyInterpolate1('title', 'prefix', v0, 'suffix');\n * ``\n * If the property name also exists as an input property
on one of the element's directives,\n * the component property will be set instead of the element property. This
check must\n * be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n *
@param propName The name of the property to update\n * @param prefix Static value used for concatenation

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only.\n \* @param v0 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolate1(\n propName: string, prefix: string, v0: any, suffix: string,\n sanitizer?: SanitizerFn): typeof propertyInterpolate1 {\n const IView = getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 1, prefix, suffix);\n }\n return propertyInterpolate1;\n}\n\n/n/\*\*\n \*\n \* Update an interpolated property on an element with 2 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 2 interpolated values in it:\n \*\n \* ``html\n \* <div title="prefix{{v0}}-{{v1}}suffix"></div>\n \* ``\n \*\n \* Its compiled

representation is:\n \*\n \* ``ts\n \* propertyInterpolate2('title', 'prefix', v0, '-', v1, 'suffix');\n \* ``\n \*\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \*\n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolate2(\n propName: string, prefix: string, v0: any, i0: string, v1: any, suffix: string,\n sanitizer?: SanitizerFn): typeof

propertyInterpolate2 {\n const IView = getLView();\n const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 2, prefix, i0, suffix);\n }\n return

propertyInterpolate2;\n}\n\n/n/\*\*\n \*\n \* Update an interpolated property on an element with 3 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 3 interpolated values in it:\n \*\n \* ``html\n \* <div title="prefix{{v0}}-{{v1}}-{{v2}}suffix"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* propertyInterpolate3(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, 'suffix');\n \* ``\n \*\n \* If the property name

also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \*\n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* ^\nexport function propertyInterpolate3(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,\n suffix: string, sanitizer?: SanitizerFn): typeof propertyInterpolate3

{\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 3, prefix, i0, i1, suffix);\n }\n return

propertyInterpolate3;\n}\n\n/n/\*\*\n \*\n \* Update an interpolated property on an element with 4 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 4 interpolated values in it:\n \*\n \* ``html\n \* <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n \* ``\n \*\n \* Its compiled



for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function propertyInterpolate6(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string,\n sanitizer?: SanitizerFn): typeof propertyInterpolate6 {\n const IView = getLView();\n const interpolatedValue =\n interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 6, prefix, i0, i1, i2, i3, i4, suffix);\n }\n return propertyInterpolate6;\n }\n\n/\*\*\n \* Update an interpolated property on an element with 7 bound values surrounded by text.\n \* Used when the value passed to a property has 7 interpolated values in it:\n \* ``html\n \* <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* propertyInterpolate7(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n \* ``\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* \n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function propertyInterpolate7(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string,\n sanitizer?: SanitizerFn): typeof propertyInterpolate7 {\n const IView = getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 7, prefix, i0, i1, i2, i3, i4, i5,\n suffix);\n }\n return propertyInterpolate7;\n }\n\n/\*\*\n \* Update an interpolated property on an element with 8 bound values surrounded by text.\n \* Used when the value passed to a property has 8 interpolated values in it:\n \* ``html\n \* <div title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n \* ``\n \* Its compiled representation is:\n \* ``ts\n \* propertyInterpolate8(\n \* 'title', 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n \* ``\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* \n \* @param propName The name of the property to update\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.

@param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6 Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function propertyInterpolate8(\n propName: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, sanitizer?: SanitizerFn): typeof propertyInterpolate8 {\n const IView = getLView();\n const interpolatedValue = interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n ngDevMode &&\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - 8, prefix, i0, i1, i2, i3, i4, i5, i6,\n suffix);\n }\n return propertyInterpolate8;\n}\n\n/\*\*\n \* Update an interpolated property on an element with 9 or more bound values surrounded by text.\n \* Used when the number of interpolated values exceeds 8.\n \* ```html\n \* <div\n \* title="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"></div>\n \* ```\n \* Its compiled representation is:\n \* ```ts\n \* propertyInterpolateV(\n \* 'title', ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n \* 'suffix']);\n \* ```\n \* If the property name also exists as an input property on one of the element's directives,\n \* the component property will be set instead of the element property. This check must\n \* be conducted at runtime so child components that add new `@Inputs` don't have to be re-compiled.\n \* @param propName The name of the property to update.\n \* @param values The collection of values and the strings in between those values, beginning with a\n \* string prefix and ending with a string suffix.\n \* (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n \* @param sanitizer An optional sanitizer function\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \*/\nexport function propertyInterpolateV(\n propName: string, values: any[], sanitizer?: SanitizerFn): typeof propertyInterpolateV {\n const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n if (interpolatedValue !== NO\_CHANGE) {\n const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(\n tView, tNode, IView, propName, interpolatedValue, IView[RENDERER], sanitizer, false);\n if (ngDevMode) {\n const interpolationInBetween = [values[0]]; // prefix\n for (let i = 2; i < values.length; i += 2) {\n interpolationInBetween.push(values[i]);\n }\n storePropertyBindingMetadata(\n tView.data, tNode, propName, getBindingIndex() - interpolationInBetween.length + 1,\n ...interpolationInBetween);\n }\n }\n return propertyInterpolateV;\n}\n\n", "/\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at\n \* https://angular.io/license\n \*/\nimport {KeyValueArray, keyValueArrayIndexOf} from\n'./../util/array\_utils';\nimport {assertEqual, assertIndexInRange, assertNotEqual} from './../util/assert';\nimport\n{assertFirstUpdatePass} from './assert';\nimport {TNode} from './interfaces/node';\nimport\n{getTStylingRangeNext, getTStylingRangePrev, setTStylingRangeNext, setTStylingRangeNextDuplicate,\nsetTStylingRangePrev, setTStylingRangePrevDuplicate, toTStylingRange, TStylingKey, TStylingKeyPrimitive,\nTStylingRange} from './interfaces/styling';\nimport {TData} from './interfaces/view';\nimport {getTView} from\n'./state';\n\n\n\*\*\n \* NOTE: The word `styling` is used interchangeably as style or class styling.\n \* This file contains code to link styling instructions together so that they can be replayed in\n \* priority order. The file exists because Ivy styling instruction execution order does not match\n \* that of the priority order. The purpose of this code is to create a linked list so\n \* that the\n \* instructions can be traversed in priority order when computing the styles.\n \* Assume we are dealing with the following code:\n \* ```\n \* @Component({\n \* template: `\n \* <my-cmp [style]=\" {color: '#001'} \"\n \* [style.color]=\" #002 \"\n \* dir-style-color-1\n \* dir-style-color-2>\n \* `)\n \* class ExampleComponent {\n \* static ngComp = ... {\n \* ... // Compiler ensures that `styleProp` is after

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`styleMap`\n * styleMap({color: '#001'});\n * styleProp('color', '#002');\n * ... \n * } \n * } \n * } \n *
@Directive({\n * selector: `[dir-style-color-1]',\n * })\n * class Style1Directive {\n * @HostBinding('style') style
= {color: '#005'};\n * @HostBinding('style.color') color = '#006';\n * \n * static ngDir = ... {\n * ... \n * //
Compiler ensures that `styleProp` is after `styleMap`\n * styleMap({color: '#005'});\n * styleProp('color',
'#006');\n * ... \n * } \n *
} \n * \n * @Directive({\n * selector: `[dir-style-color-2]',\n * })\n * class Style2Directive {\n *
@HostBinding('style') style = {color: '#007'};\n * @HostBinding('style.color') color = '#008';\n * \n * static ngDir
= ... {\n * ... \n * // Compiler ensures that `styleProp` is after `styleMap`\n * styleMap({color: '#007'});\n *
styleProp('color', '#008');\n * ... \n * } \n * } \n * \n * @Directive({\n * selector: `my-cmp`,\n * })\n * class
MyComponent {\n * @HostBinding('style') style = {color: '#003'};\n * @HostBinding('style.color') color =
'#004';\n * \n * static ngComp = ... {\n * ... \n * // Compiler ensures that `styleProp` is after `styleMap`\n *
styleMap({color: '#003'});\n * styleProp('color', '#004');\n * ... \n * } \n * } \n * ```\n * \n * The Order of
instruction execution is:\n * \n * NOTE: the comment binding location is for illustrative purposes only.\n * \n * ```\n *
// Template: (ExampleComponent)\n * styleMap({color:
'#001'}); // Binding index: 10\n * styleProp('color', '#002'); // Binding index: 12\n * // MyComponent\n *
styleMap({color: '#003'}); // Binding index: 20\n * styleProp('color', '#004'); // Binding index: 22\n * //
Style1Directive\n * styleMap({color: '#005'}); // Binding index: 24\n * styleProp('color', '#006'); // Binding
index: 26\n * // Style2Directive\n * styleMap({color: '#007'}); // Binding index: 28\n * styleProp('color',
'#008'); // Binding index: 30\n * ```\n * \n * The correct priority order of concatenation is:\n * \n * ```\n * //
MyComponent\n * styleMap({color: '#003'}); // Binding index: 20\n * styleProp('color', '#004'); // Binding
index: 22\n * // Style1Directive\n * styleMap({color: '#005'}); // Binding index: 24\n * styleProp('color',
'#006'); // Binding index: 26\n * // Style2Directive\n * styleMap({color: '#007'}); // Binding index: 28\n *
styleProp('color',
'#008'); // Binding index: 30\n * // Template: (ExampleComponent)\n * styleMap({color: '#001'}); // Binding
index: 10\n * styleProp('color', '#002'); // Binding index: 12\n * ```\n * \n * What color should be rendered?\n * \n *
Once the items are correctly sorted in the list, the answer is simply the last item in the\n * concatenation list which
is `#002`.\n * \n * To do so we keep a linked list of all of the bindings which pertain to this element.\n * Notice that
the bindings are inserted in the order of execution, but the `TVView.data` allows\n * us to traverse them in the order
of priority.\n * \n * [Idx] TVView.data` LVView` | Notes\n * |---|-----|-----|-----|-----| \n * |...|
| \n * | \n * |10 | null` | {color: '#001'} | `styleMap('color', {color: '#001'})` \n * |11 | 30 | 12` | ... | \n *
|12 | `color` | `'#002` | `styleProp('color', '#002')` \n * |13 | 10 | 0` | ... | \n *
| \n * |... | \n * | \n * |20 | null` | {color: '#003'} | `styleMap('color', {color: '#003'})` \n * |21 | 0 | 22` | ...
| \n * | \n * |22 | `color` | `'#004` | `styleProp('color', '#004')` \n * |23 | 20 | 24` | ... | \n * |24 | null`
| {color: '#005'} | `styleMap('color', {color: '#005'})` \n * |25 | 22 | 26` | ... | \n * |26 | `color` | `'#006`
| `styleProp('color', '#006')` \n * |27 | 24 | 28` | ... | \n * |28 | null` | {color: '#007'} | `styleMap('color',
{color: '#007'})` \n * |29 | 26 | 30` | ... | \n * |30 | `color` | `'#008` | `styleProp('color', '#008')` \n * |31
| 28 | 10` | ... | \n *
\n * \n * The above data structure allows us to re-concatenate the styling no matter which data
binding\n * changes.\n * \n * NOTE: in addition to keeping track of next/previous index the `TVView.data` also stores
prev/next\n * duplicate bit. The duplicate bit if
true says there either is a binding with the same name or\n * there is a map (which may contain the name). This
information is useful in knowing if other\n * styles with higher priority need to be searched for overwrites.\n * \n *
NOTE: See `should support example in 'tnode_linked_list.ts' documentation` in\n * `tnode_linked_list_spec.ts` for
working example.\n * \n * \n * let __unused_const_as_closure_does_not_like_standalone_comment_blocks__:\n *
undefined;\n * \n * \n * Insert new `tStyleValue` at `TData` and link existing style bindings such that we maintain
linked\n * list of styles and compute the duplicate flag.\n * \n * Note: this function is executed during
`firstUpdatePass` only to populate the `TVView.data`.\n * \n * The function works by keeping track of `tStylingRange`
which contains two pointers pointing to\n * the head/tail of the template portion of the styles.\n * - if `isHost ===
false` (we are template) then insertion is at tail of `TStylingRange`\n * - if `isHost === true` (we are

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host binding) then insertion is at head of `TStylingRange`\n *\n * @param tData The `TData` to insert into.\n *\n * @param tNode `TNode` associated with the styling element.\n *\n * @param tStylingKey See `TStylingKey`.\n *\n * @param index location of where `tStyleValue` should be stored (and linked into list.)\n *\n * @param isHostBinding `true` if the insertion is for a `hostBinding`. (insertion is in front of\n *\n *      template.)\n *\n * @param\n *\n * isClassBinding True if the associated `tStylingKey` as a `class` styling.\n *\n *      `tNode.classBindings`\n *\n * should be used (or `tNode.styleBindings` otherwise.)\n */\n\nexport function insertTStylingBinding(\n  tData: TData,\n  tNode: TNode, tStylingKeyWithStatic: TStylingKey, index: number,\n  isHostBinding: boolean, isClassBinding:\n  boolean): void {\n  ngDevMode && assertFirstUpdatePass(getTView());\n  let tBindings = isClassBinding ?\n  tNode.classBindings : tNode.styleBindings;\n  let tmpHead = getTStylingRangePrev(tBindings);\n  let tmpTail\n  = getTStylingRangeNext(tBindings);\n  tData[index] = tStylingKeyWithStatic;\n  let isKeyDuplicateOfStatic =\n  false;\n  let tStylingKey: TStylingKeyPrimitive;\n  if (Array.isArray(tStylingKeyWithStatic)) {\n    // We are case\n    when the `TStylingKey` contains static fields as well.\n    const staticKeyValueArray = tStylingKeyWithStatic as\n    KeyValueArray<any>;\n    tStylingKey = staticKeyValueArray[1]; // unwrap.\n    // We need to check if our key is\n    present in the static so that we can mark it as duplicate.\n    if (tStylingKey === null ||\n    keyValueArrayIndexOf(staticKeyValueArray, tStylingKey as string) > 0) {\n      // tStylingKey is present in the\n      statics, need to mark it as duplicate.\n      isKeyDuplicateOfStatic = true;\n    } else {\n      tStylingKey =\n      tStylingKeyWithStatic;\n    }\n    if (isHostBinding) {\n      // We are inserting host bindings\n      // If we don't have\n      template bindings then `tail` is 0.\n      const hasTemplateBindings = tmpTail !== 0;\n      // This\n      is important to know because that means that the `head` can't point to the first\n      // template bindings (there are\n      none.) Instead the head points to the tail of the template.\n      if (hasTemplateBindings) {\n        // template head's\n        `prev` will point to last host binding or to 0 if no host bindings yet\n        const previousNode =\n        getTStylingRangePrev(tData[tmpHead + 1] as TStylingRange);\n        tData[index + 1] =\n        toTStylingRange(previousNode, tmpHead);\n        // if a host binding has already been registered, we need to update\n        the next of that host\n        // binding to point to this one\n        if (previousNode !== 0) {\n          // We need to update\n          the template-tail value to point to us.\n          tData[previousNode + 1] =\n          setTStylingRangeNext(tData[previousNode + 1] as TStylingRange, index);\n        }\n        // The `previous` of the\n        template binding head should point to this host binding\n        tData[tmpHead + 1] =\n        setTStylingRangePrev(tData[tmpHead + 1] as TStylingRange,\n        index);\n      } else {\n        tData[index + 1] = toTStylingRange(tmpHead, 0);\n        // if a host binding has already\n        been registered, we need to update the next of that host\n        // binding to point to this one\n        if (tmpHead !== 0)\n        {\n          // We need to update the template-tail value to point to us.\n          tData[tmpHead + 1] =\n          setTStylingRangeNext(tData[tmpHead + 1] as TStylingRange, index);\n        }\n        // if we don't have template, the\n        head points to template-tail, and needs to be advanced.\n        tmpHead = index;\n      }\n    } else {\n      // We are\n      inserting in template section.\n      // We need to set this binding's `previous` to the current template tail\n      tData[index + 1] = toTStylingRange(tmpTail, 0);\n      ngDevMode &&\n      assertEqual(\n        tmpHead !== 0\n        && tmpTail === 0, false,\n        'Adding template bindings after hostBindings is not allowed.);\n      if (tmpHead\n      === 0) {\n        tmpHead = index;\n      } else {\n        // We\n        need to update the previous value `next` to point to this binding\n        tData[tmpTail + 1] =\n        setTStylingRangeNext(tData[tmpTail + 1] as TStylingRange, index);\n      }\n      tmpTail = index;\n    }\n  }\n  // Now\n  we need to update / compute the duplicates.\n  // Starting with our location search towards head (least priority)\n  if\n  (isKeyDuplicateOfStatic) {\n    tData[index + 1] = setTStylingRangePrevDuplicate(tData[index + 1] as\n    TStylingRange);\n  }\n  markDuplicates(tData, tStylingKey, index, true, isClassBinding);\n  markDuplicates(tData,\n  tStylingKey, index, false, isClassBinding);\n  markDuplicateOfResidualStyling(tNode, tStylingKey, tData, index,\n  isClassBinding);\n  tBindings = toTStylingRange(tmpHead, tmpTail);\n  if (isClassBinding) {\n    tNode.classBindings = tBindings;\n  } else {\n    tNode.styleBindings = tBindings;\n  }\n}\n\n/**\n * Look into the\n * residual styling to see if the current `TStylingKey` is duplicate of residual.\n *\n * @param tNode `TNode` where the\n * residual

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is stored.\n \* @param tStylingKey `TStylingKey` to store.\n \* @param tData `TData` associated with the current `LView`.\n \* @param index location of where `tStyleValue` should be stored (and linked into list).\n \* @param isClassBinding True if the associated `tStylingKey` as a `class` styling.\n \* `tNode.classBindings` should be used (or `tNode.styleBindings` otherwise.)\n \*/\nfunction markDuplicateOfResidualStyling(\n tNode: TNode, tStylingKey: TStylingKey, tData: TData, index: number, isClassBinding: boolean) {\n const residual = isClassBinding ? tNode.residualClasses : tNode.residualStyles;\n if (residual != null /\* or undefined \*/ && typeof tStylingKey == 'string' &&\n keyValueArrayIndexOf(residual, tStylingKey) >= 0) {\n // We have duplicate in the residual so mark ourselves as duplicate.\n tData[index + 1] = setTStylingRangeNextDuplicate(tData[index + 1] as TStylingRange);\n }\n}\n\n/\*\n \* Marks `TStyleValue`s as duplicates if another style binding in the list has the same\n \* `TStyleValue`.\n \* NOTE: this function is intended to be called twice once with `isPrevDir` set to `true` and once\n \* with it set to `false` to search both the previous as well as next items in the list.\n \* No duplicate case\n \* ```\n \* [style.color]\n \* [style.width.px] <<- index\n \* [style.height.px]\n \* ```\n \* In the above case adding `[style.width.px]` to the existing `[style.color]` produces no\n \* duplicates because `width` is not found in any other part of the linked list.\n \* Duplicate case\n \* ```\n \* [style.color]\n \* [style.width.em]\n \* [style.width.px] <<- index\n \* ```\n \* In the above case adding `[style.width.px]` will produce a duplicate with `[style.width.em]`\n \* because `width` is found in the chain.\n \* Map case 1\n \* ```\n \* [style.width.px]\n \* [style.color]\n \* [style] <<- index\n \* ```\n \* In the above case adding `[style]` will produce a duplicate with any other bindings because\n \* `[style]` is a Map and as such is fully dynamic and could produce `color` or `width`.\n \* Map case 2\n \* ```\n \* [style]\n \* [style.width.px]\n \* [style.color] <<- index\n \* ```\n \* In the above case adding `[style.color]` will produce a duplicate because there is already a\n \* `[style]` binding which is a Map and as such is fully dynamic and could produce `color` or\n \* `width`.\n \* NOTE: Once `[style]` (Map) is added into the system all things are mapped as duplicates.\n \* NOTE: We use `style` as example, but same logic is applied to `class`es as well.\n \* @param tData `TData` where the linked list is stored.\n \* @param tStylingKey `TStylingKeyPrimitive` which contains the value to compare to other keys in\n \* the linked list.\n \* @param index Starting location in the linked list to search from\n \* @param isPrevDir Direction.\n \* - `true` for previous (lower priority);\n \* - `false` for next (higher priority).\n \*/\nfunction markDuplicates(\n tData: TData, tStylingKey: TStylingKeyPrimitive, index: number, isPrevDir: boolean,\n isClassBinding: boolean) {\n const tStylingAtIndex = tData[index + 1] as TStylingRange;\n const isMap = tStylingKey === null;\n let cursor =\n isPrevDir ? getTStylingRangePrev(tStylingAtIndex) : getTStylingRangeNext(tStylingAtIndex);\n let foundDuplicate = false;\n // We keep iterating as long as we have a cursor\n // AND either:\n // - we found what we are looking for, OR\n // - we are a map in which case we have to continue searching even after we find what we were\n // looking for since we are a wild card and everything needs to be flipped to duplicate.\n while (cursor !== 0 && (foundDuplicate === false || isMap)) {\n ngDevMode && assertIndexInRange(tData, cursor);\n const tStylingValueAtCursor = tData[cursor] as TStylingKey;\n const tStyleRangeAtCursor = tData[cursor + 1] as TStylingRange;\n if (isStylingMatch(tStylingValueAtCursor, tStylingKey)) {\n foundDuplicate = true;\n tData[cursor + 1] = isPrevDir ? setTStylingRangeNextDuplicate(tStyleRangeAtCursor)\n :\n setTStylingRangePrevDuplicate(tStyleRangeAtCursor);\n }\n cursor = isPrevDir ?\n getTStylingRangePrev(tStyleRangeAtCursor) :\n getTStylingRangeNext(tStyleRangeAtCursor);\n }\n if (foundDuplicate) {\n // if we found a duplicate, than mark ourselves.\n tData[index + 1] = isPrevDir ?\n setTStylingRangePrevDuplicate(tStylingAtIndex) :\n setTStylingRangeNextDuplicate(tStylingAtIndex);\n }\n}\n\n/\*\n \* Determines if two `TStylingKey`s are a match.\n \* When computing whether a binding contains a duplicate, we need to compare if the instruction\n \* `TStylingKey` has a match.\n \* Here are examples of `TStylingKey`s which match given `TStylingKeyCursor` is:\n \* - `color`\n \* - `color` // Match another color\n \* - `null` // That means that `tStylingKey` is a `classMap`/`styleMap` instruction\n \* - `['', 'color', 'other', true]` // wrapped `color` so match\n \* - `['', null, 'other', true]` // wrapped `null` so match\n \* - `['', 'width', 'color', 'value']` // wrapped static value contains a match on `color`\n \* - `null` // `tStylingKeyCursor` always match as it is `classMap`/`styleMap` instruction\n \*/



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*\n * @param tStylingKeyCursor\n * @param tStylingKey\n */function isStylingMatch(tStylingKeyCursor:
TStylingKey, tStylingKey: TStylingKeyPrimitive) {\n  ngDevMode &&\n    assertNotEqual(\n
Array.isArray(tStylingKey), true, 'Expected that `tStylingKey` has been unwrapped');\n  if (\n
tStylingKeyCursor === null || // If the cursor is `null` it means that we have map at that\n //
location so we must assume that we have a match.\n    tStylingKey == null || // If `tStylingKey` is `null` then it is a
map therefor assume that it\n // contains
a match.\n    (Array.isArray(tStylingKeyCursor) ? tStylingKeyCursor[1] : tStylingKeyCursor) ===\n
tStylingKey // If the keys match explicitly than we are a match.\n  ) {\n    return true;\n  } else if
(Array.isArray(tStylingKeyCursor) && typeof tStylingKey === 'string') {\n    // if we did not find a match, but
`tStylingKeyCursor` is `KeyValueArray` that means cursor has\n // statics and we need to check those as well.\n
return keyValueArrayIndexOf(tStylingKeyCursor, tStylingKey) >= 0; // see if we are matching the key\n  }
return false;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {assertEqual, throwError} from '../util/assert';\nimport {CharCode} from
 '../util/char_code';\n\n/**\n * Stores the locations of key/value indexes while parsing styling.\n * In case of
`cssText` parsing the indexes are like so:\n * ```\n * |"key1: value1; key2: value2; key3: value3"\n * ^
^ ^ ^\n * | | | | +--- textEnd\n * | | | | +----- valueEnd\n * | | +----- value\n * | +----- keyEnd\n * +----- key\n * ```\n * In case of `className` parsing the indexes are like so:\n * ```\n * | | +--- textEnd\n * | +----- keyEnd\n * +----- key\n * ```\n * NOTE: `value` and `valueEnd` are used only for styles, not classes.\n */\ninterface ParserState {\n  textEnd:
number;\n  key: number;\n  keyEnd: number;\n  value: number;\n  valueEnd: number;\n}\n// Global state of the
parser. (This makes parser non-reentrant, but that is not an issue)\nconst
parserState: ParserState = {\n  textEnd: 0,\n  key: 0,\n  keyEnd: 0,\n  value: 0,\n  valueEnd: 0,\n};\n\n/**\n *
Retrieves the last parsed `key` of style.\n * @param text the text to substring the key from.\n */\nexport function
getLastParsedKey(text: string): string {\n  return text.substring(parserState.key, parserState.keyEnd);\n}\n\n/**\n *
Retrieves the last parsed `value` of style.\n * @param text the text to substring the key from.\n */\nexport function
getLastParsedValue(text: string): string {\n  return text.substring(parserState.value,\n    parserState.valueEnd);\n}\n\n/**\n * Initializes `className` string for parsing and parses the first token.\n * This
function is intended to be used in this format:\n * ```\n * for (let i = parseClassName(text); i >= 0; i =
parseClassNameNext(text, i)) {\n *   const key = getLastParsedKey();\n *   ...}\n * }\n * ```\n * @param text
`className` to parse\n * @returns index where the next invocation of `parseClassNameNext` should resume.\n */\nexport
function parseClassName(text: string): number {\n  resetParserState(text);\n  return parseClassNameNext(text,\n    consumeWhitespace(text, 0, parserState.textEnd));\n}\n\n/**\n * Parses next `className` token.\n * This
function is intended to be used in this format:\n * ```\n * for (let i = parseClassName(text); i >= 0; i =
parseClassNameNext(text, i)) {\n *   const key = getLastParsedKey();\n *   ...}\n * }\n * ```\n * @param text
`className` to parse\n * @param index where the parsing should resume.\n * @returns index where the next
invocation of `parseClassNameNext` should resume.\n */\nexport function parseClassNameNext(text: string, index:
number): number {\n  const end = parserState.textEnd;\n  if (end === index) {\n    return -1;\n  }\n  index =
parserState.keyEnd = consumeClassToken(text, parserState.key = index, end);\n  return consumeWhitespace(text,\n    index, end);\n}\n\n/**\n * Initializes `cssText` string for parsing and parses the first key/values.\n * This
function
is intended to be used in this format:\n * ```\n * for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n
*   const key = getLastParsedKey();\n *   const value = getLastParsedValue();\n *   ...}\n * }\n * ```\n * @param text
`cssText` to parse\n * @returns index where the next invocation of `parseStyleNext` should resume.\n */\nexport
function parseStyle(text: string): number {\n  resetParserState(text);\n  return parseStyleNext(text,\n    consumeWhitespace(text, 0, parserState.textEnd));\n}\n\n/**\n * Parses the next `cssText` key/values.\n * This

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function is intended to be used in this format:\n * ```\n * for (let i = parseStyle(text); i >= 0; i = parseStyleNext(text,
i))) {\n *   const key = getLastParsedKey();\n *   const value = getLastParsedValue();\n *   ...}\n * }\n * @param
text `cssText` to parse\n * @param index where the parsing should resume.\n * @returns index where the next
invocation of `parseStyleNext` should resume.\n */\n\nexport function parseStyleNext(text:
string, startIndex: number): number {\n   const end = parserState.textEnd;\n   let index = parserState.key =
consumeWhitespace(text, startIndex, end);\n   if (end === index) {\n     // we reached an end so just quit\n     return -
1;\n   }\n   index = parserState.keyEnd = consumeStyleKey(text, index, end);\n   index = consumeSeparator(text,
index, end, CharCode.COLON);\n   index = parserState.value = consumeWhitespace(text, index, end);\n   index =
parserState.valueEnd = consumeStyleValue(text, index, end);\n   return consumeSeparator(text, index, end,
CharCode.SEMI_COLON);\n}\n\n/**\n * Reset the global state of the styling parser.\n * @param text The styling
text to parse.\n */\n\nexport function resetParserState(text: string): void {\n   parserState.key = 0;\n   parserState.keyEnd
= 0;\n   parserState.value = 0;\n   parserState.valueEnd = 0;\n   parserState.textEnd = text.length;\n}\n\n/**\n *
Returns index of next non-whitespace character.\n * @param text Text to scan\n * @param
startIndex Starting index of character where the scan should start.\n * @param endIndex Ending index of character
where the scan should end.\n * @returns Index of next non-whitespace character (May be the same as `start` if no
whitespace at\n *      that location.)\n */\n\nexport function consumeWhitespace(text: string, startIndex: number,
endIndex: number): number {\n   while (startIndex < endIndex && text.charCodeAt(startIndex) <=
CharCode.SPACE) {\n     startIndex++;\n   }\n   return startIndex;\n}\n\n/**\n * Returns index of last char in class
token.\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan should
start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index after last char
in class token.\n */\n\nexport function consumeClassToken(text: string, startIndex: number, endIndex: number):
number {\n   while (startIndex < endIndex && text.charCodeAt(startIndex) > CharCode.SPACE) {\n
startIndex++;\n   }\n   return startIndex;\n}\n\n/**\n * Consumes all of the characters belonging to style key and token.\n * @param text Text to scan\n * @param startIndex Starting index of character where the scan should start.\n * @param
endIndex Ending index of character where the scan should end.\n * @returns Index after last style key
character.\n */\n\nexport function consumeStyleKey(text: string, startIndex: number, endIndex: number): number {\n
let ch: number;\n   while (startIndex < endIndex &&\n     ((ch = text.charCodeAt(startIndex)) ===
CharCode.DASH || ch === CharCode.UNDERSCORE ||\n     ((ch & CharCode.UPPER_CASE) >= CharCode.A
&& (ch & CharCode.UPPER_CASE) <= CharCode.Z) ||\n     (ch >= CharCode.ZERO && ch <=
CharCode.NINE))) {\n     startIndex++;\n   }\n   return startIndex;\n}\n\n/**\n * Consumes all whitespace and the
separator `` after the style key.\n * @param text Text to scan\n * @param startIndex Starting index of character
where the scan should start.\n * @param
endIndex Ending index of character where the scan should end.\n * @returns Index after separator and surrounding
whitespace.\n */\n\nexport function consumeSeparator(\n   text: string, startIndex: number, endIndex: number,
separator: number): number {\n   startIndex = consumeWhitespace(text, startIndex, endIndex);\n   if (startIndex <
endIndex) {\n     if (ngDevMode && text.charCodeAt(startIndex) !== separator) {\n       malformedStyleError(text,
String.fromCharCode(separator), startIndex);\n     }\n     startIndex++;\n   }\n   return startIndex;\n}\n\n/**\n *
Consumes style value honoring `url()` and ``"`` text.\n * @param text Text to scan\n * @param startIndex
Starting index of character where the scan should start.\n * @param endIndex Ending index of character where the
scan should end.\n * @returns Index after last style value character.\n */\n\nexport function consumeStyleValue(text:
string, startIndex: number, endIndex: number): number {\n   let ch1 = -1; // 1st previous character\n   let ch2 = -1; // 2nd previous character\n   let ch3 = -1; // 3rd previous character\n   let i = startIndex;\n   let
lastChIndex = i;\n   while (i < endIndex) {\n     const ch: number = text.charCodeAt(i++);\n     if (ch ===
CharCode.SEMI_COLON) {\n       return lastChIndex;\n     } else if (ch === CharCode.DOUBLE_QUOTE || ch ===
CharCode.SINGLE_QUOTE) {\n       lastChIndex = i = consumeQuotedText(text, ch, i, endIndex);\n     } else if (\n
startIndex ===\n       i - 4 && // We have seen only 4 characters so far "URL(" (Ignore "foo_URL()")\n
ch3 === CharCode.U &&\n       ch2 === CharCode.R && ch1 === CharCode.L && ch ===

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CharCode.OPEN_PAREN) {\n    lastChIndex = i = consumeQuotedText(text, CharCode.CLOSE_PAREN, i,
endIndex);\n  } else if (ch > CharCode.SPACE) {\n    // if we have a non-whitespace character then capture its
location\n    lastChIndex = i;\n  }\n  ch3 = ch2;\n  ch2 = ch1;\n  ch1 = ch & CharCode.UPPER_CASE;\n }\n
return lastChIndex;\n}\n\n/**\n * Consumes all of the quoted characters.\n * @param text Text to scan\n * @param quoteCharCode CharCode
of either `"` or `"` quote or `)` for `url(...)`.\n * @param startIndex Starting index of character where the scan should
start.\n * @param endIndex Ending index of character where the scan should end.\n * @returns Index after quoted
characters.\n */\nexport function consumeQuotedText(\n  text: string, quoteCharCode: number, startIndex: number,
endIndex: number): number {\n  let ch1 = -1; // 1st previous character\n  let index = startIndex;\n  while (index <
endIndex) {\n    const ch = text.charCodeAt(index++);\n    if (ch === quoteCharCode && ch1 !==
CharCode.BACK_SLASH) {\n      return index;\n    }\n    if (ch === CharCode.BACK_SLASH && ch1 ===
CharCode.BACK_SLASH) {\n      // two back slashes cancel each other out. For example `""` should properly
end the\n      // quotation. (It should not assume that the last `"` is escaped.)\n      ch1 = 0;\n    } else
{\n      ch1 = ch;\n    }\n  }\n  throw ngDevMode ? malformedStyleError(text,
String.fromCharCode(quoteCharCode), endIndex) :\n    new Error();\n}\n\nfunction
malformedStyleError(text: string, expecting: string, index: number): never {\n  ngDevMode && assertEquals(typeof
text === 'string', true, 'String expected here');\n  throw throwError(\n    `Malformed style at location ${index} in
string ` + text.substring(0, index) + `[>>' +\n    text.substring(index, index + 1) + '<<]' + text.slice(index + 1) +\n
`. Expecting '${expecting}'.`);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport { SafeValue, unwrapSafeValue } from '../sanitization/bypass';\nimport
{ KeyValueType, keyValueTypeGet, keyValueTypeSet } from '../util/array_utils';\nimport { assertDefined,
assertEqual, assertLessThan,
assertNotEqual, throwError } from '../util/assert';\nimport { EMPTY_ARRAY } from '../util/empty';\nimport
{ concatStringsWhiteSpace, stringify } from '../util/stringify';\nimport { assertFirstUpdatePass } from
'./assert';\nimport { bindingUpdated } from './bindings';\nimport { DirectiveDef } from
'./interfaces/definition';\nimport { AttributeMarker, TAttributes, TNode, TNodeFlags, TNodeType } from
'./interfaces/node';\nimport { Renderer } from './interfaces/renderer';\nimport { RElement } from
'./interfaces/renderer_dom';\nimport { getTStylingRangeNext, getTStylingRangeNextDuplicate,
getTStylingRangePrev, getTStylingRangePrevDuplicate, TStylingKey, TStylingRange } from
'./interfaces/styling';\nimport { LView, RENDERER, TData, TView } from './interfaces/view';\nimport
{ applyStyling } from './node_manipulation';\nimport { getCurrentDirectiveDef, getLView, getSelectedIndex,
getTView, incrementBindingIndex } from './state';\nimport { insertTStylingBinding } from
'./styling/style_binding_list';\nimport
{ getLastParsedKey, getLastParsedValue, parseClassName, parseClassNameNext, parseStyle, parseStyleNext } from
'./styling/styling_parser';\nimport { NO_CHANGE } from './tokens';\nimport { getNativeByIndex } from
'./util/view_utils';\nimport { setDirectiveInputsWhichShadowsStyling } from './property';\n\n/**\n * Update a
style binding on an element with the provided value.\n *\n * If the style value is falsy then it will be removed from
the element\n * (or assigned a different value depending if there are any styles placed\n * on the element with
`styleMap` or any static styles that are\n * present from when the element was created with `styling`).\n *\n * Note
that the styling element is updated as part of `stylingApply`.\n *\n * @param prop A valid CSS property.\n *
@param value New value to write ( `null` or an empty string to remove).\n * @param suffix Optional suffix. Used
with scalar values to add unit such as `px`.\n *\n * Note that this will apply the provided style value to
the host element if this function is called\n * within a host binding function.\n *\n * @codeGenApi\n */\nexport
function styleProp(\n  prop: string, value: string|number|SafeValue|undefined|null,\n  suffix?: string|null): typeof
styleProp {\n  checkStylingProperty(prop, value, suffix, false);\n  return styleProp;\n}\n\n/**\n * Update a class
binding on an element with the provided value.\n *\n * This instruction is meant to handle the `[class.foo]="exp"`
case and,\n * therefore, the class binding itself must already be allocated using\n * `styling` within the creation

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block.\n * \n * @param prop A valid CSS class (only one).\n * @param value A true/false value which will turn the
class on or off.\n * \n * Note that this will apply the provided class value to the host element if this function\n * is
called within a host binding function.\n * \n * @codeGenApi\n * /\nexport function classProp(className: string,
value: boolean|undefined|null): typeof classProp {\n  checkStylingProperty(className,
value, null, true);\n  return classProp;\n}\n\n/**\n * Update style bindings using an object literal on an element.\n
*\n * This instruction is meant to apply styling via the `[style]="exp"` template bindings.\n * When styles are
applied to the element they will then be updated with respect to\n * any styles/classes set via `styleProp`. If any
styles are set to falsy\n * then they will be removed from the element.\n * \n * Note that the styling instruction will
not be applied until `stylingApply` is called.\n * \n * @param styles A key/value style map of the styles that will be
applied to the given element.\n * Any missing styles (that have already been applied to the element beforehand)
will be\n * removed (unset) from the element's styling.\n * \n * Note that this will apply the provided styleMap
value to the host element if this function\n * is called within a host binding.\n * \n * @codeGenApi\n * /\nexport
function styleMap(styles: {[styleName:
string]: any}|string|undefined|null): void {\n  checkStylingMap(styleKeyValueArraySet, styleStringParser, styles,
false);\n}\n\n/**\n * Parse text as style and add values to KeyValueArray.\n * \n * This code is pulled out to a
separate function so that it can be tree shaken away if it is not\n * needed. It is only referenced from `styleMap`.\n
*\n * @param keyValueArray KeyValueArray to add parsed values to.\n * @param text text to parse.\n * /\nexport
function styleStringParser(keyValueArray: KeyValueArray<any>, text: string): void {\n  for (let i =
parseStyle(text); i >= 0; i = parseStyleNext(text, i)) {\n    styleKeyValueArraySet(keyValueArray,
getLastParsedKey(text), getLastParsedValue(text));\n  }\n}\n\n/**\n * Update class bindings using an object literal
or class-string on an element.\n * \n * This instruction is meant to apply styling via the `[class]="exp"` template
bindings.\n * When classes are applied to the element they will then be updated with\n * respect to any styles/classes
set via `classProp`. If any\n * classes are set to falsy then they will be removed from the element.\n * \n * Note
that the styling instruction will not be applied until `stylingApply` is called.\n * Note that this will the provided
classMap value to the host element if this function is called\n * within a host binding.\n * \n * @param classes A key/value
map or string of CSS classes that will be added to the\n * given element. Any missing classes (that have already
been applied to the element\n * beforehand) will be removed (unset) from the element's list of CSS classes.\n
*\n * @codeGenApi\n * /\nexport function classMap(classes: {[className: string]:
boolean|undefined|null}|string|undefined|\n
null): void {\n  checkStylingMap(keyValueArraySet,
classStringParser, classes, true);\n}\n\n/**\n * Parse text as class and add values to KeyValueArray.\n * \n * This
code is pulled out to a separate function so that it can be tree shaken away
if it is not\n * needed. It is only referenced from `classMap`.\n * \n * @param keyValueArray KeyValueArray to
add parsed values to.\n * @param text text to parse.\n * /\nexport function classStringParser(keyValueArray:
KeyValueArray<any>, text: string): void {\n  for (let i = parseClassName(text); i >= 0; i =
parseClassNameNext(text, i)) {\n    keyValueArraySet(keyValueArray, getLastParsedKey(text), true);\n  }\n}\n\n/**\n
* Common code between `classProp` and `styleProp`.\n * \n * @param prop property name.\n * @param value binding
value.\n * @param suffix suffix for the property (e.g. `em` or `px`)\n * @param
isClassBased `true` if `class` change (`false` if `style`)\n * /\nexport function checkStylingProperty(\n  prop: string,
value: any|NO_CHANGE, suffix: string|undefined|null, isClassBased: boolean): void {\n  const IView =
getLView();\n  const tView = getTView();\n  // Styling instructions use 2 slots per binding.\n  // 1. one for the value /
TStylingKey\n  // 2. one
for the intermittent-value / TStylingRange\n  const bindingIndex = incrementBindingIndex(2);\n  if
(tView.firstUpdatePass) {\n    stylingFirstUpdatePass(tView, prop, bindingIndex, isClassBased);\n  }\n  if (value
!== NO_CHANGE && bindingUpdated(IView, bindingIndex, value)) {\n    const tNode =
tView.data[getSelectedIndex()] as TNode;\n    updateStyling(\n      tView, tNode, IView, IView[RENDERER],
prop,\n      IView[bindingIndex + 1] = normalizeSuffix(value, suffix), isClassBased, bindingIndex);\n  }\n}\n\n/**\n
* Common code between `classMap` and `styleMap`.\n * \n * @param keyValueArraySet (See
`keyValueArraySet` in `"util/array_utils") Gets passed in as a\n * function so that `style` can be processed. This

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is done for tree shaking purposes.\n * @param stringParser Parser used to parse `value` if `string`. (Passed in as
`style` and `class`\n *      have different parsers.)\n * @param value bound value from application\n * @param
isClassBased `true` if `class` change
(`false` if `style`)\n *^\nexport function checkStylingMap(\n  keyValueArraySet: (keyValueArray:
KeyValueArray<any>, key: string, value: any) => void,\n  stringParser: (styleKeyValueArray:
KeyValueArray<any>, text: string) => void,\n  value: any|NO_CHANGE, isClassBased: boolean): void {\n  const
tView = getTView();\n  const bindingIndex = incrementBindingIndex(2);\n  if (tView.firstUpdatePass) {\n
stylingFirstUpdatePass(tView, null, bindingIndex, isClassBased);\n  }\n  const IView = getLView();\n  if (value !==
NO_CHANGE && bindingUpdated(IView, bindingIndex, value)) {\n    // `getSelectedIndex()` should be here
(rather than in instruction) so that it is guarded by the\n    // if so as not to read unnecessarily.\n    const tNode =
tView.data[getSelectedIndex()] as TNode;\n    if (hasStylingInputShadow(tNode, isClassBased) &&
!isInHostBindings(tView, bindingIndex)) {\n      if (ngDevMode) {\n        // verify that if we are shadowing then
`TData` is appropriately marked so that
we skip\n        // processing this binding in styling resolution.\n        const tStylingKey =
tView.data[bindingIndex];\n        assertEquals(\n          Array.isArray(tStylingKey) ? tStylingKey[1] : tStylingKey,
false,\n          `Styling linked list shadow input should be marked as \\`false\\`);\n        }\n        // VE does not
concatenate the static portion like we are doing here.\n        // Instead VE just ignores the static completely if dynamic
binding is present.\n        // Because of locality we have already set the static portion because we don't know if there\n
// is a dynamic portion until later. If we would ignore the static portion it would look like\n        // the binding has
removed it. This would confuse `[ngStyle]`/`[ngClass]` to do the wrong\n        // thing as it would think that the static
portion was removed. For this reason we\n        // concatenate it so that `[ngStyle]`/`[ngClass]` can continue to work
on changed.\n        let staticPrefix = isClassBased ?
tNode.classesWithoutHost : tNode.stylesWithoutHost;\n        ngDevMode && isClassBased === false &&
staticPrefix !== null &&\n        assertEquals(\n          staticPrefix.endsWith(';'), true, `Expecting static portion to
end with \\`;\\`);\n        if (staticPrefix !== null) {\n          // We want to make sure that falsy values of `value` become
empty strings.\n          value = concatStringsWithSpace(staticPrefix, value ? value : '');\n        }\n        // Given `

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uses `@Input('style')` or `@Input('class')` than\n    // we need to neutralize this binding since that directive is
shadowing it.\n    // We turn this into a noop by setting the key to `false`\n    tStylingKey
= false;\n  }\n  tStylingKey = wrapInStaticStylingKey(tData, tNode, tStylingKey, isClassBased);\n
insertTStylingBinding(tData, tNode, tStylingKey, bindingIndex, isHostBindings, isClassBased);\n  } }\n\n**\n
Adds static styling information to the binding if applicable.\n *\n * The linked list of styles not only stores the list
and keys, but also stores static styling\n * information on some of the keys. This function determines if the key
should contain the styling\n * information and computes it.\n *\n * See `TStylingStatic` for more details.\n *\n *
@param tData `TData` where the linked list is stored.\n * @param tNode `TNode` for which the styling is being
computed.\n * @param stylingKey `TStylingKeyPrimitive` which may need to be wrapped into `TStylingKey`\n *
@param isClassBased `true` if `class` (`false` if `style`)\n */\nexport function wrapInStaticStylingKey(\n  tData:
TData, tNode: TNode, stylingKey: TStylingKey, isClassBased: boolean): TStylingKey {\n  const
hostDirectiveDef = getCurrentDirectiveDef(tData);\n  let residual = isClassBased ? tNode.residualClasses :
tNode.residualStyles;\n  if (hostDirectiveDef === null) {\n    // We are in template node.\n    // If template node
already had styling instruction then it has already collected the static\n    // styling and there is no need to collect
them again. We know that we are the first styling\n    // instruction because the `TNode.*Bindings` points to 0
(nothing has been inserted yet).\n    const isFirstStylingInstructionInTemplate =\n      (isClassBased ?
tNode.classBindings : tNode.styleBindings) as any as number === 0;\n    if (isFirstStylingInstructionInTemplate)
{\n      // It would be nice to be able to get the statics from `mergeAttrs`, however, at this point\n      // they are
already merged and it would not be possible to figure which property belongs where\n      // in the priority.\n      stylingKey = collectStylingFromDirectives(null, tData, tNode, stylingKey, isClassBased);\n
      stylingKey = collectStylingFromTAttrs(stylingKey, tNode.attrs, isClassBased);\n      // We know that if we have
styling binding in template we can't have residual.\n      residual = null;\n    } else {\n      // We are in host binding
node and there was no binding instruction in template node.\n      // This means that we need to compute the
residual.\n      const directiveStylingLast = tNode.directiveStylingLast;\n      const
isFirstStylingInstructionInHostBinding =\n        directiveStylingLast === -1 || tData[directiveStylingLast] !==
hostDirectiveDef;\n      if (isFirstStylingInstructionInHostBinding) {\n        stylingKey =\n
collectStylingFromDirectives(hostDirectiveDef, tData, tNode, stylingKey, isClassBased);\n        if (residual === null)
{\n          // - If `null` than either:\n          // - Template styling instruction already ran and it has consumed the static\n
          // styling into its `TStylingKey` and so there is no need to update residual. Instead\n
          // we need to update the `TStylingKey` associated with the first template node\n          // instruction. OR\n
          // - Some other styling instruction ran and determined that there are no residuals\n          let templateStylingKey =
getTemplateHeadTStylingKey(tData, tNode, isClassBased);\n          if (templateStylingKey !== undefined &&
Array.isArray(templateStylingKey)) {\n            // Only recompute if `templateStylingKey` had static values. (If no
static value found\n            // then there is nothing to do since this operation can only produce less static keys, not\n
            // more.)\n            templateStylingKey = collectStylingFromDirectives(\n              null, tData, tNode,
templateStylingKey[1] /* unwrap previous statics */,\n              isClassBased);\n            templateStylingKey =\n
collectStylingFromTAttrs(templateStylingKey, tNode.attrs, isClassBased);\n            setTemplateHeadTStylingKey(tData, tNode, isClassBased, templateStylingKey);\n
          } else {\n            // We only need to recompute residual if it is not `null`. \n            // - If existing residual
(implies there was no template styling). This means that some of\n            // the statics may have moved from the
residual to the `stylingKey` and so we have to\n            // recompute.\n            // - If `undefined` this is the first time we
are running.\n            residual = collectResidual(tData, tNode, isClassBased);\n          } }\n        }\n      } if (residual !==
undefined) {\n        isClassBased ? (tNode.residualClasses = residual) : (tNode.residualStyles = residual);\n      }\n      return
stylingKey;\n    }\n  }\n\n**\n
Retrieve the `TStylingKey` for the template styling instruction.\n *\n * This is needed
since `hostBinding` styling instructions are inserted after the template\n * instruction. While the template instruction
needs to update the residual in `TNode` the\n * `hostBinding` instructions need to update the `TStylingKey` of the
template instruction because\n * the template

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instruction is downstream from the `hostBindings` instructions.  
 \* @param tData `TData` where the linked list is stored.  
 \* @param tNode `TNode` for which the styling is being computed.  
 \* @param isClassBased `true` if `class` (`false` if `style`)  
 \* @return `TStylingKey` if found or `undefined` if not found.  
 \* \nfunction  
 getTemplateHeadTStylingKey(tData: TData, tNode: TNode, isClassBased: boolean): TStylingKey | undefined  
 {\n const bindings = isClassBased ? tNode.classBindings : tNode.styleBindings;\n if  
 (getTStylingRangeNext(bindings) === 0) {\n // There does not seem to be a styling instruction in the `template`.\n  
 return undefined;\n }\n return tData[getTStylingRangePrev(bindings)] as TStylingKey;\n}\n\n/\*\*\n \* Update the  
 `TStylingKey` of the first template instruction in `TNode`.\n \* \n \* Logically `hostBindings` styling instructions are  
 of lower priority than that of the template.\n \* However, they execute after the template styling instructions. This  
 means that they get inserted  
 \* in front of the template styling instructions.\n \* \n \* If we have a template styling  
 instruction and a new `hostBindings` styling instruction is  
 \* executed it means that it may need to steal static fields  
 from the template instruction. This  
 \* method allows us to update the first template instruction `TStylingKey` with  
 a new value.\n \* \n \* Assume:\n \* ```\n \* <div my-dir style="color: red" [style.color]="tmplExp"></div>\n \* \n \* @Directive({\n \* host: {\n \* 'style': 'width: 100px',\n \* '[style.color]': 'dirExp',\n \* } \n \* })\n \* class MyDir  
 {\n \* ```\n \* \n \* when `[style.color]="tmplExp"` executes it creates this data structure.\n \* ```\n \* [\n \* 'color',  
 'color', 'red', 'width', '100px'],\n \* ```\n \* \n \* The reason for this is that the template instruction does not know if there  
 are styling  
 \* instructions and must assume that there are none and must collect all of the static styling.\n \* (both  
 \* `color` and `width`)\n \* \n \*

When `[style.color]: 'dirExp',` executes we need to insert a new data into the linked list.  
 \* ```\n \* [\n \* 'color',  
 'width', '100px'], // newly inserted  
 \* [\n \* 'color', 'color', 'red', 'width', '100px'], // this is wrong  
 \* ```\n \* \n \* Notice  
 that the template statics is now wrong as it incorrectly contains `width` so we need to  
 \* update it like so:  
 \* ```\n \* [\n \* 'color', 'width', '100px'],\n \* [\n \* 'color', 'color', 'red'], // UPDATE  
 \* ```\n \* \n \* @param tData `TData` where  
 the linked list is stored.  
 \* @param tNode `TNode` for which the styling is being computed.  
 \* @param  
 isClassBased `true` if `class` (`false` if `style`)  
 \* @param tStylingKey New `TStylingKey` which is replacing the  
 old one.  
 \* \nfunction setTemplateHeadTStylingKey(\n tData: TData, tNode: TNode, isClassBased: boolean,  
 tStylingKey: TStylingKey): void {\n const bindings = isClassBased ? tNode.classBindings : tNode.styleBindings;\n  
 ngDevMode &&\n assertNotEqual(\n getTStylingRangeNext(bindings),  
 0,\n 'Expecting to have at least one template styling binding.);\n tData[getTStylingRangePrev(bindings)] =  
 tStylingKey;\n}\n\n/\*\*\n \* Collect all static values after the current `TNode.directiveStylingLast` index.  
 \* \n \* Collect the remaining styling information which has not yet been collected by an existing  
 \* styling instruction.  
 \* \n \* @param tData `TData` where the `DirectiveDefs` are stored.  
 \* @param tNode `TNode` which contains the  
 directive range.  
 \* @param isClassBased `true` if `class` (`false` if `style`)  
 \* \nfunction collectResidual(tData:  
 TData, tNode: TNode, isClassBased: boolean): KeyValueArray<any> | null {\n let residual:  
 KeyValueArray<any> | null | undefined = undefined;\n const directiveEnd = tNode.directiveEnd;\n ngDevMode  
 &&\n assertNotEqual(\n tNode.directiveStylingLast, -1,\n 'By the time this function gets called at  
 least one hostBindings-node styling instruction must have executed.);\n // We  
 add `1 + tNode.directiveStart` because we need to skip the current directive (as we are  
 // collecting things after  
 the last `hostBindings` directive which had a styling instruction.)\n for (let i = 1 + tNode.directiveStylingLast; i <  
 directiveEnd; i++) {\n const attrs = (tData[i] as DirectiveDef<any>).hostAttrs;\n residual =  
 collectStylingFromTAttrs(residual, attrs, isClassBased) as KeyValueArray<any> | null;\n }\n return  
 collectStylingFromTAttrs(residual, tNode.attrs, isClassBased) as KeyValueArray<any> | null;\n}\n\n/\*\*\n \* Collect  
 the static styling information with lower priority than `hostDirectiveDef`.\n \* \n \* (This is opposite of residual  
 styling.)  
 \* \n \* @param hostDirectiveDef `DirectiveDef` for which we want to collect lower priority static  
 \* styling. (Or `null` if template styling)  
 \* @param tData `TData` where the linked list is stored.  
 \* @param tNode  
 `TNode` for which the styling is being computed.  
 \* @param stylingKey Existing `TStylingKey` to update  
 or wrap.  
 \* @param isClassBased `true` if `class` (`false` if `style`)  
 \* \nfunction collectStylingFromDirectives(\n hostDirectiveDef: DirectiveDef<any> | null, tData: TData, tNode: TNode, stylingKey: TStylingKey,\n  
 isClassBased: boolean): TStylingKey {\n // We need to loop because there can be directives which have `hostAttrs`

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but don't have\n // `hostBindings` so this loop catches up to the current directive.\n let currentDirective:
DirectiveDef<any>|null = null;\n const directiveEnd = tNode.directiveEnd;\n let directiveStylingLast =
tNode.directiveStylingLast;\n if (directiveStylingLast === -1) {\n directiveStylingLast = tNode.directiveStart;\n
} else {\n directiveStylingLast++;\n }\n while (directiveStylingLast < directiveEnd) {\n currentDirective =
tData[directiveStylingLast] as DirectiveDef<any>;\n ngDevMode && assertDefined(currentDirective, 'expected
to be defined');\n stylingKey = collectStylingFromTAttrs(stylingKey, currentDirective.hostAttrs,
isClassBased);\n if (currentDirective === hostDirectiveDef) break;\n directiveStylingLast++;\n }\n if
(hostDirectiveDef !== null) {\n // we only advance the styling cursor if we are collecting data from host
bindings.\n // Template executes before host bindings and so if we would update the index,\n // host bindings
would not get their statics.\n tNode.directiveStylingLast = directiveStylingLast;\n }\n return
stylingKey;\n}\n\n/**\n * Convert `TAttrs` into `TStylingStatic`.\n *\n * @param stylingKey existing
`TStylingKey` to update or wrap.\n *\n * @param attrs `TAttributes` to process.\n *\n * @param isClassBased `true` if
`class` (`false` if `style`)\n *\n * @param collectStylingFromTAttrs(\n stylingKey: TStylingKey|undefined, attrs:
TAttributes|null,\n isClassBased: boolean): TStylingKey {\n const desiredMarker = isClassBased ?
AttributeMarker.Classes : AttributeMarker.Styles;\n let currentMarker = AttributeMarker.ImplicitAttributes;\n if
(attrs !== null) {\n
for (let i = 0; i < attrs.length; i++) {\n const item = attrs[i] as number | string;\n if (typeof item ===
'number') {\n currentMarker = item;\n } else {\n if (currentMarker === desiredMarker) {\n if
(!Array.isArray(stylingKey)) {\n stylingKey = stylingKey === undefined ? [] : [", stylingKey] as any;\n
}\n keyValueArraySet(\n stylingKey as KeyValueArray<any>, item, isClassBased ? true :
attrs[++i]);\n }\n }\n }\n return stylingKey === undefined ? null : stylingKey;\n}\n\n/**\n * Convert
user input to `KeyValueArray`.\n *\n * This function takes user input which could be `string`, Object literal, or
iterable and converts\n * it into a consistent representation. The output of this is `KeyValueArray` (which is an
array\n * where\n * even indexes contain keys and odd indexes contain values for those keys).\n *\n * The
advantage of converting to `KeyValueArray` is that we can perform
diff in an input\n * independent\n * way.\n * (ie we can compare `foo bar` to `[bar, baz]` and determine a set of
changes which need to be\n * applied)\n *\n * The fact that `KeyValueArray` is sorted is very important because it
allows us to compute the\n * difference in linear fashion without the need to allocate any additional data.\n *\n * For
example if we kept this as a `Map` we would have to iterate over previous `Map` to determine\n * which values
need to be deleted, over the new `Map` to determine additions, and we would have to\n * keep additional `Map` to
keep track of duplicates or items which have not yet been visited.\n *\n * @param keyValueArraySet (See
`keyValueArraySet` in `util/array_utils`) Gets passed in as a\n * function so that `style` can be processed. This
is done\n * for tree shaking purposes.\n *\n * @param stringParser The parser is passed in so that it will be tree
shakable. See\n * `styleStringParser` and `classStringParser`\n *\n * @param
value The value to parse/convert to `KeyValueArray`\n *\n * @export function toStylingKeyValueArray(\n
keyValueArraySet: (keyValueArray: KeyValueArray<any>, key: string, value: any) => void,\n stringParser:
(styleKeyValueArray: KeyValueArray<any>, text: string) => void,\n value: string|string[]|{[key: string]:
any}|SafeValue|null|undefined): KeyValueArray<any> {\n if (value == null || value === undefined || value ===
") return EMPTY_ARRAY as any;\n const styleKeyValueArray: KeyValueArray<any> = [] as any;\n const
unwrappedValue = unwrapSafeValue(value) as string | string[] | {[key: string]: any};\n if
(Array.isArray(unwrappedValue)) {\n for (let i = 0; i < unwrappedValue.length; i++) {\n
keyValueArraySet(styleKeyValueArray, unwrappedValue[i], true);\n }\n } else if (typeof unwrappedValue ===
'object') {\n for (const key in unwrappedValue) {\n if (unwrappedValue.hasOwnProperty(key)) {\n
keyValueArraySet(styleKeyValueArray, key, unwrappedValue[key]);\n
}\n }\n } else if (typeof unwrappedValue === 'string') {\n stringParser(styleKeyValueArray,
unwrappedValue);\n } else {\n ngDevMode &&\n throwError('Unsupported styling type ' + typeof
unwrappedValue + ': ' + unwrappedValue);\n }\n return styleKeyValueArray;\n}\n\n/**\n * Set a `value` for a
`key`.\n *\n * See: `keyValueArraySet` for details\n *\n * @param keyValueArray KeyValueArray to add to.\n *

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@param key Style key to add.\n \* @param value The value to set.\n \*/\nexport function styleKeyValuePairSet(keyValuePair: KeyValuePair<any>, key: string, value: any) {\n keyValuePairSet(keyValuePair, key, unwrapSafeValue(value));\n}\n\n/\*\*\n \* Update map based styling.\n \*\n \* Map based styling could be anything which contains more than one binding. For example `string`,\n \* or object literal. Dealing with all of these types would complicate the logic so\n \* instead this function expects that the complex input is first converted into normalized\n \* `KeyValuePair`.

The advantage of normalization is that we get the values sorted, which makes it\n \* very cheap to compute deltas between the previous and current value.\n \*\n \* @param tView Associated `TVIEW.data` contains the linked list of binding priorities.\n \* @param tNode `TNode` where the binding is located.\n \* @param lView `LView` contains the values associated with other styling binding at this `TNode`.\n \* @param renderer Renderer to use if any updates.\n \* @param oldKeyValuePair Previous value represented as `KeyValuePair`\n \* @param newKeyValuePair Current value represented as `KeyValuePair`\n \* @param isClassBased `true` if `class` (`false` if `style`)\n \* @param bindingIndex Binding index of the binding.\n \*/\nfunction updateStylingMap(\n tView: TVIEW, tNode: TNode, lView: LView, renderer: Renderer,\n oldKeyValuePair: KeyValuePair<any>,\n newKeyValuePair: KeyValuePair<any>,\n isClassBased: boolean, bindingIndex: number) {\n if (oldKeyValuePair as KeyValuePair<any> |

NO\_CHANGE === NO\_CHANGE) {\n // On first execution the oldKeyValuePair is NO\_CHANGE => treat it as empty KeyValuePair.\n oldKeyValuePair = EMPTY\_ARRAY as any;\n }\n let oldIndex = 0;\n let newIndex = 0;\n let oldKey: string|null = 0 < oldKeyValuePair.length ? oldKeyValuePair[0] : null;\n let newKey: string|null = 0 < newKeyValuePair.length ? newKeyValuePair[0] : null;\n while (oldKey !== null || newKey !== null) {\n ngDevMode && assertLessThan(oldIndex, 999, 'Are we stuck in infinite loop?');\n ngDevMode && assertLessThan(newIndex, 999, 'Are we stuck in infinite loop?');\n const oldValue =\n oldIndex < oldKeyValuePair.length ? oldKeyValuePair[oldIndex + 1] : undefined;\n const newValue =\n newIndex < newKeyValuePair.length ? newKeyValuePair[newIndex + 1] : undefined;\n let setKey: string|null = null;\n let setValue: any = undefined;\n if (oldKey === newKey) {\n // UPDATE: Keys are equal => new value is overwriting

old value.\n oldIndex += 2;\n newIndex += 2;\n if (oldValue !== newValue) {\n setKey = newKey;\n setValue = newValue;\n } else if (newKey === null || oldKey !== null && oldKey < newKey!) {\n // DELETE: oldKey key is missing or we did not find the oldKey in the newValue\n // (because the keyValuePair is sorted and `newKey` is found later alphabetically).\n // `\"background\" < \"color\"` so we need to delete `\"background\"` because it is not found in the\n // new array.\n oldIndex += 2;\n setKey = oldKey;\n } else {\n // CREATE: newKey's is earlier alphabetically than oldKey's (or no oldKey) => we have new key.\n // `\"color\" > \"background\"` so we need to add `color` because it is in new array but not in\n // old array.\n ngDevMode && assertDefined(newKey, 'Expecting to have a valid key');\n newIndex += 2;\n setKey = newKey;\n setValue = newValue;\n }\n if (setKey !==

null) {\n updateStyling(tView, tNode, lView, renderer, setKey, setValue, isClassBased, bindingIndex);\n }\n oldKey = oldIndex < oldKeyValuePair.length ? oldKeyValuePair[oldIndex] : null;\n newKey = newIndex < newKeyValuePair.length ? newKeyValuePair[newIndex] : null;\n }\n}\n\n/\*\*\n \* Update a simple (property name) styling.\n \*\n \* This function takes `prop` and updates the DOM to that value. The function takes the binding\n \* value as well as binding priority into consideration to determine which value should be written\n \* to DOM. (For example it may be determined that there is a higher priority overwrite which blocks\n \* the DOM write, or if the value goes to `undefined` a lower priority overwrite may be consulted.)\n \*\n \* @param tView Associated `TVIEW.data` contains the linked list of binding priorities.\n \* @param tNode `TNode` where the binding is located.\n \* @param lView `LView` contains the values associated with other styling binding at this `TNode`.\n \* @param renderer Renderer to use if any updates.\n \* @param prop Either style property name or a class name.\n \* @param value Either style value for `prop` or `true`/`false` if `prop` is class.\n \* @param isClassBased `true` if `class` (`false` if `style`)\n \* @param bindingIndex Binding index of the binding.\n \*/\nfunction updateStyling(\n tView: TVIEW, tNode: TNode, lView: LView, renderer: Renderer, prop: string,\n value:

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string|undefined|null|boolean, isClassBased: boolean, bindingIndex: number) {\n if (!(tNode.type &
TNodeType.AnyRNode)) {\n // It is possible to have styling on non-elements (such as ng-container).\n // This is
rare, but it does happen. In such a case, just ignore the binding.\n return;\n }\n const tData = tView.data;\n const
tRange = tData[bindingIndex + 1] as TStylingRange;\n const higherPriorityValue =
getTStylingRangeNextDuplicate(tRange) ?\n findStylingValue(tData, tNode, IView, prop,
getTStylingRangeNext(tRange), isClassBased) :\n
undefined;\n if (!isStylingValuePresent(higherPriorityValue)) {\n // We don't have a next duplicate, or we did
not find a duplicate value.\n if (!isStylingValuePresent(value)) {\n // We should delete current value or restore
to lower priority value.\n if (getTStylingRangePrevDuplicate(tRange)) {\n // We have a possible prev
duplicate, let's retrieve it.\n value = findStylingValue(tData, null, IView, prop, bindingIndex, isClassBased);\n
}\n }\n const rNode = getNativeByIndex(getSelectedIndex(), IView) as RElement;\n applyStyling(renderer,
isClassBased, rNode, prop, value);\n }\n}\n\n/**\n * Search for styling value with higher priority which is
overwriting current value, or a\n * value of lower priority to which we should fall back if the value is `undefined`.\n
*\n * When value is being applied at a location, related values need to be consulted.\n * - If there is a higher priority
binding, we should be using that one instead.\n * For example
`<div [style]="{color:exp1}" [style.color]="exp2">` change to `exp1`\n * requires that we check `exp2` to see
if it is set to value other than `undefined`.\n * - If there is a lower priority binding and we are changing to
`undefined`\n * For example `<div [style]="{color:exp1}" [style.color]="exp2">` change to `exp2` to\n
* `undefined` requires that we check `exp1` (and static values) and use that as new value.\n *\n * NOTE: The styling
stores two values.\n * 1. The raw value which came from the application is stored at `index + 0` location. (This
value\n * is used for dirty checking).\n * 2. The normalized value is stored at `index + 1`.\n *\n * @param tData
`TData` used for traversing the priority.\n * @param tNode `TNode` to use for resolving static styling. Also controls
search direction.\n * - `TNode` search next and quit as soon as `isStylingValuePresent(value)` is true.\n * If no
value found consult `tNode.residualStyle`/`tNode.residualClass` for default
value.\n * - `null` search prev and go all the way to end. Return last value where\n *
`isStylingValuePresent(value)` is true.\n * @param IView `LView` used for retrieving the actual values.\n *
@param prop Property which we are interested in.\n * @param index Starting index in the linked list of styling
bindings where the search should start.\n * @param isClassBased `true` if `class` (`false` if `style`)\n */\nfunction
findStylingValue(\n tData: TData, tNode: TNode|null, IView: LView, prop: string, index: number,\n
isClassBased: boolean): any {\n // `TNode` to use for resolving static styling. Also controls search direction.\n // -
`TNode` search next and quit as soon as `isStylingValuePresent(value)` is true.\n // If no value found consult
`tNode.residualStyle`/`tNode.residualClass` for default value.\n // - `null` search prev and go all the way to end.
Return last value where\n // `isStylingValuePresent(value)` is true.\n const isPrevDirection =
tNode === null;\n let value: any = undefined;\n while (index > 0) {\n const rawKey = tData[index] as
TStylingKey;\n const containsStatics = Array.isArray(rawKey);\n // Unwrap the key if we contain static
values.\n const key = containsStatics ? (rawKey as string[])[1] : rawKey;\n const isStylingMap = key === null;\n
let valueAtLViewIndex = IView[index + 1];\n if (valueAtLViewIndex === NO_CHANGE) {\n // In
firstUpdatePass the styling instructions create a linked list of styling.\n // On subsequent passes it is possible for a
styling instruction to try to read a binding\n // which\n // has not yet executed. In that case we will find
`NO_CHANGE` and we should assume that\n // we have `undefined` (or empty array in case of styling-map
instruction) instead. This\n // allows the resolution to apply the value (which may later be overwritten when the\n
// binding actually executes.)\n valueAtLViewIndex = isStylingMap ? EMPTY_ARRAY
:\n undefined;\n }\n let currentValue = isStylingMap ? keyValueArrayGet(valueAtLViewIndex, prop) :\n
(key === prop ? valueAtLViewIndex : undefined);\n if (containsStatics &&
!isStylingValuePresent(currentValue)) {\n currentValue = keyValueArrayGet(rawKey as KeyValueArray<any>,
prop);\n }\n if (isStylingValuePresent(currentValue)) {\n value = currentValue;\n if (isPrevDirection) {\n
return value;\n }\n }\n const tRange = tData[index + 1] as TStylingRange;\n index = isPrevDirection ?
getTStylingRangePrev(tRange) : getTStylingRangeNext(tRange);\n }\n if (tNode !== null) {\n // in case where

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we are going in next direction AND we did not find anything, we need to\n // consult residual styling\n let
residual = isClassBased ? tNode.residualClasses : tNode.residualStyles;\n if (residual != null /** OR residual !==
undefined */) {\n value = keyValueArrayGet(residual!, prop);\n } }\n
return value;\n}\n\n/**\n * Determines if the binding value should be used (or if the value is 'undefined' and hence
priority\n * resolution should be used.)\n * \n * @param value Binding style value.\n */\nfunction
isStylingValuePresent(value: any): boolean {\n // Currently only `undefined` value is considered non-binding. That
is `undefined` says I don't\n // have an opinion as to what this binding should be and you should consult other
bindings by\n // priority to determine the valid value.\n // This is extracted into a single function so that we have a
single place to control this.\n return value !== undefined;\n}\n\n/**\n * Normalizes and/or adds a suffix to the
value.\n * \n * If value is `null`/`undefined` no suffix is added\n * @param value\n * @param suffix\n */\nfunction
normalizeSuffix(value: any, suffix: string|undefined|null): string|null|undefined|boolean {\n if (value === null /** ||
value === undefined */) {\n // do nothing\n } else if (typeof suffix === 'string')
{\n value = value + suffix;\n } else if (typeof value === 'object') {\n value =
stringify(unwrapSafeValue(value));\n } }\n return value;\n}\n\n\n/**\n * Tests if the `TNode` has input shadow.\n
*\n * An input shadow is when a directive steals (shadows) the input by using `@Input('style')` or\n *
`@Input('class')` as input.\n * \n * @param tNode `TNode` which we would like to see if it has shadow.\n * @param
isClassBased `true` if `class` (`false` if `style`)\n */\nexport function hasStylingInputShadow(tNode: TNode,
isClassBased: boolean) {\n return (tNode.flags & (isClassBased ? TNodeFlags.hasClassInput :
TNodeFlags.hasStyleInput)) !== 0;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\nimport {assertEqual, assertIndexInRange} from '../util/assert';\nimport
{TElementNode, TNodeType} from '../interfaces/node';\nimport
{HEADER_OFFSET, RENDERER, T_HOST} from '../interfaces/view';\nimport {appendChild, createTextNode}
from '../node_manipulation';\nimport {getBindingIndex, getLView, getTView, setCurrentTNode} from
'../state';\nimport {getOrCreateTNode} from './shared';\n\n\n/**\n * Create static text node\n * \n * @param
index Index of the node in the data array\n * @param value Static string value to write.\n * \n * @codeGenApi\n
*/\nexport function text(index: number, value: string = ""): void {\n const lView = getLView();\n const tView =
getTView();\n const adjustedIndex = index + HEADER_OFFSET;\n\n ngDevMode &&\n assertEqual(\n
getBindingIndex(), tView.bindingStartIndex,\n 'text nodes should be created before any bindings');\n\n
ngDevMode && assertIndexInRange(lView, adjustedIndex);\n\n const tNode = tView.firstCreatePass ?\n
getOrCreateTNode(tView, adjustedIndex, TNodeType.Text, value, null) :\n tView.data[adjustedIndex] as
TElementNode;\n\n const textNative
= lView[adjustedIndex] = createTextNode(lView[RENDERER], value);\n appendChild(tView, lView, textNative,
tNode);\n\n // Text nodes are self closing.\n setCurrentTNode(tNode, false);\n}\n\n",/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\nimport {getLView, getSelectedIndex} from
'../state';\nimport {NO_CHANGE} from './tokens';\nimport {interpolation1, interpolation2, interpolation3,
interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from
'./interpolation';\nimport {textBindingInternal} from './shared';\n\n\n/**\n * Update text content with a lone
bound value\n * \n * Used when a text node has 1 interpolated value in it, an no additional text\n * surrounds that
interpolated value.\n * \n * ```html\n * <div>{v0}</div>\n * ```\n * \n * Its compiled representation is:\n
*\n * ```ts\n * textInterpolate(v0);\n * ```\n * \n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n
*/\n * @codeGenApi\n */\nexport function textInterpolate(v0: any): typeof textInterpolate {\n textInterpolate1("", v0,
");\n return textInterpolate;\n}\n\n\n\n/**\n * Update text content with single bound value surrounded by other
text.\n * \n * Used when a text node has 1 interpolated value in it:\n * \n * ```html\n *
<div>prefix{v0}suffix</div>\n * ```\n * \n * Its compiled representation is:\n * \n * ```ts\n *
textInterpolate1('prefix', v0, 'suffix');\n * ```\n * \n * @returns itself, so that it may be chained.\n * @see
textInterpolateV\n * @codeGenApi\n */\nexport function textInterpolate1(\n prefix: string, v0: any, suffix: string):

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typeof textInterpolate1 {\n  const IView = getLView();\n  const interpolated = interpolation1(IView, prefix, v0,
suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated
as string);\n  }\n  return textInterpolate1;\n}\n\n/**\n * Update text content with 2 bound values surrounded by
other text.\n * Used when a text node has 2 interpolated values in it:\n * ```html\n * <div>prefix{{v0}}-
{{v1}}suffix</div>\n * ```\n * Its compiled representation is:\n * ```ts\n * textInterpolate2('prefix', v0, '-', v1,
'suffix');\n * ```\n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n
*/\nexport function textInterpolate2(\n  prefix: string, v0: any, i0: string, v1: any, suffix: string): typeof
textInterpolate2 {\n  const IView = getLView();\n  const interpolated = interpolation2(IView, prefix, v0, i0, v1,
suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as
string);\n  }\n  return textInterpolate2;\n}\n\n/**\n * Update text content with 3 bound values surrounded by
other text.\n * Used when a text node has 3 interpolated values
in it:\n * ```html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}suffix</div>\n * ```\n * Its compiled representation
is:\n * ```ts\n * textInterpolate3(\n * 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ```\n * @returns itself, so that it may
be chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function textInterpolate3(\n  prefix: string,
v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string,
suffix: string): typeof textInterpolate3 {\n  const IView =
getLView();\n  const interpolated = interpolation3(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5,
suffix);\n  if (interpolated !==
NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return
textInterpolate3;\n}\n\n/**\n * Update text content with 4 bound values surrounded by other text.\n * Used
when a text node has 4 interpolated values in it:\n * ```html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}-
{{v3}}suffix</div>\n * ```\n * Its compiled representation is:\n *
```ts\n * textInterpolate4(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ```\n * @returns itself, so that it may be
chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function textInterpolate4(\n  prefix: string, v0:
any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string,
v6: any, i6: string, v7: any, i7: string, v8: any, i8: string, v9: any, i9: string, suffix: string): typeof textInterpolate4 {\n
const IView = getLView();\n  const interpolated = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5,
v6, i6, v7, i7, v8, i8, v9, i9, suffix);\n  if
(interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n
return textInterpolate4;\n}\n\n/**\n * Update text content with 5 bound values surrounded by other text.\n * Used
when a text node has 5 interpolated values in it:\n * ```html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}-
{{v3}}-{{v4}}suffix</div>\n * ```\n * Its compiled representation is:\n *
```ts\n * textInterpolate5(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, 'suffix');\n * ```\n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n
*/\nexport function textInterpolate5(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3:
any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, i7: string, v8: any, i8: string,
v9: any, i9: string, v10: any, i10: string, suffix: string): typeof textInterpolate5 {\n  const IView = getLView();\n
const interpolated = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, i7, v8, i8,
v9, i9, v10, i10, suffix);\n  if (interpolated !==
NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return
textInterpolate5;\n}\n\n/**\n * Update text content with 6 bound values surrounded by other text.\n * Used
when a text node has 6 interpolated values in it:\n * ```html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}-{{v5}}suffix</div>\n * ```\n * Its compiled representation is:\n *
```ts\n * textInterpolate6(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n * ```\n *
@param i4 Static value used for concatenation only.\n * @param v5 Value checked for change. @returns
itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n */\nexport function
textInterpolate6(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string,
v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, i7: string, v8: any, i8: string, v9: any, i9: string,
v10: any, i10: string, v11: any, i11: string, v12: any, i12: string, v13: any, i13: string, v14: any, i14: string, v15: any,
i15: string, suffix: string): typeof textInterpolate6 {\n  const IView = getLView();\n  const
interpolated =\n    interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, i7, v8, i8,
v9, i9, v10, i10, v11, i11, v12, i12, v13, i13, v14, i14, v15, i15, suffix);\n  if (interpolated
!== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return
textInterpolate6;\n}\n\n/**\n * Update text content with 7 bound values surrounded by other text.\n * Used
when a text node has 7 interpolated values in it:\n * ```html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-
{{v4}}-{{v5}}-{{v6}}suffix</div>\n * ```\n * Its compiled representation is:\n *

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* ``ts\n * textInterpolate7(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ``\n * @returns
itself, so that it may be chained.\n * @see textInterpolateV\n * @codeGenApi\n * ^\nexport function
textInterpolate7(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  i3: string,
v4: any, i4: string, v5: any, i5: string, v6: any,\n  suffix: string): typeof textInterpolate7 {\n  const IView =
getLView();\n  const interpolated =\n    interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6,
suffix);\n  if (interpolated !== NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as
string);\n  }\n  return textInterpolate7;\n}\n\n/**\n * \n * Update text content with 8 bound values surrounded by
other text.\n * \n * Used when a text node has 8 interpolated values in it:\n * \n * ``html\n * <div>prefix{{v0}}-
{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix</div>\n
* ``\n * \n * Its compiled representation is:\n * \n * ``ts\n * textInterpolate8(\n * 'prefix', v0, '-', v1, '-', v2, '-', v3, '-',
v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * ``\n * \n * @returns itself, so that it may be chained.\n * @see textInterpolateV\n *
@codeGenApi\n * ^\nexport function textInterpolate8(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2:
any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n  suffix:
string): typeof textInterpolate8 {\n  const IView = getLView();\n  const interpolated = interpolation8(\n    IView,
prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n  if (interpolated !== NO_CHANGE) {\n
textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return textInterpolate8;\n}\n\n/**\n * \n * Update text content with 9 or more bound values other surrounded by text.\n * \n * Used when the number of
interpolated
values exceeds 8.\n * \n * ``html\n * <div>prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-
{{v8}}-{{v9}}suffix</div>\n * ``\n * \n * Its compiled representation is:\n * \n * ``ts\n * textInterpolateV(\n *
['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9,\n * 'suffix']);\n * ``\n * \n * @param values The
collection of values and the strings in between those values, beginning with\n * a string prefix and ending with a
string suffix.\n * (e.g. `[prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n * \n * @returns itself, so that it
may be chained.\n * @codeGenApi\n * ^\nexport function textInterpolateV(values: any[]): typeof textInterpolateV
{\n  const IView = getLView();\n  const interpolated = interpolationV(IView, values);\n  if (interpolated !==
NO_CHANGE) {\n    textBindingInternal(IView, getSelectedIndex(), interpolated as string);\n  }\n  return
textInterpolateV;\n}\n\n", /**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n * \n\nimport {keyValueArraySet} from
'../util/array_utils';\nimport {getLView} from '../state';\nimport {interpolation1, interpolation2, interpolation3,
interpolation4, interpolation5, interpolation6, interpolation7, interpolation8, interpolationV} from
'/interpolation';\nimport {checkStylingMap, classStringParser} from './styling';\n\n\n/**\n * \n * Update an
interpolated class on an element with single bound value surrounded by text.\n * \n * Used when the value passed to
a property has 1 interpolated value in it:\n * \n * ``html\n * <div class="prefix{{v0}}suffix"></div>\n * ``\n * \n * Its compiled representation is:\n * \n * ``ts\n * classMapInterpolate1('prefix', v0, 'suffix');\n * ``\n * \n * @param
prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param
suffix Static value used for concatenation only.\n * @codeGenApi\n * ^\nexport function
classMapInterpolate1(prefix: string, v0: any, suffix: string): void {\n  const IView = getLView();\n  const
interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n  checkStylingMap(keyValueArraySet,
classStringParser, interpolatedValue, true);\n}\n\n/**\n * \n * Update an interpolated class on an element with 2
bound values surrounded by text.\n * \n * Used when the value passed to a property has 2 interpolated values in it:\n
* \n * ``html\n * <div class="prefix{{v0}}-{{v1}}suffix"></div>\n * ``\n * \n * Its compiled representation is:\n
* \n * ``ts\n * classMapInterpolate2('prefix', v0, '-', v1, 'suffix');\n * ``\n * \n * @param prefix Static value used for
concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation
only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@codeGenApi\n
* ^\nexport function classMapInterpolate2(\n  prefix: string, v0: any, i0: string, v1: any, suffix: string): void {\n
const IView = getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n}

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checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n\n/**\n *\n * Update an interpolated class on an element with 3 bound values surrounded by text.\n *\n * Used when the value passed to a property has 3 interpolated values in it:\n *\n * ```html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * classMapInterpolate3(\n *   'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ```\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n * ^\nexport function classMapInterpolate3(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): void {\n  const IView = getLView();\n  const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n\n}\n\n/**\n *\n * Update an interpolated class on an element with 4 bound values surrounded by text.\n *\n * Used when the value passed to a property has 4 interpolated values in it:\n *\n * ```html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * classMapInterpolate4(\n *   'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n * ```\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n * ^\nexport function classMapInterpolate4(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  suffix: string): void {\n  const IView = getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n\n}\n\n/**\n *\n * Update an interpolated class on an element with 5 bound values surrounded by text.\n *\n * Used when the value passed to a property has 5 interpolated values in it:\n *\n * ```html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * classMapInterpolate5(\n *   'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n * ```\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n * ^\nexport function classMapInterpolate5(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  i3: string, v4: any, suffix: string): void {\n  const IView = getLView();\n  const interpolatedValue = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n\n}\n\n/**\n *\n * Update an interpolated class on an element with 6 bound values surrounded by text.\n *\n * Used when the value passed to a property has 6 interpolated values in it:\n *\n * ```html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n * classMapInterpolate6(\n *   'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, 'suffix');\n * ```\n *\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n * ^\nexport function classMapInterpolate6(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any,\n  i3: string, v4: any, i4: string, v5: any, suffix: string): void {\n  const IView =

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getLView();\n const interpolatedValue =\n  interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5,
suffix);\n checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n *\n * Update an interpolated class on an element with 7 bound values surrounded by text.\n *\n * Used when the value
passed to a property has 7 interpolated values in it:\n *\n * ```html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-
{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n *
```ts\n * classMapInterpolate7(\n *   'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n * ```\n *\n *
@param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0
Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1 Static value
used for concatenation only.\n * @param v2 Value checked for change.\n * @param i2 Static value used for
concatenation only.\n * @param v3 Value checked for change.\n * @param i3 Static value used for concatenation
only.\n * @param v4 Value checked for change.\n * @param i4 Static value used for concatenation only.\n *
@param v5 Value checked for change.\n * @param i5 Static value used for concatenation only.\n * @param v6
Value checked for change.\n * @param suffix Static value used for concatenation only.\n * @codeGenApi\n
*\n * \nexport function classMapInterpolate7(\n  prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any,
i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n  const IView
= getLView();\n  const interpolatedValue =\n    interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5,
i5, v6, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n *\n * Update an interpolated class on an element with 8 bound values surrounded by text.\n *\n * Used when the value
passed to a property has 8 interpolated values in it:\n *\n * ```html\n * <div class="prefix{{v0}}-{{v1}}-{{v2}}-
{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n *
```ts\n * classMapInterpolate8(\n *   'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, 'suffix');\n * ```\n *\n *
@param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param i0
Static value used for concatenation only.\n *\n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.\n * @param v2
Value checked for change.\n * @param i2 Static value used for concatenation only.\n * @param v3 Value checked
for change.\n * @param i3 Static value used for concatenation only.\n * @param v4 Value checked for change.\n *
@param i4 Static value used for concatenation only.\n * @param v5 Value checked for change.\n * @param i5
Static value used for concatenation only.\n * @param v6 Value checked for change.\n * @param i6 Static value
used for concatenation only.\n * @param v7 Value checked for change.\n * @param suffix Static value used for
concatenation only.\n * @codeGenApi\n
*\n * \nexport function classMapInterpolate8(\n  prefix: string, v0: any, i0:
string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6:
string, v7: any, suffix: string): void {\n  const IView = getLView();\n  const interpolatedValue
= interpolation8(\n    IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n/**\n *\n * Update an
interpolated class on an element with 9 or more bound values surrounded by text.\n *\n * Used when the number of
interpolated values exceeds 8.\n *\n * ```html\n * <div\n *   class="prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-
{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix"></div>\n * ```\n *\n * Its compiled representation is:\n *\n *
```ts\n * classMapInterpolateV(\n *   ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6, '-', v7, '-', v9, \n * 'suffix'];\n * );\n * ```\n *\n *
@param values The collection of values and the strings in-between those values, beginning with\n * a
string prefix and ending with a string suffix.\n * (e.g. `['prefix', value0, '-', value1, '-', value2, ..., value99, 'suffix']`)\n *
*\n * @codeGenApi\n
*\n * \nexport function classMapInterpolateV(values:
any[]): void {\n  const IView = getLView();\n  const interpolatedValue = interpolationV(IView, values);\n  checkStylingMap(keyValueArraySet, classStringParser, interpolatedValue, true);\n}\n\n"/**\n *\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n * \nimport {getLView} from
'./state';\nimport {interpolation1, interpolation2, interpolation3, interpolation4, interpolation5, interpolation6,
interpolation7, interpolation8, interpolationV} from './interpolation';\nimport {styleMap} from './styling';\n\n/**\n *\n * Update an interpolated style on an element with single bound value surrounded by text.\n *\n * Used when the

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value passed to a property has 1 interpolated value in it:\n \*\n \* ``html\n \* <div style=\"key: {v0} suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate1('key: ', v0, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate1(prefix: string, v0: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation1(IView, prefix, v0, suffix);\n styleMap(interpolatedValue);\n }\n\n/\*\*\n \*\n \* Update an interpolated style on an element with 2 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 2 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {v0}; key1: {v1} suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate2('key: ', v0, 'key1: ', v1, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate2(\n prefix: string, v0: any, i0: string, v1: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n styleMap(interpolatedValue);\n }\n\n/\*\*\n \*\n \* Update an interpolated style on an element with 3 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 3 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {v0}; key2: {v1}; key2: {v2} suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate3(\n \* 'key: ', v0, 'key1: ', v1, 'key2: ', v2, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate3(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n styleMap(interpolatedValue);\n }\n\n/\*\*\n \*\n \* Update an interpolated style on an element with 4 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 4 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {v0}; key1: {v1}; key2: {v2}; key3: {v3} suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate4(\n \* 'key: ', v0, 'key1: ', v1, 'key2: ', v2, 'key3: ', v3, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate4(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n styleMap(interpolatedValue);\n }\n\n/\*\*\n \*\n \* Update an interpolated style on an element with 5 bound values surrounded by text.\n \*\n \* Used when the value passed to a property has 5 interpolated values in it:\n \*\n \* ``html\n \* <div style=\"key: {v0}; key1: {v1}; key2: {v2}; key3: {v3}; key4: {v4} suffix\"></div>\n \* ``\n \*\n \* Its compiled representation is:\n \*\n \* ``ts\n \* styleMapInterpolate5(\n \* 'key: ', v0, 'key1: ', v1, 'key2: ', v2, 'key3: ', v3, 'key4: ', v4, 'suffix');\n \* ``\n \*\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param suffix Static value used for concatenation only.\n \* @codeGenApi\n \*/\nexport function styleMapInterpolate5(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, suffix: string): void {\n const IView = getLView();\n



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const interpolatedValue = interpolation5(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);
styleMap(interpolatedValue);

```

`styleMap(interpolatedValue);`  
`*/` Update an interpolated style on an element with 6 bound values surrounded by text.  
`*/` Used when the value passed to a property has 6 interpolated values in it:  
`*/` ````html<div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}} suffix"></div>`  
`*/` Its compiled representation is:  
`*/` `styleMapInterpolate6(\n * 'key: ', v0, '; key1: ', v1, '; key2: ', v2, '; key3: ', v3, '; key4: ', v4, '; key5: ', v5,\n * 'suffix');\n * @param prefix` Static value used for concatenation only.  
`*/` `@param v0` Value checked for change.  
`*/` `@param i0` Static value used for concatenation only.  
`*/` `@param v1` Value checked for change.  
`*/` `@param i1` Static value used for concatenation only.  
`*/` `@param v2` Value checked for change.  
`*/` `@param i2` Static value used for concatenation only.  
`*/` `@param v3` Value checked for change.  
`*/` `@param i3` Static value used for concatenation only.  
`*/` `@param v4` Value checked for change.  
`*/` `@param i4` Static value used for concatenation only.  
`*/` `@param v5` Value checked for change.  
`*/` `@param suffix` Static value used for concatenation only.  
`*/` `@codeGenApi\n * \nexport function styleMapInterpolate6(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, suffix);\n styleMap(interpolatedValue);\n */`  
`*/` Update an interpolated style on an element with 7 bound values surrounded by text.  
`*/` Used when the value passed to a property has 7 interpolated values in it:  
`*/` ````html<div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}}; key6: {{v6}} suffix"></div>`  
`*/` Its compiled representation is:  
`*/` `styleMapInterpolate7(\n * 'key: ', v0, '; key1: ', v1, '; key2: ', v2, '; key3: ', v3, '; key4: ', v4, '; key5: ', v5,\n * 'key6: ', v6, 'suffix');\n * @param prefix` Static value used for concatenation only.  
`*/` `@param v0` Value checked for change.  
`*/` `@param i0` Static value used for concatenation only.  
`*/` `@param v1` Value checked for change.  
`*/` `@param i1` Static value used for concatenation only.  
`*/` `@param v2` Value checked for change.  
`*/` `@param i2` Static value used for concatenation only.  
`*/` `@param v3` Value checked for change.  
`*/` `@param i3` Static value used for concatenation only.  
`*/` `@param v4` Value checked for change.  
`*/` `@param i4` Static value used for concatenation only.  
`*/` `@param v5` Value checked for change.  
`*/` `@param i5` Static value used for concatenation only.  
`*/` `@param v6` Value checked for change.  
`*/` `@param suffix` Static value used for concatenation only.  
`*/` `@codeGenApi\n * \nexport function styleMapInterpolate7(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, suffix);\n styleMap(interpolatedValue);\n */`  
`*/` Update an interpolated style on an element with 8 bound values surrounded by text.  
`*/` Used when the value passed to a property has 8 interpolated values in it:  
`*/` ````html<div style="key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}}; key6: {{v6}}; key7: {{v7}} suffix"></div>`  
`*/` Its compiled representation is:  
`*/` `styleMapInterpolate8(\n * 'key: ', v0, '; key1: ', v1, '; key2: ', v2, '; key3: ', v3, '; key4: ', v4, '; key5: ', v5,\n * 'key6: ', v6, '; key7: ', v7, 'suffix');\n * @param prefix` Static value used for concatenation only.  
`*/` `@param v0` Value checked for change.  
`*/` `@param i0` Static value used for concatenation only.  
`*/` `@param v1` Value checked for change.  
`*/` `@param i1` Static value used for concatenation only.  
`*/` `@param v2` Value checked for change.  
`*/` `@param i2` Static value used for concatenation only.  
`*/` `@param v3` Value checked for change.  
`*/` `@param i3` Static value used for concatenation only.  
`*/` `@param v4` Value checked for change.  
`*/` `@param i4` Static value used for concatenation only.  
`*/` `@param v5` Value checked for change.  
`*/` `@param i5` Static value used for concatenation only.  
`*/` `@param v6` Value checked for change.  
`*/` `@param i6` Static value used for concatenation only.  
`*/` `@param v7` Value checked for change.  
`*/` `@param suffix` Static value used for concatenation only.  
`*/` `@codeGenApi\n * \nexport function styleMapInterpolate8(\n prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string, v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any, suffix: string): void {\n const IView = getLView();\n const interpolatedValue = interpolation8(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7,`

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suffix);\n styleMap(interpolatedValue);\n\n\n/**\n * Update an interpolated style on an element with 9 or more
bound values surrounded by text.\n *\n * Used when the number of interpolated values exceeds 8.\n *\n * ```html\n
* <div\n * class=\"key: {{v0}}; key1: {{v1}}; key2: {{v2}}; key3: {{v3}}; key4: {{v4}}; key5: {{v5}};\n *
key6: {{v6}}; key7: {{v7}}; key8: {{v8}}; key9: {{v9}}suffix\"></div>\n * ```\n *\n * Its compiled representation
is:\n *\n * ```ts\n * styleMapInterpolateV(\n *   ['key: ', v0, ' key1: ', v1, ' key2: ', v2, ' key3: ', v3, ' key4: ', v4, '
key5: ', v5,\n *     ' key6: ', v6, ' key7:
', v7, ' key8: ', v8, ' key9: ', v9, 'suffix'];\n *   \n *\n * @param values The collection of values and the strings in-
between those values, beginning with\n * a string prefix and ending with a string suffix.\n * (e.g. `[prefix', value0, '
key2: ', value1, ' key2: ', value2, ..., value99, 'suffix']`)\n * @codeGenApi\n * ^\nexport function
styleMapInterpolateV(values: any[]): void {\n  const IView = getLView();\n  const interpolatedValue =
interpolationV(IView, values);\n  styleMap(interpolatedValue);\n}\n\n"/**\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n *\n\nimport {getLView,} from './state';\nimport {interpolation1,
interpolation2, interpolation3, interpolation4, interpolation5, interpolation6, interpolation7, interpolation8,
interpolationV} from './interpolation';\nimport {checkStylingProperty} from './styling';\n\n\n/**\n
*\n * Update an interpolated style property on an element with single bound value surrounded by text.\n *\n * Used
when the value passed to a property has 1 interpolated value in it:\n *\n * ```html\n * <div
style.color=\"prefix{{v0}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n *
stylePropInterpolate1(0, 'prefix', v0, 'suffix');\n * ```\n *\n * @param styleIndex Index of style to update. This index
value refers to the\n * index of the style in the style bindings array that was passed into\n * `styling`.\n *
@param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n * @param
suffix Static value used for concatenation only.\n * @param valueSuffix Optional suffix. Used with scalar values to
add unit such as `px`.\n * @returns itself, so that it may be chained.\n * @codeGenApi\n * ^\nexport function
stylePropInterpolate1(\n  prop: string, prefix: string, v0: any, suffix: string,\n  valueSuffix?:
string|null): typeof stylePropInterpolate1 {\n  const IView = getLView();\n  const interpolatedValue =
interpolation1(IView, prefix, v0, suffix);\n  checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n
return stylePropInterpolate1;\n}\n\n\n/**\n
*\n * Update an interpolated style property on an element with 2 bound
values surrounded by text.\n *\n * Used when the value passed to a property has 2 interpolated values in it:\n *\n *
```html\n * <div style.color=\"prefix{{v0}}-{{v1}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n
*\n * ```ts\n * stylePropInterpolate2(0, 'prefix', v0, '-', v1, 'suffix');\n * ```\n *\n * @param styleIndex Index of style
to update. This index value refers to the\n * index of the style in the style bindings array that was passed into\n *
`styling`.\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for
change.\n * @param i0 Static value used for concatenation
only.\n * @param v1 Value checked for change.\n * @param suffix Static value used for concatenation only.\n *
@param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n * @returns itself, so that it
may be chained.\n * @codeGenApi\n * ^\nexport function stylePropInterpolate2(\n  prop: string, prefix: string, v0:
any, i0: string, v1: any, suffix: string,\n  valueSuffix?: string|null): typeof stylePropInterpolate2 {\n  const IView =
getLView();\n  const interpolatedValue = interpolation2(IView, prefix, v0, i0, v1, suffix);\n
checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n  return stylePropInterpolate2;\n}\n\n\n/**\n
*\n * Update an interpolated style property on an element with 3 bound values surrounded by text.\n *\n * Used when the
value passed to a property has 3 interpolated values in it:\n *\n * ```html\n * <div style.color=\"prefix{{v0}}-
{{v1}}-{{v2}}suffix\"></div>\n * ```\n *\n * Its compiled representation is:\n *\n * ```ts\n *
stylePropInterpolate3(0, 'prefix', v0, '-', v1, '-', v2, 'suffix');\n * ```\n *\n * @param styleIndex Index of style to
update. This index value refers to the\n * index of the style in the style bindings array that was passed into\n *
`styling`.\n * @param prefix Static value used for concatenation only.\n * @param v0 Value checked for change.\n
*\n * @param i0 Static value used for concatenation only.\n * @param v1 Value checked for change.\n * @param i1
Static value used for concatenation only.\n * @param v2 Value checked for change.\n * @param suffix Static value
used for concatenation only.\n * @param valueSuffix Optional suffix. Used with scalar values to add unit such as

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`px`.n * @returns itself, so that it may be chained.n * @codeGenApi.n * ^\nexport function
stylePropInterpolate3(\n  prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, suffix: string,\n
  valueSuffix?: string|null): typeof stylePropInterpolate3 {\n  const IView
= getLView();\n  const interpolatedValue = interpolation3(IView, prefix, v0, i0, v1, i1, v2, suffix);\n
checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n  return stylePropInterpolate3;\n}\n\n/**\n *\n *
Update an interpolated style property on an element with 4 bound values surrounded by text.n *\n * Used when the
value passed to a property has 4 interpolated values in it:\n *\n * ``html\n * <div style.color=\"prefix{{v0}}-
{{v1}}-{{v2}}-{{v3}}suffix\"></div>\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n *
stylePropInterpolate4(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, 'suffix');\n *\n * ``\n *\n * @param styleIndex Index of style to
update. This index value refers to the\n *      index of the style in the style bindings array that was passed into\n *
`styling`.n * @param prefix Static value used for concatenation only.n * @param v0 Value checked for change.\n
* @param i0 Static value used for concatenation only.n * @param v1 Value
checked for change.\n * @param i1 Static value used for concatenation only.n * @param v2 Value checked for
change.\n * @param i2 Static value used for concatenation only.n * @param v3 Value checked for change.\n
* @param suffix Static value used for concatenation only.n * @param valueSuffix Optional suffix. Used with scalar
values to add unit such as `px`.n * @returns itself, so that it may be chained.n * @codeGenApi.n * ^\nexport
function stylePropInterpolate4(\n  prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2:
string,\n  v3: any, suffix: string, valueSuffix?: string|null): typeof stylePropInterpolate4 {\n  const IView =
getLView();\n  const interpolatedValue = interpolation4(IView, prefix, v0, i0, v1, i1, v2, i2, v3, suffix);\n
checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n  return stylePropInterpolate4;\n}\n\n/**\n *\n *
Update an interpolated style property on an element with 5 bound values surrounded by
text.\n *\n * Used when the value passed to a property has 5 interpolated values in it:\n *\n * ``html\n * <div
style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}suffix\"></div>\n * ``\n *\n * Its compiled
representation is:\n *\n * ``ts\n * stylePropInterpolate5(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, 'suffix');\n *\n * ``\n
*\n * @param styleIndex Index of style to update. This index value refers to the\n *      index of the style in the
style bindings array that was passed into\n *      `styling`.n * @param prefix Static value used for concatenation
only.n * @param v0 Value checked for change.\n * @param i0 Static value used for concatenation only.n *
@param v1 Value checked for change.\n * @param i1 Static value used for concatenation only.n * @param v2
Value checked for change.\n * @param i2 Static value used for concatenation only.n * @param v3 Value checked
for change.\n * @param i3 Static value used for concatenation only.n * @param v4 Value checked
for change.\n * @param suffix Static value used for concatenation only.n * @param valueSuffix Optional suffix.
Used with scalar values to add unit such as `px`.n * @returns itself, so that it may be chained.n * @codeGenApi\n
* ^\nexport function stylePropInterpolate5(\n  prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2:
any, i2: string,\n  v3: any, i3: string, v4: any, suffix: string,\n  valueSuffix?: string|null): typeof
stylePropInterpolate5 {\n  const IView = getLView();\n  const interpolatedValue =\n    interpolation5(IView,
prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, suffix);\n  checkStylingProperty(prop, interpolatedValue, valueSuffix,
false);\n  return stylePropInterpolate5;\n}\n\n/**\n *\n * Update an interpolated style property on an element with 6
bound values surrounded by text.n *\n * Used when the value passed to a property has 6 interpolated values in it:\n
*\n * ``html\n * <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}suffix\"></div>\n
*\n * ``\n *\n * Its compiled representation is:\n *\n * ``ts\n * stylePropInterpolate6(0, 'prefix', v0, '-', v1, '-', v2, '-', v3,
'-', v4, '-', v5, 'suffix');\n *\n * ``\n *\n * @param styleIndex Index of style to update. This index value refers to the\n
*      index of the style in the style bindings array that was passed into\n *      `styling`.n * @param prefix Static value
used for concatenation only.n * @param v0 Value checked for change.\n * @param i0 Static value used for
concatenation only.n * @param v1 Value checked for change.\n * @param i1 Static value used for concatenation
only.n * @param v2 Value checked for change.\n * @param i2 Static value used for concatenation only.n *
@param v3 Value checked for change.\n * @param i3 Static value used for concatenation only.n * @param v4
Value checked for change.\n * @param i4 Static value used for concatenation only.n * @param v5 Value checked
for change.\n * @param suffix Static value used

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for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function stylePropInterpolate6(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate6 {\n const IView =\n getLView();\n const interpolatedValue =\n interpolation6(IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5,\n suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return\n stylePropInterpolate6;\n}\n\n/\*\*\n \* \n \* Update an interpolated style property on an element with 7 bound values\n surrounded by text.\n \* \n \* Used when the value passed to a property has 7 interpolated values in it:\n \* \n \* ```html\n \* <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}suffix\"></div>\n \* ```\n \* \n \* Its compiled representation is:\n \* \n \* ```ts\n \* stylePropInterpolate7(\n \* 0, 'prefix', v0, '-', v1, '-', v2,\n \* '-', v3, '-', v4, '-', v5, '-', v6, 'suffix');\n \* ```\n \* \n \* @param styleIndex Index of style to update. This index value\n refers to the\n \* index of the style in the style bindings array that was passed into\n \* `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static\n value used for concatenation only.\n \* @param v1 Value checked for change.\n \* @param i1 Static value used for\n concatenation only.\n \* @param v2 Value checked for change.\n \* @param i2 Static value used for concatenation\n only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5\n Value checked for change.\n \* @param i5 Static value used for\n concatenation only.\n \* @param v6 Value checked for change.\n \* @param suffix Static value used for\n concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function stylePropInterpolate7(\n prop:\n string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4:\n string, v5: any, i5: string, v6: any, suffix: string,\n valueSuffix?: string|null): typeof stylePropInterpolate7 {\n const IView =\n getLView();\n const interpolatedValue =\n interpolation7(IView, prefix, v0, i0, v1, i1, v2, i2, v3,\n i3, v4, i4, v5, i5, v6, suffix);\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return\n stylePropInterpolate7;\n}\n\n/\*\*\n \* \n \* Update an interpolated style property on an element with 8 bound values\n surrounded by text.\n \* \n \* Used when the value passed to a property\n has 8 interpolated values in it:\n \* \n \* ```html\n \* <div style.color=\"prefix{{v0}}-{{v1}}-{{v2}}-{{v3}}-{{v4}}-\n {{v5}}-{{v6}}-{{v7}}suffix\"></div>\n \* ```\n \* \n \* Its compiled representation is:\n \* \n \* ```ts\n \* stylePropInterpolate8(0, 'prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-', v5, '-', v6,\n '-', v7, 'suffix');\n \* ```\n \* \n \* @param styleIndex Index of style to update. This index value refers to the\n \* index of the style in the style\n bindings array that was passed into\n \* `styling`.\n \* @param prefix Static value used for concatenation only.\n \* @param v0 Value checked for change.\n \* @param i0 Static value used for concatenation only.\n \* @param v1\n Value checked for change.\n \* @param i1 Static value used for concatenation only.\n \* @param v2 Value checked\n for change.\n \* @param i2 Static value used for concatenation only.\n \* @param v3 Value checked for change.\n \* @param i3 Static value used for concatenation only.\n \* @param v4 Value checked for\n change.\n \* @param i4 Static value used for concatenation only.\n \* @param v5 Value checked for change.\n \* @param i5 Static value used for concatenation only.\n \* @param v6 Value checked for change.\n \* @param i6\n Static value used for concatenation only.\n \* @param v7 Value checked for change.\n \* @param suffix Static value\n used for concatenation only.\n \* @param valueSuffix Optional suffix. Used with scalar values to add unit such as\n `px`.\n \* @returns itself, so that it may be chained.\n \* @codeGenApi\n \* \nexport function\n stylePropInterpolate8(\n prop: string, prefix: string, v0: any, i0: string, v1: any, i1: string, v2: any, i2: string,\n v3: any, i3: string, v4: any, i4: string, v5: any, i5: string, v6: any, i6: string, v7: any,\n suffix: string, valueSuffix?:\n string|null): typeof stylePropInterpolate8 {\n const IView =\n getLView();\n const interpolatedValue =\n interpolation8(\n IView, prefix, v0, i0, v1, i1, v2, i2, v3, i3, v4, i4, v5, i5, v6, i6, v7, suffix);\n\n checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolate8;\n}\n\n/\*\*\n \* \n \* Update an interpolated style property on an element with 9 or more bound values surrounded by\n \* text.\n \* \n \* Used when the number of interpolated values exceeds 8.\n \* \n \* ```html\n \* <div\n \* style.color=\"prefix{{v0}}-

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{{v1}}-{{v2}}-{{v3}}-{{v4}}-{{v5}}-{{v6}}-{{v7}}-{{v8}}-{{v9}}suffix">\n * </div>\n * ```\n * Its
compiled representation is:\n * ```\n * stylePropInterpolateV(\n * 0, ['prefix', v0, '-', v1, '-', v2, '-', v3, '-', v4, '-',
v5, '-', v6, '-', v7, '-', v9,\n * 'suffix']);\n * ```\n * @param styleIndex Index of style to update. This index value
refers to the\n *      index of the style in the style bindings array that was passed into\n *      `styling`..\n * @param
values The collection of values and the strings in-between those values, beginning with\n * a string prefix and
ending with a string suffix.\n * (e.g. `[prefix', value0,
'-', value1, '-', value2, ..., value99, 'suffix']`)\n * @param valueSuffix Optional suffix. Used with scalar values to add
unit such as `px`.\n * @returns itself, so that it may be chained.\n * @codeGenApi\n */\nexport function
stylePropInterpolateV(\n  prop: string, values: any[], valueSuffix?: string|null): typeof stylePropInterpolateV {\n
const IView = getLView();\n const interpolatedValue = interpolationV(IView, values);\n
checkStylingProperty(prop, interpolatedValue, valueSuffix, false);\n return stylePropInterpolateV;\n}\n"/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {bindingUpdated}
from './bindings';\nimport {SanitizerFn} from './interfaces/sanitization';\nimport {RENDERER} from
 './interfaces/view';\nimport {getCurrentDirectiveDef, getLView, getSelectedTNode, getTView, nextBindingIndex}
from './state';\nimport {NO_CHANGE} from './tokens';\n\nimport {elementPropertyInternal,
loadComponentRenderer, storePropertyBindingMetadata} from './shared';\n\n/**\n * Update a property on a host
element. Only applies to native node properties, not inputs.\n *\n * Operates on the element selected by index via the
{@link select} instruction.\n *\n * @param propName Name of property. Because it is going to DOM, this is not
subject to\n *      renaming as part of minification.\n *\n * @param value New value to write.\n *\n * @param sanitizer An
optional function used to sanitize the value.\n *\n * @returns This function returns itself so that it may be chained\n *
(e.g. `property('name', ctx.name)(title, ctx.title)`)\n */\n@codeGenApi\n */\nexport function hostProperty<T>(\n
propName: string, value: T, sanitizer?: SanitizerFn|null): typeof hostProperty {\n const IView = getLView();\n
const bindingIndex = nextBindingIndex();\n if (bindingUpdated(IView, bindingIndex, value)) {\n
const tView = getTView();\n const tNode = getSelectedTNode();\n elementPropertyInternal(tView, tNode,
IView, propName, value, IView[RENDERER], sanitizer, true);\n ngDevMode &&
storePropertyBindingMetadata(tView.data, tNode, propName, bindingIndex);\n }\n return
hostProperty;\n}\n\n/**\n * Updates a synthetic host binding (e.g. `[@foo]`) on a component or directive.\n *\n *
This instruction is for compatibility purposes and is designed to ensure that a\n * synthetic host binding (e.g.
`@HostBinding('@foo')`) properly gets rendered in\n * the component's renderer. Normally all host bindings are
evaluated with the parent\n * component's renderer, but, in the case of animation @triggers, they need to be\n *
evaluated with the sub component's renderer (because that's where the animation\n * triggers are defined).\n *\n *
Do not use this instruction as a replacement for `elementProperty`. This instruction\n * only exists to ensure
compatibility with the ViewEngine's host binding
behavior.\n *\n * @param index The index of the element to update in the data array\n *\n * @param propName Name
of property. Because it is going to DOM, this is not subject to\n *      renaming as part of minification.\n *\n *
@param value New value to write.\n *\n * @param sanitizer An optional function used to sanitize the value.\n */\n
@codeGenApi\n */\nexport function syntheticHostProperty<T>(\n  propName: string, value: T|NO_CHANGE,\n
sanitizer?: SanitizerFn|null): typeof syntheticHostProperty {\n const IView = getLView();\n const bindingIndex =
nextBindingIndex();\n if (bindingUpdated(IView, bindingIndex, value)) {\n const tView = getTView();\n const
tNode = getSelectedTNode();\n const currentDef = getCurrentDirectiveDef(tView.data);\n const renderer =
loadComponentRenderer(currentDef, tNode, IView);\n elementPropertyInternal(tView, tNode, IView, propName,
value, renderer, sanitizer, true);\n ngDevMode && storePropertyBindingMetadata(tView.data, tNode, propName,
bindingIndex);\n }\n return syntheticHostProperty;\n}\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {global} from './global';\n\ndeclare global {\n const
ngI18nClosureMode: boolean;\n}\n\n/**\n * NOTE: changes to the `ngI18nClosureMode` name must be synced
with `compiler-cli/src/tooling.ts`.\n */\nif (typeof ngI18nClosureMode === 'undefined') {\n // These property

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accesses can be ignored because ngI18nClosureMode will be set to false\n // when optimizing code and the whole if
statement will be dropped.\n // Make sure to refer to ngI18nClosureMode as ['ngI18nClosureMode'] for closure.\n
// NOTE: we need to have it in IIFE so that the tree-shaker is happy.\n (function() {\n // tslint:disable-next-
line:no-toplevel-property-access\n global['ngI18nClosureMode'] =\n // TODO(FW-1250): validate
that this actually, you know, works.\n // tslint:disable-next-line:no-toplevel-property-access\n typeof goog
!=='undefined' && typeof goog.getMsg === 'function';\n }());\n\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n */\n\n// THIS CODE IS GENERATED - DO NOT
MODIFY.\nconst u = undefined;\nfunction plural(val: number): number {\nconst n = val, i =
Math.floor(Math.abs(val)), v = val.toString().replace(/^[^]*\./, "").length;\nif (i === 1 && v === 0)\n return
1;\nreturn 5;\n}\n\nexport default
["en", ["a", "p"], ["AM", "PM"], u, ["AM", "PM"], u, u, ["S", "M", "T", "W", "T", "F", "S"], ["Sun", "
Mon", "Tue", "Wed", "Thu", "Fri", "Sat"], ["Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "F
riday", "Saturday"], ["Su", "Mo", "Tu", "We", "Th", "Fr", "Sa"], u, ["J", "F", "M", "A", "M", "J", "J", "
A", "S", "O", "N", "D"], ["Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep", "Oct", "Nov", "
Dec"], ["January", "February", "March", "April", "May", "June", "July", "August", "September", "October"
], "November", "December"], u, ["B", "A"], ["BC", "AD"], ["Before
Christ", "Anno Domini"], 0, [6, 0], ["M/d/yy", "MMM d, y", "MMMM d, y", "EEEE, MMMM d, y"], ["h:mm
a", "h:mm:ss a", "h:mm:ss a z", "h:mm:ss a zzzz"], [{"1}, {0}], u, {"1" 'at' {0}], u, [".", ",", ";", "%", "+", "-",
"\", "E", "x", "%o", "\", "\", "NaN", ":"], [{"#, ##0.###", "#, ##0%", "##0.00", "#E0"}, {"USD", "$", "US
Dollar", {, "ltr", plural};\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport { RuntimeError, RuntimeErrorCode } from './errors';\nimport { global }
from './util/global';\n\nimport localeEn from './locale_en';\n\n/*\n * This const is used to store the locale data
registered with `registerLocaleData`\n *\nlet LOCALE_DATA: {[localeId: string]: any} = {};\n\n/*\n * Register
locale data to be used internally by Angular. See the\n * ["I18n guide"] (guide/i18n-common-format-data-locale) to
know how to import additional locale\n * data.\n *\n * The signature `registerLocaleData(data: any, extraData?:
any)` is deprecated since v5.1.\n *\nexport function registerLocaleData(data: any, localeId?: string | any, extraData?:
any): void {\n if (typeof localeId !== 'string') {\n extraData = localeId;\n localeId =
data[LocaleDataIndex.LocaleId];\n }\n\n localeId = localeId.toLowerCase().replace(/_/g, '-');\n\n
LOCALE_DATA[localeId] = data;\n\n if (extraData) {\n
LOCALE_DATA[localeId][LocaleDataIndex.ExtraData] = extraData;\n }\n}\n\n/*\n * Finds the locale data for a
given locale.\n *\n * @param locale The locale code.\n *\n * @returns The locale data.\n *\n * @see [Internationalization (i18n) Guide] (https://angular.io/guide/i18n-overview)\n\n
*\nexport function findLocaleData(locale: string): any {\n const normalizedLocale = normalizeLocale(locale);\n\n
let match = getLocaleData(normalizedLocale);\n if (match) {\n return match;\n }\n\n // let's try to find a parent
locale\n const parentLocale = normalizedLocale.split('-')[0];\n match = getLocaleData(parentLocale);\n if (match)
{\n return match;\n }\n\n if (parentLocale === 'en') {\n return localeEn;\n }\n\n throw new RuntimeError(\n
RuntimeErrorCode.MISSING_LOCALE_DATA, \n ngDevMode && `Missing locale data for the locale
`${locale}`.`);\n}\n\n/*\n * Retrieves the default currency code for the given locale.\n *\n * The default is defined
as the first currency which is still in use.\n *\n * @param locale The code of the locale whose currency code we
want.\n *\n * @returns The code of the default currency for the given locale.\n *\n *\nexport
function getLocaleCurrencyCode(locale: string): string | null {\n const data = findLocaleData(locale);\n return
data[LocaleDataIndex.CurrencyCode] || null;\n}\n\n/*\n * Retrieves the plural function used by ICU expressions to
determine the plural case to use\n * for a given locale.\n *\n * @param locale A locale code for the locale format rules
to use.\n *\n * @returns The plural function for the locale.\n *\n * @see `NgPlural`\n *\n * @see [Internationalization (i18n)
Guide] (https://angular.io/guide/i18n-overview)\n *\nexport function getLocalePluralCase(locale: string): (value:
number) => number {\n const data = findLocaleData(locale);\n return

```



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SHIFT_REF | AppendChild,\n *\n * // For adding element nodes\n * // -----\n * // Equivalent to:\n *
// IView[1].appendChild(IView[0] = document.createElement('div'));\n * ELEMENT_MARKER, 'div', 0, 1 <<
SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n *\n * // For adding comment nodes\n * // -----
-\n
* // Equivalent to:\n * // IView[1].appendChild(IView[0] = document.createComment("));\n * ICU_MARKER,
", 0, 1 << SHIFT_PARENT | 0 << SHIFT_REF | AppendChild,\n *\n * // For moving existing nodes to a different
location\n * // -----\n * // Equivalent to:\n * // const node = IView[1];\n *
// IView[2].appendChild(node);\n * 1 << SHIFT_REF | Select, 2 << SHIFT_PARENT | 0 << SHIFT_REF |
AppendChild,\n *\n * // For removing existing nodes\n * // -----\n * //
const node = IView[1];\n * // removeChild(tView.data(1), node, IView);\n * 1 << SHIFT_REF | Remove,\n *\n *
// For writing attributes\n * // -----\n * // const node = IView[1];\n * //
node.setAttribute('attr', 'value');\n * 1 << SHIFT_REF | Attr, 'attr', 'value\n * ];\n * ```\n */\nexport interface
IcuCreateOpCodes extends Array<number|string|ELEMENT_MARKER|ICU_MARKER|null>,\n
    I18nDebug {\n    __brand__: 'I18nCreateOpCodes';\n    }\n\nexport const enum
I18nUpdateOpCode {\n    /**\n     * Stores shift amount for bits 17-2 that contain reference index.\n     */\n
SHIFT_REF = 2,\n    /**\n     * Mask for OpCode\n     */\n    MASK_OPCODE = 0b11,\n    /**\n     * Instruction to
update a text node.\n     */\n    Text = 0b00,\n    /**\n     * Instruction to update a attribute of a node.\n     */\n
Attr = 0b01,\n    /**\n     * Instruction to switch the current ICU case.\n     */\n    IcuSwitch = 0b10,\n    /**\n     * Instruction to
update the current ICU case.\n     */\n    IcuUpdate = 0b11,\n    }\n\n/**\n     * Marks that the next string is an element
name.\n     */\n    * See `I18nMutateOpCodes` documentation.\n     */\n\nexport const ELEMENT_MARKER:
ELEMENT_MARKER = {\n    marker: 'element'\n};\n\nexport interface ELEMENT_MARKER {\n    marker:
'element';\n    }\n\n/**\n     * Marks that the next string is comment text need for ICU.\n     */\n    * See `I18nMutateOpCodes`
documentation.\n     */\n\nexport const ICU_MARKER: ICU_MARKER = {\n    marker: 'ICU'\n};\n\nexport interface
ICU_MARKER {\n    marker: 'ICU';\n    }\n\nexport interface I18nDebug {\n    /**\n     * Human readable representation
of the OpCode arrays.\n     */\n    * NOTE: This property only exists if `ngDevMode` is set to `true` and it is not
present in\n     * production. Its presence is purely to help debug issue in development, and should not be relied\n     *
on in production application.\n     */\n    debug?: string[];\n    }\n\n/**\n     * Array storing OpCode for dynamically creating
`i18n` translation DOM elements.\n     */\n    * This array creates a sequence of `Text` and `Comment` (as ICU anchor)
DOM elements. It consists\n     * of a pair of `number` and `string` pairs which encode the operations for the creation
of the\n     * translated block.\n     */\n    * The number is shifted and encoded according to `I18nCreateOpCode`\n     */\n
Pseudocode:\n     * ```\n     * const i18nCreateOpCodes = [\n     *   10 << I18nCreateOpCode.SHIFT, \"Text
Node add to DOM\",\n     *   11 << I18nCreateOpCode.SHIFT | I18nCreateOpCode.COMMENT, \"Comment Node
add to DOM\",\n     *   12 << I18nCreateOpCode.SHIFT | I18nCreateOpCode.APPEND_LATER, \"Text Node added
later\"\n     * ];\n     * for(var i=0; i<i18nCreateOpCodes.length; i++) {\n     *   const opcode =
i18nCreateOpCodes[i++];\n     *   const index = opcode >> I18nCreateOpCode.SHIFT;\n     *   const text =
i18nCreateOpCodes[i];\n     *   let node: Text|Comment;\n     *   if (opcode & I18nCreateOpCode.COMMENT ===
I18nCreateOpCode.COMMENT) {\n     *     node = IView[~index] = document.createComment(text);\n     *   } else {\n     *
node = IView[index] = document.createTextNode(text);\n     *   }\n     *   if (opcode &
I18nCreateOpCode.APPEND_EAGERLY !== I18nCreateOpCode.APPEND_EAGERLY) {\n     *     parentNode.appendChild(node);\n     *   }\n     * }\n     * ```\n     */\n\nexport interface I18nCreateOpCodes extends
Array<number|string>, I18nDebug {\n    __brand__: 'I18nCreateOpCodes';\n    }\n\n/**\n     * See `I18nCreateOpCodes`\n     */\n\nexport enum I18nCreateOpCode {\n
    /**\n     * Number of bits to shift index so that it can be combined with the `APPEND_EAGERLY` and\n     *
`COMMENT`.\n     */\n    SHIFT = 2,\n    /**\n     * Should the node be appended to parent immediately after
creation.\n     */\n    APPEND_EAGERLY = 0b01,\n    /**\n     * If set the node should be comment (rather than a text)
node.\n     */\n    COMMENT = 0b10,\n    }\n\n/**\n     * Stores DOM operations which need to be applied to update
DOM render tree due to changes in\n     * expressions.\n     */\n    * The basic idea is that `i18nExp` OpCodes capture
expression changes and update a change\n     * mask bit. (Bit 1 for expression 1, bit 2 for expression 2 etc..., bit 32 for

```



expression 32 and higher.) The OpCodes then compare its own change mask against the expression change mask to determine if the OpCodes should execute. NOTE: 32nd bit is special as it says 32nd or higher. This way if we have more than 32 bindings the code still works, but with lower efficiency. (it is unlikely that a translation

would have more than 32 bindings.) These OpCodes can be used by both the i18n block as well as ICU sub-block.

```

## Example
Assume
if (rf & RenderFlags.Update) {
  i18nExp(ctx.exp1); // If changed set mask bit 1
  i18nExp(ctx.exp2); // If changed set mask bit 2
  i18nExp(ctx.exp3); // If changed set mask bit 3
  i18nExp(ctx.exp4); // If changed set mask bit 4
  i18nApply(0); // Apply all changes by executing the OpCodes
}

We can assume that each call to `i18nExp` sets an internal `changeMask` bit depending on the index of `i18nExp`.

The following OpCodes represent:
<div i18n-title="pre">{exp1}in{exp2}post">
  // If `changeMask & 0b11` has changed then execute update OpCodes
  // has NOT changed then skip `8` values and start processing next OpCodes
  0b11, 8,
  // Concatenate
  `newValue = 'pre'+IView[bindIndex-4]+'in'+IView[bindIndex-3]+'post';
  // Update attribute: `elementAttribute(1, 'title', sanitizerFn(newValue));
  // The following OpCodes represent:
  <div i18n>Hello {exp3}!>
  // If `changeMask & 0b100` has changed then execute update OpCodes
  // has NOT changed then skip `4` values and start processing next OpCodes
  0b100, 4,
  // Concatenate `newValue = 'Hello ' + IView[bindIndex -2] + '!';
  // Update text: `IView[1].textContent = newValue;
  // The following OpCodes represent:
  <div i18n>{exp4, plural, ... }>
  // If `changeMask & 0b1000` has changed then execute update OpCodes
  // has NOT changed then skip `2` values and start processing next OpCodes
  0b1000, 2,
  // Concatenate `newValue = IView[bindIndex -1];
  // Switch ICU: `icuSwitchCase(IView[1], 0, newValue);
  0 << SHIFT_ICU | 1 << SHIFT_REF | IcuSwitch,
  // Note `changeMask & -1` is always true, so the IcuUpdate will always execute.
  -1, 1,
  // Update ICU: `icuUpdateCase(IView[1], 0);
  0 << SHIFT_ICU | 1 << SHIFT_REF | IcuUpdate,
  ];

I18nUpdateOpCodes extends
Array<string|number|SanitizerFn|null>, I18nDebug {
  __brand__: 'I18nUpdateOpCodes';
}

Store information for the i18n translation block.
I18n {
  /**
   * A set of OpCodes which will create the Text Nodes and ICU anchors for the translation blocks.
   * NOTE: The ICU anchors are filled in with ICU Update OpCode.
   * create: I18nCreateOpCodes;
   */
  /**
   * A set of OpCodes which will be executed on each change detection to determine if any changes to DOM are required.
   * update: I18nUpdateOpCodes;
   */
}

* Defines the ICU type of `select` or `plural`
IcuType {
  select = 0,
  plural = 1,
}

I18n {
  /**
   * Defines the ICU type of `select` or `plural` type: IcuType;
   */
  /**
   * Index in `LView` where the anchor node is stored.
   * <!-- ICU 0:0 -->
   */
  anchorIdx: number;
  /**
   * Currently selected ICU case pointer.
   * `IView[currentCaseLViewIndex]` stores the currently selected case. This is needed to know how to clean up the current case when transitioning to the new case.
   * If the value stored is:
   * `null`: No current case selected.
   * `<0`: A flag which means that the ICU just switched and that `icuUpdate` must be executed regardless of the `mask`. (After the execution the flag is cleared)
   * `>=0` A currently selected case index.
   */
  currentCaseLViewIndex: number;
  /**
   * A list of case values which the current ICU will try to match.
   * The last value is `other` cases: any[];
   */
  /**
   * A set of OpCodes to apply in order to build up the DOM render tree for the ICU
   */
  create: I18nCreateOpCodes[];
  /**
   * A set of OpCodes to apply in order to destroy the DOM render tree for the ICU.
   */
  remove: I18nRemoveOpCodes[];
  /**
   * A set of OpCodes to apply in order to update the DOM render tree for the ICU bindings.
   */
  update: I18nUpdateOpCodes[];
}

// Note: This hack is necessary so we don't erroneously get a circular dependency failure based on types.
export const unusedValueExportToPlacateAjd = 1;
export type ParsedICUExpression =

```

```

*\nexport interface IcuExpression {\n type: IcuType;\n mainBinding: number;\n cases: string[];\n values:
(string[IcuExpression])[];\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n
*\n\nimport {DEFAULT_LOCALE_ID} from './../i18n/localization';\nimport {assertDefined} from
'../util/assert';\n\n/**\n * The locale id that the application is currently using (for translations and ICU
expressions).\n * This is the ivy version of `LOCALE_ID` that was defined as an injection token for the view
engine\n * but is now defined as a global value.\n *\nlet LOCALE_ID = DEFAULT_LOCALE_ID;\n\n/**\n * Sets
the locale id that will be used for translations and ICU expressions.\n * This is the ivy version of `LOCALE_ID` that
was defined as an injection token for the view engine\n * but is now defined as a global value.\n *\n * @param
localeId\n *\nexport function setLocaleId(localeId: string) {\n assertDefined(localeId, `Expected localeId to be
defined`);\n if (typeof localeId === 'string') {\n LOCALE_ID = localeId.toLowerCase().replace(/_/g, '-');\n
}\n}\n\n/**\n * Gets the locale id that will be used for translations and ICU expressions.\n * This is the
ivy version of `LOCALE_ID` that was defined as an injection token for the view engine\n * but is now defined as a
global value.\n *\nexport function getLocaleId(): string {\n return LOCALE_ID;\n}\n", "/*\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {assertDomNode,
assertIndexInRange} from './util/assert';\nimport {TNode, TNodeFlags, TNodeType} from
'./interfaces/node';\nimport {Renderer} from './interfaces/renderer';\nimport {RElement, RNode} from
'./interfaces/renderer_dom';\nimport {LView} from './interfaces/view';\nimport
{getInsertInFrontOfRNodeWithNoI18n, nativeInsertBefore} from './node_manipulation';\nimport {unwrapRNode}
from './util/view_utils';\n\n/**\n * Find a node in front of which `currentTNode` should be inserted (takes i18n into
account).\n *\n * This method determines the `RNode` in front of which
we should insert the `currentRNode`. This\n * takes `TNode.insertBeforeIndex` into account.\n *\n * @param
parentTNode parent `TNode`\n * @param currentTNode current `TNode` (The node which we would like to insert
into the DOM)\n * @param IView current `LView`\n *\nexport function getInsertInFrontOfRNodeWithI18n(\n
parentTNode: TNode, currentTNode: TNode, IView: LView): RNode|null {\n const tNodeInsertBeforeIndex =
currentTNode.insertBeforeIndex;\n const insertBeforeIndex =\n Array.isArray(tNodeInsertBeforeIndex) ?
tNodeInsertBeforeIndex[0] : tNodeInsertBeforeIndex;\n if (insertBeforeIndex === null) {\n return
getInsertInFrontOfRNodeWithNoI18n(parentTNode, currentTNode, IView);\n } else {\n ngDevMode &&
assertIndexInRange(IView, insertBeforeIndex);\n return unwrapRNode(IView[insertBeforeIndex]);\n
}\n}\n\n/**\n * Process `TNode.insertBeforeIndex` by adding i18n text nodes.\n *\n * See
`TNode.insertBeforeIndex`\n *\nexport function processI18nInsertBefore(\n
renderer: Renderer, childTNode: TNode, IView: LView, childRNode: RNode|RNode[],\n parentRElement:
RElement|null): void {\n const tNodeInsertBeforeIndex = childTNode.insertBeforeIndex;\n if
(Array.isArray(tNodeInsertBeforeIndex)) {\n // An array indicates that there are i18n nodes that need to be added
as children of this\n // `childRNode`. These i18n nodes were created before this `childRNode` was available and
so\n // only now can be added. The first element of the array is the normal index where we should\n // insert the
`childRNode`. Additional elements are the extra nodes to be added as children of\n // `childRNode`.\n ngDevMode && assertDomNode(childRNode);\n let i18nParent: RElement|null = childRNode as RElement;\n
let anchorRNode: RNode|null = null;\n if (!(childTNode.type & TNodeType.AnyRNode)) {\n anchorRNode =
i18nParent;\n i18nParent = parentRElement;\n }\n if (i18nParent !== null && (childTNode.flags &
TNodeFlags.isComponentHost)
=== 0) {\n for (let i = 1; i < tNodeInsertBeforeIndex.length; i++) {\n // No need to `unwrapRNode` because
all of the indexes point to i18n text nodes.\n // see `assertDomNode` below.\n const i18nChild =
IView[tNodeInsertBeforeIndex[i]];\n nativeInsertBefore(renderer, i18nParent, i18nChild, anchorRNode,
false);\n }\n }\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at

```

```

https://angular.io/license\n */\n\nimport { assertEquals } from '../util/assert';\nimport { TNode, TNodeType } from\n '../interfaces/node';\nimport { setI18nHandling } from '../node_manipulation';\nimport\n {getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore} from '../node_manipulation_i18n';\n\n/**\n * Add\n * `tNode` to `previousTNodes` list and update relevant `TNode`s in `previousTNodes` list\n *\n * `tNode.insertBeforeIndex`.\n *\n * Things to\n * keep in mind:\n * 1. All i18n text nodes are encoded as `TNodeType.Element` and are created eagerly by the\n * `i18nStart` instruction.\n * 2. All `TNodeType.Placeholder` `TNodes` are elements which will be created later by\n * `elementStart` instruction.\n * 3. `elementStart` instruction will create `TNode`s in the ascending `TNode.index`\n * order. (So a\n * smaller index `TNode` is guaranteed to be created before a larger one)\n *\n * We use the above\n * three invariants to determine `TNode.insertBeforeIndex`.\n *\n * In an ideal world `TNode.insertBeforeIndex`\n * would always be `TNode.next.index`. However,\n * this will not work because `TNode.next.index` may be larger\n * than `TNode.index` which means that\n * the next node is not yet created and therefore we can't insert in front of\n * it.\n *\n * Rule1: `TNode.insertBeforeIndex = null` if `TNode.next === null` (Initial condition, as we don't\n * know if there will be further `TNode`s inserted after.))\n * Rule2: If `previousTNode`\n * is created after the `tNode` being inserted, then\n * `previousTNode.insertBeforeNode = tNode.index` (So\n * when a new `tNode` is added we check\n * previous to see if we can update its `insertBeforeTNode`))\n *\n * See `TNode.insertBeforeIndex` for more context.\n *\n * @param previousTNodes A list of previous TNodes so\n * that we can easily traverse `TNode`s in\n * reverse order. (If `TNode` would have `previous` this would not be\n * necessary.))\n * @param newTNode A TNode to add to the `previousTNodes` list.\n */\nexport function\n addTNodeAndUpdateInsertBeforeIndex(previousTNodes: TNode[], newTNode: TNode) {\n // Start with Rule1\n ngDevMode &&\n assertEquals(newTNode.insertBeforeIndex, null, 'We expect that insertBeforeIndex is not\n set');\n\n previousTNodes.push(newTNode);\n if (previousTNodes.length > 1) {\n for (let i =\n previousTNodes.length - 2; i >= 0; i--) {\n const existingTNode = previousTNodes[i];\n // Text nodes are\n created eagerly and\n so they don't need their `indexBeforeIndex` updated.\n // It is safe to ignore them.\n if\n (!isI18nText(existingTNode)) {\n if (isNewTNodeCreatedBefore(existingTNode, newTNode) &&\n getInsertBeforeIndex(existingTNode) === null) {\n // If it was created before us in time, (and it does not yet\n have `insertBeforeIndex`)\n // then add the `insertBeforeIndex`.\n setInsertBeforeIndex(existingTNode,\n newTNode.index);\n }\n }\n }\n }\n\nfunction isI18nText(tNode: TNode): boolean {\n return\n !(tNode.type & TNodeType.Placeholder);\n}\n\nfunction isNewTNodeCreatedBefore(existingTNode: TNode,\n newTNode: TNode): boolean {\n return isI18nText(newTNode) || existingTNode.index >\n newTNode.index;\n}\n\nfunction getInsertBeforeIndex(tNode: TNode): number|null {\n const index =\n tNode.insertBeforeIndex;\n return Array.isArray(index) ? index[0] : index;\n}\n\nfunction\n setInsertBeforeIndex(tNode: TNode, value: number): void {\n const\n index = tNode.insertBeforeIndex;\n if (Array.isArray(index)) {\n // Array is stored if we have to insert child\n nodes. See `TNode.insertBeforeIndex`\n index[0] = value;\n } else {\n setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);\n tNode.insertBeforeIndex =\n value;\n }\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code\n * is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n */\n\nimport { assertEquals, assertGreaterThan, assertGreaterThanOrEqual, throwError } from '../util/assert';\nimport\n {assertTIcu, assertTNode} from '../assert';\nimport { createTNodeAtIndex } from '../instructions/shared';\nimport\n {IcuCreateOpCode, TIcu} from '../interfaces/i18n';\nimport { TIcuContainerNode, TNode, TNodeType } from\n '../interfaces/node';\nimport { LView, TView } from '../interfaces/view';\nimport { assertTNodeType } from\n '../node_assert';\nimport { setI18nHandling }\n\n from '../node_manipulation';\nimport {getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore} from\n '../node_manipulation_i18n';\nimport {addTNodeAndUpdateInsertBeforeIndex} from\n '../i18n_insert_before_index';\n\n\n/**\n * Retrieve `TIcu` at a given `index`.\n *\n * The `TIcu` can be stored either\n * directly (if it is nested ICU) OR\n * it is stored inside the `TIcuContainer` if it is top level ICU.\n *\n * The reason

```

for this is that the top level ICU need a `TNode` so that they are part of the render tree, but nested ICU's have no TNode, because we don't know ahead of time if the nested ICU is expressed (parent ICU may have selected a case which does not contain it.)

```

    @param tView Current `TView`.
    @param index Index where the value should be read from.
    ^\nextport function getTicu(tView: TView, index: number): Ticu|null {
    const value = tView.data[index] as null | Ticu | TicuContainerNode | string;
    if (value === null || typeof value === 'string') return null;

    if (ngDevMode && !(value.hasOwnProperty('tViews') || value.hasOwnProperty('currentCaseLViewIndex')))
    throw Error('We expect to get '\null'\Ticu'\TicuContainer', but got: ' + value);
    } // Here the `value.hasOwnProperty('currentCaseLViewIndex')` is a polymorphic read as it can be // either Ticu or TicuContainerNode. This is not ideal, but we still think it is OK because it // will be just two cases which fits into the browser inline cache (inline cache can take up to // 4)
    const ticu = value.hasOwnProperty('currentCaseLViewIndex') ? value as Ticu : (value as TicuContainerNode).value;
    ngDevMode && assertTicu(ticu);
    return ticu;
}

Store `Ticu` at a give `index`.
The `Ticu` can be stored either directly (if it is nested ICU) OR it is stored inside the `TicuContainer` if it is top level ICU.
The reason for this is that the top level ICU need a `TNode` so that they are part of the render tree, but nested ICU's have no TNode, because we don't know ahead of time if the nested ICU is expressed (parent ICU may have selected a case which does not contain it.)
@param tView Current `TView`.
@param index Index where the value should be stored at in `Tview.data`.
@param ticu The Ticu to store.
^\nextport function setTicu(tView: TView, index: number, ticu: Ticu): void {
const tNode = tView.data[index] as null | TicuContainerNode;
ngDevMode && assertEqual(
    tNode === null || tNode.hasOwnProperty('tViews'), true,
    'We expect to get '\null'\TicuContainer');
if (tNode === null) {
    tView.data[index] = ticu;
} else {
    ngDevMode && assertTNodeType(tNode, TNodeType.Icu);
    tNode.value = ticu;
}
}

Set `TNode.insertBeforeIndex` taking the `Array` into account.
See `TNode.insertBeforeIndex`.
^\nextport function setTNodeInsertBeforeIndex(tNode: TNode, index: number) {
ngDevMode && assertTNode(tNode);
let insertBeforeIndex = tNode.insertBeforeIndex;
if (insertBeforeIndex === null) {
setI18nHandling(getInsertInFrontOfRNodeWithI18n, processI18nInsertBefore);
insertBeforeIndex = tNode.insertBeforeIndex = [null!/* may be updated to number later */, index];
} else {
assertEqual(Array.isArray(insertBeforeIndex), true, 'Expecting array here');
(insertBeforeIndex as number[]).push(index);
}
}

Create `TNode.type=TNodeType.Placeholder` node.
See `TNodeType.Placeholder` for more information.
^\nextport function createTNodePlaceholder(
    tView: TView,
    previousTNodes: TNode[],
    index: number): TNode {
const tNode = createTNodeAtIndex(tView, index, TNodeType.Placeholder, null, null);
addTNodeAndUpdateInsertBeforeIndex(previousTNodes, tNode);
return tNode;
}

Returns current ICU case.
ICU cases are stored as index into the `Ticu.cases`.

At times it is necessary to communicate that the ICU case just switched and that next ICU update should update all bindings regardless of the mask. In such a case the we store negative numbers for cases which have just been switched. This function removes the negative flag.
^\nextport function getCurrentICUCaseIndex(ticu: Ticu, lView: LView) {
const currentCase: number|null = lView[ticu.currentCaseLViewIndex];
return currentCase === null ? currentCase : (currentCase < 0 ? ~currentCase : currentCase);
}

^\nextport function getParentFromIcuCreateOpCode(mergedCode: number): number {
return mergedCode >>> IcuCreateOpCode.SHIFT_PARENT;
}

^\nextport function getRefFromIcuCreateOpCode(mergedCode: number): number {
return (mergedCode & IcuCreateOpCode.MASK_REF) >>> IcuCreateOpCode.SHIFT_REF;
}

^\nextport function getInstructionFromIcuCreateOpCode(mergedCode: number): number {
return mergedCode & IcuCreateOpCode.MASK_INSTRUCTION;
}

^\nextport function icuCreateOpCode(opCode: IcuCreateOpCode, parentIdx: number, refIdx: number) {
ngDevMode && assertGreaterThanOrEqual(parentIdx, 0, 'Missing parent index');
ngDevMode && assertGreaterThanOrEqual(refIdx, 0, 'Missing ref index');
return opCode | parentIdx << IcuCreateOpCode.SHIFT_PARENT | refIdx << IcuCreateOpCode.SHIFT_REF;
}

```

```

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style license that can be found in the LICENSE file at https://angular.io/license
import { RuntimeError,
RuntimeErrorCodes } from '../errors';
import { getPluralCase } from '../i18n/localization';
import { assertDefined,
assertDomNode, assertEqual, assertGreaterThan, assertIndexInRange, throwError } from '../util/assert';
import {
assertIndexInExpandoRange, assertTIcu } from './assert';
import { attachPatchData } from
'./context_discovery';
import { elementPropertyInternal, setElementAttribute } from './instructions/shared';
import
{ ELEMENT_MARKER,
I18nCreateOpCode, I18nCreateOpCodes, I18nUpdateOpCode, I18nUpdateOpCodes, ICU_MARKER,
IcuCreateOpCode, IcuCreateOpCodes, IcuType, TI18n, TIcu } from './interfaces/i18n';
import { TNode } from
'./interfaces/node';
import { RElement, RNode, RText } from './interfaces/renderer_dom';
import { SanitizerFn }
from './interfaces/sanitization';
import { HEADER_OFFSET, LView, RENDERER, TView } from
'./interfaces/view';
import { createCommentNode, createElementNode, createTextNode, nativeInsertBefore,
nativeParentNode, nativeRemoveNode, updateTextNode } from './node_manipulation';
import { getBindingIndex }
from './state';
import { renderStringify } from './util/stringify_utils';
import { getNativeByIndex, unwrapRNode }
from './util/view_utils';
import { getLocaleId } from './i18n_locale_id';
import { getCurrentICUCaseIndex,
getParentFromIcuCreateOpCode, getRefFromIcuCreateOpCode, getTIcu } from './i18n_util';
}

 * Keep track of which input bindings in `i18nExp` have changed.
 * This is used to efficiently update expressions in i18n only when the corresponding input has changed.
 * 1) Each bit represents which of the `i18nExp` has changed.
 * 2) There are 32 bits allowed in JS.
 * 3) Bit 32 is special as it is shared for all changes past 32. (In other words if you have more than 32 `i18nExp` then all changes past 32nd `i18nExp` will be mapped to same bit. This means that we may end up changing more than we need to. But i18n expressions with 32 bindings is rare so in practice it should not be an issue.)
 * let changeMask = 0b0;
 * Keeps track of which bit needs to be updated in `changeMask`
 * This value gets incremented on every call to `i18nExp`
 * let changeMaskCounter = 0;
 * Keep track of which input bindings in `i18nExp` have changed.
 * `setMaskBit` gets invoked by each call to `i18nExp`.
 * @param hasChange did `i18nExp` detect a change.
 * export function setMaskBit(hasChange:
boolean) {
  if (hasChange) {
    changeMask = changeMask | (1 << Math.min(changeMaskCounter, 31));
  }
  changeMaskCounter++;
}
 * export function applyI18n(tView: TView, IView: LView, index: number) {
  if (changeMaskCounter > 0) {
    ngDevMode && assertDefined(tView, `tView should be defined`);
    const tI18n = tView.data[index] as TI18n | I18nUpdateOpCodes;
    // When `index` points to an `i18nAttributes` then we have an array otherwise `TI18n`
    const updateOpCodes: I18nUpdateOpCodes = Array.isArray(tI18n) ? tI18n as I18nUpdateOpCodes : (tI18n as TI18n).update;
    const bindingsStartIndex = getBindingIndex() - changeMaskCounter - 1;
    applyUpdateOpCodes(tView, IView, updateOpCodes, bindingsStartIndex, changeMask);
  }
  // Reset changeMask & maskBit to default for the next update cycle
  changeMask = 0b0;
  changeMaskCounter = 0;
}

 * Apply `I18nCreateOpCodes` op-codes as stored in `TI18n.create`.
 * Creates text (and comment)
nodes which are internationalized.
 * @param IView Current IView
 * @param createOpCodes Set of op-codes to apply
 * @param parentRNode Parent node (so that direct children can be added eagerly) or `null` if it is a root node.
 * @param insertInFrontOf DOM node that should be used as an anchor.
 * export function applyCreateOpCodes(IView: LView, createOpCodes: I18nCreateOpCodes, parentRNode: RElement|null, insertInFrontOf: RElement|null): void {
  const renderer = IView[RENDERER];
  for (let i = 0; i < createOpCodes.length; i++) {
    const opCode = createOpCodes[i] as any;
    const text = createOpCodes[i] as string;
    const isComment = (opCode & I18nCreateOpCode.COMMENT) === I18nCreateOpCode.COMMENT;
    const appendNow = (opCode & I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY;
    const index = opCode >>> I18nCreateOpCode.SHIFT;
    let rNode = IView[index];
    if (rNode === null) {
      // We only create

```

```

new DOM nodes if they don't already exist: If ICU switches case back to a\n // case which was already
instantiated, no need to create new DOM nodes.\n rNode = IView[index] =\n isComment ?
renderer.createComment(text) : createTextNode(renderer, text);\n }\n if (appendNow && parentRNode !==
null) {\n nativeInsertBefore(renderer, parentRNode, rNode, insertInFrontOf, false);\n }\n }\n\n/n/**\n *
Apply `I18nMutateOpCodes` OpCodes.\n *\n * @param tView Current `TVIEW`\n *\n * @param mutableOpCodes
Mutable OpCodes to process\n *\n * @param IView Current `LVIEW`\n *\n * @param anchorRNode place where the i18n
node should be inserted.\n */\nexport function applyMutableOpCodes(\n tView: TVIEW, mutableOpCodes:
IcuCreateOpCodes, IView: LVIEW, anchorRNode: RNode): void {\n ngDevMode &&
assertDomNode(anchorRNode);\n const renderer = IView[RENDERER];\n // `rootIdx` represents the node into
which all inserts happen.\n let rootIdx: number|null = null;\n // `rootRNode` represents
the real node into which we insert. This can be different from\n // `IView[rootIdx]` if we have projection.\n // -
null we don't have a parent (as can be the case in when we are inserting into a root of\n // `LVIEW` which has no
parent.)\n // - `RElement` The element representing the root after taking projection into account.\n let rootRNode!:
RElement|null;\n for (let i = 0; i < mutableOpCodes.length; i++) {\n const opCode = mutableOpCodes[i];\n if
(typeof opCode === 'string') {\n const textNodeIndex = mutableOpCodes[++i] as number;\n if
(IView[textNodeIndex] === null) {\n ngDevMode && ngDevMode.rendererCreateTextNode++;\n
ngDevMode && assertIndexInRange(IView, textNodeIndex);\n IView[textNodeIndex] =
createTextNode(renderer, opCode);\n }\n } else if (typeof opCode === 'number') {\n switch (opCode &
IcuCreateOpCode.MASK_INSTRUCTION) {\n case IcuCreateOpCode.AppendChild:\n const parentIdx =
getParentFromIcuCreateOpCode(opCode);\n
if (rootIdx === null) {\n // The first operation should save the `rootIdx` because the first operation\n
// must insert into the root. (Only subsequent operations can insert into a dynamic\n // parent)\n
rootIdx = parentIdx;\n rootRNode = nativeParentNode(renderer, anchorRNode);\n }\n let
insertInFrontOf: RNode|null;\n let parentRNode: RElement|null;\n if (parentIdx === rootIdx) {\n
insertInFrontOf = anchorRNode;\n parentRNode = rootRNode;\n } else {\n insertInFrontOf =
null;\n parentRNode = unwrapRNode(IView[parentIdx]) as RElement;\n }\n // FIXME(misko):
Refactor with `processI18nText`\n if (parentRNode !== null) {\n // This can happen if the `LVIEW` we
are adding to is not attached to a parent `LVIEW`.\n // In such a case there is no `root` we can attach to.
This is fine, as we still need to\n // create the elements. When the `LVIEW` gets later added to a parent these
`root` nodes\n // get picked up and added.\n ngDevMode && assertDomNode(parentRNode);\n
const refIdx = getRefFromIcuCreateOpCode(opCode);\n ngDevMode && assertGreaterThan(refIdx,
HEADER_OFFSET, 'Missing ref');\n // `unwrapRNode` is not needed here as all of these point to RNodes as
part of the i18n\n // which can't have components.\n const child = IView[refIdx] as RElement;\n
ngDevMode && assertDomNode(child);\n nativeInsertBefore(renderer, parentRNode, child, insertInFrontOf,
false);\n const tIcu = getTIcu(tView, refIdx);\n if (tIcu !== null && typeof tIcu === 'object') {\n
// If we just added a comment node which has ICU then that ICU may have already been\n // rendered and
therefore we need to re-add it here.\n
ngDevMode && assertTIcu(tIcu);\n const caseIndex = getCurrentICUCaseIndex(tIcu, IView);\n
if (caseIndex !== null) {\n applyMutableOpCodes(tView, tIcu.create[caseIndex], IView,
IView[tIcu.anchorIdx]);\n }\n }\n }\n break;\n case IcuCreateOpCode.Attr:\n
const elementNodeIndex = opCode >>> IcuCreateOpCode.SHIFT_REF;\n const attrName =
mutableOpCodes[++i] as string;\n const attrValue = mutableOpCodes[++i] as string;\n // This code is
used for ICU expressions only, since we don't support\n // directives/components in ICUs, we don't need to
worry about inputs here\n setElementAttribute(\n renderer, getNativeByIndex(elementNodeIndex,
IView) as RElement, null, null, attrName,\n attrValue, null);\n break;\n default:\n if
(ngDevMode) {\n throw new RuntimeError(\n
RuntimeErrorCode.INVALID_I18N_STRUCTURE,\n

```

```

    `Unable to determine the type of mutate operation for "\${opCode}\`";\n      }\n    } else {\n
switch (opCode) {\n      case ICU_MARKER:\n        const commentValue = mutableOpCodes[++i] as string;\n
        const commentNodeIndex = mutableOpCodes[++i] as number;\n          if (IView[commentNodeIndex] === null)\n
{\n          ngDevMode &&\n            assertEquals(\n              typeof commentValue, 'string',\n            `Expected "\${commentValue}`" to be a comment node value`);\n          ngDevMode &&\n            ngDevMode.rendererCreateComment++;\n            ngDevMode && assertIndexInExpandoRange(IView,\n            commentNodeIndex);\n          const commentRNode = IView[commentNodeIndex] =\n            createCommentNode(renderer, commentValue);\n            //FIXME(misko): Attaching patch data is only needed for\n            the root (Also add tests)\n            attachPatchData(commentRNode, IView);\n          }\n          break;\n        case ELEMENT_MARKER:\n          const tagName = mutableOpCodes[++i] as string;\n
          const elementNodeIndex = mutableOpCodes[++i] as number;\n          if (IView[elementNodeIndex] === null) {\n
            ngDevMode &&\n              assertEquals(\n                typeof tagName, 'string',\n              `Expected\n            "\${tagName}`" to be an element node tag name`);\n            ngDevMode &&\n              ngDevMode.rendererCreateElement++;\n              ngDevMode && assertIndexInExpandoRange(IView,\n              elementNodeIndex);\n            const elementRNode = IView[elementNodeIndex] =\n              createElementNode(renderer, tagName, null);\n              //FIXME(misko): Attaching patch data is only needed for\n              the root (Also add tests)\n              attachPatchData(elementRNode, IView);\n            }\n            break;\n          default:\n            ngDevMode &&\n              throwError(`Unable to determine the type of mutate operation for "\${opCode}\`");\n            }\n          }\n        }\n      }\n\n    *\n    * Apply `I18nUpdateOpCodes` OpCodes\n    * @param tView Current `TView`\n    * @param IView Current `LView`\n    * @param updateOpCodes OpCodes to process\n    * @param bindingsStartIndex\n    Location of the first `i18nApply`\n    * @param changeMask Each bit corresponds to a `i18nExp` (Counting\n    backwards from\n    * `bindingsStartIndex`)\n    *\n    ^\n    ^next export function applyUpdateOpCodes(\n      tView: TView, IView:\n      LView, updateOpCodes: I18nUpdateOpCodes, bindingsStartIndex: number,\n      changeMask: number) {\n      for (let i\n      = 0; i < updateOpCodes.length; i++) {\n        // bit code to check if we should apply the next update\n        const checkBit\n        = updateOpCodes[i] as number;\n        // Number of opCodes to skip until next set of update codes\n        const skipCodes\n        = updateOpCodes[++i] as number;\n        if (checkBit & changeMask) {\n          // The value has been updated since last\n          checked\n          let value = `;\n          for (let j = i + 1; j <= (i + skipCodes); j++) {\n            const opCode =\n            updateOpCodes[j];\n            if (typeof opCode == 'string') {\n              value += opCode;\n            } else if (typeof opCode == 'number') {\n              if (opCode < 0) {\n                // Negative opCode represent `i18nExp` values offset.\n                value +=\n                renderStringify(IView[bindingsStartIndex - opCode]);\n              } else {\n                const nodeIndex = (opCode >>>\n                I18nUpdateOpCode.SHIFT_REF);\n                switch (opCode & I18nUpdateOpCode.MASK_OPCODE) {\n                  case I18nUpdateOpCode.Attr:\n                    const propName = updateOpCodes[++j] as string;\n                    const\n                    sanitizeFn = updateOpCodes[++j] as SanitizerFn | null;\n                    const tNodeOrTagName =\n                    tView.data[nodeIndex] as TNode | string;\n                    ngDevMode && assertDefined(tNodeOrTagName, 'Expecting\n                    TNode or string');\n                    if (typeof tNodeOrTagName === 'string') {\n                      // IF we don't have a `TNode`,\n                      then we are an element in ICU (as ICU content does\n                      // not have\n                      TNode), in which case we know that there are no directives, and hence\n                      // we use attribute setting.\n                      setElementAttribute(\n                        IView[RENDERER], IView[nodeIndex], null, tNodeOrTagName,\n                        propName, value,\n                        sanitizeFn);\n                    } else {\n                      elementPropertyInternal(\n                        tView, tNodeOrTagName, IView, propName, value, IView[RENDERER], sanitizeFn,\n                        false);\n                    }\n                    break;\n                  case I18nUpdateOpCode.Text:\n                    const rText = IView[nodeIndex] as\n                    RText | null;\n                    rText !== null && updateTextNode(IView[RENDERER], rText, value);\n                    break;\n                  case I18nUpdateOpCode.IcuSwitch:\n                    applyIcuSwitchCase(tView, getTicu(tView,\n                    nodeIndex)!, IView, value);\n                    break;\n                  case I18nUpdateOpCode.IcuUpdate:\n                    applyIcuUpdateCase(tView, getTicu(tView,

```

```

nodeIndex)!, bindingsStartIndex, IView);
break;
}
}
} else {
const opCode = updateOpCodes[i + 1] as number;
if (opCode > 0 && (opCode &
I18nUpdateOpCode.MASK_OPCODE) === I18nUpdateOpCode.IcuUpdate) {
// Special case for the
`icuUpdateCase`. It could be that the mask did not match, but
// we still need to execute `icuUpdateCase`
because the case has changed recently due to
// previous `icuSwitchCase` instruction. (`icuSwitchCase` and
`icuUpdateCase` always come in
// pairs.)
const nodeIndex = (opCode >>>
I18nUpdateOpCode.SHIFT_REF);
const tIcu = getTicu(tView, nodeIndex)!;
const currentIndex =
IView[tIcu.currentCaseLViewIndex];
if (currentIndex < 0) {
applyIcuUpdateCase(tView, tIcu,
bindingsStartIndex, IView);
}
}
i += skipCodes;
}
}
}

* Apply OpCodes associated
with updating
an existing ICU.
@param tView Current `TView`
@param tIcu Current `Ticu`
@param bindingsStartIndex Location of the first `I18nApply`
@param IView Current `LView`
/function
applyIcuUpdateCase(tView: TView, tIcu: Ticu, bindingsStartIndex: number, IView: LView) {
ngDevMode &&
assertIndexInRange(IView, tIcu.currentCaseLViewIndex);
let activeCaseIndex =
IView[tIcu.currentCaseLViewIndex];
if (activeCaseIndex !== null) {
let mask = changeMask;
if
(activeCaseIndex < 0) {
// Clear the flag.
// Negative number means that the ICU was freshly created and
we need to force the update.
activeCaseIndex = IView[tIcu.currentCaseLViewIndex] = ~activeCaseIndex;
// -1 is same as all bits on, which simulates creation since it marks all bits dirty
mask = -1;
}
applyUpdateOpCodes(tView, IView, tIcu.update[activeCaseIndex], bindingsStartIndex, mask);
}
}

* Apply OpCodes associated with switching a case on ICU.
This involves tearing down existing case and then building up a new case.
@param tView Current
`TView`
@param tIcu Current `Ticu`
@param IView Current `LView`
@param value Value of the case
to update to.
/function
applyIcuSwitchCase(tView: TView, tIcu: Ticu, IView: LView, value: string) {
//
Rebuild a new case for this ICU
const caseIndex = getCaseIndex(tIcu, value);
let activeCaseIndex =
getCurrentICUCaseIndex(tIcu, IView);
if (activeCaseIndex !== caseIndex) {
applyIcuSwitchCaseRemove(tView, tIcu, IView);
IView[tIcu.currentCaseLViewIndex] = caseIndex === null ?
null : ~caseIndex;
if (caseIndex !== null) {
// Add the nodes for the new case
const anchorRNode =
IView[tIcu.anchorIdx];
if (anchorRNode) {
ngDevMode && assertDomNode(anchorRNode);
applyMutableOpCodes(tView, tIcu.create[caseIndex], IView, anchorRNode);
}
}
}

* Apply
OpCodes associated with tearing ICU
case.
This involves tearing down existing case and then building up a new case.
@param tView
Current `TView`
@param tIcu Current `Ticu`
@param IView Current `LView`
/function
applyIcuSwitchCaseRemove(tView: TView, tIcu: Ticu, IView: LView) {
let activeCaseIndex =
getCurrentICUCaseIndex(tIcu, IView);
if (activeCaseIndex !== null) {
const removeCodes =
tIcu.remove[activeCaseIndex];
for (let i = 0; i < removeCodes.length; i++) {
const nodeOrIcuIndex =
removeCodes[i] as number;
if (nodeOrIcuIndex > 0) {
// Positive numbers are `RNode`s.
const
rNode = getNativeByIndex(nodeOrIcuIndex, IView);
rNode !== null &&
nativeRemoveNode(IView[RENDERER], rNode);
} else {
// Negative numbers are ICUs
applyIcuSwitchCaseRemove(tView, getTicu(tView, ~nodeOrIcuIndex)!, IView);
}
}
}

Returns the index of the current case of an ICU expression depending on the main binding
value.
@param icuExpression
@param bindingValue The value of the main binding used by this ICU
expression.
/function
getCaseIndex(icuExpression: Ticu, bindingValue: string): number|null {
let index =
icuExpression.cases.indexOf(bindingValue);
if (index === -1) {
switch (icuExpression.type) {
case
IcuType.plural: {
const resolvedCase = getPluralCase(bindingValue, getLocaleId());
index =
icuExpression.cases.indexOf(resolvedCase);
if (index === -1 && resolvedCase !== 'other') {
index =
icuExpression.cases.indexOf('other');
}
break;
}
case IcuType.select: {
index =
icuExpression.cases.indexOf('other');
break;
}
}
}
return index === -1 ? null :
index;
}

*/
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```



```

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 * found in the LICENSE file at https://angular.io/license
 */
import { assertDomNode, assertNumber, assertNumberInRange } from '../util/assert';
import { EMPTY_ARRAY } from '../util/empty';
import { assertTICu, assertTNodeForLView } from './assert';
import { getCurrentICUCaseIndex } from './i18n/i18n_util';
import { I18nRemoveOpCodes, TICu } from './interfaces/i18n';
import { TICuContainerNode } from './interfaces/node';
import { RNode } from './interfaces/renderer_dom';
import { LView, TVIEW } from './interfaces/view';
export function loadIcuContainerVisitor() {
  const _stack: any[] = [];
  let _index: number = -1;
  let _lView: LView;
  let _removes: I18nRemoveOpCodes;
  /**
   * Retrieves a set of root nodes from `TICu.remove`. Used by
   * `TNodeType.ICUContainer` to determine which root belong to the ICU.
   * Example of usage.
   * ```
   * const nextRNode = icuContainerIteratorStart(tIcuContainerNode, lView);
   * let rNode: RNode|null;
   * while(rNode = nextRNode()) {
   *   console.log(rNode);
   * }
   * ```
   * @param tIcuContainerNode Current `TICuContainerNode`
   * @param lView `LView`
   * where the `RNode`s should be looked up.
   */
  function icuContainerIteratorStart(tIcuContainerNode: TICuContainerNode, lView: LView): () => RNode | null {
    _lView = lView;
    while (_stack.length) _stack.pop();
    ngDevMode && assertTNodeForLView(tIcuContainerNode, lView);
    enterIcu(tIcuContainerNode.value, lView);
    return icuContainerIteratorNext;
  }
  function enterIcu(tIcu: TICu, lView: LView) {
    _index = 0;
    const currentCase = getCurrentICUCaseIndex(tIcu, lView);
    if (currentCase !== null) {
      ngDevMode && assertNumberInRange(currentCase, 0, tIcu.cases.length - 1);
      _removes = tIcu.remove[currentCase];
    } else {
      _removes = EMPTY_ARRAY as any;
    }
  }
  function icuContainerIteratorNext(): RNode | null {
    if (_index < _removes.length) {
      const removeOpCode = _removes[_index++] as number;
      ngDevMode && assertNumber(removeOpCode, 'Expecting OpCode number');
      if (removeOpCode > 0) {
        const rNode = _lView[removeOpCode];
        ngDevMode && assertDomNode(rNode);
        return rNode;
      } else {
        _stack.push(_index, _removes);
        // ICUs are represented by negative indices
        const tIcuIndex = ~removeOpCode;
        const tIcu = _lView[TVIEW].data[tIcuIndex] as TICu;
        ngDevMode && assertTICu(tIcu);
        enterIcu(tIcu, _lView);
        return icuContainerIteratorNext();
      }
    } else {
      if (_stack.length === 0) {
        return null;
      } else {
        _removes = _stack.pop();
        _index = _stack.pop();
        return icuContainerIteratorNext();
      }
    }
  }
  return icuContainerIteratorStart;
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
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 * found in the LICENSE file at
 * https://angular.io/license
 */
import { assertNumber, assertString } from '../util/assert';
import { ELEMENT_MARKER, I18nCreateOpCode, I18nCreateOpCodes, I18nRemoveOpCodes, I18nUpdateOpCode, I18nUpdateOpCodes, ICU_MARKER, IcuCreateOpCode, IcuCreateOpCodes } from './interfaces/i18n';
import { getInstructionFromIcuCreateOpCode, getParentFromIcuCreateOpCode, getRefFromIcuCreateOpCode } from './i18n_util';
/**
 * Converts `I18nCreateOpCodes` array into a human readable format.
 * This function is attached to the `I18nCreateOpCodes.debug` property if `ngDevMode` is enabled.
 * This function provides a human readable view of the opcodes. This is useful when debugging the
 * application as well as writing more readable tests.
 * @param this `I18nCreateOpCodes` if attached as a method.
 * @param opcodes `I18nCreateOpCodes` if invoked as a function.
 */
export function i18nCreateOpCodesToString(this: I18nCreateOpCodes | void, opcodes?: I18nCreateOpCodes): string[] {
  const createOpCodes: I18nCreateOpCodes = opcodes || (Array.isArray(this) ? this : [] as any);
  let lines: string[] = [];
  for (let i = 0; i < createOpCodes.length; i++) {
    const opCode = createOpCodes[i] as any;
    const text = createOpCodes[i] as string;
    const isComment = (opCode & I18nCreateOpCode.COMMENT) === I18nCreateOpCode.COMMENT;
    const appendNow = (opCode & I18nCreateOpCode.APPEND_EAGERLY) === I18nCreateOpCode.APPEND_EAGERLY;
    const index = opCode >>> I18nCreateOpCode.SHIFT;
    lines.push(`lView[${index}] = document.${isComment ? 'createComment' : 'createText'}(${JSON.stringify(text)});`);
    if (appendNow) {

```

lines.push(`parent.appendChild(IView[\${index}]);`);  
 `I18nUpdateOpCodes` array into a human readable format.  
 `I18nUpdateOpCodes.debug` property if `ngDevMode` is enabled.  
 This function provides a human readable view of the opcodes.

This is useful when debugging the application as well as writing more readable tests.  
 @param this `I18nUpdateOpCodes` if attached as a method.  
 @param opcodes `I18nUpdateOpCodes` if invoked as a function.  
 ^next export function i18nUpdateOpCodesToString(  
 this: I18nUpdateOpCodes|void, opcodes?: I18nUpdateOpCodes): string[] {  
 const parser = new OpCodeParser(opcodes || (Array.isArray(this) ? this : []));  
 let lines: string[] = [];  
 function consumeOpCode(value: number): string {  
 const ref = value >>> I18nUpdateOpCode.SHIFT\_REF;  
 const opCode = value & I18nUpdateOpCode.MASK\_OPCODE;  
 switch (opCode) {  
 case I18nUpdateOpCode.Text:  
 return `(IView[\${ref}] as Text).textContent = \$\$\$`;  
 case I18nUpdateOpCode.Attr:  
 const attrName = parser.consumeString();  
 const sanitizationFn = parser.consumeFunction();  
 const value = sanitizationFn ? `(\${sanitizationFn})(\$\$\$)` : \$\$\$`;  
 return `(IView[\${ref}]`

as Element).setAttribute(`\${attrName}`, \${value})`;  
 case I18nUpdateOpCode.IcuSwitch:  
 return `icuSwitchCase[\${ref}], \$\$\$`;  
 case I18nUpdateOpCode.IcuUpdate:  
 return `icuUpdateCase[\${ref}]`;  
 }  
 throw new Error('unexpected OpCode');  
 }  
 while (parser.hasMore()) {  
 let mask = parser.consumeNumber();  
 let size = parser.consumeNumber();  
 const end = parser.i + size;  
 const statements: string[] = [];  
 let statement = ``;  
 while (parser.i < end) {  
 let value = parser.consumeNumberOrString();  
 if (typeof value === 'string') {  
 statement += value; } else if (value < 0) {  
 // Negative numbers are ref indexes  
 // Here `i` refers to current binding index. It is to signify that the value is relative,  
 // rather than absolute.  
 statement += `(IView[\${i} + value + ])`;  
 } else {  
 // Positive numbers are operations.  
 const opCodeText = consumeOpCode(value);  
 statements.push(opCodeText.replace('\$\$\$', `` + statement + ``) + `;`);  
 statement = ``;  
 }  
 }  
 lines.push(`if (mask & 0b\${mask.toString(2)}) { \${statements.join(' ')} }`);  
 }  
 return lines; }  
 Converts `I18nCreateOpCodes` array into a human readable format.  
 This function is attached to the `I18nCreateOpCodes.debug` if `ngDevMode` is enabled.  
 This function provides a human readable view of the opcodes.  
 This is useful when debugging the application as well as writing more readable tests.  
 @param this `I18nCreateOpCodes` if attached as a method.  
 @param opcodes `I18nCreateOpCodes` if invoked as a function.  
 ^next export function icuCreateOpCodesToString(  
 this: IcuCreateOpCodes|void, opcodes?: IcuCreateOpCodes): string[] {  
 const parser = new OpCodeParser(opcodes || (Array.isArray(this) ? this : []));  
 let lines: string[] = [];  
 function consumeOpCode(opCode: number): string {  
 const parent = getParentFromIcuCreateOpCode(opCode);  
 const ref = getRefFromIcuCreateOpCode(opCode);  
 switch (getInstructionFromIcuCreateOpCode(opCode)) {  
 case IcuCreateOpCode.AppendChild:  
 return `(IView[\${parent}] as Element).appendChild(IView[\${lastRef}])`;  
 case IcuCreateOpCode.Attr:  
 return `(IView[\${ref}] as Element).setAttribute("\${parser.consumeString()}", "\${parser.consumeString()}")`;  
 }  
 throw new Error('Unexpected OpCode: ' + getInstructionFromIcuCreateOpCode(opCode));  
 }  
 let lastRef = -1;  
 while (parser.hasMore()) {  
 let value = parser.consumeNumberStringOrMarker();  
 if (value === ICU\_MARKER) {  
 const text = parser.consumeString();  
 lastRef = parser.consumeNumber();  
 lines.push(`IView[\${lastRef}] = document.createComment("\${text}")`);  
 } else if (value === ELEMENT\_MARKER) {  
 const text = parser.consumeString();  
 lastRef = parser.consumeNumber();  
 lines.push(`IView[\${lastRef}] = document.createElement("\${text}")`);  
 } else if (typeof value === 'string') {  
 lastRef = parser.consumeNumber();  
 lines.push(`IView[\${lastRef}] = document.createTextNode("\${value}")`);  
 } else if (typeof value === 'number') {  
 const line = consumeOpCode(value);  
 line && lines.push(line);  
 } else {  
 throw new Error('Unexpected value');  
 }  
 }  
 return lines; }  
 Converts `I18nRemoveOpCodes` array into a human readable format.  
 This function is attached to the

```

`I18nRemoveOpCodes.debug` if `ngDevMode` is enabled. This * function provides a human readable view of the
opcodes. This is useful when debugging the * application as well as writing more readable tests. * @param
this `I18nRemoveOpCodes` if attached as a method. * @param opcodes `I18nRemoveOpCodes` if invoked as a
function. * ^/next export function i18nRemoveOpCodesToString(\n this: I18nRemoveOpCodes|void, opcodes?:
I18nRemoveOpCodes): string[]
{\n  const removeCodes = opcodes || (Array.isArray(this) ? this : []);\n  let lines: string[] = [];\n  for (let i = 0; i <
removeCodes.length; i++) {\n    const nodeOrIcuIndex = removeCodes[i] as number;\n    if (nodeOrIcuIndex > 0)
{\n      // Positive numbers are `RNode`s.\n      lines.push(`remove(IView[${nodeOrIcuIndex}]`));\n    } else {\n      //
Negative numbers are ICUs\n      lines.push(`removeNestedICU(${~nodeOrIcuIndex})`);\n    }\n  }\n  return
lines;\n}\n\n\nclass OpCodeParser {\n  i: number = 0;\n  codes: any[];\n  constructor(codes: any[]) {\n    this.codes
= codes;\n  }\n  hasMore() {\n    return this.i < this.codes.length;\n  }\n  consumeNumber(): number {\n    let
value = this.codes[this.i++];\n    assertNumber(value, 'expecting number in OpCode');\n    return value;\n  }\n  consumeString(): string {\n    let value = this.codes[this.i++];\n    assertString(value, 'expecting string in OpCode');\n    return value;\n  }\n  consumeFunction(): Function|null
{\n    let value = this.codes[this.i++];\n    if (value === null || typeof value === 'function') {\n      return value;\n    }\n    throw new Error('expecting function in OpCode');\n  }\n  consumeNumberOrString(): number|string {\n    let
value = this.codes[this.i++];\n    if (typeof value === 'string') {\n      return value;\n    }\n    assertNumber(value,
'expecting number or string in OpCode');\n    return value;\n  }\n  consumeNumberStringOrMarker():
number|string|ICU_MARKER|ELEMENT_MARKER {\n    let value = this.codes[this.i++];\n    if (typeof value ===
'string' || typeof value === 'number' || value == ICU_MARKER ||\n      value == ELEMENT_MARKER) {\n      return
value;\n    }\n    assertNumber(value, 'expecting number, string, ICU_MARKER or ELEMENT_MARKER in
OpCode');\n    return value;\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * ^/import './../util/ng_dev_mode';\nimport './../util/ng_i18n_closure_mode';\n\nimport
{getTemplateContent, URI_ATTRS, VALID_ATTRS, VALID_ELEMENTS} from
'./../sanitization/html_sanitizer';\nimport {getInertBodyHelper} from './../sanitization/inert_body';\nimport
{ _sanitizeUrl } from './../sanitization/url_sanitizer';\nimport {assertDefined, assertEqual, assertGreaterThanOrEqual,
assertOneOf, assertString} from './../util/assert';\nimport {CharCode} from './../util/char_code';\nimport
{loadIcuContainerVisitor} from './instructions/i18n_icu_container_visitor';\nimport {allocExpando,
createTNodeAtIndex} from './instructions/shared';\nimport {getDocument} from './interfaces/document';\nimport
{ELEMENT_MARKER, I18nCreateOpCode, I18nCreateOpCodes, I18nRemoveOpCodes, I18nUpdateOpCode,
I18nUpdateOpCodes, ICU_MARKER, IcuCreateOpCode, IcuCreateOpCodes, IcuExpression, IcuType, TI18n,
TIcu} from './interfaces/i18n';\nimport {TNode, TNodeType} from './interfaces/node';\nimport
{SanitizerFn} from './interfaces/sanitization';\nimport {HEADER_OFFSET, LView, TView} from
'./interfaces/view';\nimport {getCurrentParentTNode, getCurrentTNode, setCurrentTNode} from './state';\nimport
{attachDebugGetter} from './util/debug_utils';\n\nimport {i18nCreateOpCodesToString,
i18nRemoveOpCodesToString, i18nUpdateOpCodesToString, icuCreateOpCodesToString} from
'./i18n_debug';\nimport {addTNodeAndUpdateInsertBeforeIndex} from './i18n_insert_before_index';\nimport
{ensureIcuContainerVisitorLoaded} from './i18n_tree_shaking';\nimport {createTNodePlaceholder,
icuCreateOpCode, setTIcu, setTNodeInsertBeforeIndex} from './i18n_util';\n\n\nconst BINDING_REGEXP =
/((\d+):?\d*/gi;\nconst ICU_REGEXP = /({\s*\d+:\d*\s*,\s*\S{6}\s*,[\s\S]*})/gi;\nconst NESTED_ICU =
/((\d+);?\nconst ICU_BLOCK_REGEXP = /^(?!\s*(\d+:\d*)\s*,\s*(select|plural))\s*,./;\nconst MARKER =
``;\nconst SUBTEMPLATE_REGEXP = /\s*(\d+:\d+)/gi;\nconst PH_REGEXP =
/(\s*#[#\d+]:?\d*/gi;\n\n/**\n * Angular Dart introduced &nbsp; as a placeholder for non-removable space, see:\n
* 
https://github.com/dart-
lang/angular/blob/0bb611387d29d65b5af7f9d2515ab571fd3fbee4/\_tests/test/compiler/preserve\_whitespace\_test.dart
#L25-L32\n * In Angular Dart &nbsp; is converted to the 0xE500 PUA (Private Use Areas) unicode character\n *
and later on replaced by a space. We are re-implementing the same idea here, since translations\n * might contain

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this special character.\n *\nconst NGSP_UNICODE_REGEXP = /\uE500/g;\nfunction replaceNgsp(value: string):
string {\n  return value.replace(NGSP_UNICODE_REGEXP, ' ');}\n}\n\n/**\n * Create dynamic nodes from i18n
translation block.\n *\n * - Text nodes are created synchronously\n * - TNodes are linked into tree lazily\n *\n *
@param tView Current `TView`\n * @parentTNodeIndex index to the parent TNode of this i18n block\n * @param
IView Current `LView`\n * @param index Index of `i18nStart` instruction.\n * @param message
Message to translate.\n * @param subTemplateIndex Index into the sub template of message translation. (ie in case
of\n * `ngIf`) (-1 otherwise)\n * ^\nexport function i18nStartFirstCreatePass(\n  tView: TView,
parentTNodeIndex: number, IView: LView, index: number, message: string,\n  subTemplateIndex: number) {\n
const rootTNode = getCurrentParentTNode();\n  const createOpCodes: I18nCreateOpCodes = [] as any;\n  const
updateOpCodes: I18nUpdateOpCodes = [] as any;\n  const existingTNodeStack: TNode[][] = [[]];\n  if
(ngDevMode) {\n    attachDebugGetter(createOpCodes, i18nCreateOpCodesToString);\n    attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n  }\n\n  message =
getTranslationForTemplate(message, subTemplateIndex);\n  const msgParts =
replaceNgsp(message).split(PH_REGEXP);\n  for (let i = 0; i < msgParts.length; i++) {\n    let value =
msgParts[i];\n    if ((i & 1) === 0) {\n      // Even indexes are text (including bindings & ICU expressions)\n      const
parts = i18nParseTextIntoPartsAndICU(value);\n      for (let j = 0; j < parts.length; j++) {\n        let part = parts[j];\n        if ((j & 1) === 0) {\n          // `j` is odd therefore `part` is string\n          const text = part as string;\n          ngDevMode && assertString(text, 'Parsed ICU part should be string');\n          if (text !== '') {\n
i18nStartFirstCreatePassProcessTextNode(\n            tView, rootTNode, existingTNodeStack[0], createOpCodes,
updateOpCodes, IView, text);\n          }\n        } else {\n          // `j` is Even therefor `part` is an `ICUExpression`\n
const icuExpression: IcuExpression = part as IcuExpression;\n          // Verify that ICU expression has the right
shape. Translations might contain invalid\n          // constructions (while original messages were correct), so ICU
parsing at runtime may\n          // not succeed (thus `icuExpression` remains a string).\n          // Note: we
intentionally retain the error here by
not using `ngDevMode`, because\n          // the value can change based on the locale and users aren't guaranteed to
hit\n          // an invalid string while they're developing.\n          if (typeof icuExpression !== 'object') {\n
throw new Error(`Unable to parse ICU expression in "${message}" message.`);\n          }\n          const
icuContainerTNode = createTNodeAndAddOpCode(\n            tView, rootTNode, existingTNodeStack[0], IView,
createOpCodes,\n            ngDevMode ? `ICU ${index}:${icuExpression.mainBinding}` : '', true);\n          const
icuNodeIndex = icuContainerTNode.index;\n          ngDevMode &&\n          assertGreaterThanOrEqual(\n
icuNodeIndex, HEADER_OFFSET, 'Index must be in absolute LView offset');\n          icuStart(tView, IView,
updateOpCodes, parentTNodeIndex, icuExpression, icuNodeIndex);\n          }\n        }\n      } else {\n        // Odd indexes
are placeholders (elements and sub-templates)\n        // At this point value
is something like: '#1:2' (originally coming from '#1:2')\n        const isClosing = value.charCodeAt(0) ===
CharCode.SLASH;\n        const type = value.charCodeAt(isClosing ? 1 : 0);\n        ngDevMode && assertOneOf(type,
CharCode.STAR, CharCode.HASH);\n        const index = HEADER_OFFSET +
Number.parseInt(value.substring((isClosing ? 2 : 1)));\n        if (isClosing) {\n          existingTNodeStack.shift();\n
setCurrentTNode(getCurrentParentTNode()!, false);\n        } else {\n          const tNode =
createTNodePlaceholder(tView, existingTNodeStack[0], index);\n          existingTNodeStack.unshift([]);\n
setCurrentTNode(tNode, true);\n        }\n      }\n    }\n\n    tView.data[index] = <TNode>{\n      create: createOpCodes,\n
update: updateOpCodes,\n    };\n  }\n\n  /**\n   * Allocate space in i18n Range add create OpCode instruction to create a
text or comment node.\n   *\n   * @param tView Current `TView` needed to allocate space in i18n range.\n   * @param
rootTNode Root `TNode` of the i18n block.
This node determines if the new TNode will be\n   * added as part of the `i18nStart` instruction or as part of the
`TNode.insertBefore`\n   * @param existingTNodes internal state for
`addTNodeAndUpdateInsertBefore`\n   * @param IView Current `LView` needed to allocate space in i18n
range.\n   * @param createOpCodes Array storing `I18nCreateOpCodes` where new opCodes will be added.\n   *
@param text Text to be added when the `Text` or `Comment` node will be created.\n   * @param isICU true if a

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`Comment` node for ICU (instead of `Text`) node should be created.\n */\nfunction createTNodeAndAddOpCode(\n
  tView: TView, rootTNode: TNode|null, existingTNodes: TNode[], IView: LView,\n
  createOpCodes: I18nCreateOpCodes, text: string|null, isICU: boolean): TNode {\n
  const i18nNodeIdx = allocExpando(tView, IView, 1, null);\n
  let opCode = i18nNodeIdx << I18nCreateOpCode.SHIFT;\n
  let parentTNode = getCurrentParentTNode();\n
  if (rootTNode === parentTNode) {\n
    // FIXME(misko): A null `parentTNode` should represent when we fall of the `LView` boundary.\n
    // (there is no parent), but in some circumstances (because we are inconsistent about how we set\n
    // `previousOrParentTNode`) it could point to `rootTNode` So this is a work around.\n
    parentTNode = null;\n
  }\n
  if (parentTNode === null) {\n
    // If we don't have a parent that means that we can eagerly add nodes.\n
    // If we have a parent than these nodes can't be added now (as the parent has not been created\n
    // yet) and instead the `parentTNode` is responsible for adding it. See\n
    // `TNode.insertBeforeIndex`\n
    opCode |= I18nCreateOpCode.APPEND_EAGERLY;\n
  }\n
  if (isICU) {\n
    opCode |= I18nCreateOpCode.COMMENT;\n
    ensureIcuContainerVisitorLoaded(loadIcuContainerVisitor);\n
  }\n
  createOpCodes.push(opCode, text === null ? "": text);\n
  // We store `{{?}}` so that when looking at debug `TNodeType.template` we can see where the\n
  // bindings are.\n
  const tNode = createTNodeAtIndex(\n
    tView, i18nNodeIdx, isICU ? TNodeType.Icu : TNodeType.Text,\n
    text === null ? (ngDevMode ? '{{?}}':) : text, null);\n
  addTNodeAndUpdateInsertBeforeIndex(existingTNodes, tNode);\n
  const tNodeIdx = tNode.index;\n
  setCurrentTNode(tNode, false /* Text nodes are self closing */);\n
  if (parentTNode !== null && rootTNode !== parentTNode) {\n
    // We are a child of deeper node (rather than a direct child of `i18nStart` instruction.)\n
    // We have to make sure to add ourselves to the parent.\n
    setTNodeInsertBeforeIndex(parentTNode, tNodeIdx);\n
  }\n
  return tNode;\n
}\n\n/**\n
 * Processes text node in i18n block.\n
 */\n\n * Text nodes can have:\n
 * - Create instruction in `createOpCodes` for creating the text node.\n
 * - Allocate spec for text node in i18n range of `LView`\n
 * - If contains binding:\n
 * - bindings => allocate space in i18n range of `LView` to store the binding value.\n
 * - populate `updateOpCodes` with update instructions.\n
 */\n\n * @param tView Current `TVIEW`\n
 * @param rootTNode Root `TNode` of the i18n block. This node determines if the new TNode will\n
 * be added as part of the `i18nStart` instruction or as part of the\n
 * `TNode.insertBeforeIndex`.\n
 * @param existingTNodes internal state for `addTNodeAndUpdateInsertBeforeIndex`.\n
 * @param createOpCodes Location where the creation OpCodes will be stored.\n
 * @param IView Current `LVIEW`\n
 * @param text The translated text (which may contain binding)\n
 */\n\nfunction i18nStartFirstCreatePassProcessTextNode(\n
  tView: TView, rootTNode: TNode|null, existingTNodes: TNode[], createOpCodes: I18nCreateOpCodes,\n
  updateOpCodes: I18nUpdateOpCodes, IView: LView, text: string): void {\n
  const hasBinding = text.match(BINDING_REGEXP);\n
  const tNode = createTNodeAndAddOpCode(\n
    tView, rootTNode, existingTNodes, IView, createOpCodes, hasBinding ? null : text, false);\n
  if (hasBinding) {\n
    generateBindingUpdateOpCodes(updateOpCodes, text, tNode.index, null, 0, null);\n
  }\n
}\n\n/**\n
 * See `i18nAttributes` above.\n
 */\n\nexport function i18nAttributesFirstPass(tView: TView, index: number, values: string[]) {\n
  const previousElement = getCurrentTNode(!);\n
  const previousElementIndex = previousElement.index;\n
  const updateOpCodes: I18nUpdateOpCodes = [] as any;\n
  if (ngDevMode) {\n
    attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n
  }\n
  if (tView.firstCreatePass && tView.data[index] === null) {\n
    for (let i = 0; i < values.length; i += 2) {\n
      const attrName = values[i];\n
      const message = values[i + 1];\n
      if (message !== "") {\n
        // Check if attribute value contains an ICU and throw an error if that's the case.\n
        // ICUs in element attributes are not supported.\n
        // Note: we intentionally retain the error here by not using `ngDevMode`, because\n
        // the `value` can change based on the locale and users aren't guaranteed to hit\n
        // an invalid string while they're developing.\n
        if (ICU_REGEXP.test(message)) {\n
          throw new Error(\n
            `ICU expressions are not supported in attributes. Message: "${message}"`);\n
        }\n
        // i18n attributes that hit this code path are guaranteed to have bindings, because\n
        // the compiler treats static i18n attributes as regular attribute bindings.\n
        // Since this may not be the first i18n attribute on this element we need to pass in how\n
        // many previous bindings there have already been.\n
        generateBindingUpdateOpCodes(\n
          updateOpCodes, message, previousElementIndex, attrName, countBindings(updateOpCodes),\n
          null);\n
      }\n
    }\n
  }\n
}

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tView.data[index] = updateOpCodes;\n } }\n\n\n/**\n * Generate the OpCodes to update the bindings of a
string.\n *\n * @param updateOpCodes Place where the update opcodes will be stored.\n * @param str The string
containing the bindings.\n * @param destinationNode Index of the destination node which will receive the
binding.\n * @param attrName Name of the attribute, if the string belongs to an attribute.\n * @param sanitizeFn
Sanitization function used to sanitize the string after update, if necessary.\n * @param bindingStart The IView index
of the next expression that can be bound via an opCode.\n * @returns The mask value for these bindings\n
*/\nfunction generateBindingUpdateOpCodes(\n  updateOpCodes: I18nUpdateOpCodes, str: string,
destinationNode: number, attrName: string|null,\n  bindingStart: number, sanitizeFn: SanitizerFn|null): number {\n
  ngDevMode &&\n  assertGreaterThanOrEqual(\n    destinationNode, HEADER_OFFSET, 'Index must be in
absolute LView offset');\n  const maskIndex = updateOpCodes.length; // Location of mask\n  const sizeIndex =
maskIndex + 1; // location of size for skipping\n  updateOpCodes.push(null, null); // Alloc space for mask
and size\n  const startIndex = maskIndex + 2; // location of first allocation.\n  if (ngDevMode) {\n
    attachDebugGetter(updateOpCodes, i18nUpdateOpCodesToString);\n  }\n  const textParts =
str.split(BINDING_REGEXP);\n  let mask = 0;\n  for (let j = 0; j < textParts.length; j++) {\n  const textValue =
textParts[j];\n  if (j & 1) {\n    // Odd indexes are bindings\n    const bindingIndex = bindingStart +
parseInt(textValue, 10);\n    updateOpCodes.push(-1 - bindingIndex);\n    mask = mask |
toMaskBit(bindingIndex);\n  } else if (textValue !== '') {\n    // Even indexes are text\n
updateOpCodes.push(textValue);\n  } }\n  updateOpCodes.push(\n    destinationNode <<
I18nUpdateOpCode.SHIFT_REF |\n    (attrName ? I18nUpdateOpCode.Attr : I18nUpdateOpCode.Text));\n  if
(attrName) {\n    updateOpCodes.push(attrName, sanitizeFn);\n  }\n  updateOpCodes[maskIndex] = mask;\n
updateOpCodes[sizeIndex] = updateOpCodes.length - startIndex;\n  return mask;\n}\n\n\n/**\n * Count the number of
bindings in the given `opCodes`.\n *\n * It could be possible to speed this
up, by passing the number of bindings found back from\n * `generateBindingUpdateOpCodes()` to
`i18nAttributesFirstPass()` but this would then require more\n * complexity in the code and/or transient objects to be
created.\n *\n * Since this function is only called once when the template is instantiated, is trivial in the\n * first
instance (since `opCodes` will be an empty array), and it is not common for elements to\n * contain multiple i18n
bound attributes, it seems like this is a reasonable compromise.\n */\nfunction countBindings(opCodes:
I18nUpdateOpCodes): number {\n  let count = 0;\n  for (let i = 0; i < opCodes.length; i++) {\n  const opCode =
opCodes[i];\n  // Bindings are negative numbers.\n  if (typeof opCode === 'number' && opCode < 0) {\n
count++;\n  } }\n  return count;\n}\n\n\n/**\n * Convert binding index to mask bit.\n *\n * Each index represents a
single bit on the bit-mask. Because bit-mask only has 32 bits, we make\n * the 32nd bit share all masks for
all bindings higher than 32. Since it is extremely rare to\n * have more than 32 bindings this will be hit very rarely.
The downside of hitting this corner\n * case is that we will execute binding code more often than necessary. (penalty
of performance)\n */\nfunction toMaskBit(bindingIndex: number): number {\n  return 1 << Math.min(bindingIndex,
31);\n}\n\n\nexport function isRootTemplateMessage(subTemplateIndex: number): subTemplateIndex is - 1 {\n
return subTemplateIndex === -1;\n}\n\n\n\n/**\n * Removes everything inside the sub-templates of a message.\n
*/\nfunction removeInnerTemplateTranslation(message: string): string {\n  let match;\n  let res = "";\n  let index =
0;\n  let inTemplate = false;\n  let tagMatched;\n  while ((match = SUBTEMPLATE_REGEXP.exec(message))
!== null) {\n  if (!inTemplate) {\n    res += message.substring(index, match.index + match[0].length);\n
tagMatched = match[1];\n    inTemplate = true;\n  } else {\n    if (match[0] ===
`${MARKER}/${tagMatched}${MARKER}`)\n    {\n      index = match.index;\n      inTemplate = false;\n    } }\n  }\n  }\n  ngDevMode &&\n  assertEqual(\n
inTemplate, false,\n    `Tag mismatch: unable to find the end of the sub-template in the translation \"${\n
message}\"`);\n  res += message.slice(index);\n  return res;\n}\n\n\n\n/**\n * Extracts a part of a message and
removes the rest.\n *\n * This method is used for extracting a part of the message associated with a template. A\n *
translated message can span multiple templates.\n *\n * Example:\n * ```\n * <div i18n>Translate <span
*ngIf>me</span>!</div>\n * ```\n *\n * @param message The message to crop\n * @param subTemplateIndex
Index of the sub-template to extract. If undefined it returns the\n * external template and removes all sub-

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    }\n    prevPos = pos + 1;\n    }\n  } else {\n    if (braceStack.length === 0) {\n      const substring =
pattern.substring(prevPos, pos);\n      results.push(substring);\n      prevPos = pos + 1;\n    }\n    braceStack.push('{');\n    }\n  }\n}\n\n const substring = pattern.substring(prevPos);\n results.push(substring);\n return
results;\n}\n\n\n/**\n * Parses a node, its children and its siblings, and generates the mutate & update OpCodes.\n
*\n */\n\nexport function parseIcuCase(\n  tView: TView, tIcu: TIcu, IView: LView, updateOpCodes:
I18nUpdateOpCodes, parentIdx: number,\n  caseName: string, unsafeCaseHtml: string, nestedIcus:
IcuExpression[]): number {\n  const create: IcuCreateOpCodes = [] as any;\n  const remove: I18nRemoveOpCodes
= [] as any;\n  const update: I18nUpdateOpCodes = [] as any;\n  if (ngDevMode) {\n    attachDebugGetter(create,
icuCreateOpCodesToString);\n    attachDebugGetter(remove, i18nRemoveOpCodesToString);\n
attachDebugGetter(update,
i18nUpdateOpCodesToString);\n  }\n  tIcu.cases.push(caseName);\n  tIcu.create.push(create);\n
tIcu.remove.push(remove);\n  tIcu.update.push(update);\n\n  const inertBodyHelper =
getInertBodyHelper(getDocument());\n  const inertBodyElement =
inertBodyHelper.getInertBodyElement(unsafeCaseHtml);\n  ngDevMode && assertDefined(inertBodyElement,
'Unable to generate inert body element');\n  const inertRootNode = getTemplateContent(inertBodyElement!) as
Element || inertBodyElement;\n  if (inertRootNode) {\n    return walkIcuTree(\n      tView, tIcu, IView,
updateOpCodes, create, remove, update, inertRootNode, parentIdx,\n      nestedIcus, 0);\n  } else {\n    return 0;\n
}\n}\n\nfunction walkIcuTree(\n  tView: TView, tIcu: TIcu, IView: LView, sharedUpdateOpCodes:
I18nUpdateOpCodes,\n  create: IcuCreateOpCodes, remove: I18nRemoveOpCodes, update:
I18nUpdateOpCodes,\n  parentNode: Element, parentIdx: number, nestedIcus: IcuExpression[], depth: number):
number {\n  let
bindingMask = 0;\n  let currentNode = parentNode.firstChild;\n  while (currentNode) {\n    const newIndex =
allocExpando(tView, IView, 1, null);\n    switch (currentNode.nodeType) {\n      case Node.ELEMENT_NODE:\n
const element = currentNode as Element;\n      const tagName = element.tagName.toLowerCase();\n      if
(VALID_ELEMENTS.hasOwnProperty(tagName)) {\n        addCreateNodeAndAppend(create,
ELEMENT_MARKER, tagName, parentIdx, newIndex);\n        tView.data[newIndex] = tagName;\n        const
elAttrs = element.attributes;\n        for (let i = 0; i < elAttrs.length; i++) {\n          const attr = elAttrs.item(i)!;\n
const lowerAttrName = attr.name.toLowerCase();\n          const hasBinding =
!!attr.value.match(BINDING_REGEXP);\n          // we assume the input string is safe, unless it's using a binding\n
if (hasBinding) {\n            if (VALID_ATTRS.hasOwnProperty(lowerAttrName)) {\n              if
(URI_ATTRS[lowerAttrName])\n                {\n                  generateBindingUpdateOpCodes(\n                    update, attr.value, newIndex, attr.name, 0,
_sanitizeUrl);\n                } else {\n                  generateBindingUpdateOpCodes(update, attr.value, newIndex,
attr.name, 0, null);\n                }\n              } else {\n                ngDevMode &&\n                console.warn(\n
`WARNING: ignoring unsafe attribute value ` +\n                `${lowerAttrName} on element ${tagName}`
+\n                `(see https://g.co/ng/security#xss)`);\n                }\n              } else {\n
addCreateAttribute(create, newIndex, attr);\n              }\n              }\n              // Parse the children of this node (if any)\n
bindingMask = walkIcuTree(\n                tView, tIcu, IView, sharedUpdateOpCodes, create, remove,
update,\n                currentNode as Element, newIndex, nestedIcus, depth + 1) |\n                bindingMask;\n
addRemoveNode(remove, newIndex, depth);\n              }\n              break;\n            case Node.TEXT_NODE:\n              const
value = currentNode.textContent || '';\n              const hasBinding = value.match(BINDING_REGEXP);\n
addCreateNodeAndAppend(create, null, hasBinding ? " : value, parentIdx, newIndex);\n
addRemoveNode(remove, newIndex, depth);\n              if (hasBinding) {\n                bindingMask =\n
generateBindingUpdateOpCodes(update, value, newIndex, null, 0, null) | bindingMask;\n                }\n              break;\n
            case Node.COMMENT_NODE:\n              // Check if the comment node is a placeholder for a nested ICU\n              const
isNestedIcu = NESTED_ICU.exec(currentNode.textContent || '');\n              if (isNestedIcu) {\n                const
nestedIcuIndex = parseInt(isNestedIcu[1], 10);\n                const icuExpression: IcuExpression =
nestedIcus[nestedIcuIndex];\n                // Create the comment node that will anchor the ICU expression\n

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addCreateNodeAndAppend(\n
    create, ICU_MARKER, ngDevMode ? `nested ICU ${nestedIcuIndex}` : "", parentIdx,\n
    icuStart(tView, IView, sharedUpdateOpCodes, parentIdx, icuExpression, newIndex);\n
addRemoveNestedIcu(remove, newIndex, depth);\n
currentNode =\n
currentNode.nextSibling;\n
return bindingMask;\n
function addRemoveNode(remove:\n
I18nRemoveOpCodes, index: number, depth: number) {\n
if (depth === 0) {\n
remove.push(index);\n
}\n
function addRemoveNestedIcu(remove: I18nRemoveOpCodes, index: number, depth: number) {\n
if (depth === 0) {\n
remove.push(~index); // remove ICU at `index`\n
remove.push(index); // remove ICU\n
comment at `index`\n
}\n
function addUpdateIcuSwitch(\n
update: I18nUpdateOpCodes, icuExpression:\n
IcuExpression, index: number) {\n
update.push(\n
toMaskBit(icuExpression.mainBinding), 2, -1 -\n
icuExpression.mainBinding,\n
index << I18nUpdateOpCode.SHIFT_REF | I18nUpdateOpCode.IcuSwitch);\n
function\n
addUpdateIcuUpdate(update: I18nUpdateOpCodes, bindingMask: number, index: number) {\n
update.push(bindingMask, 1, index << I18nUpdateOpCode.SHIFT_REF | I18nUpdateOpCode.IcuUpdate);\n
function addCreateNodeAndAppend(\n
create: IcuCreateOpCodes,\n
marker: null|ICU_MARKER|ELEMENT_MARKER, text: string,\n
appendToParentIdx: number, createAtIdx:\n
number) {\n
if (marker !== null) {\n
create.push(marker);\n
}\n
create.push(\n
text, createAtIdx,\n
icuCreateOpCode.IcuCreateOpCode.AppendChild, appendToParentIdx, createAtIdx);\n
function\n
addCreateAttribute(create: IcuCreateOpCodes, newIndex: number, attr: Attr) {\n
create.push(newIndex <<\n
IcuCreateOpCode.SHIFT_REF | IcuCreateOpCode.Attr, attr.name, attr.value);\n
}"/**\n
 * Copyright Google LLC All Rights Reserved.\n
 * Use of this source code is governed by an MIT-style license\n
 * that can be\n
 * found in the LICENSE file at https://angular.io/license\n
 */\n
 * i18nPostprocess\n
const ROOT_TEMPLATE_ID = 0;\n
const PP_MULTI_VALUE_PLACEHOLDERS_REGEXP =\n
/\\((.+?)\\)/;\n
const PP_PLACEHOLDERS_REGEXP = /\\((.+?)\\)(\\|\\?\\|*\\d+:\\d+)/g;\n
const\n
PP_ICU_VARS_REGEXP = /(\\s*)(VAR_(PLURAL|SELECT)(_\\d+)?)\\s*/g;\n
const\n
PP_ICU_PLACEHOLDERS_REGEXP = /{([A-Z0-9_+])}/g;\n
const PP_ICUS_REGEXP =\n
/!18N_EXP_(ICU_\\d+)/g;\n
const PP_CLOSE_TEMPLATE_REGEXP = /\\|\\|*/;\n
const\n
PP_TEMPLATE_ID_REGEXP = /\\d+\\|:(\\d+)/;\n
// Parsed placeholder structure used in postprocessing (within\n
`i18nPostprocess` function)\n
// Contains the following fields: [templateId, isCloseTemplateTag, placeholder]\n
type\n
PostprocessPlaceholder = [number, boolean, string];\n
/**\n
 * Handles message string post-processing for\n
internationalization.\n
 * Handles message string post-processing by transforming it from intermediate\n
 * format\n
(that might contain some markers that we need to replace) to the final\n
 * form, consumable by i18nStart instruction.\n
Post processing\n
steps include:\n
 * 1. Resolve all multi-value cases (like [#1:1#2:1|#4:1|5])\n
 * 2. Replace all ICU vars (like\n
`VAR_PLURAL`)\n
 * 3. Replace all placeholders used inside ICUs in a form of {PLACEHOLDER}\n
 * 4.\n
Replace all ICU references with corresponding values (like ICU_EXP_ICU_1)\n
 * in case multiple ICUs have the\n
same placeholder name\n
 * @param message Raw translation string for post processing\n
 * @param\n
replacements Set of replacements that should be applied\n
 * @returns Transformed string that can be consumed\n
by i18nStart instruction\n
 * @codeGenApi\n
export function i18nPostprocess(\n
message: string,\n
replacements: {[key: string]: (string|string[])} = {}): string {\n
/**\n
 * Step 1: resolve all multi-value placeholders\n
like [#5*1:1#2:1|#4:1]\n
 * Note: due to the way we process nested templates (BFS), multi-value placeholders\n
are typically\n
 * grouped by templates, for example: [#5#6#1:1#3:2] where #5 and #6\n
belong to root\n
 * template, #1:1 belong to nested template with index 1 and #1:2 - nested template with index\n
 * 3. However in real templates the order might be different: i.e. #1:1 and/or #3:2 may go in\n
 * front of #6. The\n
post processing step restores the right order by keeping track of the\n
 * template id stack and looks for placeholders\n
that belong to the currently active template.\n
 * let result: string = message;\n
if\n
(PP_MULTI_VALUE_PLACEHOLDERS_REGEXP.test(message)) {\n
const matches: {[key: string]:\n
PostprocessPlaceholder[]} = {};\n
const templateIdsStack: number[] = [ROOT_TEMPLATE_ID];\n
result =

```

```

result.replace(PP_PLACEHOLDERS_REGEXP, (m: any, phs: string, tpl: string): string => {\n  const content =
phs || tpl;\n  const placeholders: PostprocessPlaceholder[] = matches[content] || [];\n  if (!placeholders.length)
{\n  content.split('').forEach((placeholder: string) => {\n    const match =
placeholder.match(PP_TEMPLATE_ID_REGEXP);\n
    const templateId = match ? parseInt(match[1], 10) : ROOT_TEMPLATE_ID;\n    const
isCloseTemplateTag = PP_CLOSE_TEMPLATE_REGEXP.test(placeholder);\n
placeholders.push([templateId, isCloseTemplateTag, placeholder]);\n  });\n  matches[content] =
placeholders;\n  }\n  if (!placeholders.length) {\n    throw new Error(`i18n postprocess: unmatched
placeholder - ${content}`);\n  }\n  const currentTemplateId = templateIdsStack[templateIdsStack.length -
1];\n  let idx = 0;\n  // find placeholder index that matches current template id\n  for (let i = 0; i <
placeholders.length; i++) {\n    if (placeholders[i][0] === currentTemplateId) {\n      idx = i;\n      break;\n    }\n  }\n  // update template id stack based on the current tag extracted\n  const [templateId,
isCloseTemplateTag, placeholder] = placeholders[idx];\n  if (isCloseTemplateTag) {\n
templateIdsStack.pop();\n
  } else if (currentTemplateId !== templateId) {\n    templateIdsStack.push(templateId);\n  }\n  // remove
processed tag from the list\n  placeholders.splice(idx, 1);\n  return placeholder;\n });\n }\n // return current
result if no replacements specified\n if (!Object.keys(replacements).length) {\n  return result;\n }\n /**\n *
Step 2: replace all ICU vars (like "VAR_PLURAL")\n */\n result = result.replace(PP_ICU_VARS_REGEXP,
(match, start, key, _type, _idx, end): string => {\n  return replacements.hasOwnProperty(key) ?
`${start}${replacements[key]}${end}` : match;\n });\n /**\n * Step 3: replace all placeholders used inside ICUs
in a form of {PLACEHOLDER}\n */\n result = result.replace(PP_ICU_PLACEHOLDERS_REGEXP, (match,
key): string => {\n  return replacements.hasOwnProperty(key) ? replacements[key] as string : match;\n });\n /**\n * Step 4: replace all ICU references with corresponding values (like ICU_EXP_ICU_1)
in case\n * multiple ICUs have the same placeholder name\n */\n result = result.replace(PP_ICUS_REGEXP,
(match, key): string => {\n  if (replacements.hasOwnProperty(key)) {\n    const list = replacements[key] as
string[];\n    if (!list.length) {\n      throw new Error(`i18n postprocess: unmatched ICU - ${match} with key:
${key}`);\n    }\n    return list.shift()!;\n  }\n  return match;\n });\n }\n return result;\n }\n\n",/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport './../util/ng_dev_mode';\nimport
'./../util/ng_i18n_closure_mode';\nimport {assertDefined} from './../util/assert';\nimport {bindingUpdated} from
'./bindings';\nimport {applyCreateOpCodes, applyI18n, setMaskBit} from './i18n/i18n_apply';\nimport
{i18nAttributesFirstPass, i18nStartFirstCreatePass} from './i18n/i18n_parse';\nimport
{i18nPostprocess} from './i18n/i18n_postprocess';\nimport {TI18n} from './interfaces/i18n';\nimport
{TElementNode, TNodeType} from './interfaces/node';\nimport {HEADER_OFFSET, T_HOST} from
'./interfaces/view';\nimport {getClosestRElement} from './node_manipulation';\nimport {getCurrentParentTNode,
getLView, getTView, nextBindingIndex, setInI18nBlock} from './state';\nimport {getConstant} from
'./util/view_utils';\n\n/**\n * Marks a block of text as translatable.\n */\n * The instructions `i18nStart` and
`i18nEnd` mark the translation block in the template.\n * The translation `message` is the value which is locale
specific. The translation string may\n * contain placeholders which associate inner elements and sub-templates
within the translation.\n */\n * The translation `message` placeholders are:\n * - `{index}(:{block})` : *Binding
Placeholder*: Marks a location where an expression will be\n * interpolated into. The placeholder `index` points to
the expression binding
index. An optional\n * `block` that matches the sub-template in which it was declared.\n * -
`#{index}(:{block})`/^#{index}(:{block})` : *Element Placeholder*: Marks the beginning\n * and end of DOM
element that were embedded in the original translation block. The placeholder\n * `index` points to the element
index in the template instructions set. An optional `block` that\n * matches the sub-template in which it was
declared.\n * - `*{index}(:{block})`/^*{index}(:{block})` : *Sub-template Placeholder*: Sub-templates must be\n *
split up and translated separately in each angular template function. The `index` points to the\n * `template`

```

instruction index. A `block` that matches the sub-template in which it was declared.

`@param index` A unique index of the translation in the static block.

`@param messageIndex` An index of the translation message from the `def.consts` array.

`@param subTemplateIndex` Optional sub-template index in the `message`.

```
@codeGenApi
*^/next export function i18nStart(index: number, messageIndex: number, subTemplateIndex: number = -1): void {
  const tView = getTView();
  const lView = getLView();
  const adjustedIndex = HEADER_OFFSET + index;
  ngDevMode && assertDefined(tView, `tView should be defined`);
  const message = getConstant<string>(tView.consts, messageIndex)!;
  const parentTNode = getCurrentParentTNode() as TElementNode | null;
  if (tView.firstCreatePass) {
    i18nStartFirstCreatePass(tView, parentTNode === null ? 0 : parentTNode.index, lView, adjustedIndex, message, subTemplateIndex);
  }
  const tI18n = tView.data[adjustedIndex] as TI18n;
  const sameViewParentTNode = parentTNode === lView[T_HOST] ? null : parentTNode;
  const parentRNode = getClosestRElement(tView, sameViewParentTNode, lView);
  // If `parentTNode` is an `ElementContainer` than it has `<!--ng-container-->`.
  // When we do inserts we have to make sure to insert in front of `<!--ng-container-->`.
  const insertInFrontOf = parentTNode && (parentTNode.type & TNodeType.ElementContainer) ? lView[parentTNode.index] : null;
  applyCreateOpCodes(lView, tI18n.create, parentRNode, insertInFrontOf);
  setInI18nBlock(true);
}

```

`* Translates a translation block marked by `i18nStart` and `i18nEnd`. It inserts the text/ICU nodes into the render tree, moves the placeholder nodes and removes the deleted nodes.`

`@codeGenApi`

```
^/next export function i18nEnd(): void {
  setInI18nBlock(false);
}

```

`* Use this instruction to create a translation block that doesn't contain any placeholder. It calls both { @link i18nStart } and { @link i18nEnd } in one instruction.`

`* The translation `message` is the value which is locale specific. The translation string may contain placeholders which associate inner elements and sub-templates within the translation.`

`* The translation `message` placeholders are: `{index}(:{block})`:`

- `*Binding Placeholder*`: Marks a location where an expression will be interpolated into. The placeholder `index` points to the expression binding index. An optional `block` that matches the sub-template in which it was declared.
- `*Element Placeholder*`: Marks the beginning and end of DOM element that were embedded in the original translation block. The placeholder `index` points to the element index in the template instructions set. An optional `block` that matches the sub-template in which it was declared.
- `*Sub-template Placeholder*`: Sub-templates must be split up and translated separately in each angular template function. The `index` points to the `template` instruction index. A `block` that matches the sub-template in which it was declared.

`@param index` A unique index of the translation in the static block.

`@param messageIndex` An index of the translation message from the `def.consts` array.

`@param subTemplateIndex` Optional sub-template index in the `message`.

```
@codeGenApi
^/next export function i18n(index: number, messageIndex: number, subTemplateIndex?: number): void {
  i18nStart(index, messageIndex, subTemplateIndex);
  i18nEnd();
}

```

`* Marks a list of attributes as translatable.`

`@param index` A unique index in the static block.

`@param values`

```
@codeGenApi
^/next export function i18nAttributes(index: number, attrsIndex: number): void {
  const tView = getTView();
  ngDevMode && assertDefined(tView, `tView should be defined`);
  const attrs = getConstant<string[]>(tView.consts, attrsIndex)!;
  i18nAttributesFirstPass(tView, index + HEADER_OFFSET, attrs);
}

```

`* Stores the values of the bindings during each update cycle in order to determine if we need to update the translated nodes.`

`@param value` The binding's value

`@returns` This function returns itself so that it may be chained (e.g. `i18nExp(ctx.name)(ctx.title)`)

```
@codeGenApi
^/next export function i18nExp<T>(value: T): typeof i18nExp {
  const lView = getLView();
  setMaskBit(bindingUpdated(lView, nextBindingIndex(), value));
  return i18nExp;
}

```

`* Updates a translation block or an i18n attribute when the bindings have changed.`

`@param index` Index of either { @link i18nStart } (translation block) or { @link i18nAttributes } (i18n attribute) on which it should update the content.

```
@codeGenApi
^/next export function i18nApply(index: number) {
  applyI18n(getTView(), getLView(),

```

index + HEADER\_OFFSET);\n\n/\*\*\n \* Handles message string post-processing for internationalization.\n \* \n \* Handles message string post-processing by transforming it from intermediate\n \* format (that might contain some markers that we need to replace) to the final\n \* form, consumable by i18nStart instruction. Post processing steps include:\n

\n \* 1. Resolve all multi-value cases (like [\*1:1#2:1#4:1#5])\n \* 2. Replace all ICU vars (like \"VAR\_PLURAL\")\n \* 3. Replace all placeholders used inside ICUs in a form of {PLACEHOLDER}\n \* 4. Replace all ICU references with corresponding values (like ICU\_EXP\_ICU\_1)\n \* in case multiple ICUs have the same placeholder name\n \* \n \* @param message Raw translation string for post processing\n \* @param replacements Set of replacements that should be applied\n \* \n \* @returns Transformed string that can be consumed by i18nStart instruction\n \* \n \* @codeGenApi\n \*/\nexport function i18nPostprocess(\n message: string,\n replacements: {[key: string]: (string|string[]) = {}}: string {\n return i18nPostprocess(message, replacements);\n})\n\n",/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* \n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n \*/\n\n \* This file re-exports

all symbols contained in this directory.\n\n \* Why is this file not `index.ts`?\n \* \n \* There seems to be an inconsistent path resolution of an `index.ts` file\n \* when only the parent directory is referenced. This could be due to the\n \* node module resolution configuration differing from rollup and/or typescript.\n \* \n \* With commit\n \* <https://github.com/angular/angular/commit/d5e3f2c64bd13ce83e7c70788b7fc514ca4a9918>\n \* the `instructions.ts` file was moved to `instructions/instructions.ts` and an\n \* `index.ts` file was used to re-export everything. Having had file names that were\n \* importing from `instructions` directly (not the from the sub file or the `index.ts`\n \* file) caused strange CI issues. `index.ts` had to be renamed to `all.ts` for this\n \* to work.\n \* \n \* Jira Issue = FW-1184\n \*/\nexport \* from './attribute';\nexport \* from './attribute\_interpolation';\nexport \* from './change\_detection';\nexport \* from './template';\nexport \* from './storage';\nexport \* from './di';\nexport

\* from './di\_attr';\nexport \* from './element';\nexport \* from './element\_container';\nexport \* from './get\_current\_view';\nexport \* from './listener';\nexport \* from './namespace';\nexport \* from './next\_context';\nexport \* from './projection';\nexport \* from './property';\nexport \* from './property\_interpolation';\nexport \* from './advance';\nexport \* from './styling';\nexport \* from './text';\nexport \* from './text\_interpolation';\nexport \* from './class\_map\_interpolation';\nexport \* from './style\_map\_interpolation';\nexport \* from './style\_prop\_interpolation';\nexport \* from './host\_property';\nexport \* from './i18n';\nexport {getUnknownElementStrictMode, setUnknownElementStrictMode, getUnknownPropertyStrictMode, setUnknownPropertyStrictMode} from './element\_validation';\n\n",/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* \n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at <https://angular.io/license>\n

\n \*/\nimport {resolveForwardRef} from './di/forward\_ref';\nimport {ClassProvider, Provider} from './di/interface/provider';\nimport {isClassProvider, isTypeProvider} from './di/provider\_collection';\nimport {providerToFactory} from './di/r3\_injector';\nimport {assertDefined} from './util/assert';\nimport {diPublicInInjector, getNodeInjectable, getOrCreateNodeInjectorForNode} from './di';\nimport {directiveInject} from './instructions/all';\nimport {DirectiveDef} from './interfaces/definition';\nimport {NodeInjectorFactory} from './interfaces/injector';\nimport {TContainerNode, TDirectiveHostNode, TElementContainerNode, TElementNode, TNodeProviderIndexes} from './interfaces/node';\nimport {isComponentDef} from './interfaces/type\_checks';\nimport {DestroyHookData, LView, TData, TVIEW, TView} from './interfaces/view';\nimport {getCurrentTNode, getLView, getTView} from './state';\n\n\n/\*\*\n \* Resolves the providers which are defined in the DirectiveDef.\n \* \n \* When inserting the tokens and the factories in their respective arrays, we can assume that\n \* this method is called first for the component (if any), and then for other directives on the same\n \* node.\n \* \n \* As a consequence, the providers are always processed in that order:\n \* \n \* 1) The view providers of the component\n \* \n \* 2) The providers of the component\n \* \n \* 3) The providers of the other directives\n \* \n \* This matches the structure of the injectables arrays of a view (for each node).\n \* \n \* So the tokens and the factories can be pushed at the end of the arrays, except\n \* in one case for multi

```

providers.\n *\n * @param def the directive definition\n * @param providers: Array of `providers`.\n * @param
viewProviders: Array of `viewProviders`.\n * ^\nexport function providersResolver<T>(\n  def: DirectiveDef<T>,
providers: Provider[], viewProviders: Provider[]): void {\n  const tView = getTView();\n  if (tView.firstCreatePass)
{\n  const isComponent = isComponentDef(def);\n\n  // The list of
view providers is processed first, and the flags are updated\n  resolveProvider(viewProviders, tView.data,
tView.blueprint, isComponent, true);\n\n  // Then, the list of providers is processed, and the flags are updated\n
resolveProvider(providers, tView.data, tView.blueprint, isComponent, false);\n  }\n}\n\n/**\n * Resolves a provider
and publishes it to the DI system.\n */\nfunction resolveProvider(\n  provider: Provider, tInjectables: TData,
IInjectablesBlueprint: NodeInjectorFactory[],\n  isComponent: boolean, isViewProvider: boolean): void {\n
provider = resolveForwardRef(provider);\n  if (Array.isArray(provider)) {\n  // Recursively call `resolveProvider`\n
// Recursion is OK in this case because this code will not be in hot-path once we implement\n  // cloning of the
initial state.\n  for (let i = 0; i < provider.length; i++) {\n  resolveProvider(\n    provider[i], tInjectables,
IInjectablesBlueprint, isComponent, isViewProvider);\n  }\n  } else
{\n  const tView = getTView();\n  const IView = getLView();\n  let token: any = isTypeProvider(provider) ?
provider : resolveForwardRef(provider.provide);\n  let providerFactory: () => any =
providerToFactory(provider);\n\n  const tNode = getCurrentTNode(!);\n  const beginIndex =
tNode.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n  const endIndex =
tNode.directiveStart;\n  const cptViewProvidersCount =\n    tNode.providerIndexes >>
TNodeProviderIndexes.CptViewProvidersCountShift;\n\n  if (isTypeProvider(provider) || !provider.multi) {\n  //
Single provider case: the factory is created and pushed immediately\n  const factory = new
NodeInjectorFactory(providerFactory, isViewProvider, directiveInject);\n  const existingFactoryIndex =
indexOf(\n    token, tInjectables, isViewProvider ? beginIndex : beginIndex + cptViewProvidersCount,\n
endIndex);\n  if (existingFactoryIndex === -1) {\n  diPublicInInjector(\n
    getOrCreateNodeInjectorForNode(\n      tNode as TElementNode | TContainerNode |
TElementContainerNode, IView),\n      tView, token);\n    registerDestroyHooksIfSupported(tView, provider,
tInjectables.length);\n    tInjectables.push(token);\n    tNode.directiveStart++;\n    tNode.directiveEnd++;\n
if (isViewProvider) {\n    tNode.providerIndexes += TNodeProviderIndexes.CptViewProvidersCountShifter;\n
  }\n  IInjectablesBlueprint.push(factory);\n  IView.push(factory);\n  } else {\n
IInjectablesBlueprint[existingFactoryIndex] = factory;\n  IView[existingFactoryIndex] = factory;\n  }\n  }
else {\n  // Multi provider case:\n  // We create a multi factory which is going to aggregate all the values.\n  //
Since the output of such a factory depends on content or view injection,\n  // we create two of them, which are
linked together.\n  //\n  // The first one (for view providers)
is always in the first block of the injectables array,\n  // and the second one (for providers) is always in the second
block.\n  // This is important because view providers have higher priority. When a multi token\n  // is being
looked up, the view providers should be found first.\n  // Note that it is not possible to have a multi factory in the
third block (directive block).\n  //\n  // The algorithm to process multi providers is as follows:\n  // 1) If the
multi provider comes from the `viewProviders` of the component:\n  // a) If the special view providers factory
doesn't exist, it is created and pushed.\n  // b) Else, the multi provider is added to the existing multi factory.\n
// 2) If the multi provider comes from the `providers` of the component or of another\n  // directive:\n  // a) If
the multi factory doesn't exist, it is created and provider pushed into it.\n  // It is also linked to the multi factory
for view
providers, if it exists.\n  // b) Else, the multi provider is added to the existing multi factory.\n\n  const
existingProvidersFactoryIndex =\n    indexOf(token, tInjectables, beginIndex + cptViewProvidersCount,
endIndex);\n  const existingViewProvidersFactoryIndex =\n    indexOf(token, tInjectables, beginIndex,
beginIndex + cptViewProvidersCount);\n  const doesProvidersFactoryExist = existingProvidersFactoryIndex >= 0
&&\n    IInjectablesBlueprint[existingProvidersFactoryIndex];\n  const doesViewProvidersFactoryExist =
existingViewProvidersFactoryIndex >= 0 &&\n
IInjectablesBlueprint[existingViewProvidersFactoryIndex];\n\n  if (isViewProvider &&

```



```

this.providerFactory.componentProviders!;\n  const multiProviders =\n    getNodeInjectable(IView,
IView[TVIEW], this.providerFactory!.index!, tNode);\n  // Copy the section of the array which contains `multi`
`providers` from the component\n  result = multiProviders.slice(0, componentCount);\n  // Insert the
`viewProvider` instances.\n  multiResolve(factories, result);\n  // Copy the section of the array which contains
`multi` `providers` from other directives\n  for (let i = componentCount; i < multiProviders.length; i++) {\n
result.push(multiProviders[i]);\n  }\n } else {\n  result = [];\n  // Insert the `viewProvider` instances.\n
multiResolve(factories, result);\n  }\n  return result;\n}\n\n/**\n * Maps an array of factories into an array of
values.\n */\nfunction multiResolve(factories: Array<() => any>, result: any[]): any[] {\n  for (let i = 0; i <
factories.length; i++) {\n    const factory = factories[i]! as () => null;\n    result.push(factory());\n  }\n  return
result;\n}\n\n/**\n * Creates a multi factory.\n */\nfunction multiFactory(\n  factoryFn: (\n    this:
NodeInjectorFactory, _: undefined, tData: TData, lData: LView,\n    tNode: TDirectiveHostNode) => any,\n  index: number, isViewProvider: boolean, isComponent: boolean,\n  f: () => any):
NodeInjectorFactory {\n  const factory = new NodeInjectorFactory(factoryFn, isViewProvider, directiveInject);\n
factory.multi = [];\n  factory.index = index;\n  factory.componentProviders = 0;\n  multiFactoryAdd(factory, f,
isComponent && !isViewProvider);\n  return factory;\n}\n\n", "/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\nimport {ProcessProvidersFunction, Provider} from
'../../di/interface/provider';\nimport {providersResolver} from '../../di_setup';\nimport {DirectiveDef} from
'../../interfaces/definition';\n\n/**\n * This feature resolves the providers of a directive (or component),\n * and publish
them into the DI system, making it visible to others for injection.\n */\n * For example:\n */\n * class
ComponentWithProviders {\n *   constructor(private greeter: GreeterDE) {}\n *   static cmp =
defineComponent({\n
 *   type: ComponentWithProviders,\n *   selectors: [['component-with-providers']],\n *   factory: () => new
ComponentWithProviders(directiveInject(GreeterDE as any)),\n *   decls: 1,\n *   vars: 1,\n *   template:
function(fs: RenderFlags, ctx: ComponentWithProviders) {\n *     if (fs & RenderFlags.Create) {\n *       text(0);\n
 *     }\n *     if (fs & RenderFlags.Update) {\n *       textInterpolate(ctx.greeter.greet());\n *     }\n *   },\n *
features: [ProvidersFeature([GreeterDE])]\n *   });\n * }\n * ``\n */\n * @param definition\n */\n * @codegenApi\n
*/\nexport function ProvidersFeature<T>(providers: Provider[], viewProviders: Provider[] = []) {\n  return
(definition: DirectiveDef<T>) => {\n    definition.providersResolver =\n      (def: DirectiveDef<T>,
processProvidersFn?: ProcessProvidersFunction) => {\n        return providersResolver(\n          def,\n
          /\n          processProvidersFn\n
        ? processProvidersFn(providers) : providers, /\n          viewProviders);\n      }\n    };\n  }\n\n", "/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {Injector} from
'../../di/injector';\nimport {EnvironmentInjector} from '../../di/r3_injector';\nimport {Type} from
'../../interface/type';\nimport {ComponentFactoryResolver} from '../../component_factory_resolver';\n\n/**\n *
Represents an instance of an `NgModule` created by an `NgModuleFactory`.\n * Provides access to the `NgModule`
instance and related objects.\n */\n * @publicApi\n */\nexport abstract class NgModuleRef<T> {\n  /**\n * The
injector that contains all of the providers of the `NgModule`.\n */\n * abstract get injector():
EnvironmentInjector;\n\n /**\n * The resolver that can retrieve component factories in a context of this module.\n
*/\n * Note:\n
 * since v13, dynamic component creation via\n *
[ViewContainerRef.createComponent](api/core/ViewContainerRef#createComponent)\n * does **not** require
resolving component factory: component class can be used directly.\n */\n * @deprecated Angular no longer
requires Component factories. Please use other APIs where\n * Component class can be used directly.\n */\n
abstract get componentFactoryResolver(): ComponentFactoryResolver;\n\n /**\n * The `NgModule` instance.\n
*/\n * abstract get instance(): T;\n\n /**\n * Destroys the module instance and all of the data structures associated
with it.\n */\n * abstract destroy(): void;\n\n /**\n * Registers a callback to be executed when the module is

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destroyed.\n *^n abstract onDestroy(callback: () => void): void;\n}\n\nexport interface InternalNgModuleRef<T>
extends NgModuleRef<T> {\n // Note: we are using the prefix _ as NgModuleData is an NgModuleRef and
therefore directly\n // exposed to the user.\n _bootstrapComponents:
Type<any>[];\n}\n\n/**\n * @publicApi\n * \n * @deprecated\n * This class was mostly used as a part of
ViewEngine-based JIT API and is no longer needed in Ivy\n * JIT mode. See [JIT API changes due to ViewEngine
deprecation](guide/deprecations#jit-api-changes)\n * for additional context. Angular provides APIs that accept
NgModule classes directly (such as\n * [PlatformRef.bootstrapModule](api/core/PlatformRef#bootstrapModule)
and\n * [createNgModule](api/core/createNgModule)), consider switching to those APIs instead of\n * using
factory-based ones.\n *^nexport abstract class NgModuleFactory<T> {\n abstract get moduleType(): Type<T>;\n
abstract create(parentInjector: Injector|null): NgModuleRef<T>;\n}\n\n", "/*\n * @license\n * Copyright Google LLC
All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in
the LICENSE file at https://angular.io/license\n *^n\nimport { createInjectorWithoutInjectorInstances } from
'./di/create_injector';\nimport
{ Injector } from './di/injector';\nimport { INJECTOR } from './di/injector_token';\nimport { InjectFlags } from
'./di/interface/injector';\nimport { ImportedNgModuleProviders, Provider } from './di/interface/provider';\nimport
{ EnvironmentInjector, getNullInjector, R3Injector } from './di/r3_injector';\nimport { Type } from
'./interface/type';\nimport { ComponentFactoryResolver as viewEngine_ComponentFactoryResolver } from
'./linker/component_factory_resolver';\nimport { InternalNgModuleRef, NgModuleFactory as
viewEngine_NgModuleFactory, NgModuleRef as viewEngine_NgModuleRef } from
'./linker/ng_module_factory';\nimport { assertDefined } from './util/assert';\nimport { stringify } from
'./util/stringify';\nimport { ComponentFactoryResolver } from './component_ref';\nimport { getNgModuleDef } from
'./definition';\nimport { maybeUnwrapFn } from './util/misc_utils';\n\n/**\n * Returns a new NgModuleRef instance
based on the NgModule class and parent injector provided.\n * \n
* @param ngModule NgModule class.\n * @param parentInjector Optional injector instance to use as a parent for
the module injector. If\n * not provided, `NullInjector` will be used instead.\n * @returns NgModuleRef that
represents an NgModule instance.\n * \n * @publicApi\n *^nexport function createNgModule<T>(n ngModule:
Type<T>, parentInjector?: Injector): viewEngine_NgModuleRef<T> {\n return new NgModuleRef<T>(ngModule,
parentInjector ?? null);\n}\n\n/**\n * The `createNgModule` function alias for backwards-compatibility.\n * Please
avoid using it directly and use `createNgModule` instead.\n * \n * @deprecated Use `createNgModule` instead.\n
*^nexport const createNgModuleRef = createNgModule;\nexport class NgModuleRef<T> extends
viewEngine_NgModuleRef<T> implements InternalNgModuleRef<T> {\n // tslint:disable-next-line:require-
internal-with-underscore\n _bootstrapComponents: Type<any>[] = [];\n // tslint:disable-next-line:require-internal-
with-underscore\n _r3Injector: R3Injector;\n
override instance: T;\n destroyCbs: (() => void)[]|null = [];\n\n // When bootstrapping a module we have a
dependency graph that looks like this:\n // ApplicationRef -> ComponentFactoryResolver -> NgModuleRef. The
problem is that if the\n // module being resolved tries to inject the ComponentFactoryResolver, it'll create a\n //
circular dependency which will result in a runtime error, because the injector doesn't\n // exist yet. We work around
the issue by creating the ComponentFactoryResolver ourselves\n // and providing it, rather than letting the injector
resolve it.\n override readonly componentFactoryResolver: ComponentFactoryResolver =\n new
ComponentFactoryResolver(this);\n\n constructor(ngModuleType: Type<T>, public _parent: Injector|null) {\n
super();\n const ngModuleDef = getNgModuleDef(ngModuleType);\n ngDevMode &&\n assertDefined(\n
ngModuleDef,\n `NgModule '${stringify(ngModuleType)}' is not a subtype of 'NgModuleType'.`);\n\n
this._bootstrapComponents = maybeUnwrapFn(ngModuleDef!.bootstrap);\n this._r3Injector =
createInjectorWithoutInjectorInstances(\n ngModuleType, _parent,\n [n
{ provide: viewEngine_NgModuleRef, useValue: this }, {n provide:
viewEngine_ComponentFactoryResolver,\n useValue: this.componentFactoryResolver\n
}],\n stringify(ngModuleType), new Set(['environment'])) as
R3Injector;\n\n // We need to resolve the injector types separately from the injector creation, because\n // the

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module might be trying to use this ref in its constructor for DI which will cause a
// circular error that will eventually error out, because the injector isn't created yet.
this._r3Injector.resolveInjectorInitializers();
this.instance = this._r3Injector.get(ngModuleType);

}

override get injector(): EnvironmentInjector {
  return this._r3Injector;
}

override destroy(): void {
  if (ngDevMode && assertDefined(this.destroyCbs, 'NgModule already destroyed')) {
    const injector = this._r3Injector;
    injector.destroyed && injector.destroy();
    this.destroyCbs!.forEach(fn => fn());
  }
  this.destroyCbs = null;
}

override onDestroy(callback: () => void): void {
  if (ngDevMode && assertDefined(this.destroyCbs, 'NgModule already destroyed')) {
    this.destroyCbs!.push(callback);
  }
}

export class NgModuleFactory<T> extends viewEngine_NgModuleFactory<T> {
  constructor(public moduleType: Type<T>) {
    super();
  }

  override create(parentInjector: Injector|null): viewEngine_NgModuleRef<T> {
    return new NgModuleRef(this.moduleType, parentInjector);
  }
}

class EnvironmentNgModuleRefAdapter extends viewEngine_NgModuleRef<null> {
  override readonly injector: EnvironmentInjector;
  override readonly componentFactoryResolver: ComponentFactoryResolver =
    new ComponentFactoryResolver(this);
  override readonly instance = null;

  constructor(
    providers: Array<Provider|ImportedNgModuleProviders>,
    parent: EnvironmentInjector|null,
    source: string|null) {
    super();
    const injector = new R3Injector(
      [...providers,
        {provide: viewEngine_NgModuleRef, useValue: this},
        {provide: viewEngine_ComponentFactoryResolver, useValue: this.componentFactoryResolver},
      ],
      parent || getNullInjector(), source, new Set(['environment']));
    this.injector = injector;
  }

  injector.resolveInjectorInitializers();
}

override destroy(): void {
  this.injector.destroy();
}

override onDestroy(callback: () => void): void {
  this.injector.onDestroy(callback);
}

/**
 * Create a new environment injector.
 * Learn more about environment injectors in [this guide](guide/standalone-components#environment-injectors).
 *
 * @param providers An array of providers.
 * @param parent A parent environment injector.
 * @param debugName An optional name for this injector instance, which will be used in error messages.
 *
 * @publicApi
 * @developerPreview
 */
export function createEnvironmentInjector(
  providers: Array<Provider|ImportedNgModuleProviders>,
  parent: EnvironmentInjector,
  debugName: string|null = null): EnvironmentInjector {
  const adapter = new EnvironmentNgModuleRefAdapter(providers, parent, debugName);
  return adapter.injector;
}

/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at
 * https://angular.io/license
 */
import {inject as inject} from './di/injector_compatibility';
import {defineInjectable as defineInjectable} from './di/interface/defs';
import {internalImportProvidersFrom} from './di/provider_collection';
import {EnvironmentInjector} from './di/r3_injector';
import {OnDestroy} from './di/interface/lifecycle_hooks';
import {ComponentDef} from './interfaces/definition';
import {createEnvironmentInjector} from './ng_module_ref';

/**
 * A service used by the framework to create instances of standalone injectors. Those injectors are created on demand in case of dynamic component instantiation and contain ambient providers collected from the imports graph rooted at a given standalone component.
 */
class StandaloneService implements OnDestroy {
  cachedInjectors = new Map<string, EnvironmentInjector|null>();

  constructor(private _injector: EnvironmentInjector) {}

  getOrCreateStandaloneInjector(componentDef: ComponentDef<unknown>): EnvironmentInjector|null {
    if (!componentDef.standalone) {
      return null;
    }
    if (!this.cachedInjectors.has(componentDef.id)) {
      const providers = internalImportProvidersFrom(false, componentDef.type);
      const standaloneInjector = providers.length > 0 ?
        createEnvironmentInjector([providers], this._injector, `Standalone[${componentDef.type.name}]`) :
        null;
      this.cachedInjectors.set(componentDef.id, standaloneInjector);
    }
    return this.cachedInjectors.get(componentDef.id)!;
  }

  ngOnDestroy() {
    try {
      for (const injector of this.cachedInjectors.values()) {
        if (injector !== null) {
          injector.destroy();
        }
      }
    } finally {
      this.cachedInjectors.clear();
    }
  }
}

/** @nocollapse */
static prov = /** @pureOrBreakMyCode */

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defineInjectable({\n  token: StandaloneService,\n  providedIn: 'environment',\n  factory: () => new
StandaloneService(inject(EnvironmentInjector)),\n  });\n}\n\n/**\n * A feature that acts as a setup code for the
{@link StandaloneService}.\n *\n * The most important responsibility of this feature is to expose
the `getStandaloneInjector`\n * function (an entry points to a standalone injector creation) on a component
definition object. We\n * go through the features infrastructure to make sure that the standalone injector creation
logic\n * is tree-shakable and not included in applications that don't use standalone components.\n *\n *
@codeGenApi\n */\nexport function StandaloneFeature(definition: ComponentDef<unknown>) {\n
definition.getStandaloneInjector = (parentInjector: EnvironmentInjector) => {\n  return
parentInjector.get(StandaloneService).getOrCreateStandaloneInjector(definition);\n  };\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { ChangeDetectionStrategy }
from '../change_detection/constants';\nimport { Injector } from '../di/injector';\nimport { ViewEncapsulation } from
'../metadata/view';\nimport
{ assertEqual } from '../util/assert';\nimport { assertLView } from '../assert';\nimport { discoverLocalRefs,
getComponentAtNodeIndex, getDirectivesAtNodeIndex, getLContext, readPatchedLView } from
'../context_discovery';\nimport { getComponentDef, getDirectiveDef } from '../definition';\nimport { NodeInjector }
from '../di';\nimport { buildDebugNode } from '../instructions/lview_debug';\nimport { DirectiveDef } from
'../interfaces/definition';\nimport { TElementNode, TNode, TNodeProviderIndexes } from '../interfaces/node';\nimport
{ isLView } from '../interfaces/type_checks';\nimport { CLEANUP, CONTEXT, DebugNode, FLAGS, LView,
LViewFlags, T_HOST, TVIEW, TViewType } from '../interfaces/view';\nimport { getLViewParent,
getRootContext } from '../view_traversal_utils';\nimport { getTNode, unwrapRNode } from '../view_utils';\n\n\n/**\n
* Retrieves the component instance associated with a given DOM element.\n *\n * @usageNotes\n * Given the
following DOM structure:\n *\n * ```html\n * <app-root>\n *   <div>\n *
   <child-comp></child-comp>\n *   </div>\n * </app-root>\n * ```\n *\n * Calling `getComponent` on `<child-comp>`
will return the instance of `ChildComponent`\n * associated with this DOM element.\n *\n * Calling the
function on `<app-root>` will return the `MyApp` instance.\n *\n * @param element DOM element from which
the component should be retrieved.\n *\n * @returns Component instance associated with the element or `null` if there\n
* is no component associated with it.\n *\n * @publicApi\n */\n * @globalApi ng\n */\nexport function
getComponent<T>(element: Element): T|null {\n  ngDevMode && assertDomElement(element);\n  const context =
getLContext(element);\n  if (context === null) return null;\n  if (context.component === undefined) {\n    const
IView = context.IView;\n    if (IView === null) {\n      return null;\n    }\n    context.component =
getComponentAtNodeIndex(context.nodeIndex, IView);\n  }\n  return context.component as unknown as
T;\n}\n\n\n/**\n * If inside
an embedded view (e.g. `*ngIf` or `*ngFor`), retrieves the context of the embedded\n * view that the element is part
of. Otherwise retrieves the instance of the component whose view\n * owns the element (in this case, the result is the
same as calling `getOwningComponent`).\n *\n * @param element Element for which to get the surrounding
component instance.\n *\n * @returns Instance of the component that is around the element or null if the element isn't\n
* inside any component.\n *\n * @publicApi\n */\n * @globalApi ng\n */\nexport function getContext<T extends
{}>(element: Element): T|null {\n  assertDomElement(element);\n  const context = getLContext(element)!;\n  const
IView = context ? context.IView : null;\n  return IView === null ? null : IView[CONTEXT] as T;\n}\n\n\n/**\n
* Retrieves the component instance whose view contains the DOM element.\n *\n * For example, if `<child-comp>` is
used in the template of `<app-comp>`\n * (i.e. a `ViewChild` of `<app-comp>`), calling `getOwningComponent`
on `<child-comp>`\n * would return `<app-comp>`.\n *\n * @param elementOrDir DOM element, component or
directive instance\n * for which to retrieve the root components.\n *\n * @returns Component instance whose view
owns the DOM element or null if the element is not\n * part of a component view.\n *\n * @publicApi\n */\n * @globalApi ng\n */\nexport function getOwningComponent<T>(elementOrDir: Element|{}): T|null {\n  const
context = getLContext(elementOrDir)!;\n  let IView = context ? context.IView : null;\n  if (IView === null) return
null;\n  let parent: LView|null;\n  while (IView[TVIEW].type === TViewType.Embedded && (parent =

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getLViewParent(IView!)) {\n  IView = parent;\n }\n return IView[FLAGS] & LViewFlags.IsRoot ? null :
IView[CONTEXT] as unknown as T;\n}\n\n/**\n * Retrieves all root components associated with a DOM element,
directive or component instance.\n * Root components are those which have been bootstrapped by Angular.\n *\n * @param elementOrDir DOM element,
component or directive instance\n * for which to retrieve the root components.\n * @returns Root components
associated with the target object.\n *\n * @publicApi\n * @globalApi ng\n */\nexport function
getRootComponents(elementOrDir: Element|{}): {}[] {\n  const IView = readPatchedLView<{}>(elementOrDir);\n
return IView !== null ? [getRootContext(IView)] : [];\n}\n\n/**\n * Retrieves an `Injector` associated with an
element, component or directive instance.\n *\n * @param elementOrDir DOM element, component or directive
instance for which to\n * retrieve the injector.\n *\n * @returns Injector associated with the element, component or
directive instance.\n *\n * @publicApi\n * @globalApi ng\n */\nexport function getInjector(elementOrDir:
Element|{}): Injector {\n  const context = getLContext(elementOrDir!);\n  const IView = context ? context.IView :
null;\n  if (IView === null) return Injector.NULL;\n  const tNode = IView[TVIEW].data[context.nodeIndex] as
TElementNode;\n  return
new NodeInjector(tNode, IView);\n}\n\n/**\n * Retrieve a set of injection tokens at a given DOM node.\n *\n * @param element Element for which the injection tokens should be retrieved.\n */\nexport function
getInjectionTokens(element: Element): any[] {\n  const context = getLContext(element!);\n  const IView = context ?
context.IView : null;\n  if (IView === null) return [];\n  const tView = IView[TVIEW];\n  const tNode =
tView.data[context.nodeIndex] as TNode;\n  const providerTokens: any[] = [];\n  const startIndex =
tNode.providerIndexes & TNodeProviderIndexes.ProvidersStartIndexMask;\n  const endIndex =
tNode.directiveEnd;\n  for (let i = startIndex; i < endIndex; i++) {\n    let value = tView.data[i];\n    if
(isDirectiveDefHack(value)) {\n      // The fact that we sometimes store Type and sometimes DirectiveDef in this
location is a\n      // design flaw. We should always store same type so that we can be monomorphic. The issue\n
      // is that for Components/Directives we
store the def instead the type. The correct behavior\n      // is that we should always be storing injectable type in this
location.\n      value = value.type;\n    }\n    providerTokens.push(value);\n  }\n  return providerTokens;\n}\n\n/**\n * Retrieves directive instances associated with a given DOM node. Does not include\n * component instances.\n *\n * @usageNotes\n * Given the following DOM structure:\n *\n * ``html\n * <app-root>\n * <button my-
button></button>\n * <my-comp></my-comp>\n * </app-root>\n * ``\n *\n * Calling `getDirectives` on
`<button>` will return an array with an instance of the `MyButton`\n * directive that is associated with the DOM
node.\n *\n * Calling `getDirectives` on `<my-comp>` will return an empty array.\n *\n * @param node DOM node
for which to get the directives.\n *\n * @returns Array of directives associated with the node.\n *\n * @publicApi\n *
@globalApi ng\n */\nexport function getDirectives(node: Node): {}[] {\n  // Skip text nodes because we
can't have directives associated with them.\n  if (node instanceof Text) {\n    return [];\n  }\n  const context =
getLContext(node!);\n  const IView = context ? context.IView : null;\n  if (IView === null) {\n    return [];\n  }\n
const tView = IView[TVIEW];\n  const nodeIndex = context.nodeIndex;\n  if (!tView?.data[nodeIndex]) {\n
return [];\n  }\n  if (context.directives === undefined) {\n    context.directives =
getDirectivesAtNodeIndex(nodeIndex, IView, false);\n  }\n  // The `directives` in this case are a named array
called `LComponentView`. Clone the\n  // result so we don't expose an internal data structure in the user's console.\n
return context.directives === null ? [] : [...context.directives];\n}\n\n/**\n * Partial metadata for a given directive
instance.\n * This information might be useful for debugging purposes or tooling.\n * Currently only `inputs` and
`outputs` metadata is available.\n *\n * @publicApi\n */\nexport interface DirectiveDebugMetadata {\n  inputs:
Record<string, string>;\n  outputs: Record<string, string>;\n}\n\n/**\n * Partial metadata for a given component
instance.\n * This information might be useful for debugging purposes or tooling.\n * Currently the following fields
are available:\n * - inputs\n * - outputs\n * - encapsulation\n * - changeDetection\n *\n * @publicApi\n */\nexport
interface ComponentDebugMetadata extends DirectiveDebugMetadata {\n  encapsulation: ViewEncapsulation;\n  changeDetection:
ChangeDetectionStrategy;\n}\n\n/**\n * Returns the debug (partial) metadata for a particular
directive or component instance.\n * The function accepts an instance of a directive or component and returns the

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corresponding\n * metadata.\n *\n * @param directiveOrComponentInstance Instance of a directive or component\n
* @returns metadata of the passed directive or component\n *\n * @publicApi\n * @globalApi ng\n */\nexport\nfunction getDirectiveMetadata(directiveOrComponentInstance: any): ComponentDebugMetadata\n
DirectiveDebugMetadata\nnull {\n const {constructor} = directiveOrComponentInstance;\n if (!constructor) {\n
throw new Error('Unable to find the instance constructor');\n }\n // In case a component inherits from a directive,\n we may have component and directive metadata\n // To ensure we don't get the metadata of the directive, we want\n to call `getComponentDef` first.\n const componentDef = getComponentDef(constructor);\n if (componentDef) {\n
return {\n inputs: componentDef.inputs,\n outputs: componentDef.outputs,\n encapsulation:\n componentDef.encapsulation,\n changeDetection: componentDef.onPush ? ChangeDetectionStrategy.OnPush :\n ChangeDetectionStrategy.Default\n };}\n }\n const directiveDef =\n getDirectiveDef(constructor);\n if (directiveDef) {\n return {inputs: directiveDef.inputs, outputs:\n directiveDef.outputs};\n }\n return null;\n}\n\n/**\n * Retrieve map of local references.\n *\n * The references\n are retrieved as a map of local reference name to element or directive instance.\n *\n * @param target DOM\n element, component or directive instance for which to retrieve\n * the local references.\n */\nexport function\ngetLocalRefs(target: {}): {[key: string]: any} {\n const context = getLContext(target);\n if (context === null)\n return {};\n\n if (context.localRefs === undefined) {\n const IView = context.IView;\n if (IView === null) {\n
return {};\n }\n context.localRefs = discoverLocalRefs(IView, context.nodeIndex);\n }\n\n return\n context.localRefs || {};\n}\n\n/**\n * Retrieves the host element of a component or directive instance.\n * The host\n element is the DOM element that matched the selector of the directive.\n *\n * @param componentOrDirective\n Component or directive instance for which the host\n * element should be retrieved.\n * @returns Host element of\n the target.\n *\n * @publicApi\n * @globalApi ng\n */\nexport function getHostElement(componentOrDirective:\n {}): Element {\n return getLContext(componentOrDirective)!.native as unknown as Element;\n}\n\n/**\n * Retrieves the rendered text for a given component.\n *\n * This function retrieves the host element of a component\n and\n * and then returns the `textContent` for that element. This implies\n * that the text returned will include re-\n projected content of\n * the component as well.\n *\n * @param component The component to return the content\n text for.\n */\nexport function getRenderedText(component: any): string {\n const hostElement =\n getHostElement(component);\n return hostElement.textContent || '';\n}\n\n/**\n * Event listener configuration\n returned from `getListeners`.\n *\n * @publicApi\n */\nexport interface Listener {\n /** Name of the event listener.\n */\n name: string;\n /** Element that the listener is bound to.\n */\n element: Element;\n /** Callback that is\n invoked when the event is triggered.\n */\n callback: (value: any) => any;\n /** Whether the listener\n is using event capturing.\n */\n useCapture: boolean;\n /**\n * Type of the listener (e.g. a native DOM event or a\n custom @Output).\n */\n type: 'dom'|'output';\n}\n\n/**\n * Retrieves a list of event listeners associated with a\n DOM element. The list does include host\n * listeners, but it does not include event listeners defined outside of the\n Angular context\n * (e.g. through `addEventListener`).\n *\n * @usageNotes\n * Given the following DOM\n structure:\n *\n * ```html\n * <app-root>\n * <div (click)="doSomething()"></div>\n * </app-root>\n * ```\n *\n * Calling `getListeners` on `<div>` will return an object that looks as follows:\n *\n * ```ts\n * {\n * name: 'click',\n * element: <div>,\n * callback: () => doSomething(),\n * useCapture: false\n * }\n * ```\n *\n * @param element\n Element for which the DOM listeners should be retrieved.\n * @returns Array of event listeners on the DOM\n element.\n *\n * @publicApi\n * @globalApi ng\n */\nexport function getListeners(element:\n Element): Listener[] {\n ngDevMode && assertDomElement(element);\n const IContext =\n getLContext(element);\n const IView = IContext === null ? null : IContext.IView;\n if (IView === null) return\n [];\n\n const tView = IView[VIEW];\n const ICleanup = IView[CLEANUP];\n const tCleanup =\n tView.cleanup;\n const listeners: Listener[] = [];\n if (tCleanup && ICleanup) {\n for (let i = 0; i <\n tCleanup.length; i++) {\n const firstParam = tCleanup[i+1];\n const secondParam = tCleanup[i+2];\n if (typeof\n firstParam === 'string') {\n const name: string = firstParam;\n const listenerElement =\n unwrapRNode(IView[secondParam]) as any as Element;\n const callback: (value: any) => any =\n ICleanup[tCleanup[i+3]];\n const useCaptureOrIndx = tCleanup[i+4];\n // if useCaptureOrIndx is boolean\n then report it as is.\n // if useCaptureOrIndx is positive number then it in unsubscribe method\n // if

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useCaptureOrIndx is negative number
then it is a Subscription\n    const type =\n        (typeof useCaptureOrIndx === 'boolean' || useCaptureOrIndx
>= 0) ? 'dom' : 'output';\n    const useCapture = typeof useCaptureOrIndx === 'boolean' ? useCaptureOrIndx :
false;\n    if (element == listenerElement) {\n        listeners.push({element, name, callback, useCapture, type});\n    }\n    }\n    }\n    }\n    listeners.sort(sortListeners);\n    return listeners;\n}\n\nfunction sortListeners(a: Listener, b:
Listener) {\n    if (a.name == b.name) return 0;\n    return a.name < b.name ? -1 : 1;\n}\n\n/**\n * This function should
not exist because it is megamorphic and only mostly correct.\n * See call site for more info.\n */\nfunction
isDirectiveDefHack(obj: any): obj is DirectiveDef<any> {\n    return obj.type !== undefined && obj.template !==
undefined && obj.declaredInputs !== undefined;\n}\n\n/**\n * Returns the attached `DebugNode` instance for an
element in the DOM.\n * @param element DOM element which
is owned by an existing component's view.\n */\nexport function getDebugNode(element: Element):
DebugNode|null {\n    if (ngDevMode && !(element instanceof Node)) {\n        throw new Error('Expecting instance of
DOM Element');\n    }\n    const lContext = getLContext(element!);\n    const lView = lContext ? lContext.lView :
null;\n    if (lView === null) {\n        return null;\n    }\n    const nodeIndex = lContext.nodeIndex;\n    if (nodeIndex !==
-1) {\n        const valueInLView = lView[nodeIndex];\n        // this means that value in the lView is a component with its
own\n        // data. In this situation the TNode is not accessed at the same spot.\n        const tNode =\n            isLView(valueInLView) ? (valueInLView[T_HOST] as TNode) : getTNode(lView[lView.TVIEW], nodeIndex);\n        ngDevMode &&\n            assertEquals(tNode.index, nodeIndex, 'Expecting that TNode at index is same as index');\n        return buildDebugNode(tNode, lView);\n    }\n    return null;\n}\n\n/**\n * Retrieve the component `lView` from
component/element.\n\n * NOTE: `lView` is a private and should not be leaked outside.\n * Don't export this method to `ng.` on
window.\n * @param target DOM element or component instance for which to retrieve the lView.\n */\nexport
function getComponentLView(target: any): lView {\n    const lContext = getLContext(target!);\n    const nodeIndx =
lContext.nodeIndex;\n    const lView = lContext.lView!;\n    ngDevMode && assertLView(lView);\n    const
componentLView = lView[nodeIndx];\n    ngDevMode && assertLView(componentLView);\n    return
componentLView;\n}\n\n/**\n * Asserts that a value is a DOM Element.\n */\nfunction assertDomElement(value: any)
{\n    if (typeof Element !== 'undefined' && !(value instanceof Element)) {\n        throw new Error('Expecting instance
of DOM Element');\n    }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport
{Type} from './interface/type';\nimport {noSideEffects} from './util/closure';\n\ninterface TypeWithMetadata
extends Type<any> {\n    decorators?: any[];\n    ctorParameters?: () => any[];\n    propDecorators?: {[field: string]:
any};\n}\n\n/**\n * Adds decorator, constructor, and property metadata to a given type via static metadata fields\n *
on the type.\n * These metadata fields can later be read with Angular's `ReflectionCapabilities` API.\n * Calls to `setClassMetadata` can be guarded by ngDevMode, resulting in the metadata assignments\n * being tree-shaken away during production builds.\n */\nexport function setClassMetadata(\n    type: Type<any>, decorators:
any[]|null, ctorParameters: () => any[]|null, propDecorators: {[field: string]: any}|null): void {\n    return
noSideEffects(() => {\n        const clazz = type as TypeWithMetadata;\n        if (decorators !== null) {\n            if
(clazz.hasOwnProperty('decorators') && clazz.decorators !== undefined) {\n                clazz.decorators.push(...decorators);\n            } else {\n                clazz.decorators = decorators;\n            }\n        }\n        if (ctorParameters !== null) {\n            // Rather than merging, clobber the existing parameters.
If other projects exist which\n            // use tsickle-style annotations and reflect over them in the same way, this
could\n            // cause issues, but that is vanishingly unlikely.\n            clazz.ctorParameters = ctorParameters;\n        }\n        if (propDecorators !== null) {\n            // The property decorator objects are merged as it is possible
different fields have\n            // different decorator types. Decorators on individual fields are not merged, as it's\n
            // also incredibly unlikely that a field will be decorated both with an Angular\n            // decorator and a non-
Angular decorator that's also been downleveled.\n            if (clazz.hasOwnProperty('propDecorators'))

```

```

&& clazz.propDecorators !== undefined) {\n      clazz.propDecorators = {...clazz.propDecorators,
...propDecorators};\n    } else {\n      clazz.propDecorators = propDecorators;\n    }\n  }) as never;\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source
code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {assertIndexInRange} from './util/assert';\nimport {bindingUpdated, bindingUpdated2,
bindingUpdated3, bindingUpdated4, getBinding, updateBinding} from './bindings';\nimport {LView} from
'./interfaces/view';\nimport {getBindingRoot, getLView} from './state';\nimport {NO_CHANGE} from
'./tokens';\n\n/**\n * Bindings for pure functions are stored after regular bindings.\n *\n * |-----decls-----|-----
vars-----|          |----- hostVars (dir1) -----|\n *\n * -----|\n
* | nodes/refs/pipes | bindings | fn slots | injector | dir1 | host bindings | host slots |\n *\n
-----|\n
*          ^          ^\n *          TView.bindingStartIndex
TView.expandoStartIndex\n *\n * Pure function instructions are given an offset from the binding root. Adding the
offset to the\n * binding root gives the first index where the bindings are stored. In component views, the binding\n
* root is the bindingStartIndex. In host bindings, the binding root is the expandoStartIndex +\n * any directive
instances + any hostVars in directives evaluated before it.\n *\n * See VIEW_DATA.md for more information about
host binding resolution.\n *\n\n/**\n * If the value hasn't been saved, calls the pure function to store and return
the\n * value. If it has been saved, returns the saved value.\n *\n * @param slotOffset the offset
from binding root to the reserved slot\n * @param pureFn Function that returns a value\n * @param thisArg
Optional calling context of pureFn\n * @returns value\n *\n * @codeGenApi\n * ^\nexport function
pureFunction0<T>(slotOffset: number, pureFn: () => T, thisArg?: any): T {\n  const bindingIndex =
getBindingRoot() + slotOffset;\n  const IView = getLView();\n  return IView[bindingIndex] === NO_CHANGE ?\n
  updateBinding(IView, bindingIndex, thisArg ? pureFn.call(thisArg) : pureFn()) :\n  getBinding(IView,
bindingIndex);\n}\n\n/**\n * If the value of the provided exp has changed, calls the pure function to return\n * an
updated value. Or if the value has not changed, returns cached value.\n *\n * @param slotOffset the offset from
binding root to the reserved slot\n * @param pureFn Function that returns an updated value\n * @param exp
Updated expression value\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached
value\n *\n * @codeGenApi\n * ^\nexport
function pureFunction1(\n  slotOffset: number, pureFn: (v: any) => any, exp: any, thisArg?: any): any {\n  return
pureFunction1Internal(getLView(), getBindingRoot(), slotOffset, pureFn, exp, thisArg);\n}\n\n/**\n * If the value
of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have
changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn\n * @param exp1\n * @param exp2\n * @param thisArg Optional calling context of pureFn\n *
@returns Updated or cached value\n *\n * @codeGenApi\n * ^\nexport function pureFunction2(\n  slotOffset:
number, pureFn: (v1: any, v2: any) => any, exp1: any, exp2: any,\n  thisArg?: any): any {\n  return
pureFunction2Internal(\n    getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, thisArg);\n}\n\n/**\n *
If the value of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values
have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param thisArg Optional calling
context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n * ^\nexport function
pureFunction3(\n  slotOffset: number, pureFn: (v1: any, v2: any, v3: any) => any, exp1: any, exp2: any, exp3:
any,\n  thisArg?: any): any {\n  return pureFunction3Internal(\n    getLView(), getBindingRoot(), slotOffset,
pureFn, exp1, exp2, exp3, thisArg);\n}\n\n/**\n * If the value of any provided exp has changed, calls the pure
function to return\n * an updated value. Or if no values have changed, returns cached value.\n *\n * @param
slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param
exp2\n * @param exp3\n * @param exp4\n * @param thisArg Optional calling context of pureFn\n * @returns
Updated or cached value\n

```

```

*\n * @codeGenApi\n *^\nexport function pureFunction4(\n  slotOffset: number, pureFn: (v1: any, v2: any, v3:
any, v4: any) => any, exp1: any, exp2: any,\n  exp3: any, exp4: any, thisArg?: any): any {\n  return
pureFunction4Internal(\n  getLView(), getBindingRoot(), slotOffset, pureFn, exp1, exp2, exp3, exp4,
thisArg);\n}\n\n/**\n * If the value of any provided exp has changed, calls the pure function to return\n * an updated
value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to
the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n *
@param exp5\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n *\n
* @codeGenApi\n *^\nexport function pureFunction5(\n  slotOffset: number, pureFn: (v1: any, v2: any, v3: any,
v4: any, v5: any) => any, exp1: any,\n  exp2: any, exp3: any, exp4: any, exp5: any, thisArg?: any): any {\n  const
bindingIndex = getBindingRoot() + slotOffset;\n  const IView = getLView();\n  const different =
bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return bindingUpdated(IView, bindingIndex + 4,
exp5) || different ?\n  updateBinding(\n    IView, bindingIndex + 5,\n    thisArg ? pureFn.call(thisArg,
exp1, exp2, exp3, exp4, exp5) :\n    pureFn(exp1, exp2, exp3, exp4, exp5)) :\n  getBinding(IView,
bindingIndex + 5);\n}\n\n/**\n * If the value of any provided exp has changed, calls the pure function to return\n *
an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from
binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n *
@param exp4\n * @param exp5\n * @param exp6\n * @param thisArg Optional calling context of pureFn\n *
@returns Updated or cached value\n *\n * @codeGenApi\n *^\nexport function pureFunction6(\n  slotOffset:
number, pureFn:
(v1: any, v2: any, v3: any, v4: any, v5: any, v6: any) => any,\n  exp1: any, exp2: any, exp3: any, exp4: any, exp5:
any, exp6: any, thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const IView =
getLView();\n  const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return
bindingUpdated2(IView, bindingIndex + 4, exp5, exp6) || different ?\n  updateBinding(\n    IView,
bindingIndex + 6,\n    thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6) :\n    pureFn(exp1, exp2, exp3, exp4, exp5, exp6)) :\n  getBinding(IView, bindingIndex + 6);\n}\n\n/**\n * If the value
of any provided exp has changed, calls the pure function to return\n * an updated value. Or if no values have
changed, returns cached value.\n *\n * @param slotOffset the offset from binding root to the reserved slot\n *
@param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param exp5\n *
@param exp6\n * @param exp7\n * @param thisArg Optional calling context of pureFn\n * @returns Updated or
cached value\n *\n * @codeGenApi\n *^\nexport function pureFunction7(\n  slotOffset: number,\n  pureFn: (v1:
any, v2: any, v3: any, v4: any, v5: any, v6: any, v7: any) => any, exp1: any,\n  exp2: any, exp3: any, exp4: any,
exp5: any, exp6: any, exp7: any, thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n
const IView = getLView();\n  let different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n
return bindingUpdated3(IView, bindingIndex + 4, exp5, exp6, exp7) || different ?\n  updateBinding(\n    IView,
bindingIndex + 7,\n    thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6, exp7) :\n    pureFn(exp1, exp2, exp3, exp4, exp5, exp6, exp7)) :\n  getBinding(IView, bindingIndex + 7);\n}\n\n/**\n * If
the value of any provided exp has changed, calls the pure function to return\n *
an updated value. Or if no values have changed, returns cached value.\n *\n * @param slotOffset the offset from
binding root to the reserved slot\n * @param pureFn\n * @param exp1\n * @param exp2\n * @param exp3\n *
@param exp4\n * @param exp5\n * @param exp6\n * @param exp7\n * @param exp8\n * @param thisArg
Optional calling context of pureFn\n * @returns Updated or cached value\n *\n * @codeGenApi\n *^\nexport
function pureFunction8(\n  slotOffset: number,\n  pureFn: (v1: any, v2: any, v3: any, v4: any, v5: any, v6: any,
v7: any, v8: any) => any,\n  exp1: any, exp2: any, exp3: any, exp4: any, exp5: any, exp6: any, exp7: any, exp8:
any,\n  thisArg?: any): any {\n  const bindingIndex = getBindingRoot() + slotOffset;\n  const IView =
getLView();\n  const different = bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4);\n  return
bindingUpdated4(IView, bindingIndex + 4, exp5, exp6, exp7, exp8) || different ?\n  updateBinding(\n    IView,
bindingIndex + 8,\n

```

`thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4, exp5, exp6, exp7, exp8) :`
`pureFn(exp1,`  
`exp2, exp3, exp4, exp5, exp6, exp7, exp8) :`
`getBinding(IView, bindingIndex + 8);`
`n}`
`n`
`**`
`n`
`*`
`pureFunction`  
instruction that can support any number of bindings.
`n`
`*`
`n`
`*`
`If the value of any provided exp has changed, calls the`  
pure function to return
`n`
`*`
`n`
`*`
`an updated value. Or if no values have changed, returns cached value.`
`n`
`*`
`n`
`*`
`@param`  
slotOffset the offset from binding root to the reserved slot
`n`
`*`
`@param pureFn` A pure function that takes binding  
values and builds an object or array
`n`
`*`
`@param exps` An array of binding values
`n`
`*`  
`@param thisArg` Optional calling context of pureFn
`n`
`*`
`@returns` Updated or cached value
`n`
`*`
`@codeGenApi`
`n`  
`*`
`export function pureFunctionV`
`(`
`slotOffset: number,`
`pureFn: (...v: any[]) => any,`
`exps: any[],`
`thisArg?: any):`  
`any {`
`n`
`return pureFunctionVInternal(getLView(), getBindingRoot(), slotOffset,`  
`pureFn, exps, thisArg);`
`n}`
`n`
`**`
`n`
`*`
`Results of a pure function invocation are stored in LView in a dedicated slot`  
that is initialized
`n`
`*`
`n`
`*`
`to NO_CHANGE. In rare situations a pure pipe might throw an exception on the very first`
`n`
`*`  
invocation and not produce any valid results. In this case LView would keep holding the NO\_CHANGE
`n`
`*`  
value. The NO\_CHANGE is not something that we can use in expressions / bindings thus we convert
`n`
`*`  
it to  
``undefined`.`
`n`
`*`
`function getPureFunctionReturnValue`
`(IView: LView, returnValueIndex: number) {`
`n`  
`ngDevMode && assertIndexInRange(IView, returnValueIndex);`
`const lastReturnValue =`  
`IView[returnValueIndex];`
`return lastReturnValue === NO_CHANGE ? undefined : lastReturnValue;`
`n}`
`n`
`**`
`n`  
`*`
`If the value of the provided exp has changed, calls the pure function to return`
`n`
`*`
`n`
`*`
`an updated value. Or if the value`  
has not changed, returns cached value.
`n`
`*`
`n`
`*`
`@param IView` LView in which the function is being executed.
`n`
`*`  
`@param bindingRoot` Binding root  
index.
`n`
`*`
`@param slotOffset` the offset from binding root to the reserved slot
`n`
`*`
`@param pureFn` Function that  
returns an updated value
`n`
`*`
`@param exp` Updated expression value
`n`
`*`
`@param thisArg` Optional calling context of  
pureFn
`n`
`*`
`@returns` Updated or cached value
`n`
`*`
`export function pureFunction1Internal`
`(`
`IView: LView,`  
`bindingRoot: number,`
`slotOffset: number,`
`pureFn: (v: any) => any,`
`exp: any,`
`thisArg?: any): any {`
`n`
`const`  
`bindingIndex = bindingRoot + slotOffset;`
`return bindingUpdated(IView, bindingIndex, exp) ?`
`n`  
`updateBinding(IView, bindingIndex + 1, thisArg ? pureFn.call(thisArg, exp) : pureFn(exp)) :`
`n`  
`getPureFunctionReturnValue(IView, bindingIndex + 1);`
`n}`
`n`
`**`
`n`
`*`
`If the value of any provided exp has`  
changed, calls the pure function to return
`n`
`*`
`n`
`*`
`an updated value. Or if no values have changed, returns cached`  
value.
`n`
`*`
`n`
`*`
`@param IView` LView in which the function is being executed.
`n`
`*`
`@param bindingRoot` Binding  
root index.
`n`
`*`
`@param slotOffset`  
the offset from binding root to the reserved slot
`n`
`*`
`@param pureFn`
`n`
`*`
`@param exp1`
`n`
`*`
`@param exp2`
`n`
`*`  
`@param thisArg` Optional calling context of pureFn
`n`
`*`
`@returns` Updated or cached value
`n`
`*`
`export function`  
`pureFunction2Internal`
`(`
`IView: LView, bindingRoot: number, slotOffset: number, pureFn: (v1: any, v2: any) =>`  
`any,`
`exp1: any, exp2: any, thisArg?: any): any {`
`n`
`const bindingIndex = bindingRoot + slotOffset;`
`return`  
`bindingUpdated2(IView, bindingIndex, exp1, exp2) ?`
`n`
`updateBinding`
`(`
`IView, bindingIndex + 2,`
`n`  
`thisArg ? pureFn.call(thisArg, exp1, exp2) : pureFn(exp1, exp2)) :`
`n`
`getPureFunctionReturnValue`
`(IView,`  
`bindingIndex + 2);`
`n}`
`n`
`**`
`n`
`*`
`If the value of any provided exp has changed, calls the pure function to return`
`n`
`*`  
an updated value. Or if no values have changed, returns cached value.
`n`
`*`
`n`
`*`
`@param IView` LView in which the  
function is being executed.
`n`
`*`
`@param bindingRoot` Binding root index.
`n`
`*`
`@param slotOffset` the offset  
from binding root to the reserved slot
`n`
`*`
`@param pureFn`
`n`
`*`
`@param exp1`
`n`
`*`
`@param exp2`
`n`
`*`
`@param exp3`
`n`  
`*`
`@param thisArg` Optional calling context of pureFn
`n`
`*`
`@returns` Updated or cached value
`n`
`*`
`export function`  
`pureFunction3Internal`
`(`
`IView: LView, bindingRoot: number, slotOffset: number,`
`n`
`pureFn: (v1: any, v2: any,`  
`v3: any) => any, exp1: any, exp2: any, exp3: any,`
`n`
`thisArg?: any): any {`
`n`
`const bindingIndex = bindingRoot +`  
`slotOffset;`
`return bindingUpdated3(IView, bindingIndex, exp1, exp2, exp3) ?`
`n`
`updateBinding`
`(`
`IView,`  
`bindingIndex + 3,`
`n`
`thisArg ? pureFn.call(thisArg, exp1, exp2, exp3) : pureFn(exp1, exp2, exp3)) :`
`n`  
`getPureFunctionReturnValue`
`(IView, bindingIndex + 3);`
`n}`
`n`
`**`
`n`
`*`
`If the value of any provided exp has`  
changed, calls the pure function to return
`n`
`*`
`n`
`*`
`an updated value. Or if no values have changed, returns cached`  
value.
`n`
`*`
`n`
`*`
`@param IView` LView in which the function is being executed.
`n`
`*`
`@param bindingRoot` Binding



```

root index.\n * @param slotOffset the offset from binding root to the reserved slot\n * @param pureFn\n * @param
exp1\n * @param exp2\n * @param exp3\n * @param exp4\n * @param thisArg Optional calling context of
pureFn\n * @returns Updated or cached value\n * \n * ^\nexport function pureFunction4Internal(\n  IView: LView,
bindingRoot: number, slotOffset: number,\n  pureFn: (v1: any, v2: any, v3: any, v4: any) => any, exp1: any, exp2:
any, exp3: any, exp4: any,\n  thisArg?: any): any {\n  const bindingIndex = bindingRoot + slotOffset;\n  return
bindingUpdated4(IView, bindingIndex, exp1, exp2, exp3, exp4) ?\n  updateBinding(\n    IView, bindingIndex
+ 4,\n    thisArg ? pureFn.call(thisArg, exp1, exp2, exp3, exp4) : pureFn(exp1, exp2, exp3, exp4)) :\n
getPureFunctionReturnValue(IView, bindingIndex + 4);\n}\n\n/**\n * pureFunction instruction that can support any
number of bindings.\n * \n * If the value of any provided exp has changed, calls the pure function
to return\n * an updated value. Or if no values have changed, returns cached value.\n * \n * @param IView LView
in which the function is being executed.\n * @param bindingRoot Binding root index.\n * @param slotOffset the
offset from binding root to the reserved slot\n * @param pureFn A pure function that takes binding values and
builds an object or array\n * containing those values.\n * @param exps An array of binding values\n * @param
thisArg Optional calling context of pureFn\n * @returns Updated or cached value\n * ^\nexport function
pureFunctionVInternal(\n  IView: LView, bindingRoot: number, slotOffset: number, pureFn: (...v: any[]) => any,\n
  exps: any[], thisArg?: any): any {\n  let bindingIndex = bindingRoot + slotOffset;\n  let different = false;\n  for (let
i = 0; i < exps.length; i++) {\n    bindingUpdated(IView, bindingIndex++, exps[i]) && (different = true);\n  }\n
return different ? updateBinding(IView, bindingIndex, pureFn.apply(thisArg, exps)) :\n
getPureFunctionReturnValue(IView, bindingIndex);\n}\n\n", "/*\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n * \n\nimport {PipeTransform} from
'./change_detection/pipe_transform';\nimport {setInjectImplementation} from './di/inject_switch';\nimport
{RuntimeError, RuntimeErrorCode} from './errors';\nimport {Type} from './interface/type';\nimport
{getFactoryDef} from './definition_factory';\nimport {setIncludeViewProviders} from './di';\nimport {store,
directiveInject} from './instructions/all';\nimport {isHostComponentStandalone} from
'./instructions/element_validation';\nimport {PipeDef, PipeDefList} from './interfaces/definition';\nimport
{CONTEXT, DECLARATION_COMPONENT_VIEW, HEADER_OFFSET, LView, TVIEW} from
'./interfaces/view';\nimport {pureFunction1Internal, pureFunction2Internal, pureFunction3Internal,
pureFunction4Internal,
pureFunctionVInternal} from './pure_function';\nimport {getBindingRoot, getLView, getTView} from
'./state';\nimport {load} from './util/view_utils';\n\n\n/**\n * Create a pipe.\n * \n * @param index Pipe index
where the pipe will be stored.\n * @param pipeName The name of the pipe\n * @returns T the instance of the
pipe.\n * \n * @codeGenApi\n * ^\nexport function pipe(index: number, pipeName: string): any {\n  const tView =
getTView();\n  let pipeDef: PipeDef<any>;\n  const adjustedIndex = index + HEADER_OFFSET;\n  if
(tView.firstCreatePass) {\n    // The `getPipeDef` throws if a pipe with a given name is not found\n    // (so we use
non-null assertion below).\n    pipeDef = getPipeDef(pipeName, tView.pipeRegistry)!;\n  }\n  tView.data[adjustedIndex] = pipeDef;\n  if (pipeDef.onDestroy) {\n    (tView.destroyHooks ||
(tView.destroyHooks = [])).push(adjustedIndex, pipeDef.onDestroy);\n  }\n } else {\n  pipeDef =
tView.data[adjustedIndex] as PipeDef<any>;\n }\n\n  const pipeFactory
= pipeDef.factory || (pipeDef.factory = getFactoryDef(pipeDef.type, true));\n  const previousInjectImplementation =
setInjectImplementation(directiveInject);\n  try {\n    // DI for pipes is supposed to behave like directives when
placed on a component\n    // host node, which means that we have to disable access to `viewProviders`\n    const
previousIncludeViewProviders = setIncludeViewProviders(false);\n    const pipeInstance = pipeFactory();\n    setIncludeViewProviders(previousIncludeViewProviders);\n    store(tView, getLView(), adjustedIndex,
pipeInstance);\n    return pipeInstance;\n  } finally {\n    // we have to restore the injector implementation in finally,
just in case the creation of the\n    // pipe throws an error.\n    setInjectImplementation(previousInjectImplementation);\n  }\n}\n\n\n/**\n * Searches the pipe registry for a pipe with
the given name. If one is found,\n * returns the pipe. Otherwise, an error is thrown because the pipe cannot be

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resolved.\n

```
*\n * @param name Name of pipe to resolve\n * @param registry Full list of available pipes\n * @returns Matching PipeDef\n *\nfunction getPipeDef(name: string, registry: PipeDefList|null): PipeDef<any>|undefined {\n  if (registry) {\n    for (let i = registry.length - 1; i >= 0; i--) {\n      const pipeDef = registry[i];\n      if (name === pipeDef.name) {\n        return pipeDef;\n      }\n    }\n  }\n  if (ngDevMode) {\n    throw new\n  }\n  RuntimeError(RuntimeErrorCode.PIPE_NOT_FOUND, getPipeNotFoundErrorMessage(name));\n}\n}\n\n/**\n * Generates a helpful error message for the user when a pipe is not found.\n * @param name Name of the missing pipe\n * @returns The error message\n *\nfunction getPipeNotFoundErrorMessage(name: string) {\n  const IView = getLView();\n  const declarationLView = IView[DECLARATION_COMPONENT_VIEW] as\n  LView<Type<unknown>>;\n  const context = declarationLView[CONTEXT];\n  const hostIsStandalone =\n  isHostComponentStandalone(IView);\n  const componentInfoMessage\n  = context ? `in the '${context.constructor.name}' component` : `declared or\n  imported in this module`;\n  const verifyMessage = `Verify that it is ${\n  hostIsStandalone ? 'included in the '@Component.imports' of this component' :\n  'declared or\n  imported in this module'}`;\n  const errorMessage =\n  `The pipe '${name}' could not be\n  found${componentInfoMessage}. ${verifyMessage}`;\n  return errorMessage;\n}\n\n/**\n * Invokes a pipe with 1\n  arguments.\n * This instruction acts as a guard to { @link PipeTransform#transform } invoking\n * the pipe only\n  when an input to the pipe changes.\n * @param index Pipe index where the pipe was stored on creation.\n * @param slotOffset the offset in the reserved slot space\n * @param v1 1st argument to { @link\n  PipeTransform#transform }.\n * @codeGenApi\n *\nexport function pipeBind1(index: number, slotOffset:\n  number, v1: any): any {\n  const adjustedIndex = index + HEADER_OFFSET;\n  const IView = getLView();\n  const pipeInstance = load<PipeTransform>(IView,\n  adjustedIndex);\n  return isPure(IView, adjustedIndex) ?\n  pureFunction1Internal(\n    IView,\n    getBindingRoot(), slotOffset, pipeInstance.transform, v1, pipeInstance) :\n  pipeInstance.transform(v1);\n}\n\n/**\n * Invokes a pipe with 2 arguments.\n * This instruction acts as a guard\n  to { @link PipeTransform#transform } invoking\n * the pipe only when an input to the pipe changes.\n * @param\n  index Pipe index where the pipe was stored on creation.\n * @param slotOffset the offset in the reserved slot\n  space\n * @param v1 1st argument to { @link PipeTransform#transform }.\n * @param v2 2nd argument to { @link\n  PipeTransform#transform }.\n * @codeGenApi\n *\nexport function pipeBind2(index: number, slotOffset:\n  number, v1: any, v2: any): any {\n  const adjustedIndex = index + HEADER_OFFSET;\n  const IView =\n  getLView();\n  const pipeInstance = load<PipeTransform>(IView, adjustedIndex);\n  return isPure(IView,\n  adjustedIndex) ?\n  pureFunction2Internal(\n    IView, getBindingRoot(), slotOffset, pipeInstance.transform, v1, v2, pipeInstance) :\n  pipeInstance.transform(v1, v2);\n}\n\n/**\n * Invokes a pipe with 3 arguments.\n * This instruction acts as a\n  guard to { @link PipeTransform#transform } invoking\n * the pipe only when an input to the pipe changes.\n * @param\n  index Pipe index where the pipe was stored on creation.\n * @param slotOffset the offset in the reserved\n  slot space\n * @param v1 1st argument to { @link PipeTransform#transform }.\n * @param v2 2nd argument to\n  { @link PipeTransform#transform }.\n * @param v3 4rd argument to { @link PipeTransform#transform }.\n * @codeGenApi\n *\nexport function pipeBind3(index: number, slotOffset: number, v1: any, v2: any, v3: any): any\n  {\n  const adjustedIndex = index + HEADER_OFFSET;\n  const IView = getLView();\n  const pipeInstance =\n  load<PipeTransform>(IView, adjustedIndex);\n  return isPure(IView, adjustedIndex) ?\n  pureFunction3Internal(\n    IView,\n    getBindingRoot(), slotOffset, pipeInstance.transform, v1, v2, v3, pipeInstance) :\n  pipeInstance.transform(v1,\n  v2, v3);\n}\n\n/**\n * Invokes a pipe with 4 arguments.\n * This instruction acts as a guard\n  to { @link\n  PipeTransform#transform } invoking\n * the pipe only when an input to the pipe changes.\n * @param\n  index\n  Pipe index where the pipe was stored on creation.\n * @param slotOffset the offset in the reserved slot space\n * @param\n  v1 1st argument to { @link PipeTransform#transform }.\n * @param v2 2nd argument to { @link\n  PipeTransform#transform }.\n * @param v3 3rd argument to { @link PipeTransform#transform }.\n * @param v4 4th\n  argument to { @link PipeTransform#transform }.\n * @codeGenApi\n *\nexport function pipeBind4(\n  index:
```

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number, slotOffset: number, v1: any, v2: any, v3: any, v4: any): any {\n  const adjustedIndex = index +
HEADER_OFFSET;\n  const lView = getLView();\n  const pipeInstance = load<PipeTransform>(lView,
adjustedIndex);\n  return isPure(lView,
  adjustedIndex) ? pureFunction4Internal(\n
    lView, getBindingRoot(), slotOffset,\n
    pipeInstance.transform, v1, v2, v3, v4, pipeInstance) :\n
  pipeInstance.transform(v1, v2, v3, v4);\n}\n\n/**\n * Invokes a pipe with variable number of arguments.\n *\n * This instruction acts as a guard to { @link PipeTransform#transform } invoking\n * the pipe only when an input to the pipe changes.\n *\n * @param index Pipe index where the pipe was stored on creation.\n *\n * @param slotOffset the offset in the reserved slot space\n *\n * @param values Array of arguments to pass to { @link PipeTransform#transform } method.\n *\n * @codeGenApi\n * ^\nexport function pipeBindV(index: number,
slotOffset: number, values: [any, ...any[]]): any {\n  const adjustedIndex = index + HEADER_OFFSET;\n  const
lView = getLView();\n  const pipeInstance = load<PipeTransform>(lView, adjustedIndex);\n  return
isPure(lView, adjustedIndex) ?\n    pureFunctionVInternal(\n      lView, getBindingRoot(), slotOffset,
pipeInstance.transform, values, pipeInstance) :\n    pipeInstance.transform.apply(pipeInstance,
values);\n}\n\nfunction isPure(lView: lView, index: number): boolean {\n  return
(<PipeDef<any>>lView[TVIEW].data[index]).pure;\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n// <reference types='rxjs' />\nimport { PartialObserver,
Subject, Subscription } from 'rxjs';\n\n/**\n * Use in components with the `@Output` directive to emit custom
events\n * synchronously or asynchronously, and register handlers for those events\n * by subscribing to an
instance.\n *\n * @usageNotes\n *\n * Extends\n * [RxJS `Subject`](https://rxjs.dev/api/index/class/Subject)\n * for
Angular by adding the `emit()` method.\n *\n * In
the following example, a component defines two output properties\n * that create event emitters. When the title is
clicked, the emitter\n * emits an open or close event to toggle the current visibility state.\n *\n * ``html\n *
@Component({\n *   selector: 'zippy',\n *   template: `\n *     <div class="zippy">\n *       <div
(click)="toggle()">Toggle</div>\n *       <div [hidden]="!visible">\n *         <ng-content></ng-content>\n *
</div>\n *     </div>` })\n * export class Zippy {\n *   visible: boolean = true;\n *   @Output() open:
EventEmitter<any> = new EventEmitter();\n *   @Output() close: EventEmitter<any> = new EventEmitter();\n *\n *
toggle() {\n *   this.visible = !this.visible;\n *   if (this.visible) {\n *     this.open.emit(null);\n *   } else {\n *
this.close.emit(null);\n *   }\n * }\n * }\n * ``\n *\n * Access the event object with the `Sevent` argument
passed to the output event\n * handler:\n *\n * ``html\n * <zippy (open)="onOpen($event)"
(close)="onClose($event)"></zippy>\n
* ``\n *\n * @see [Observables in Angular](guide/observables-in-angular)\n * @publicApi\n * ^\nexport interface
EventEmitter<T> extends Subject<T> {\n  /**\n * @internal\n * ^\n  __isAsync: boolean;\n\n  /**\n * Creates an
instance of this class that can\n * deliver events synchronously or asynchronously.\n *\n * @param
[isAsync=false] When true, deliver events asynchronously.\n *\n * ^\n  new(isAsync?: boolean):
EventEmitter<T>;\n\n  /**\n * Emits an event containing a given value.\n * @param value The value to emit.\n
* ^\n  emit(value?: T): void;\n\n  /**\n * Registers handlers for events emitted by this instance.\n * @param next
When supplied, a custom handler for emitted events.\n * @param error When supplied, a custom handler for an
error notification from this emitter.\n * @param complete When supplied, a custom handler for a completion
notification from this\n * emitter.\n * ^\n  subscribe(next?: (value: T)
=> void, error?: (error: any) => void, complete?: () => void):\n  Subscription;\n\n  /**\n * Registers handlers for
events emitted by this instance.\n * @param observerOrNext When supplied, a custom handler for emitted events,
or an observer\n * object.\n * @param error When supplied, a custom handler for an error notification from this
emitter.\n * @param complete When supplied, a custom handler for a completion notification from this\n *
emitter.\n * ^\n  subscribe(observerOrNext?: any, error?: any, complete?: any): Subscription;\n}\n\nclass
EventEmitter_ extends Subject<any> {\n  __isAsync: boolean; // tslint:disable-line\n\n  constructor(isAsync:
boolean = false) {\n    super();\n    this.__isAsync = isAsync;\n  }\n\n  emit(value?: any) {\n    super.next(value);\n

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}\n\n override subscribe(observerOrNext?: any, error?: any, complete?: any): Subscription {\n  let nextFn =
observerOrNext;\n  let errorFn = error || (() => null);\n  let completeFn = complete;\n\n  if (observerOrNext && typeof observerOrNext === 'object') {\n    const observer = observerOrNext as
PartialObserver<unknown>;\n    nextFn = observer.next?.bind(observer);\n    errorFn =
observer.error?.bind(observer);\n    completeFn = observer.complete?.bind(observer);\n  }\n\n  if
(this.__isAsync) {\n    errorFn = _wrapInTimeout(errorFn);\n\n    if (nextFn) {\n      nextFn =
_wrapInTimeout(nextFn);\n    }\n\n    if (completeFn) {\n      completeFn = _wrapInTimeout(completeFn);\n
}\n  }\n\n  const sink = super.subscribe({next: nextFn, error: errorFn, complete: completeFn});\n\n  if
(observerOrNext instanceof Subscription) {\n    observerOrNext.add(sink);\n  }\n\n  return sink;\n
}\n}\n\nfunction _wrapInTimeout(fn: (value: unknown) => any) {\n  return (value: unknown) => {\n
setTimeout(fn, undefined, value);\n  };\n}\n\n/**\n * @publicApi\n * ^\nexport const EventEmitter: {\n  new
(isAsync?: boolean): EventEmitter<any>;\n  new<T>(isAsync?:
boolean): EventEmitter<T>;\n  readonly prototype: EventEmitter<any>;\n} = EventEmitter_ as any;\n",/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport {Observable}
from 'rxjs';\nimport {EventEmitter} from './event_emitter';\nimport {arrayEquals, flatten} from
'./util/array_utils';\nimport {getSymbolIterator} from './util/symbol';\nfunction symbolIterator<T>(this:
QueryList<T>): Iterator<T> {\n  return ((this as any as { _results: Array<T> })._results as
any)[getSymbolIterator()];\n}\n\n/**\n * An unmodifiable list of items that Angular keeps up to date when the
state\n * of the application changes.\n * The type of object that { @link ViewChildren }, { @link
ContentChildren }, and { @link QueryList }\n * provide.\n * Implements an iterable interface, therefore it can be
used in both ES6\n * javascript `for
(var i of items)` loops as well as in Angular templates with\n * `*ngFor`="let i of myList".\n * Changes can be
observed by subscribing to the changes `Observable`.\n * NOTE: In the future this class will implement an
`Observable` interface.\n * @usageNotes\n * ### Example\n * ```typescript\n * @Component({...})\n * class
Container {\n *   @ViewChildren(Item) items: QueryList<Item>;\n * }\n * ```\n * @publicApi\n * ^\nexport class
QueryList<T> implements Iterable<T> {\n  public readonly dirty = true;\n  private _results: Array<T> = [];\n
private _changesDetected: boolean = false;\n  private _changes: EventEmitter<QueryList<T>>|null = null;\n\n
readonly length: number = 0;\n  readonly first: T = undefined!;\n  readonly last: T = undefined!;\n\n  /**\n *
Returns `Observable` of `QueryList` notifying the subscriber of changes.\n * ^\n  get changes(): Observable<any>
{\n  return this._changes || (this._changes = new EventEmitter());\n  }\n\n  /**\n * @param
emitDistinctChangesOnly
Whether `QueryList.changes` should fire only when actual change\n * has occurred. Or if it should fire when
query is recomputed. (recomputing could resolve in\n * the same result)\n * ^\n  constructor(private
_emitDistinctChangesOnly: boolean = false) {\n  // This function should be declared on the prototype, but doing so
there will cause the class\n  // declaration to have side-effects and become not tree-shakable. For this reason we do
it in\n  // the constructor.\n  // [getSymbolIterator()]: Iterator<T> { ... }\n  const symbol =
getSymbolIterator();\n  const proto = QueryList.prototype as any;\n  if (!proto[symbol]) proto[symbol] =
symbolIterator;\n  }\n\n  /**\n * Returns the QueryList entry at `index`.\n * ^\n  get(index: number): T|undefined
{\n  return this._results[index];\n  }\n\n  /**\n * See\n * [Array.map](https://developer.mozilla.org/en-
US/docs/Web/JavaScript/Reference/Global_Objects/Array/map)\n * ^\n  map<U>(fn: (item:
T, index: number, array: T[]) => U): U[] {\n  return this._results.map(fn);\n  }\n\n  /**\n * See\n *
[Array.filter](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/filter)\n
^ \n  filter(fn: (item: T, index: number, array: T[]) => boolean): T[] {\n  return this._results.filter(fn);\n
}\n\n  /**\n * See\n * [Array.find](https://developer.mozilla.org/en-
US/docs/Web/JavaScript/Reference/Global_Objects/Array/find)\n * ^ \n  find(fn: (item: T, index: number, array:
T[]) => boolean): T|undefined {\n  return this._results.find(fn);\n  }\n\n  /**\n * See\n *
[Array.reduce](https://developer.mozilla.org/en-

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US/docs/Web/JavaScript/Reference/Global\_Objects/Array/reduce)\n \*/\n reduce<U>(fn: (prevValue: U, curValue: T, curIndex: number, array: T[]) => U, init: U): U {\n return this.\_results.reduce(fn, init);\n }\n /\*\*\n \* See\n \* [Array.forEach](https://developer.mozilla.org/en-

US/docs/Web/JavaScript/Reference/Global\_Objects/Array/forEach)\n \*/\n forEach(fn: (item: T, index: number, array: T[]) => void): void {\n this.\_results.forEach(fn);\n }\n /\*\*\n \* See\n \* [Array.some](https://developer.mozilla.org/en-

US/docs/Web/JavaScript/Reference/Global\_Objects/Array/some)\n \*/\n some(fn: (value: T, index: number, array: T[]) => boolean): boolean {\n return this.\_results.some(fn);\n }\n /\*\*\n \* Returns a copy of the internal results list as an Array.\n \*/\n toArray(): T[] {\n return this.\_results.slice();\n }\n\n toString(): string {\n return this.\_results.toString();\n }\n /\*\*\n \* Updates the stored data of the query list, and resets the `dirty` flag to `false`, so that\n \* on change detection, it will not notify of changes to the queries, unless a new change\n \* occurs.\n \*/\n \* @param resultsTree The query results to store\n \* @param identityAccessor Optional function for extracting stable object identity from a value\n \* in the array. This function is executed for each element of the query result list while\n \* comparing current query list with the new one (provided as a first argument of the `reset`\n \* function) to detect if the lists are different. If the function is not provided, elements\n \* are compared as is (without any pre-processing).\n \*/\n reset(resultsTree: Array<T>[], identityAccessor?: (value: T) => unknown): void {\n // Cast to `QueryListInternal` so that we can mutate fields which are readonly for the usage of\n // QueryList (but not for QueryList itself.)\n const self = this as QueryListInternal<T>;\n (self as {dirty: boolean}).dirty = false;\n const newResultFlat = flatten(resultsTree);\n if (this.\_changesDetected = !arrayEquals(self.\_results, newResultFlat, identityAccessor)) {\n self.\_results = newResultFlat;\n self.length = newResultFlat.length;\n self.last = newResultFlat[this.length - 1];\n self.first = newResultFlat[0];\n }\n }\n /\*\*\n \* Triggers a change event by emitting on the `changes` `@link EventEmitter`.\n \*/\n notifyOnChanges(): void {\n if (this.\_changes && (this.\_changesDetected || !this.\_emitDistinctChangesOnly))\n this.\_changes.emit(this);\n }\n\n /\*\* internal \*/\n setDirty() {\n (this as {dirty: boolean}).dirty = true;\n }\n\n /\*\* internal \*/\n destroy(): void {\n (this.changes as EventEmitter<any>).complete();\n (this.changes as EventEmitter<any>).unsubscribe();\n }\n\n // The implementation of `Symbol.iterator` should be declared here, but this would cause\n // tree-shaking issues with `QueryList`. So instead, it's added in the constructor (see comments\n // there) and this declaration is left here to ensure that TypeScript considers QueryList to\n // implement the Iterable interface. This is required for template type-checking of NgFor loops\n // over QueryLists to work correctly, since QueryList must be assignable to NgIterable.\n [Symbol.iterator]!: () => Iterator<T>;\n }\n\n /\*\*\n \* Internal set of APIs used by the framework. (not to be made public)\n \*/\n interface QueryListInternal<T> extends QueryList<T> {\n reset(a: any[]): void;\n notifyOnChanges(): void;\n length: number;\n last: T;\n first: T;\n }\n\n /\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*/\n\n import {Injector} from './di/injector';\n import {assertLContainer} from './render3/assert';\n import {createLView, renderView} from './render3/instructions/shared';\n import {TContainerNode, TNode, TNodeType} from './render3/interfaces/node';\n import {DECLARATION\_LCONTAINER, LView, LViewFlags, QUERIES, TView} from './render3/interfaces/view';\n import {getCurrentTNode, getLView} from './render3/state';\n import {ViewRef as R3\_ViewRef} from './render3/view\_ref';\n import {assertDefined} from './util/assert';\n import {createElementRef, ElementRef} from './element\_ref';\n import {EmbeddedViewRef} from './view\_ref';\n\n /\*\*\n \* Represents an embedded template that can be used to instantiate embedded views.\n \* To instantiate embedded views based on a template, use the `ViewContainerRef`\n \* method `createEmbeddedView()`.\n \* Access a `TemplateRef` instance by placing a directive on an ``\n \* element (or directive prefixed with `\*`). The `TemplateRef` for the embedded view\n \* is injected into the constructor of the directive,\n \* using the `TemplateRef` token.\n \* You can also use a `Query` to find a `TemplateRef` associated with\n \* a component or a directive.\n \* @see `ViewContainerRef`\n \* @see [Navigate the Component Tree with

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DI](guide/dependency-injection-navtree)\n *\n * @publicApi\n *^nexport abstract class TemplateRef<C> {\n /**\n * The anchor element in the parent view for this embedded view.\n *\n * The data-binding and injection contexts of embedded views created from this\n\n `TemplateRef`\n * inherit from the contexts of this location.\n *\n * Typically new embedded views are attached to the view container of this location, but in\n * advanced use-cases, the view can be attached to a different container while keeping the\n * data-binding and injection context from the original location.\n *\n */\n\n // TODO(i): rename to anchor or location\n abstract readonly elementRef: ElementRef;\n\n /**\n * Instantiates an unattached embedded view based on this template.\n * @param context The data-binding context of the embedded view, as declared\n * in the `` usage.\n * @param injector Injector to be used within the embedded view.\n * @returns The new embedded view object.\n */\n abstract createEmbeddedView(context: C, injector?: Injector): EmbeddedViewRef<C>;\n\n /**\n * @internal\n * @nocollapse\n */\n static __NG_ELEMENT_ID__: () => TemplateRef<any>|\n null = injectTemplateRef;\n}\n\nconst ViewEngineTemplateRef = TemplateRef;\n\n//\n\n TODO(alxhub): combine interface and implementation. Currently this is challenging since something\n in g3 depends on them being separate.\n\nconst R3TemplateRef = class TemplateRef<T> extends ViewEngineTemplateRef<T> {\n constructor(\n private _declarationLView: LView, private _declarationTContainer: TContainerNode,\n public override elementRef: ElementRef) {\n super();\n }\n\n override createEmbeddedView(context: T, injector?: Injector): EmbeddedViewRef<T> {\n const embeddedTView = this._declarationTContainer.tViews as TView;\n const embeddedLView = createLView(\n this._declarationLView, embeddedTView, context, LViewFlags.CheckAlways, null,\n embeddedTView.declTNode, null, null, null, null, injector || null);\n const declarationLContainer = this._declarationLView[this._declarationTContainer.index];\n ngDevMode && assertLContainer(declarationLContainer);\n embeddedLView[DECLARATION_LCONTAINER] = declarationLContainer;\n\n const declarationViewLQueries = this._declarationLView[QUERIES];\n if (declarationViewLQueries !== null) {\n embeddedLView[QUERIES] = declarationViewLQueries.createEmbeddedView(embeddedTView);\n }\n\n renderView(embeddedTView, embeddedLView, context);\n return new R3_ViewRef<T>(embeddedLView);\n }\n};\n\n/**\n * Creates a TemplateRef given a node.\n *\n * @returns The TemplateRef instance to use\n\n */\n\n^nexport function injectTemplateRef<T>(): TemplateRef<T>|\n null {\n return createTemplateRef<T>(getCurrentTNode()!, getLView());\n }\n\n/**\n * Creates a TemplateRef and stores it on the injector.\n *\n * @param hostTNode The node on which a TemplateRef is requested\n * @param hostLView The `LView` to which the node belongs\n * @returns The TemplateRef instance or null if we can't create a TemplateRef on a given node type\n\n */\n\n^nexport function createTemplateRef<T>(hostTNode: TNode, hostLView: LView): TemplateRef<T>|\n null {\n if (hostTNode.type & TNodeType.Container) {\n ngDevMode && assertDefined(hostTNode.tViews, 'TView must be allocated');\n return new R3TemplateRef(\n hostLView, hostTNode as TContainerNode, createElementRef(hostTNode, hostLView));\n }\n return null;\n }\n\n",\n\n /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n\n */\n\n^nimport {Injector} from './di/injector';\n^nimport {EnvironmentInjector} from './di/r3_injector';\n^nimport {isType, Type} from './interface/type';\n^nimport {assertNodeInjector} from './render3/assert';\n^nimport {ComponentFactory as R3ComponentFactory} from './render3/component_ref';\n^nimport {getComponentDef} from './render3/definition';\n^nimport {getParentInjectorLocation, NodeInjector} from './render3/di';\n^nimport {addToViewTree, createLContainer} from './render3/instructions/shared';\n^nimport {CONTAINER_HEADER_OFFSET, LContainer, NATIVE, VIEW_REFS} from './render3/interfaces/container';\n^nimport {NodeInjectorOffset} from './render3/interfaces/injector';\n^nimport {TContainerNode, TDirectiveHostNode, TElementContainerNode, TElementNode, TNodeType} from './render3/interfaces/node';\n^nimport {RComment, RElement} from './render3/interfaces/render_dom';\n^nimport {isLContainer} from

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'./render3/interfaces/type_checks';\nimport {LView, PARENT, RENDERER, T_HOST, TVIEW} from
'./render3/interfaces/view';\nimport {assertTNodeType} from './render3/node_assert';\nimport
{addViewToContainer, destroyLView, detachView, getBeforeNodeForView, insertView, nativeInsertBefore,
nativeNextSibling, nativeParentNode} from './render3/node_manipulation';\nimport {getCurrentTNode, getLView}
from './render3/state';\nimport {getParentInjectorIndex, getParentInjectorView, hasParentInjector} from
'./render3/util/injector_utils';\nimport {getNativeByTNode, unwrapRNode, viewAttachedToContainer} from
'./render3/util/view_utils';\nimport {ViewRef as R3ViewRef} from
'./render3/view_ref';\nimport {addToArray, removeFromArray} from './util/array_utils';\nimport {assertDefined,
assertEqual, assertGreaterThan, assertLessThan, throwError} from './util/assert';\nimport {ComponentFactory,
ComponentRef} from './component_factory';\nimport {createElementRef, ElementRef} from
'./element_ref';\nimport {NgModuleRef} from './ng_module_factory';\nimport {TemplateRef} from
'./template_ref';\nimport {EmbeddedViewRef, ViewRef} from './view_ref';\n/**\n * Represents a container where
one or more views can be attached to a component.\n *\n * Can contain *host views* (created by instantiating a\n *
component with the `createComponent()` method), and *embedded views*\n * (created by instantiating a
`TemplateRef` with the `createEmbeddedView()` method).\n *\n * A view container instance can contain other view
containers,\n * creating a [view hierarchy](guide/glossary#view-tree).\n *\n * @see `ComponentRef`\n * @see
`EmbeddedViewRef`\n *\n * @publicApi\n */\nexport
abstract class ViewContainerRef {\n /**\n * Anchor element that specifies the location of this container in the
containing view.\n * Each view container can have only one anchor element, and each anchor element\n * can
have only a single view container.\n *\n * Root elements of views attached to this container become siblings of
the anchor element in\n * the rendered view.\n *\n * Access the `ViewContainerRef` of an element by placing a
`Directive` injected\n * with `ViewContainerRef` on the element, or use a `ViewChild` query.\n *\n * <!--
TODO: rename to anchorElement -->\n */\n abstract get element(): ElementRef;\n\n /**\n * The [dependency
injector](guide/glossary#injector) for this view container.\n */\n abstract get injector(): Injector;\n\n /**
@deprecated No replacement */\n abstract get parentInjector(): Injector;\n\n /**\n * Destroys all views in this
container.\n */\n abstract clear(): void;\n\n /**\n * Retrieves a view from this
container.\n * @param index The 0-based index of the view to retrieve.\n * @returns The `ViewRef` instance, or
null if the index is out of range.\n */\n abstract get(index: number): ViewRef|null;\n\n /**\n * Reports how many
views are currently attached to this container.\n * @returns The number of views.\n */\n abstract get length():
number;\n\n /**\n * Instantiates an embedded view and inserts it\n * into this container.\n * @param
templateRef The HTML template that defines the view.\n * @param context The data-binding context of the
embedded view, as declared\n * in the `` usage.\n * @param options Extra configuration for the
created view. Includes:\n * * index: The 0-based index at which to insert the new view into this container.\n *
If not specified, appends the new view as the last entry.\n * * injector: Injector to be used within the embedded
view.\n *\n * @returns The `ViewRef` instance for the newly created view.\n */\n\n /**\n * abstract
createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, options?: {\n index?:
number,\n injector?: Injector\n }): EmbeddedViewRef<C>;\n\n /**\n * Instantiates an embedded view and
inserts it\n * into this container.\n * @param templateRef The HTML template that defines the view.\n *
@param context The data-binding context of the embedded view, as declared\n * in the `` usage.\n
* @param index The 0-based index at which to insert the new view into this container.\n * If not specified,
appends the new view as the last entry.\n *\n * @returns The `ViewRef` instance for the newly created view.\n
*/\n\n /**\n * abstract createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, index?: number):\n
EmbeddedViewRef<C>;\n\n /**\n * Instantiates a single component and inserts its host view into this container.\n
*\n * @param componentType Component Type to use.\n * @param options An object that contains extra
parameters:\n * * index: the index at which to insert the new component's host view into this container.\n *
If not
specified, appends the new view as the last entry.\n * * injector: the injector to use as the parent for the new
component.\n * * ngModuleRef: an NgModuleRef of the component's NgModule, you should almost always

```

```

provide\n *      this to ensure that all expected providers are available for the component\n *
instantiation.\n * * environmentInjector: an EnvironmentInjector which will provide the component's
environment.\n *      you should almost always provide this to ensure that all expected providers\n *
are available for the component instantiation. This option is intended to\n *      replace the `ngModuleRef`
parameter.\n * * projectableNodes: list of DOM nodes that should be projected through\n *      [ `<ng-
content>` ](api/core/ng-content) of the new component
instance.\n * \n * @returns The new `ComponentRef` which contains the component instance and the host
view.\n * \n abstract createComponent<C>(componentType: Type<C>, options?: {\n  index?: number,\n
injector?: Injector,\n  ngModuleRef?: NgModuleRef<unknown>,\n  environmentInjector?:
EnvironmentInjector|NgModuleRef<unknown>,\n  projectableNodes?: Node[][],\n }): ComponentRef<C>;\n\n
/**\n * Instantiates a single component and inserts its host view into this container.\n * \n * @param
componentFactory Component factory to use.\n * @param index The index at which to insert the new component's
host view into this container.\n * If not specified, appends the new view as the last entry.\n * @param injector
The injector to use as the parent for the new component.\n * @param projectableNodes List of DOM nodes that
should be projected through\n *      [ `<ng-content>` ](api/core/ng-content) of the new component instance.\n *
@param ngModuleRef An instance of the
NgModuleRef that represent an NgModule.\n * This information is used to retrieve corresponding NgModule
injector.\n * \n * @returns The new `ComponentRef` which contains the component instance and the host view.\n
*\n * @deprecated Angular no longer requires component factories to dynamically create components.\n * Use
different signature of the `createComponent` method, which allows passing\n *      Component class directly.\n
*\n abstract createComponent<C>(componentFactory: ComponentFactory<C>, index?: number, injector?:
Injector,\n  projectableNodes?: any[][],\n  environmentInjector?: EnvironmentInjector|NgModuleRef<any>):
ComponentRef<C>;\n\n /**\n * Inserts a view into this container.\n * @param viewRef The view to insert.\n *
@param index The 0-based index at which to insert the view.\n * If not specified, appends the new view as the last
entry.\n * @returns The inserted `ViewRef` instance.\n * \n * \n abstract insert(viewRef:
ViewRef, index?: number): ViewRef;\n\n /**\n * Moves a view to a new location in this container.\n * @param
viewRef The view to move.\n * @param index The 0-based index of the new location.\n * @returns The moved
`ViewRef` instance.\n * \n abstract move(viewRef: ViewRef, currentIndex: number): ViewRef;\n\n /**\n *
Returns the index of a view within the current container.\n * @param viewRef The view to query.\n * @returns
The 0-based index of the view's position in this container,\n * or -1 if this container doesn't contain the view.\n
*\n abstract indexOf(viewRef: ViewRef): number;\n\n /**\n * Destroys a view attached to this container\n *
@param index The 0-based index of the view to destroy.\n * If not specified, the last view in the container is
removed.\n * \n abstract remove(index?: number): void;\n\n /**\n * Detaches a view from this container without
destroying it.\n * Use along with `insert()` to move a view within the current container.\n
*\n * @param index The 0-based index of the view to detach.\n * If not specified, the last view in the container is
detached.\n * \n abstract detach(index?: number): ViewRef|null;\n\n /**\n * @internal\n * @nocollapse\n * \n
static __NG_ELEMENT_ID__: () => ViewContainerRef = injectViewContainerRef;\n}\n\n/**\n * Creates a
ViewContainerRef and stores it on the injector. Or, if the ViewContainerRef\n * already exists, retrieves the existing
ViewContainerRef.\n * \n * @returns The ViewContainerRef instance to use\n * \n export function
injectViewContainerRef(): ViewContainerRef {\n  const previousTNode = getCurrentTNode() as TElementNode |
TElementContainerNode | TContainerNode;\n  return createContainerRef(previousTNode, getLView());\n}\n\nconst
VE_ViewContainerRef = ViewContainerRef;\n\n// TODO(alxhub): cleaning up this indirection triggers a subtle bug
in Closure in g3. Once the fix\n// for that lands, this can be cleaned up.\nconst R3ViewContainerRef = class
ViewContainerRef
extends VE_ViewContainerRef {\n  constructor(\n    private _lContainer: LContainer,\n    private _hostTNode:
TElementNode|TContainerNode|TElementContainerNode,\n    private _hostLView: LView) {\n    super();\n  }\n\n
override get element(): ElementRef {\n    return createElementRef(this._hostTNode, this._hostLView);\n  }\n\n
override get injector(): Injector {\n    return new NodeInjector(this._hostTNode, this._hostLView);\n  }\n\n /**

```



```

@deprecated No replacement */\n override get parentInjector(): Injector {\n  const parentLocation =
getParentInjectorLocation(this._hostTNode, this._hostLView);\n  if (hasParentInjector(parentLocation)) {\n
const parentView = getParentInjectorView(parentLocation, this._hostLView);\n  const injectorIndex =
getParentInjectorIndex(parentLocation);\n  ngDevMode && assertNodeInjector(parentView, injectorIndex);\n
const parentTNode =\n    parentView[TVIEW].data[injectorIndex + NodeInjectorOffset.TNODE] as
TElementNode;\n
    return new NodeInjector(parentTNode, parentView);\n  } else {\n    return new NodeInjector(null,
this._hostLView);\n  }\n }\n\n override clear(): void {\n  while (this.length > 0) {\n    this.remove(this.length -
1);\n  }\n }\n\n override get(index: number): ViewRef|null {\n  const viewRefs =
getViewRefs(this._IContainer);\n  return viewRefs !== null && viewRefs[index] || null;\n }\n\n override get
length(): number {\n  return this._IContainer.length - CONTAINER_HEADER_OFFSET;\n }\n\n override
createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, options?: {\n  index?: number,\n
injector?: Injector\n }): EmbeddedViewRef<C>;\n\n override createEmbeddedView<C>(templateRef:
TemplateRef<C>, context?: C, index?: number):\n  EmbeddedViewRef<C>;\n\n override
createEmbeddedView<C>(templateRef: TemplateRef<C>, context?: C, indexOrOptions?: number|{\n  index?:
number,\n  injector?: Injector\n }): EmbeddedViewRef<C> {\n  let index: number|undefined;\n
let injector: Injector|undefined;\n\n  if (typeof indexOrOptions === 'number') {\n    index = indexOrOptions;\n
} else if (indexOrOptions != null) {\n    index = indexOrOptions.index;\n    injector = indexOrOptions.injector;\n
}\n\n  const viewRef = templateRef.createEmbeddedView(context || <any>{ }, injector);\n  this.insert(viewRef,
index);\n  return viewRef;\n }\n\n override createComponent<C>(componentType: Type<C>, options?: {\n
index?: number,\n  injector?: Injector,\n  projectableNodes?: Node[][],\n  ngModuleRef?:
NgModuleRef<unknown>,\n }): ComponentRef<C>;\n\n /**\n  * @deprecated Angular no longer requires
component factories to dynamically create components.\n  * Use different signature of the `createComponent`
method, which allows passing\n  * Component class directly.\n  */\n\n override createComponent<C>(\n
componentFactory: ComponentFactory<C>, index?: number|undefined,\n  injector?: Injector|undefined,
projectableNodes?: any[][]|undefined,\n  environmentInjector?:
EnvironmentInjector|NgModuleRef<any>|undefined): ComponentRef<C>;\n\n override createComponent<C>(\n
componentFactoryOrType: ComponentFactory<C>|Type<C>, indexOrOptions?: number|undefined|{\n  index?:
number,\n  injector?: Injector,\n  ngModuleRef?: NgModuleRef<unknown>,\n  environmentInjector?:
EnvironmentInjector|NgModuleRef<unknown>,\n  projectableNodes?: Node[][],\n  },\n  injector?:
Injector|undefined, projectableNodes?: any[][]|undefined,\n  environmentInjector?:
EnvironmentInjector|NgModuleRef<any>|undefined): ComponentRef<C> {\n  const isComponentFactory =
componentFactoryOrType && !isType(componentFactoryOrType);\n  let index: number|undefined;\n\n  // This
function supports 2 signatures and we need to handle options correctly for both:\n  // 1. When first argument is a
Component type. This signature also requires extra\n  // options to be provided
as as object (more ergonomic option).\n  // 2. First argument is a Component factory. In this case extra options
are represented as\n  // positional arguments. This signature is less ergonomic and will be deprecated.\n  if
(isComponentFactory) {\n    if (ngDevMode) {\n      assertEquals(\n        typeof indexOrOptions !== 'object',
true,\n        'It looks like Component factory was provided as the first argument ' +\n          'and an options
object as the second argument. This combination of arguments ' +\n          'is incompatible. You can either
change the first argument to provide Component ' +\n          'type or change the second argument to be a number
(representing an index at ' +\n          'which to insert the new component\\\'s host view into this container)');\n
}\n    index = indexOrOptions as number | undefined;\n  } else {\n    if (ngDevMode) {\n      assertDefined(\n
getComponentDef(componentFactoryOrType),\n
        `Provided Component class doesn't contain Component definition.` +\n          `Please check whether
provided class has @Component decorator.`);\n      assertEquals(\n        typeof indexOrOptions !== 'number',
true,\n        'It looks like Component type was provided as the first argument ' +\n          'and a number
(representing an index at which to insert the new component\\\'s ' +\n          'host view into this container as the

```

```

second argument. This combination of arguments ' +\n
'is incompatible. Please use an object as the second
argument instead.);\n
}\n
const options = (indexOrOptions || {}) as {\n
  index?: number,\n
  injector?:
Injector,\n
  ngModuleRef?: NgModuleRef<unknown>,\n
  environmentInjector?: EnvironmentInjector |
NgModuleRef<unknown>,\n
  projectableNodes?: Node[][],\n
};\n
if (ngDevMode &&
options.environmentInjector && options.ngModuleRef) {\n
  throwError(\n
    `Cannot pass both environmentInjector and NgModuleRef options to createComponent().`);\n
}\n
index
= options.index;\n
injector = options.injector;\n
projectableNodes = options.projectableNodes;\n
environmentInjector = options.environmentInjector || options.ngModuleRef;\n
}\n\n
const componentFactory:
ComponentFactory<C> = isComponentFactory ?\n
  componentFactoryOrType as ComponentFactory<C>:\n
  new R3ComponentFactory(getComponentDef(componentFactoryOrType!));\n
const contextInjector = injector ||
this.parentInjector;\n\n
// If an `NgModuleRef` is not provided explicitly, try retrieving it from the DI tree.\n
if
(!environmentInjector && (componentFactory as any).ngModule == null) {\n
  // For the `ComponentFactory`
case, entering this logic is very unlikely, since we expect that\n
  // an instance of a `ComponentFactory`, resolved
via `ComponentFactoryResolver` would have an\n
  // `ngModule` field. This
is possible in some test scenarios and potentially in some JIT-based\n
  // use-cases. For the `ComponentFactory`
case we preserve backwards-compatibility and try\n
  // using a provided injector first, then fall back to the parent
injector of this\n
  // `ViewContainerRef` instance.\n
  // For the factory-less case, it's critical to establish a
connection with the module\n
  // injector tree (by retrieving an instance of an `NgModuleRef` and accessing its
injector),\n
  // so that a component can use DI tokens provided in MgModules. For this reason, we can not\n
  // rely on the provided injector, since it might be detached from the DI tree (for example, if\n
  // it was created via
`Injector.create` without specifying a parent injector, or if an\n
  // injector is retrieved from an `NgModuleRef`
created via `createNgModule` using an\n
  // NgModule outside of a module tree). Instead, we always use
`ViewContainerRef`'s parent\n
  // injector,
which is normally
connected to the DI tree, which includes module injector\n
  // subtree.\n
  const _injector =
isComponentFactory ? contextInjector : this.parentInjector;\n\n
  // DO NOT REFACTOR. The code here used to
have a `injector.get(NgModuleRef, null) ||\n
  // undefined` expression which seems to cause internal google apps
to fail. This is documented\n
  // in the following internal bug issue: go/b/142967802\n
  const result =
_injector.get(EnvironmentInjector, null);\n
  if (result) {\n
    environmentInjector = result;\n
  }\n
}\n\n
const componentRef =\n
  componentFactory.create(contextInjector, projectableNodes, undefined,
environmentInjector);\n
this.insert(componentRef.hostView, index);\n
return componentRef;\n
}\n\n
override
insert(viewRef: ViewRef, index?: number): ViewRef {\n
  const IView = (viewRef as
R3ViewRef<any>)._IView!;\n
  const tView = IView[TVIEW];\n\n
  if (ngDevMode && viewRef.destroyed) {\n
    throw
new Error('Cannot insert a destroyed View in a ViewContainer!');\n
  }\n\n
  if (viewAttachedToContainer(IView))
{\n
    // If view is already attached, detach it first so we clean up references appropriately.\n\n
    const prevIdx =
this.indexOf(viewRef);\n\n
    // A view might be attached either to this or a different container. The `prevIdx` for\n
    // those cases will be:\n
    // equal to -1 for views attached to this ViewContainerRef\n
    // >= 0 for views
attached to a different ViewContainerRef\n
    if (prevIdx !== -1) {\n
      this.detach(prevIdx);\n
    } else {\n
      const prevLContainer = IView[PARENT] as LContainer;\n
      ngDevMode &&\n
      assertEquals(\n
isLContainer(prevLContainer), true,\n
      'An attached view should have its PARENT point to a
container.);\n\n
      // We need to re-create a R3ViewContainerRef instance since those are not stored on\n
      // LView (nor anywhere else).\n
      const prevVContainerRef
= new R3ViewContainerRef(\n
        prevLContainer, prevLContainer[T_HOST] as TDirectiveHostNode,
prevLContainer[PARENT]);\n
      prevVContainerRef.detach(prevVContainerRef.indexOf(viewRef));\n
    }\n
}\n\n
//
Logical operation of adding `LView` to `LContainer`\n
const adjustedIdx = this._adjustIndex(index);\n
const
IContainer = this._IContainer;\n
insertView(tView, IView, IContainer, adjustedIdx);\n\n
// Physical operation of
adding the DOM nodes.\n
const beforeNode = getBeforeNodeForView(adjustedIdx, IContainer);\n
const
renderer = IView[RENDERER];\n
const parentRNode = nativeParentNode(renderer, IContainer[NATIVE]) as

```

```

RElement | RComment);
  if (parentRNode !== null) {
    addViewToContainer(tView, IContainer[T_HOST],
      renderer, IView, parentRNode, beforeNode);
  }
  (viewRef as
R3ViewRef<any>).attachToViewContainerRef();
  addToArray(getOrCreateViewRefs(IContainer), adjustedIdx,
viewRef);
  return viewRef;
}
override move(viewRef:
ViewRef, newIndex: number): ViewRef {
  if (ngDevMode && viewRef.destroyed) {
    throw new
Error('Cannot move a destroyed View in a ViewContainer!');
  }
  return this.insert(viewRef, newIndex);
}
override indexOf(viewRef: ViewRef): number {
  const viewRefsArr = getViewRefs(this._IContainer);
  return viewRefsArr !== null ? viewRefsArr.indexOf(viewRef) : -1;
}
override remove(index?: number): void {
  const adjustedIdx = this._adjustIndex(index, -1);
  const detachedView = detachView(this._IContainer,
adjustedIdx);
  if (detachedView) {
    // Before destroying the view, remove it from the container's array of
`ViewRef`s.
    // This ensures the view container length is updated before calling
`destroyLView`, which
could recursively call view container methods that
    // rely on an accurate container length.
    // (e.g. a method
on this view container being called by a child directive's OnDestroy
    // lifecycle
hook)
    removeFromArray(getOrCreateViewRefs(this._IContainer), adjustedIdx);
  }
  destroyLView(detachedView[TVIEW], detachedView);
}
override detach(index?: number):
ViewRef|null {
  const adjustedIdx = this._adjustIndex(index, -1);
  const view = detachView(this._IContainer,
adjustedIdx);
  const wasDetached = view &&
removeFromArray(getOrCreateViewRefs(this._IContainer), adjustedIdx) !== null;
  return wasDetached ? new
R3ViewRef(view!) : null;
}
private _adjustIndex(index?: number, shift: number = 0) {
  if (index == null)
  {
    return this.length + shift;
  }
  if (ngDevMode) {
    assertGreaterThan(index, -1, `ViewRef index must
be positive, got ${index}`);
    // +1 because it's legal to insert at the end.
    assertLessThan(index, this.length +
1 + shift, `index`);
  }
  return index;
}
}
function getViewRefs(IContainer: LContainer): ViewRef[]|null {
  return IContainer[VIEW_REFS] as ViewRef[];
}
function
getOrCreateViewRefs(IContainer: LContainer): ViewRef[] {
  return (IContainer[VIEW_REFS] ||
(IContainer[VIEW_REFS] = [])) as ViewRef[];
}
/**
 * Creates a ViewContainerRef and stores it on the
injector.
 * @param ViewContainerRefToken The ViewContainerRef type
 * @param ElementRefToken The
ElementRef type
 * @param hostTNode The node that is requesting a ViewContainerRef
 * @param hostLView
The view to which the node belongs
 * @returns The ViewContainerRef instance to use
 */
export function
createContainerRef(
  hostTNode: TElementNode|TContainerNode|TElementContainerNode,
  hostLView:
LView): ViewContainerRef {
  ngDevMode && assertTNodeType(hostTNode, TNodeType.AnyContainer |
TNodeType.AnyRNode);
  let IContainer: LContainer;
  const slotValue = hostLView[hostTNode.index];
  if (isLContainer(slotValue)) {
    // If the host is a container, we don't need to create a new LContainer
    IContainer = slotValue;
  } else {
    let commentNode:
RComment;
    // If the host is an element container, the native host element is guaranteed to be a
    // comment
and we can reuse that comment as anchor element for the new LContainer.
    // The comment node in question is
already part of the DOM structure so we don't need to append
    // it again.
    if (hostTNode.type &
TNodeType.ElementContainer) {
      commentNode = unwrapRNode(slotValue) as RComment;
    } else {
      // If the host is a regular element, we have to insert a comment node manually which will
      // be used as an
anchor when inserting elements. In this specific case we use low-level DOM
      // manipulation to insert it.
      const renderer = hostLView[RENDERER];
      ngDevMode && ngDevMode.rendererCreateComment++;
      commentNode = renderer.createComment(ngDevMode ? 'container' : '');
      const hostNative =
getNativeByTNode(hostTNode, hostLView)!;
      const parentOfHostNative = nativeParentNode(renderer,
hostNative);
      nativeInsertBefore(
        renderer, parentOfHostNative!, commentNode, nativeNextSibling(renderer,
hostNative),
        false);
    }
    hostLView[hostTNode.index] = IContainer =
createLContainer(slotValue, hostLView, commentNode, hostTNode);
    addToViewTree(hostLView,
IContainer);
  }
  return new R3ViewContainerRef(IContainer, hostTNode, hostLView);
}
}
"/*
 * @license
 * Copyright Google LLC All Rights Reserved.
 * Use of this source code is governed by an MIT-

```

style license that can be found in the LICENSE file at <https://angular.io/license>

```

import {ProcessProvidersFunction} from '../di/interface/provider';
import {EnvironmentInjector} from '../di/r3_injector';
import {Type} from '../interface/type';
import {SchemaMetadata} from '../metadata/schema';
import {ViewEncapsulation} from '../metadata/view';
import {FactoryFn} from '../definition_factory';
import {TAttributes, TConstantsOrFactory} from './node';
import {CssSelectorList} from './projection';
import {TView} from './view';

```

**Definition of what a template rendering function should look like for a component.**

```

export type ComponentTemplate<T> = {
  // Note: the ctx parameter is typed as T|U, as using only U would prevent a template with
  // e.g. ctx: {} from being assigned to ComponentTemplate<any> as TypeScript won't infer U = any
  // in that scenario. By including T this incompatibility is resolved.
  <U extends T>(rf: RenderFlags, ctx: T|U): void;
}

```

**Definition of what a view queries function should look like.**

```

export type ViewQueriesFunction<T> = <U extends T>(rf:
  RenderFlags, ctx: U) => void;

```

**Definition of what a content queries function should look like.**

```

export type ContentQueriesFunction<T> = <U extends T>(rf: RenderFlags, ctx: U, directiveIndex: number) => void;

```

**Flags passed into template functions to determine which blocks (i.e. creation, update) should be executed.**

Typically, a template runs both the creation block and the update block on initialization and subsequent runs only execute the update block. However, dynamically created views require that the creation block be executed separately from the update block (for backwards compat).

```

export const enum RenderFlags {
  // Whether to run the creation block (e.g. create elements and directives)
  Create = 0b01,
  // Whether to run the update block (e.g. refresh bindings)
  Update = 0b10
}

```

**A subclass of `Type` which has a static `cmp` field making it consumable for rendering.**

```

export interface ComponentType<T> extends Type<T> {
  cmp: unknown;
}

```

**A subclass of `Type` which has a static `dir` field making it consumable for rendering.**

```

export interface DirectiveType<T> extends Type<T> {
  dir: unknown;
  fac: unknown;
}

```

**A subclass of `Type` which has a static `pipe` field making it consumable for rendering.**

```

export interface PipeType<T> extends Type<T> {
  pipe: unknown;
}

```

**Runtime link information for Directives.**

This is an internal data structure used by the render to link directives into templates.

**NOTE:** Always use `defineDirective` function to create this object, never create the object directly since the shape of this object can change between versions.

**@param** Selector type metadata specifying the selector of the directive or component

**See:** {@link defineDirective}

```

export interface DirectiveDef<T> {
  // A dictionary mapping the inputs' minified property names to their public API names, which are their aliases if any, or their original unminified property names (as in `@Input('alias') propertyName: any;`).
  // readonly inputs: {[P in keyof T]: string};
  // @deprecated This is only here because `NgOnChanges` incorrectly uses declared name instead of public or minified name.
  // readonly declaredInputs: {[P in keyof T]: string};
  // A dictionary mapping the outputs' minified property names to their public API names, which are their aliases if any, or their original unminified property names (as in `@Output('alias') propertyName: any;`).
  // readonly outputs: {[P in keyof T]: string};
  // Function to create and refresh content queries associated with a given directive.
  // contentQueries: ContentQueriesFunction<T>|null;
  // Query-related instructions for a directive. Note that while directives don't have a view and as such view queries won't necessarily do anything, there might be components that extend the directive.
  // viewQuery: ViewQueriesFunction<T>|null;
  // Refreshes host bindings on the associated directive.
  // readonly hostBindings: HostBindingsFunction<T>|null;
  // The number of bindings in this directive `hostBindings` (including pure fn bindings).
  // Used to calculate the length of the component's LView array, so we can pre-fill the array and set the host binding start index.
  // readonly hostVars: number;
  // Assign static attribute values to a host element. This property will assign static attribute values as well as class and style values to a host element. Since attribute values can consist of different types of values, the `hostAttrs` array must include the values in the following format:
  // // static attributes (like `title`, `name`, `id`...)
  // attr1, value1, attr2, value,
  // // a single

```



The function is necessary to be able to support forward declarations.

```

* pipeDefs:
PipeDefListOrFactory|null;
/**
 * Unfiltered list of all dependencies of a component, or `null` if none.
*/
dependencies: TypeOrFactory<DependencyTypeList>|null;
/**
 * The set of schemas that declare elements to be allowed in the component's template.
*/
schemas: SchemaMetadata[]|null;
/**
 * Ivy runtime uses this place to store the computed tView for the component. This gets filled on
 * the first run of component.
*/
tView: TView|null;
/**
 * A function added by the {@link StandaloneFeature} and used by the framework to create
 * standalone injectors.
*/
getStandaloneInjector: ((parentInjector: EnvironmentInjector) => EnvironmentInjector | null)|null;
/**
 * Used to store the result of `noSideEffects` function so that it is not removed by closure
 * compiler. The property should never be read.
*/
readonly _?: unknown;
}
/**
 * Runtime link information for Pipes.
*/
* This is an internal data structure used by the renderer to link
 * pipes into templates.
*/
* NOTE: Always use `definePipe` function to create this object,
 * never create the object directly since the shape of this object
 * can change between versions.
*/
* See: {@link definePipe}
*/
export interface PipeDef<T> {
/**
 * Token representing the pipe.
*/
type: Type<T>;
/**
 * Pipe name.
*/
name: string;
/**
 * Used to resolve pipe in templates.
*/
readonly name: string;
/**
 * Factory function used to create a new pipe instance. Will be null initially.
 * Populated when the factory is first requested by pipe instantiation logic.
*/
factory: FactoryFn<T>|null;
/**
 * Whether or not the pipe is pure.
*/
pure: boolean;
/**
 * Whether this pipe is standalone.
*/
readonly standalone: boolean;
}
/**
 * The following are lifecycle hooks for this pipe
*/
onDestroy: (() => void)|null;
}
export interface DirectiveDefFeature {
<T>(directiveDef: DirectiveDef<T>): void;
}
/**
 * Marks a feature as something that {@link InheritDefinitionFeature} will execute
 * during inheritance.
*/
* NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers
 * identifying the change as a side effect, and the feature will be included in
 * every bundle.
*/
ngInherit?: true;
}
export interface ComponentDefFeature {
<T>(componentDef: ComponentDef<T>): void;
}
/**
 * Marks a feature as something that {@link InheritDefinitionFeature} will execute
 * during inheritance.
*/
* NOTE: DO NOT SET IN ROOT OF MODULE! Doing so will result in tree-shakers/bundlers
 * identifying the change as a side effect, and the feature will be included in
 * every bundle.
*/
ngInherit?: true;
}
}
/**
 * Type used for directiveDefs on component definition.
*/
* The function is necessary to be able to support forward declarations.
*/
export type DirectiveDefListOrFactory = (() => DirectiveDefList)|DirectiveDefList;
export type DirectiveDefList = (DirectiveDef<any>|ComponentDef<any>[]);
export type DirectiveTypesOrFactory = (() => DirectiveTypeList)|DirectiveTypeList;
export type DirectiveTypeList = (DirectiveType<any>|ComponentType<any>|Type<any>)*
Type as workaround for: Microsoft/TypeScript/issues/4881 */[];
export type DependencyTypeList = (DirectiveType<any>|ComponentType<any>|PipeType<any>|Type<any>[]);
export type TypeOrFactory<T> = T|(() => T);
export type HostBindingsFunction<T> = <U extends T>(rf: RenderFlags, ctx: U) => void;
/**
 * Type used for PipeDefs on component definition.
*/
* The function is necessary to be able to support forward declarations.
*/
export type PipeDefListOrFactory = (() => PipeDefList)|PipeDefList;
export type PipeDefList = PipeDef<any>[];
export type PipeTypesOrFactory = (() => PipeTypeList)|PipeTypeList;
export type PipeTypeList = (PipeType<any>|Type<any>)*
Type as workaround for: Microsoft/TypeScript/issues/4881 */[];
// Note: This hack is necessary so we don't erroneously get a circular dependency
// failure based on types.
export const unusedValueExportToPlacateAjd = 1;
}
/**
 * Copyright Google LLC All Rights Reserved.
*/
* Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
*/
import {ProviderToken} from '../di/provider_token';
import {QueryList} from '../linker/query_list';
import {TNode} from '../node';
import {TView} from '../view';
/**
 * An object representing query metadata extracted from query annotations.
*/
export interface TQueryMetadata {
predicate: ProviderToken<unknown>|string[];
read: any;
flags:

```

QueryFlags;}\n\n/\*\*\n \* A set of flags to be used with Queries.\n \*\n \* NOTE: Ensure changes here are reflected in `packages/compiler/src/render3/view/compiler.ts`\n \*/\nexport const enum QueryFlags {\n /\*\*\n \* No flags\n \*/\n none = 0b0000,\n /\*\*\n \* Whether or not the query should descend into children.\n \*/\n descendants = 0b0001,\n /\*\*\n \* The query can be computed statically and hence can be assigned eagerly.\n \*\n \* NOTE: Backwards compatibility with ViewEngine.\n \*/\n isStatic = 0b0010,\n /\*\*\n \* If the `QueryList` should fire change event only if actual change to query was computed (vs old\n \* behavior where the change was fired whenever the query was recomputed, even if the recomputed\n \* query resulted in the same list).\n \*/\n emitDistinctChangesOnly = 0b0100,\n}\n\n/\*\*\n \* TQuery objects represent all the query-related data that remain the same from one view instance\n \* to another and can be determined on the very first template pass.

Most notably TQuery holds all\n \* the matches for a given view.\n \*/\nexport interface TQuery {\n /\*\*\n \* Query metadata extracted from query annotations.\n \*/\n metadata: TQueryMetadata;\n /\*\*\n \* Index of a query in a declaration view in case of queries propagated to an embedded view, -1\n \* for queries declared in a given view. We are storing this index so we can find a parent query\n \* to clone for an embedded view (when an embedded view is created).\n \*/\n indexInDeclarationView: number;\n /\*\*\n \* Matches collected on the first template pass. Each match is a pair of:\n \* - TNode index;\n \* - match index;\n \*/\n \* A TNode index can be either:\n \* - a positive number (the most common case) to indicate a matching TNode;\n \* - a negative number to indicate that a given query is crossing a <ng-template> element and\n \* results from views created based on TemplateRef should be inserted at this place.\n \*/\n \* A match index is a number used to find

an actual value (for a given node) when query results\n \* are materialized. This index can have one of the following values:\n \* - -2 - indicates that we need to read a special token (TemplateRef, ViewContainerRef etc.); \n \* - -1 - indicates that we need to read a default value based on the node type (TemplateRef for\n \* ng-template and ElementRef for other elements); \n \* - a positive number - index of an injectable to be read from the element injector.\n \*/\n matches: number[]|null;\n /\*\*\n \* A flag indicating if a given query crosses an <ng-template> element. This flag exists for\n \* performance reasons: we can notice that queries not crossing any <ng-template> elements will\n \* have matches from a given view only (and adapt processing accordingly).\n \*/\n crossesNgTemplate: boolean;\n /\*\*\n \* A method call when a given query is crossing an element (or element container). This is where a\n \* given TNode is matched against a query predicate.\n \* @param tView\n \* @param tNode\n \*/\n elementStart(tView: TView, tNode: TNode): void;\n /\*\*\n \* A method called when processing the elementEnd instruction - this is mostly useful to determine\n \* if a given content query should match any nodes past this point.\n \* @param tNode\n \*/\n elementEnd(tNode: TNode): void;\n /\*\*\n \* A method called when processing the template instruction. This is where a\n \* given TContainerNode is matched against a query predicate.\n \* @param tView\n \* @param tNode\n \*/\n template(tView: TView, tNode: TNode): void;\n /\*\*\n \* A query-related method called when an embedded TView is created based on the content of a\n \* <ng-template> element. We call this method to determine if a given query should be propagated\n \* to the embedded view and if so - return a cloned TQuery for this embedded view.\n \* @param tNode\n \* @param childQueryIndex\n \*/\n embeddedTView(tNode: TNode, childQueryIndex: number): TQuery|null;\n}\n\n/\*\*\n

TQueries represent a collection of individual TQuery objects tracked in a given view. Most of the\n \* methods on this interface are simple proxy methods to the corresponding functionality on TQuery.\n \*/\nexport interface TQueries {\n /\*\*\n \* Adds a new TQuery to a collection of queries tracked in a given view.\n \* @param tQuery\n \*/\n track(tQuery: TQuery): void;\n /\*\*\n \* Returns a TQuery instance for at the given index in the queries array.\n \* @param index\n \*/\n getByIndex(index: number): TQuery;\n /\*\*\n \* Returns the number of queries tracked in a given view.\n \*/\n length: number;\n /\*\*\n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n \* `elementStart` on each and every TQuery.\n \* @param tView\n \* @param tNode\n \*/\n elementStart(tView: TView, tNode: TNode): void;\n /\*\*\n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n \* `elementEnd` on each and every TQuery.\n \* @param tNode\n \*/\n elementEnd(tNode: TNode): void;\n /\*\*\n \* A proxy method that iterates over all the TQueries in a given TView and calls the corresponding\n \* `template`

```

on each and every TQuery.\n * @param tView\n * @param tNode\n * ^\n template(tView: TView, tNode:
TNode): void;\n\n /**\n * A proxy method that iterates over all the TQueries in a given TView and calls the
corresponding\n * `embeddedTView` on each and every TQuery.\n * @param tNode\n * ^\n
embeddedTView(tNode: TNode): TQueries|null;\n}\n\n/**\n * An interface that represents query-related
information specific to a view instance. Most notably\n * it contains:\n * - materialized query matches;\n * - a
pointer to a QueryList where materialized query results should be reported.\n * ^\nexport interface LQuery<T> {\n
/**\n * Materialized query matches for a given view only (!). Results are initialized lazily so the\n * array of
matches is set to `null`
initially.\n * ^\n matches: (T|null)[]|null;\n\n /**\n * A QueryList where materialized query results should be
reported.\n * ^\n queryList: QueryList<T>;\n\n /**\n * Clones an LQuery for an embedded view. A cloned query
shares the same `QueryList` but has a\n * separate collection of materialized matches.\n * ^\n clone():
LQuery<T>;\n\n /**\n * Called when an embedded view, impacting results of this query, is inserted or removed.\n
^ \n setDirty(): void;\n}\n\n/**\n * LQueries represent a collection of individual LQuery objects tracked in a given
view.\n * ^\nexport interface LQueries {\n /**\n * A collection of queries tracked in a given view.\n * ^\n queries:
LQuery<any>[];\n\n /**\n * A method called when a new embedded view is created. As a result a set of LQueries
applicable\n * for a new embedded view is instantiated (cloned) from the declaration view.\n * @param tView\n
^ \n createEmbeddedView(tView: TView): LQueries|null;\n\n /**\n * A
method called when an embedded view is inserted into a container. As a result all impacted\n * `LQuery` objects
(and associated `QueryList`) are marked as dirty.\n * @param tView\n * ^ \n insertView(tView: TView): void;\n\n
/**\n * A method called when an embedded view is detached from a container. As a result all impacted\n *
`LQuery` objects (and associated `QueryList`) are marked as dirty.\n * @param tView\n * ^ \n detachView(tView:
TView): void;\n}\n\n// Note: This hack is necessary so we don't erroneously get a circular dependency\n// failure
based on types.\nexport const unusedValueExportToPlacateAjd = 1;\n\n", " /**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * ^\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n * ^\n\n// We are temporarily importing the existing
viewEngine_from core so we can be sure we are\n// correctly implementing its interfaces for backwards
compatibility.\n\nimport
{ ProviderToken } from '../di/provider_token';\nimport { createElementRef, ElementRef as ViewEngine_ElementRef,
unwrapElementRef } from '../linker/element_ref';\nimport { QueryList } from '../linker/query_list';\nimport
{ createTemplateRef, TemplateRef as ViewEngine_TemplateRef } from '../linker/template_ref';\nimport
{ createContainerRef, ViewContainerRef } from '../linker/view_container_ref';\nimport { assertDefined,
assertIndexInRange, assertNumber, throwError } from '../util/assert';\nimport { stringify } from
 '../util/stringify';\nimport { assertFirstCreatePass, assertLContainer } from './assert';\nimport { getNodeInjectable,
locateDirectiveOrProvider } from './di';\nimport { storeCleanupWithContext } from './instructions/shared';\nimport
{ CONTAINER_HEADER_OFFSET, LContainer, MOVED_VIEWS } from './interfaces/container';\nimport
{ unusedValueExportToPlacateAjd as unused1 } from './interfaces/definition';\nimport
{ unusedValueExportToPlacateAjd as unused2 } from './interfaces/injector';\nimport
{ TContainerNode, TElementContainerNode, TElementNode, TNode, TNodeType,
unusedValueExportToPlacateAjd as unused3 } from './interfaces/node';\nimport { LQueries, LQuery, QueryFlags,
TQueries, TQuery, TQueryMetadata, unusedValueExportToPlacateAjd as unused4 } from
 './interfaces/query';\nimport { DECLARATION_LCONTAINER, LView, PARENT, QUERIES, TVIEW, TView }
from './interfaces/view';\nimport { assertTNodeType } from './node_assert';\nimport { getCurrentQueryIndex,
getCurrentTNode, getLView, getTView, setCurrentQueryIndex } from './state';\nimport { isCreationMode } from
 './util/view_utils';\n\nconst unusedValueToPlacateAjd = unused1 + unused2 + unused3 + unused4;\n\nclass
LQuery_<T> implements LQuery<T> {\n matches: (T|null)[]|null = null;\n constructor(public queryList:
QueryList<T>) {\n clone(): LQuery<T> {\n return new LQuery_(this.queryList);\n } \n setDirty(): void {\n
this.queryList.setDirty();\n } \n}\n\nclass LQueries_ implements LQueries {\n constructor(public queries:

```



```

LQuery<any>[] = [] } }
createEmbeddedView(tView: TView): LQueries|null {
  const tQueries = tView.queries;
  if (tQueries !== null) {
    const noOfInheritedQueries = tView.contentQueries !== null
      ? tView.contentQueries[0] : tQueries.length;
    const viewLQueries: LQuery<any>[] = []; // An embedded
    view has queries propagated from a declaration view at the beginning of the
    // TQueries collection and up until a first content query declared in the
    // propagated LQueries are created at this point
    // queries will be instantiated from the content query instructions
    // for each directive).
    for (let i = 0; i < noOfInheritedQueries; i++) {
      const tQuery = tQueries.getByIndex(i);
      const parentLQuery = this.queries[tQuery.indexInDeclarationView];
      viewLQueries.push(parentLQuery.clone());
    }
    return new LQueries_(viewLQueries);
  }
  return null;
}
insertView(tView: TView): void {
  this.dirtyQueriesWithMatches(tView);
}
detachView(tView: TView): void {
  this.dirtyQueriesWithMatches(tView);
}
private dirtyQueriesWithMatches(tView: TView) {
  for (let i = 0; i < this.queries.length; i++) {
    if (getTQuery(tView, i).matches !== null) {
      this.queries[i].setDirty();
    }
  }
}
class TQueryMetadata_ implements TQueryMetadata {
  constructor(public predicate: ProviderToken<unknown>|string[], public flags: QueryFlags, public read: any = null) {}
}
class TQueries_ implements TQueries {
  constructor(private queries: TQuery[] = []) {}
  elementStart(tView: TView, tNode: TNode): void {
    ngDevMode && assertFirstCreatePass(tView, 'Queries should collect results on the first template pass only');
    for (let i = 0; i < this.queries.length; i++) {
      this.queries[i].elementStart(tView, tNode);
    }
  }
  elementEnd(tNode: TNode): void {
    for (let i = 0; i < this.queries.length; i++) {
      this.queries[i].elementEnd(tNode);
    }
  }
  embeddedTView(tNode: TNode): TQueries|null {
    let queriesForTemplateRef: TQuery[]|null = null;
    for (let i = 0; i < this.length; i++) {
      const childQueryIndex = queriesForTemplateRef !== null ? queriesForTemplateRef.length : 0;
      const tqueryClone = this.getByIndex(i).embeddedTView(tNode, childQueryIndex);
      if (tqueryClone) {
        tqueryClone.indexInDeclarationView = i;
        if (queriesForTemplateRef !== null) {
          queriesForTemplateRef.push(tqueryClone);
        } else {
          queriesForTemplateRef = [tqueryClone];
        }
      }
    }
    return queriesForTemplateRef !== null ? new TQueries_(queriesForTemplateRef) : null;
  }
  template(tView: TView, tNode: TNode): void {
    ngDevMode && assertFirstCreatePass(tView, 'Queries should collect results on the first template pass only');
    for (let i = 0; i < this.queries.length; i++) {
      this.queries[i].template(tView, tNode);
    }
  }
  getByIndex(index: number): TQuery {
    ngDevMode && assertIndexInRange(this.queries, index);
    return this.queries[index];
  }
  get length(): number {
    return this.queries.length;
  }
  track(tquery: TQuery): void {
    this.queries.push(tquery);
  }
}
class TQuery_ implements TQuery {
  matches: number[]|null = null;
  indexInDeclarationView = -1;
  crossesNgTemplate = false;
  /**
   * A node index on which a query was declared (-1 for view queries and ones inherited from the
   * declaration template). We use this index (alongside with _appliesToNextNode flag) to know
   * when to apply content queries to elements in a template.
   */
  private _declarationNodeIndex: number;
  /**
   * A flag indicating if a given query still applies to nodes it is crossing. We use this flag
   * (alongside with _declarationNodeIndex) to know when to stop applying content queries to
   * elements in a template.
   */
  private _appliesToNextNode = true;
  constructor(public metadata: TQueryMetadata, nodeIndex: number = -1) {
    this._declarationNodeIndex = nodeIndex;
  }
  elementStart(tView: TView, tNode: TNode): void {
    if (this.isApplyingToNode(tNode)) {
      this.matchTNode(tView, tNode);
    }
  }
  elementEnd(tNode: TNode): void {
    if (this._declarationNodeIndex === tNode.index) {
      this._appliesToNextNode = false;
    }
  }
  template(tView: TView, tNode: TNode): void {
    this.elementStart(tView, tNode);
  }
  embeddedTView(tNode: TNode, childQueryIndex: number): TQuery|null {
    if (this.isApplyingToNode(tNode)) {
      this.crossesNgTemplate = true; // A marker indicating a `<ng-template>` element (a placeholder for
      query results from // embedded views created based on this `<ng-template>`).
      this.addMatch(-tNode.index,

```

```

childQueryIndex);\n    return new TQuery_(this.metadata);\n    }\n    return null;\n    }\n\n    private
isApplyingToNode(tNode: TNode): boolean {\n    if (this._appliesToNextNode &&\n        (this.metadata.flags &
QueryFlags.descendants) !== QueryFlags.descendants) {\n        const declarationNodeIdx =
this._declarationNodeIndex;\n        let parent = tNode.parent;\n        // Determine if a given TNode is a \"direct\" child
of a node on which a content query was\n        // declared (only direct children of query's host node can match with
the descendants: false\n        // option). There are 3 main use-case / conditions to consider here:\n        // - <needs-
target><i #target></i></needs-target>: here <i #target> parent node is a query\n        // host node;\n        // - <needs-
target><ng-template [ngIf]=\"true\"><i #target></i></ng-template></needs-target>:\n        // here <i #target> parent
node is null;\n        // - <needs-target><ng-container><i #target></i></ng-container></needs-target>: here we
need\n        // to go past `<ng-container>` to determine <i #target> parent node (but we shouldn't traverse\n        // up
past the query's host node!).\n        while (parent !== null && (parent.type & TNodeType.ElementContainer) &&\n            parent.index !== declarationNodeIdx) {\n            parent = parent.parent;\n        }\n        return declarationNodeIdx
=== (parent !== null ? parent.index : -1);\n    }\n    return this._appliesToNextNode;\n    }\n\n    private
matchTNode(tView: TView, tNode: TNode): void {\n    const predicate = this.metadata.predicate;\n    if
(Array.isArray(predicate)) {\n        for (let i = 0; i < predicate.length; i++) {\n            const name = predicate[i];\n            this.matchTNodeWithReadOption(tView, tNode, getIdxOfMatchingSelector(tNode, name));\n            // Also try
matching the name to a provider since strings can be used as DI tokens too.\n            this.matchTNodeWithReadOption(\n                tView, tNode, locateDirectiveOrProvider(tNode, tView, name, false,
false));\n        }\n    } else {\n        if ((predicate as any) === ViewEngine_TemplateRef) {\n            if (tNode.type &
TNodeType.Container) {\n                this.matchTNodeWithReadOption(tView, tNode, -1);\n            }\n        } else {\n            this.matchTNodeWithReadOption(\n                tView, tNode, locateDirectiveOrProvider(tNode, tView, predicate,
false, false));\n        }\n    }\n\n    private matchTNodeWithReadOption(tView: TView, tNode: TNode,
nodeMatchIdx: number|null): void {\n    if (nodeMatchIdx !== null) {\n        const read = this.metadata.read;\n        if
(read !== null) {\n            if (read === ViewEngine_ElementRef || read === ViewContainerRef ||\n                read ===
ViewEngine_TemplateRef && (tNode.type & TNodeType.Container)) {\n                this.addMatch(tNode.index, -2);\n            }
else {\n                const directiveOrProviderIdx =\n                    locateDirectiveOrProvider(tNode, tView, read, false,
false);\n                if (directiveOrProviderIdx !== null) {\n                    this.addMatch(tNode.index,
directiveOrProviderIdx);\n                }\n            }\n        } else {\n            this.addMatch(tNode.index, nodeMatchIdx);\n        }\n    }\n\n    private addMatch(tNodeIdx: number, matchIdx: number) {\n    if (this.matches === null) {\n        this.matches = [tNodeIdx, matchIdx];\n    } else {\n        this.matches.push(tNodeIdx, matchIdx);\n    }\n}\n}\n\n/*\n * Iterates over local names for a given node and returns directive index\n * (or -1 if a local name
points to an element).\n * @param tNode static data of a node to check\n * @param selector selector to match\n *
@return directive index, -1 or null if a selector didn't match any of the local names\n */\nfunction
getIdxOfMatchingSelector(tNode: TNode, selector: string): number|null {\n    const localNames =
tNode.localNames;\n    if (localNames !== null) {\n        for (let i = 0; i < localNames.length; i += 2) {\n            if
(localNames[i] === selector) {\n                return localNames[i + 1] as number;\n            }\n        }\n    }\n    return
null;\n}\n\nfunction createResultByTNodeType(tNode: TNode, currentView: LView): any {\n    if (tNode.type &
TNodeType.AnyRNode | TNodeType.ElementContainer) {\n        return createElementRef(tNode, currentView);\n    }\n    else if (tNode.type & TNodeType.Container) {\n        return createTemplateRef(tNode, currentView);\n    }\n    return
null;\n}\n\nfunction createResultForNode(IView: LView, tNode: TNode, matchingIdx: number, read: any): any
{\n    if (matchingIdx === -1) {\n        // if read token and / or strategy is not specified, detect it using appropriate tNode
type\n        return createResultByTNodeType(tNode, IView);\n    } else if (matchingIdx === -2) {\n        // read a special
token from a node injector\n        return createSpecialToken(IView, tNode, read);\n    } else {\n        // read a token\n        return getNodeInjectable(IView, IView[TVIEW], matchingIdx, tNode as TElementNode);\n    }\n}\n\nfunction
createSpecialToken(IView: LView, tNode: TNode, read: any): any {\n    if (read === ViewEngine_ElementRef) {\n        return
createElementRef(tNode, IView);\n    } else if (read === ViewEngine_TemplateRef) {\n        return
createTemplateRef(tNode, IView);\n    } else if (read === ViewContainerRef) {\n        ngDevMode &&

```

```

assertTNodeType(tNode, TNodeType.AnyRNode | TNodeType.AnyContainer);\n  return createContainerRef(\n
  tNode as TElementNode | TContainerNode | TElementContainerNode, IView);\n } else {\n  ngDevMode &&\n
  throwError(\n    `Special token to read should be one of ElementRef, TemplateRef or ViewContainerRef but
  got ${\n      stringify(read)}.`);\n }\n}\n\n/**\n * A helper function that creates query results for a given view.
  This function is meant to do the\n * processing once and only once for a given view instance (a set of results for a
  given view\n * doesn't change).\n */\nfunction materializeViewResults<T>(\n  tView: TView, IView: LView,\n  tQuery: TQuery, queryIndex: number): (T|null)[] {\n  const IQuery = IView[QUERIES]!.queries![queryIndex];\n  if
  (IQuery.matches
  === null) {\n    const tViewData = tView.data;\n    const tQueryMatches = tQuery.matches!;\n    const result:
  T|null[] = [];\n    for (let i = 0; i < tQueryMatches.length; i += 2) {\n      const matchedNodeIdx =
  tQueryMatches[i];\n      if (matchedNodeIdx < 0) {\n        // we at the <ng-template> marker which might have
  results in views created based on this\n        // <ng-template> - those results will be in separate views though, so here
  we just leave\n        // null as a placeholder\n        result.push(null);\n      } else {\n        ngDevMode &&
  assertIndexInRange(tViewData, matchedNodeIdx);\n        const tNode = tViewData[matchedNodeIdx] as TNode;\n
        result.push(createResultForNode(IView, tNode, tQueryMatches[i + 1], tQuery.metadata.read));\n      }\n    }\n
    IQuery.matches = result;\n  }\n  return IQuery.matches;\n }\n\n/**\n * A helper function that collects (already
  materialized) query results from a tree of views,\n * starting with a provided LView.\n */\nfunction collectQueryResults<T>(\n  tView: TView, IView: LView, queryIndex: number, result: T[]): T[] {\n
  const tQuery = tView.queries!.getByIndex(queryIndex);\n  const tQueryMatches = tQuery.matches;\n  if
  (tQueryMatches !== null) {\n    const IViewResults = materializeViewResults<T>(tView, IView, tQuery,\n  queryIndex);\n    for (let i = 0; i < tQueryMatches.length; i += 2) {\n      const tNodeIdx = tQueryMatches[i];\n
      if (tNodeIdx > 0) {\n        result.push(IViewResults[i / 2] as T);\n      } else {\n        const childQueryIndex =
  tQueryMatches[i + 1];\n        const declarationLContainer = IView[-tNodeIdx] as LContainer;\n        ngDevMode
  && assertLContainer(declarationLContainer);\n        // collect matches for views inserted in this container\n
        for (let i = CONTAINER_HEADER_OFFSET; i < declarationLContainer.length; i++) {\n          const
  embeddedLView = declarationLContainer[i];\n          if (embeddedLView[DECLARATION_LCONTAINER] ===
  embeddedLView[PARENT]) {\n            collectQueryResults(embeddedLView[TVIEW], embeddedLView, childQueryIndex, result);\n          }\n
        }\n        // collect matches for views created from this declaration container and inserted into\n        // different
  containers\n        if (declarationLContainer[MOVED_VIEWS] !== null) {\n          const embeddedLViews =
  declarationLContainer[MOVED_VIEWS]!;\n          for (let i = 0; i < embeddedLViews.length; i++) {\n            const
  embeddedLView = embeddedLViews[i];\n            collectQueryResults(embeddedLView[TVIEW],\n  embeddedLView, childQueryIndex, result);\n          }\n        }\n        return result;\n      }\n    }\n  }\n\n/**\n * Refreshes a query by combining matches from all active views and removing matches from deleted\n * views.\n * @returns `true` if a query got dirty during change detection or if this is a static query\n * resolving in creation
  mode, `false` otherwise.\n * @codeGenApi\n */\nexport function queryRefresh(queryList: QueryList<any>):
  boolean {\n  const IView = getLView();\n  const tView = getTView();\n  const queryIndex =
  getCurrentQueryIndex();\n  setCurrentQueryIndex(queryIndex + 1);\n  const tQuery = getTQuery(tView,\n  queryIndex);\n  if (queryList.dirty &&\n    (isCreationMode(IView) ===\n    ((tQuery.metadata.flags &
  QueryFlags.isStatic) === QueryFlags.isStatic))) {\n    if (tQuery.matches === null) {\n      queryList.reset([]);\n    }
  else {\n    const result = tQuery.crossesNgTemplate ?\n      collectQueryResults(tView, IView, queryIndex, []) : \n
      materializeViewResults(tView, IView, tQuery, queryIndex);\n    queryList.reset(result, unwrapElementRef);\n
    queryList.notifyOnChanges();\n  }\n  return true;\n }\n return false;\n }\n\n/**\n * Creates new QueryList,
  stores the reference in LView and returns QueryList.\n * @param predicate The type for which the query will
  search\n * @param flags Flags associated with the query\n * @param read What to save in the query\n */\n
  @codeGenApi\n */\nexport function viewQuery<T>(\n  predicate: ProviderToken<unknown>|string[], flags:
  QueryFlags, read?: any): void {\n  ngDevMode && assertNumber(flags, 'Expecting flags');\n  const tView =
  getTView();\n  if (tView.firstCreatePass) {\n    createTQuery(tView, new TQueryMetadata_(predicate, flags, read), -

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1);\n  if ((flags & QueryFlags.isStatic) === QueryFlags.isStatic) {\n    tView.staticViewQueries = true;\n  }\n}\n createLQuery<T>(tView, getLView(), flags);\n}\n\n/**\n * Registers a QueryList, associated with a content\n query, for later refresh (part of a view\n * refresh).\n * @param directiveIndex Current directive index\n * @param predicate The type for which the query will search\n * @param flags Flags associated with the query\n * @param read What to save in the query\n * @returns QueryList<T>\n * @codeGenApi\n */\nexport function\n contentQuery<T>(\n  directiveIndex: number, predicate: ProviderToken<unknown>|string[], flags: QueryFlags,\n  read?: any): void {\n  ngDevMode && assertNumber(flags, 'Expecting flags');\n  const tView = getTView();\n  if\n (tView.firstCreatePass) {\n    const tNode = getCurrentTNode();\n    createTQuery(tView, new\n TQueryMetadata_(predicate, flags, read), tNode.index);\n    saveContentQueryAndDirectiveIndex(tView,\n directiveIndex);\n  } if ((flags & QueryFlags.isStatic) === QueryFlags.isStatic) {\n    tView.staticContentQueries =\n true;\n  }\n}\n\n createLQuery<T>(tView, getLView(), flags);\n}\n\n/**\n * Loads a QueryList corresponding to\n the current view or content query.\n * @codeGenApi\n */\nexport function loadQuery<T>(): QueryList<T> {\n  return loadQueryInternal<T>(getLView(), getCurrentQueryIndex());\n}\n\nfunction loadQueryInternal<T>(IView:\n LView, queryIndex: number): QueryList<T> {\n  ngDevMode &&\n    assertDefined(IView[QUERIES], 'LQueries\n should be defined when trying to load a query');\n  ngDevMode &&\n    assertIndexInRange(IView[QUERIES]!.queries, queryIndex);\n\n  return IView[QUERIES]!.queries[queryIndex].queryList;\n}\n\nfunction createLQuery<T>(tView: TView, IView:\n LView, flags: QueryFlags) {\n  const queryList = new QueryList<T>(\n    (flags &\n QueryFlags.emitDistinctChangesOnly) === QueryFlags.emitDistinctChangesOnly);\n  storeCleanupWithContext(tView, IView, queryList, queryList.destroy);\n  if (IView[QUERIES] === null)\n IView[QUERIES] = new LQueries_();\n  IView[QUERIES]!.queries.push(new\n LQuery_(queryList));\n}\n\nfunction createTQuery(tView: TView, metadata: TQueryMetadata, nodeIndex:\n number): void {\n  if (tView.queries === null) tView.queries = new TQueries_();\n  tView.queries.track(new\n TQuery_(metadata, nodeIndex));\n}\n\nfunction saveContentQueryAndDirectiveIndex(tView: TView,\n directiveIndex: number) {\n  const tViewContentQueries = tView.contentQueries || (tView.contentQueries = []);\n  const lastSavedDirectiveIndex =\n tViewContentQueries.length ?\n tViewContentQueries[tViewContentQueries.length - 1] : -1;\n  if (directiveIndex\n !== lastSavedDirectiveIndex) {\n    tViewContentQueries.push(tView.queries!.length - 1, directiveIndex);\n  }\n}\n\nfunction getTQuery(tView: TView, index: number): TQuery {\n  ngDevMode &&\n    assertDefined(tView.queries, 'TQueries must be defined to retrieve a TQuery');\n  return\n tView.queries!.getByIndex(index);\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n */\nimport { createTemplateRef, TemplateRef } from './linker/template_ref';\nimport\n { TNode } from './interfaces/node';\nimport { LView } from './interfaces/view';\n\n/**\n * Retrieves `TemplateRef`\n instance from `Injector` when a local reference is placed on the\n * <ng-template>` element.\n * @codeGenApi\n */\nexport function templateRefExtractor(tNode: TNode, IView: LView): TemplateRef<any>|null\n {\n  return createTemplateRef(tNode, IView);\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an\n MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport\n { LifecycleHooksFeature } from './component_ref';\nimport { defineComponent, defineDirective, defineNgModule,\n definePipe, setComponentScope, setNgModuleScope } from './definition';\nimport { CopyDefinitionFeature } from\n './features/copy_definition_feature';\nimport { InheritDefinitionFeature } from\n './features/inherit_definition_feature';\nimport { NgOnChangesFeature } from\n './features/ng_onchanges_feature';\nimport { ProvidersFeature } from './features/providers_feature';\nimport\n { StandaloneFeature } from './features/standalone_feature';\nimport { ComponentDef, ComponentTemplate,\n ComponentType, DirectiveDef, DirectiveType, PipeDef } from './interfaces/definition';\nimport\n { ComponentDeclaration, DirectiveDeclaration, FactoryDeclaration, InjectorDeclaration, NgModuleDeclaration,\n
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PipeDeclaration} from './interfaces/public_definitions';\nimport {ComponentDebugMetadata,
DirectiveDebugMetadata, GetComponent, getDirectiveMetadata, getDirectives, getHostElement, getRenderedText}
from './util/discovery_utils';\n\nexport {NgModuleType} from './metadata/ng_module_def';\nexport
{ComponentFactory, ComponentFactoryResolver, ComponentRef, injectComponentFactoryResolver} from
'./component_ref';\nexport {getInheritedFactory} from './di';\nexport {getLocaleId, setLocaleId} from
'./i18n/i18n_locale_id';\n// clang-format off\nexport {\n detectChanges,\n store,\n advance,\n\n attribute,\n
attributeInterpolate1,\n attributeInterpolate2,\n attributeInterpolate3,\n attributeInterpolate4,\n
attributeInterpolate5,\n attributeInterpolate6,\n attributeInterpolate7,\n attributeInterpolate8,\n
attributeInterpolateV,\n\n classMap,\n classMapInterpolate1,\n classMapInterpolate2,\n classMapInterpolate3,\n
classMapInterpolate4,\n
classMapInterpolate5,\n classMapInterpolate6,\n classMapInterpolate7,\n classMapInterpolate8,\n
classMapInterpolateV,\n\n classProp,\n\n directiveInject,\n\n element,\n\n elementContainer,\n
elementContainerEnd,\n elementContainerStart,\n elementEnd,\n elementStart,\n\n getCurrentView,\n
hostProperty,\n injectAttribute,\n invalidFactory,\n\n listener,\n\n namespaceHTML,\n namespaceMathML,\n
namespaceSVG,\n\n nextContext,\n\n projection,\n projectionDef,\n property,\n propertyInterpolate,\n
propertyInterpolate1,\n propertyInterpolate2,\n propertyInterpolate3,\n propertyInterpolate4,\n
propertyInterpolate5,\n propertyInterpolate6,\n propertyInterpolate7,\n propertyInterpolate8,\n
propertyInterpolateV,\n\n reference,\n\n styleMap,\n styleMapInterpolate1,\n styleMapInterpolate2,\n
styleMapInterpolate3,\n styleMapInterpolate4,\n styleMapInterpolate5,\n styleMapInterpolate6,\n
styleMapInterpolate7,\n styleMapInterpolate8,\n styleMapInterpolateV,\n\n styleProp,\n stylePropInterpolate1,\n
stylePropInterpolate2,\n stylePropInterpolate3,\n stylePropInterpolate4,\n stylePropInterpolate5,\n
stylePropInterpolate6,\n stylePropInterpolate7,\n stylePropInterpolate8,\n stylePropInterpolateV,\n\n
syntheticHostListener,\n syntheticHostProperty,\n\n template,\n\n text,\n textInterpolate,\n textInterpolate1,\n
textInterpolate2,\n textInterpolate3,\n textInterpolate4,\n textInterpolate5,\n textInterpolate6,\n
textInterpolate7,\n textInterpolate8,\n textInterpolateV,\n getUnknownElementStrictMode,\n setUnknownElementStrictMode,\n
getUnknownPropertyStrictMode,\n setUnknownPropertyStrictMode\n} from './instructions/all';\nexport {i18n,
i18nApply, i18nAttributes, i18nEnd, i18nExp, i18nPostprocess, i18nStart} from './instructions/i18n';\nexport
{RenderFlags}
from './interfaces/definition';\nexport {\n AttributeMarker\n} from './interfaces/node';\nexport {CssSelectorList,
ProjectionSlots} from './interfaces/projection';\nexport {\n setClassMetadata,\n} from './metadata';\nexport
{NgModuleFactory, NgModuleRef, createEnvironmentInjector} from './ng_module_ref';\nexport {\n pipe,\n
pipeBind1,\n pipeBind2,\n pipeBind3,\n pipeBind4,\n pipeBindV,\n} from './pipe';\nexport {\n pureFunction0,\n
pureFunction1,\n pureFunction2,\n pureFunction3,\n pureFunction4,\n pureFunction5,\n pureFunction6,\n
pureFunction7,\n pureFunction8,\n pureFunctionV,\n} from './pure_function';\nexport {\n contentQuery,\n
loadQuery,\n queryRefresh,\n viewQuery\n} from './query';\nexport {\n disableBindings,\n\n enableBindings,\n
resetView,\n restoreView,\n} from './state';\nexport {NO_CHANGE} from './tokens';\nexport {resolveBody,
resolveDocument, resolveWindow} from './util/misc_utils';\nexport
{ templateRefExtractor} from './view_engine_compatibility_prebound';\n// clang-format on\n\nexport {\n
ComponentDebugMetadata,\n ComponentDef,\n ComponentTemplate,\n ComponentType,\n
DirectiveDebugMetadata,\n DirectiveDef,\n DirectiveType,\n GetComponent,\n getDirectiveMetadata,\n
getDirectives,\n getHostElement,\n getRenderedText,\n LifecycleHooksFeature,\n PipeDef,\n
ComponentDeclaration,\n CopyDefinitionFeature,\n defineComponent,\n defineDirective,\n defineNgModule,\n
definePipe,\n DirectiveDeclaration,\n FactoryDeclaration,\n InheritDefinitionFeature,\n InjectorDeclaration,\n
NgModuleDeclaration,\n NgOnChangesFeature,\n PipeDeclaration,\n ProvidersFeature,\n setComponentScope,\n
setNgModuleScope,\n StandaloneFeature,\n};\n\n/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n

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*/\n\nimport { forwardRef, resolveForwardRef } from './../di/forward_ref';\nimport { inject, invalidFactoryDep }
from './../di/injector_compatibility';\nimport { defineInjectable, defineInjector } from './../di/interface/defs';\nimport
{ registerNgModuleType } from './../linker/ng_module_registration';\nimport * as iframe_attrs_validation from
'./../sanitization/iframe_attrs_validation';\nimport * as sanitization from './../sanitization/sanitization';\nimport * as
r3 from './index';\n\n\n/**\n * A mapping of the @angular/core API surface used in generated expressions to the
actual symbols.\n * This should be kept up to date with the public exports of @angular/core.\n */\nexport const
angularCoreEnv: {[name: string]: Function} =\n  (() => ({\n    'attribute': r3.attribute,\n    'attributeInterpolate1':
r3.attributeInterpolate1,\n    'attributeInterpolate2': r3.attributeInterpolate2,\n    'attributeInterpolate3':
r3.attributeInterpolate3,\n    'attributeInterpolate4': r3.attributeInterpolate4,\n    'attributeInterpolate5': r3.attributeInterpolate5,\n
'attributeInterpolate6': r3.attributeInterpolate6,\n    'attributeInterpolate7': r3.attributeInterpolate7,\n
'attributeInterpolate8': r3.attributeInterpolate8,\n    'attributeInterpolateV': r3.attributeInterpolateV,\n
'defineComponent': r3.defineComponent,\n    'defineDirective': r3.defineDirective,\n    'defineInjectable':
defineInjectable,\n    'defineInjector': defineInjector,\n    'defineNgModule': r3.defineNgModule,\n
'definePipe': r3.definePipe,\n    'directiveInject': r3.directiveInject,\n    'getInheritedFactory':
r3.getInheritedFactory,\n    'inject': inject,\n    'injectAttribute': r3.injectAttribute,\n    'invalidFactory':
r3.invalidFactory,\n    'invalidFactoryDep': invalidFactoryDep,\n    'templateRefExtractor':
r3.templateRefExtractor,\n    'resetView': r3.resetView,\n    'NgOnChangesFeature': r3.NgOnChangesFeature,\n    'ProvidersFeature':
r3.ProvidersFeature,\n    'CopyDefinitionFeature': r3.CopyDefinitionFeature,\n    'InheritDefinitionFeature':
r3.InheritDefinitionFeature,\n    'StandaloneFeature': r3.StandaloneFeature,\n    'nextContext': r3.nextContext,\n
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'stylePropInterpolate7': r3.stylePropInterpolate7,\n
'stylePropInterpolate8': r3.stylePropInterpolate8,\n
'stylePropInterpolateV': r3.stylePropInterpolateV,\n
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'textInterpolate6':
r3.textInterpolate6,\n
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'resolveDocument':
r3.resolveDocument,\n
'resolveBody': r3.resolveBody,\n
'setComponentScope': r3.setComponentScope,\n
'setNgModuleScope': r3.setNgModuleScope,\n
'registerNgModuleType': registerNgModuleType,\n\n
'sanitizeHtml': sanitization.sanitizeHtml,\n
'sanitizeStyle': sanitization.sanitizeStyle,\n
'sanitizeResourceUrl': sanitization.sanitizeResourceUrl,\n
'sanitizeScript': sanitization.sanitizeScript,\n
'sanitizeUrl': sanitization.sanitizeUrl,\n
'sanitizeUrlOrResourceUrl': sanitization.sanitizeUrlOrResourceUrl,\n
'trustConstantHtml': sanitization.trustConstantHtml,\n
'trustConstantResourceUrl':
sanitization.trustConstantResourceUrl,\n
'validateIframeAttribute':
iframe_attrs_validation.validateIframeAttribute,\n\n
'forwardRef': forwardRef,\n
'resolveForwardRef':
resolveForwardRef,\n
  ));\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nexport function patchModuleCompilation(): void {\n // Does nothing, but exists as
a target for patching.\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {ModuleWithProviders} from '../di/interface/provider';\nimport {Type}
from '../interface/type';\nimport {NgModuleDef} from '../metadata/ng_module_def';\nimport
{getNgModuleDef} from '../definition';\n\nexport function isModuleWithProviders(value: any): value is
ModuleWithProviders<T> {\n return (value as {ngModule?: any}).ngModule !== undefined;\n}\n\nexport
function isNgModule<T>(value: Type<T>): value is Type<T> & {mod: NgModuleDef<T>} {\n return
!!getNgModuleDef(value);\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {getCompilerFacade, JitCompilerUsage, R3InjectorMetadataFacade} from
'../compiler/compiler_facade';\nimport {resolveForwardRef}
from '../di/forward_ref';\nimport {NG_INJ_DEF} from '../di/interface/defs';\nimport {ModuleWithProviders}
from '../di/interface/provider';\nimport {reflectDependencies} from '../di/jit/util';\nimport {Type} from
'../interface/type';\nimport {registerNgModuleType} from '../linker/ng_module_registration';\nimport
{Component} from '../metadata/directives';\nimport {NgModule} from '../metadata/ng_module';\nimport
{NgModuleDef, NgModuleTransitiveScopes, NgModuleType} from '../metadata/ng_module_def';\nimport
{deepForEach, flatten} from '../util/array_utils';\nimport {assertDefined} from '../util/assert';\nimport
{EMPTY_ARRAY} from '../util/empty';\nimport {getComponentDef, getDirectiveDef, getNgModuleDef,
getPipeDef, isStandalone} from '../definition';\nimport {NG_COMP_DEF, NG_DIR_DEF, NG_FACTORY_DEF,

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NG_MOD_DEF, NG_PIPE_DEF} from './fields';\nimport {ComponentDef} from './interfaces/definition';\nimport
{maybeUnwrapFn} from './util/misc_utils';\nimport
{stringifyForError} from './util/stringify_utils';\nimport {angularCoreEnv} from './environment';\nimport
{patchModuleCompilation} from './module_patch';\nimport {isModuleWithProviders, isNgModule} from
 './util';\ninterface ModuleQueueItem {\n  moduleType: Type<any>;\n  ngModule: NgModule;\n}\n\nconst
moduleQueue: ModuleQueueItem[] = [];\n\n/**\n * Enqueues moduleDef to be checked later to see if scope can be
set on its\n * component declarations.\n */\nfunction enqueueModuleForDelayedScoping(moduleType: Type<any>,
ngModule: NgModule) {\n  moduleQueue.push({moduleType, ngModule});\n}\n\nlet flushingModuleQueue =
false;\n\n/**\n * Loops over queued module definitions, if a given module definition has all of its\n * declarations
resolved, it dequeues that module definition and sets the scope on\n * its declarations.\n */\nexport function
flushModuleScopingQueueAsMuchAsPossible() {\n  if (!flushingModuleQueue) {\n    flushingModuleQueue =
true;\n    try {\n      for (let i = moduleQueue.length
- 1; i >= 0; i--) {\n        const {moduleType, ngModule} = moduleQueue[i];\n\n        if (ngModule.declarations &&
ngModule.declarations.every(isResolvedDeclaration)) {\n          // dequeue\n          moduleQueue.splice(i, 1);\n
setScopeOnDeclaredComponents(moduleType, ngModule);\n        }\n      }\n    } finally {\n      flushingModuleQueue = false;\n    }\n  }\n}\n\n/**\n * Returns truthy if a declaration has resolved. If the declaration
happens to be\n * an array of declarations, it will recurse to check each declaration in that array\n * (which may also
be arrays).\n */\nfunction isResolvedDeclaration(declaration: any[]|Type<any>): boolean {\n  if
(Array.isArray(declaration)) {\n    return declaration.every(isResolvedDeclaration);\n  }\n  return
!resolveForwardRef(declaration);\n}\n\n/**\n * Compiles a module in JIT mode.\n */\n * This function
automatically gets called when a class has a `@NgModule` decorator.\n */\nexport function
compileNgModule(moduleType:
Type<any>, ngModule: NgModule = {}): void {\n  patchModuleCompilation();\n  compileNgModuleDefs(moduleType as NgModuleType, ngModule);\n  if (ngModule.id !== undefined) {\n    registerNgModuleType(moduleType as NgModuleType, ngModule.id);\n  }\n\n  // Because we don't know if all
declarations have resolved yet at the moment the\n  // NgModule decorator is executing, we're enqueueing the
setting of module scope\n  // on its declarations to be run at a later time when all declarations for the module,\n  //
including forward refs, have resolved.\n  enqueueModuleForDelayedScoping(moduleType, ngModule);\n}\n\n/**\n
 * Compiles and adds the `mod`, `fac` and `inj` properties to the module class.\n */\n * It's possible to compile a
module via this API which will allow duplicate declarations in its\n * root.\n */\nexport function
compileNgModuleDefs(\n  moduleType: NgModuleType, ngModule: NgModule,\n  allowDuplicateDeclarationsInRoot: boolean = false): void {\n  ngDevMode && assertDefined(moduleType,
'Required value moduleType');\n  ngDevMode && assertDefined(ngModule, 'Required value ngModule');\n  const
declarations: Type<any>[] = flatten(ngModule.declarations || EMPTY_ARRAY);\n  let ngModuleDef: any = null;\n  Object.defineProperty(moduleType, NG_MOD_DEF, {\n    configurable: true,\n    get: () => {\n      if
(ngModuleDef === null) {\n        if (ngDevMode && ngModule.imports &&
ngModule.imports.indexOf(moduleType) > -1) {\n          // We need to assert this immediately, because allowing it
to continue will cause it to\n          // go into an infinite loop before we've reached the point where we throw all the
errors.\n          throw new Error(`${stringifyForError(moduleType)} module can't import itself`);\n        }\n      }\n      const compiler = getCompilerFacade(\n        {\n          usage: JitCompilerUsage.Decorator, kind: 'NgModule', type:
moduleType\n        });\n      ngModuleDef = compiler.compileNgModule(angularCoreEnv,\n        `ng:${moduleType.name}/mod.js`, {\n          type:
moduleType,\n          bootstrap: flatten(ngModule.bootstrap || EMPTY_ARRAY).map(resolveForwardRef),\n          declarations: declarations.map(resolveForwardRef),\n          imports: flatten(ngModule.imports ||
EMPTY_ARRAY)\n            .map(resolveForwardRef)\n            .map(expandModuleWithProviders),\n          exports: flatten(ngModule.exports || EMPTY_ARRAY)\n            .map(resolveForwardRef)\n            .map(expandModuleWithProviders),\n          schemas: ngModule.schemas ? flatten(ngModule.schemas) : null,\n          id: ngModule.id || null,\n        });\n      // Set `schemas` on ngModuleDef to an empty array in JIT mode to

```



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indicate that runtime\n    // should verify that there are no unknown elements in a template. In AOT mode, that
check\n    // happens at compile time and `schemas` information is not present on Component and Module\n    //
defs after compilation (so the check doesn't happen the second time at
runtime).\n    if (!ngModuleDef.schemas) {\n        ngModuleDef.schemas = [];\n        }\n    }\n    return
ngModuleDef;\n    }\n});\n\n let ngFactoryDef: any = null;\n    Object.defineProperty(moduleType,
NG_FACTORY_DEF, {\n    get: () => {\n        if (ngFactoryDef === null) {\n            const compiler =
getCompilerFacade(\n                {usage: JitCompilerUsage.Decorator, kind: 'NgModule', type: moduleType});\n
ngFactoryDef = compiler.compileFactory(angularCoreEnv, `ng://${moduleType.name}/fac.js`, {\n            name:
moduleType.name,\n            type: moduleType,\n            deps: reflectDependencies(moduleType),\n            target:
compiler.FactoryTarget.NgModule,\n            typeArgumentCount: 0,\n            });\n        }\n    }\n    return ngFactoryDef;\n
},\n    // Make the property configurable in dev mode to allow overriding in tests\n    configurable: !!ngDevMode,\n
});\n\n let ngInjectorDef: any = null;\n    Object.defineProperty(moduleType, NG_INJ_DEF, {\n    get: () =>
{\n        if (ngInjectorDef === null) {\n            ngDevMode &&\n                verifySemanticsOfNgModuleDef(\n
moduleType as any as NgModuleType, allowDuplicateDeclarationsInRoot);\n            const meta:
R3InjectorMetadataFacade = {\n                name: moduleType.name,\n                type: moduleType,\n                providers:
ngModule.providers || EMPTY_ARRAY,\n                imports: [\n                    (ngModule.imports ||
EMPTY_ARRAY).map(resolveForwardRef),\n                    (ngModule.exports ||
EMPTY_ARRAY).map(resolveForwardRef),\n                    ],\n                });\n            const compiler = getCompilerFacade(\n
{usage: JitCompilerUsage.Decorator, kind: 'NgModule', type: moduleType});\n            ngInjectorDef =\ncompiler.compileInjector(angularCoreEnv, `ng://${moduleType.name}/inj.js`, meta);\n        }\n    }\n    return
ngInjectorDef;\n    },\n    // Make the property configurable in dev mode to allow overriding in tests\n
configurable: !!ngDevMode,\n    });\n}\n\nexport function generateStandaloneInDeclarationsError(type:
Type<any>, location: string) {\n    const prefix = `Unexpected \"${stringifyForError(type)}\" found in the
\"declarations\" array of the`;\n    const suffix = `\"${stringifyForError(type)}\" is marked as standalone and can't be
declared ` +\n        `in any NgModule - did you intend to import it instead (by adding it to the \"imports\" array)?`;\n
return `${prefix} ${location}, ${suffix}`;\n}\n\nfunction verifySemanticsOfNgModuleDef(\n    moduleType:
NgModuleType, allowDuplicateDeclarationsInRoot: boolean,\n    importingModule?: NgModuleType): void {\n    if
(verifiedNgModule.get(moduleType)) return;\n\n    // skip verifications of standalone components, directives, and
pipes\n    if (isStandalone(moduleType)) return;\n\n    verifiedNgModule.set(moduleType, true);\n    moduleType =
resolveForwardRef(moduleType);\n    let ngModuleDef: NgModuleDef<any>;\n    if (importingModule) {\n
ngModuleDef = getNgModuleDef(moduleType)!;\n        if (!ngModuleDef) {\n            throw new
Error(`Unexpected value '${moduleType.name}' imported by the module '${\n            importingModule.name}'.
Please add an @NgModule annotation.`);\n        }\n    } else {\n        ngModuleDef = getNgModuleDef(moduleType,
true);\n    }\n    const errors: string[] = [];\n    const declarations = maybeUnwrapFn(ngModuleDef.declarations);\n
const imports = maybeUnwrapFn(ngModuleDef.imports);\n
flatten(imports).map(unwrapModuleWithProvidersImports).forEach(modOrStandaloneCmpt => {\n
verifySemanticsOfNgModuleImport(modOrStandaloneCmpt, moduleType);\n
verifySemanticsOfNgModuleDef(modOrStandaloneCmpt, false, moduleType);\n    });\n    const exports =
maybeUnwrapFn(ngModuleDef.exports);\n    declarations.forEach(verifyDeclarationsHaveDefinitions);\n
declarations.forEach(verifyDirectivesHaveSelector);\n    declarations.forEach((declarationType) =>
verifyNotStandalone(declarationType, moduleType));\n    const combinedDeclarations: Type<any>[] = [\n
...declarations.map(resolveForwardRef),\n
...flatten(imports.map(computeCombinedExports)).map(resolveForwardRef),\n
];\n    exports.forEach(verifyExportsAreDeclaredOrReExported);\n    declarations.forEach(decl =>
verifyDeclarationIsUnique(decl, allowDuplicateDeclarationsInRoot));\n
declarations.forEach(verifyComponentEntryComponentsIsPartOfNgModule);\n\n    const ngModule =
getAnnotation<NgModule>(moduleType, 'NgModule');\n    if (ngModule) {\n        ngModule.imports &&\n
flatten(ngModule.imports).map(unwrapModuleWithProvidersImports).forEach(mod => {\n

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verifySemanticsOfNgModuleImport(mod, moduleType);\n    verifySemanticsOfNgModuleDef(mod, false,
moduleType);\n    });\n    NgModule.bootstrap && deepForEach NgModule.bootstrap,
verifyCorrectBootstrapType);\n    NgModule.bootstrap && deepForEach NgModule.bootstrap,
verifyComponentIsPartOfNgModule);\n    NgModule.entryComponents &&\n
deepForEach NgModule.entryComponents, verifyComponentIsPartOfNgModule);\n    }\n\n    // Throw Error if any
errors were detected.\n    if (errors.length)
    {\n        throw new Error(errors.join('\n'));\n    }\n\n    function verifyDeclarationsHaveDefinitions(type: Type<any>): void {\n        type = resolveForwardRef(type);\n
const def = getComponentDef(type) || getDirectiveDef(type) || getPipeDef(type);\n        if (!def) {\n
errors.push(`Unexpected value '${stringifyForError(type)}' declared by the module '${\n
stringifyForError(moduleType)}'. Please add a @Pipe/@Directive/@Component annotation.`);\n        }\n    }\n\n
function verifyDirectivesHaveSelector(type: Type<any>): void {\n        type = resolveForwardRef(type);\n        const def
= getDirectiveDef(type);\n        if (!getComponentDef(type) && def && def.selectors.length === 0) {\n
errors.push(`Directive ${stringifyForError(type)} has no selector, please add it!`);\n        }\n    }\n\n
function verifyNotStandalone(type: Type<any>, moduleType: NgModuleType): void {\n        type =
resolveForwardRef(type);\n
        const def = getComponentDef(type) || getDirectiveDef(type) || getPipeDef(type);\n        if (def?.standalone) {\n
const location = `\"${stringifyForError(moduleType)}\" NgModule`;\n
errors.push(generateStandaloneInDeclarationsError(type, location));\n        }\n    }\n\n
function verifyExportsAreDeclaredOrReExported(type: Type<any>) {\n        type = resolveForwardRef(type);\n        const kind =
getComponentDef(type) && 'component' || getDirectiveDef(type) && 'directive' ||\n        getPipeDef(type) &&
'pipe';\n        if (kind) {\n            // only checked if we are declared as Component, Directive, or Pipe\n            // Modules don't
need to be declared or imported.\n            if (combinedDeclarations.lastIndexOf(type) === -1) {\n                // We are
exporting something which we don't explicitly declare or import.\n                errors.push(`Can't export ${kind}
${stringifyForError(type)} from ${\n                stringifyForError(moduleType)} as it was neither declared nor
imported!`);\n            }\n        }\n    }\n\n
function verifyDeclarationIsUnique(type: Type<any>, suppressErrors: boolean) {\n        type =
resolveForwardRef(type);\n        const existingModule = ownerNgModule.get(type);\n        if (existingModule &&
existingModule !== moduleType) {\n            if (!suppressErrors) {\n                const modules = [existingModule,
moduleType].map(stringifyForError).sort();\n                errors.push(`\n                `Type ${stringifyForError(type)} is part of
the declarations of 2 modules: ${\n                modules[0]} and ${modules[1]}!` +\n                `Please consider moving
${stringifyForError(type)} to a higher module that imports ${\n                modules[0]} and ${modules[1]}.` +\n
                `You can also create a new NgModule that exports and includes ${\n                stringifyForError(\n
type)} then import that NgModule in ${modules[0]} and ${modules[1]}.`);\n            }\n        }\n        else {\n            // Mark type as
having owner.\n            ownerNgModule.set(type, moduleType);\n        }\n    }\n\n
function verifyComponentIsPartOfNgModule(type: Type<any>) {\n        type = resolveForwardRef(type);\n        const
existingModule = ownerNgModule.get(type);\n        if (!existingModule && !isStandalone(type)) {\n
errors.push(`Component ${\n        stringifyForError(\n        type)} is not part of any NgModule or the module
has not been imported into your module.`);\n        }\n    }\n\n
function verifyCorrectBootstrapType(type: Type<any>)\n    {\n        type = resolveForwardRef(type);\n        if (!getComponentDef(type)) {\n
errors.push(`${stringifyForError(type)} cannot be used as an entry component.`);\n        }\n        if (isStandalone(type))\n        {\n            // Note: this error should be the same as the\n            // `NGMODULE_BOOTSTRAP_IS_STANDALONE` one
in AOT compiler.\n            errors.push(`\n            `The ``${stringifyForError(type)}`` class is a standalone component,
which can ` +\n            `not be used in the ``@NgModule.bootstrap`` array. Use the ``bootstrapApplication`` ` +\n
            `function\n            for bootstrap instead.`);\n        }\n    }\n\n
function verifyComponentEntryComponentsIsPartOfNgModule(type:
Type<any>) {\n        type = resolveForwardRef(type);\n        if (getComponentDef(type)) {\n            // We know we are
component\n            const component = getAnnotation<Component>(type, 'Component');\n            if (component &&

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component.entryComponents) {\n  deepForEach(component.entryComponents,\n  verifyComponentIsPartOfNgModule);\n  }\n  }\n  }\n\n  function verifySemanticsOfNgModuleImport(type:\n  Type<any>, importingModule: Type<any>) {\n    type = resolveForwardRef(type);\n    const directiveDef =\n    getComponentDef(type) || getDirectiveDef(type);\n    if (directiveDef !== null && !directiveDef.standalone) {\n    throw new Error(`Unexpected directive '${type.name}' imported by the module '${\n    importingModule.name}'. Please add an @NgModule annotation.`);\n    }\n    const pipeDef = getPipeDef(type);\n    if (pipeDef !== null && !pipeDef.standalone) {\n    throw new Error(`Unexpected\n    pipe '${type.name}' imported by the module '${\n    importingModule.name}'. Please add an @NgModule\n    annotation.`);\n    }\n  }\n  }\n}\n\nfunction unwrapModuleWithProvidersImports(typeOrWithProviders:\nNgModuleType<any>|\n    {ngModule: NgModuleType<any>}): NgModuleType<any> {\n  typeOrWithProviders = resolveForwardRef(typeOrWithProviders);\n  return (typeOrWithProviders as\n  any).ngModule || typeOrWithProviders;\n}\n\nfunction getAnnotation<T>(type: any, name: string): T|null {\n  let\n  annotation: T|null = null;\n  collect(type.__annotations__);\n  collect(type.decorators);\n  return annotation;\n}\n\nfunction collect(annotations: any[]|null) {\n  if (annotations) {\n    annotations.forEach(readAnnotation);\n  }\n}\n\nfunction readAnnotation(\n  decorator: {type: {prototype: {ngMetadataName: string}}, args: any[]}, args:\n  any): void {\n  if (!annotation) {\n    const proto = Object.getPrototypeOf(decorator);\n    if\n    (proto.ngMetadataName\n    == name) {\n    annotation = decorator as any;\n    } else if (decorator.type) {\n    const proto =\n    Object.getPrototypeOf(decorator.type);\n    if (proto.ngMetadataName == name) {\n    annotation =\n    decorator.args[0];\n    }\n  }\n}\n}\n}\n}\n\n/* Keep track of compiled components. This is needed\nbecause in tests we often want to compile the\n * same component with more than one NgModule. This would cause\nan error unless we reset which\n * NgModule the component belongs to. We keep the list of compiled components\nhere so that the\n * TestBed can reset it later.\n */\nlet ownerNgModule = new WeakMap<Type<any>,\nNgModuleType<any>>();\nlet verifiedNgModule = new WeakMap<NgModuleType<any>, boolean>();\n\nexport\nfunction resetCompiledComponents(): void {\n  ownerNgModule = new WeakMap<Type<any>,\nNgModuleType<any>>();\n  verifiedNgModule = new WeakMap<NgModuleType<any>, boolean>();\n}\n\nmoduleQueue.length = 0;\n}\n}\n\n/* Computes the combined\n  declarations of explicit declarations, as well as declarations inherited by\n * traversing the exports of imported\nmodules.\n * @param type\n */\nfunction computeCombinedExports(type: Type<any>): Type<any>[] {\n  type =\n  resolveForwardRef(type);\n  const ngModuleDef = getNgModuleDef(type);\n  // a standalone component,\n  directive or pipe\n  if (ngModuleDef === null) {\n    return [type];\n  }\n  return\n  [...flatten(maybeUnwrapFn(ngModuleDef.exports).map((type) => {\n    const ngModuleDef =\n    getNgModuleDef(type);\n    if (ngModuleDef) {\n    verifySemanticsOfNgModuleDef(type as any as\n    NgModuleType, false);\n    return computeCombinedExports(type);\n    } else {\n    return type;\n    }\n  })]);\n}\n}\n}\n\n/* Some declared components may be compiled asynchronously, and thus may not have their\n * cmp set yet. If this is the case, then a reference to the module is written into\n * the `ngSelectorScope` property of\nthe declared type.\n */\nfunction setScopeOnDeclaredComponents(moduleType:\n  Type<any>, ngModule: NgModule) {\n  const declarations: Type<any>[] = flatten(ngModule.declarations ||\n  EMPTY_ARRAY);\n  const transitiveScopes = transitiveScopesFor(moduleType);\n  declarations.forEach(declaration => {\n    declaration = resolveForwardRef(declaration);\n    if\n    (declaration.hasOwnProperty(NG_COMP_DEF)) {\n    // A `cmp` field exists - go ahead and patch the component\n    directly.\n    const component = declaration as Type<any>& {cmp: ComponentDef<any>};\n    const\n    componentDef = getComponentDef(component);\n    patchComponentDefWithScope(componentDef,\n    transitiveScopes);\n    } else if (\n    !declaration.hasOwnProperty(NG_DIR_DEF) &&\n    !declaration.hasOwnProperty(NG_PIPE_DEF)) {\n    // Set `ngSelectorScope` for future reference when the\n    component compilation finishes.\n    (declaration as Type<any>& {ngSelectorScope?: any}).ngSelectorScope =\n    moduleType;\n    }\n  });\n}\n}\n}\n\n/* Patch the definition of a component with directives and pipes
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from the compilation scope of\n * a given module.\n *\nexport function patchComponentDefWithScope<C>(\n
componentDef: ComponentDef<C>, transitiveScopes: NgModuleTransitiveScopes) {\n
componentDef.directiveDefs = () =>\n    Array.from(transitiveScopes.compilation.directives)\n        .map(\n
    dir => dir.hasOwnProperty(NG_COMP_DEF) ? getComponentDef(dir) ! : getDirectiveDef(dir)!\n        )\n
.componentDef.pipeDefs = () =>\n
Array.from(transitiveScopes.compilation.pipes).map(pipe => getPipeDef(pipe));\n
componentDef.schemas =
transitiveScopes.schemas;\n\n // Since we avoid Components/Directives/Pipes recompiling in case there are no
overrides, we\n // may face a problem where previously compiled defs available to a given Component/Directive\n
// are cached in TView and may become stale (in case any of these defs gets recompiled). In\n // order to avoid this
problem, we force fresh TView to be created.\n
componentDef.tView
= null;\n}\n\n/**\n * Compute the pair of transitive scopes (compilation scope and exported scope) for a given
type\n * (either a NgModule or a standalone component / directive / pipe).\n *\nexport function
transitiveScopesFor<T>(type: Type<T>): NgModuleTransitiveScopes {\n
if (isNgModule(type)) {\n
return
transitiveScopesForNgModule(type);\n
} else if (isStandalone(type)) {\n
const directiveDef =
getComponentDef(type) || getDirectiveDef(type);\n
if (directiveDef !== null) {\n
return {\n
schemas:
null,\n
compilation: {\n
directives: new Set<any>(),\n
pipes: new Set<any>(),\n
},\n
exported: {\n
directives: new Set<any>([type]),\n
pipes: new Set<any>(),\n
},\n
};\n
}\n\n
const pipeDef = getPipeDef(type);\n
if (pipeDef !== null) {\n
return {\n
schemas: null,\n
compilation:
{\n
directives: new Set<any>(),\n
pipes: new Set<any>(),\n
},\n
exported: {\n
directives: new Set<any>(),\n
pipes: new Set<any>([type]),\n
},\n
};\n
}\n\n
}\n\n // TODO: change the error message to be more user-facing and take standalone into account\n
throw new
Error(`${type.name} does not have a module def (mod property)`);\n}\n\n/**\n * Compute the pair of transitive
scopes (compilation scope and exported scope) for a given module.\n *\n * This operation is memoized and the
result is cached on the module's definition. This function can\n * be called on modules with components that have
not fully compiled yet, but the result should not\n * be used until they have.\n *\n * @param moduleType module
that transitive scope should be calculated for.\n *\nexport function transitiveScopesForNgModule<T>(moduleType:
Type<T>): NgModuleTransitiveScopes {\n
const def = getNgModuleDef(moduleType, true);\n\n
if
(def.transitiveCompileScopes !== null) {\n
return def.transitiveCompileScopes;\n
}\n\n
const scopes:
NgModuleTransitiveScopes = {\n
schemas: def.schemas || null,\n
compilation: {\n
directives: new
Set<any>(),\n
pipes: new Set<any>(),\n
},\n
exported: {\n
directives: new Set<any>(),\n
pipes: new
Set<any>(),\n
},\n
};\n\n
maybeUnwrapFn(def.imports).forEach(<I>(imported: Type<I>) => {\n
// When this
module imports another, the imported module's exported directives and pipes are\n
// added to the compilation
scope of this module.\n
const importedScope = transitiveScopesFor(imported);\n
importedScope.exported.directives.forEach(entry => scopes.compilation.directives.add(entry));\n
importedScope.exported.pipes.forEach(entry => scopes.compilation.pipes.add(entry));\n
});\n\n
maybeUnwrapFn(def.declarations).forEach(declared => {\n
const declaredWithDefs = declared as Type<any>&
{\n
pipe?: any;\n
};\n\n
if (getPipeDef(declaredWithDefs)) {\n
scopes.compilation.pipes.add(declared);\n
} else {\n
// Either declared has
a cmp or dir, or it's a component which hasn't\n
// had its template compiled yet. In either case, it gets added to
the compilation's\n
// directives.\n
scopes.compilation.directives.add(declared);\n
}\n
});\n\n
maybeUnwrapFn(def.exports).forEach(<E>(exported: Type<E>) => {\n
const exportedType = exported as
Type<E>& {\n
// Components, Directives, NgModules, and Pipes can all be exported.\n
cmp?: any;\n
dir?:
any;\n
mod?: NgModuleDef<E>;\n
pipe?: any;\n
};\n\n
// Either the type is a module, a pipe, or a
component/directive (which may not have a\n
// cmp as it might be compiled asynchronously).\n
if
(isNgModule(exportedType)) {\n
// When this module exports another, the exported module's exported directives
and pipes are\n
// added to both the compilation and exported scopes of this module.\n
const exportedScope =
transitiveScopesFor(exportedType);\n
exportedScope.exported.directives.forEach(entry

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=> {\n    scopes.compilation.directives.add(entry);\n    scopes.exported.directives.add(entry);\n  });\n  exportedScope.exported.pipes.forEach(entry => {\n    scopes.compilation.pipes.add(entry);\n    scopes.exported.pipes.add(entry);\n  });\n  } else if (getPipeDef(exportedType)) {\n    scopes.exported.pipes.add(exportedType);\n  } else {\n    scopes.exported.directives.add(exportedType);\n  }\n});\n\n def.transitiveCompileScopes = scopes;\n return scopes;\n}\n\nfunction expandModuleWithProviders(value:\nType<any>|ModuleWithProviders<{}>): Type<any> {\n  if (isModuleWithProviders(value)) {\n    return\n    value.ngModule;\n  }\n  return value;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n */\n\nimport {stringify as stringify} from '@angular/core';\n\nimport\n{MetadataOverride} from './metadata_override';\n\nexport\ninterface StringMap = {\n  [key: string]: any;\n};\n\nlet _nextReferenceId = 0;\n\nexport class MetadataOverrider {\n  private\n  _references = new Map<any, string>();\n\n  /**\n   * Creates a new instance for the given metadata class\n   * based\n   * on an old instance and overrides.\n   */\n  overrideMetadata<C extends T, T>(metadataClass: {new(options:\nT): C}; oldMetadata: C, override: MetadataOverride<T>): C {\n    const props: StringMap = {};\n    if\n    (oldMetadata) {\n      _valueProps(oldMetadata).forEach((prop) => props[prop] = (<any>oldMetadata)[prop]);\n    }\n\n    if (override.set) {\n      if (override.remove || override.add) {\n        throw new Error(`Cannot set and\nadd/remove ${stringify(metadataClass)} at the same time!`);\n      }\n      setMetadata(props, override.set);\n    }\n\n    if (override.remove) {\n      removeMetadata(props, override.remove, this._references);\n    }\n\n    if (override.add)\n    {\n      addMetadata(props, override.add);\n    }\n\n    return\n    new metadataClass(<any>props);\n  }\n\n  removeMetadata(metadata: StringMap, remove: any,\nreferences: Map<any, string>) {\n    const removeObjects = new Set<string>();\n    for (const prop in remove) {\n      const\n      removeValue = remove[prop];\n      if (Array.isArray(removeValue)) {\n        removeValue.forEach((value: any)\n=> {\n          removeObjects.add(_propHashKey(prop, value, references));\n        });\n      } else {\n       \n        removeObjects.add(_propHashKey(prop, removeValue, references));\n      }\n    }\n\n    for (const prop in metadata) {\n      const\n      propValue = metadata[prop];\n      if (Array.isArray(propValue)) {\n        metadata[prop] = propValue.filter((\nvalue: any) => !removeObjects.has(_propHashKey(prop, value, references))); \n      } else {\n        if\n        (removeObjects.has(_propHashKey(prop, propValue, references))) {\n          metadata[prop] = undefined;\n        }\n      }\n    }\n  }\n\n  addMetadata(metadata: StringMap, add: any) {\n    for (const prop in add) {\n      const\n      addValue = add[prop];\n      const propValue = metadata[prop];\n      if (propValue != null &&\nArray.isArray(propValue)) {\n        metadata[prop] = propValue.concat(addValue);\n      } else {\n        metadata[prop]\n= addValue;\n      }\n    }\n  }\n\n  setMetadata(metadata: StringMap, set: any) {\n    for (const prop in set) {\n      metadata[\nprop] = set[prop];\n    }\n  }\n\n  _propHashKey(propName: any, propValue: any, references:\nMap<any, string>): string {\n    let nextObjectId = 0;\n    const objectIds = new Map<object, string>();\n    const\n    replacer = (key: any, value: any) => {\n      if (value != null && typeof value === 'object') {\n        if\n        (objectIds.has(value)) {\n          return objectIds.get(value);\n        }\n        // Record an id for this object such that any\nlater references use the object's id instead\n        // of the object itself, in order to break cyclic pointers in objects.\n        objectIds.set(value, `obj#${nextObjectId++}`);\n      }\n      // The first time an object is seen the object\nitself is serialized.\n      return value;\n    } else if (typeof value === 'function') {\n      value =\n      _serializeReference(value, references);\n    }\n    return value;\n  };\n\n  return\n  `_${propName}:${JSON.stringify(propValue, replacer)}`;\n}\n\nfunction _serializeReference(ref: any, references:\nMap<any, string>): string {\n  let id = references.get(ref);\n  if (!id) {\n    id =\n    `_${stringify(ref)}_${_nextReferenceId++}`;\n    references.set(ref, id);\n  }\n  return id;\n}\n\nfunction\n_valueProps(obj: any): string[] {\n  const props: string[] = [];\n  // regular public props\nObject.keys(obj).forEach((prop) => {\n  if (!prop.startsWith('_')) {\n    props.push(prop);\n  }\n});\n\n//\ngetters\nlet proto = obj;\nwhile (proto = Object.getPrototypeOf(proto)) {\n  Object.keys(proto).forEach((protoProp) => {\n    const desc = Object.getOwnPropertyDescriptor(proto,\nprotoProp);\n    if (!protoProp.startsWith('_') && desc && 'get' in desc) {\n      props.push(protoProp);\n    }\n  });\n}\n}

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    }
  });
  return props;
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 *
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import { Component, Directive, NgModule, Pipe, Type, ReflectionCapabilities as
ReflectionCapabilities } from '@angular/core';
import { MetadataOverride } from './metadata_override';
import { MetadataOverrider } from './metadata_overrider';
const reflection = new ReflectionCapabilities();
/**
 * Base interface to resolve `@Component`, `@Directive`, `@Pipe` and `@NgModule`.
 */
export interface Resolver<T> {
  addOverride(type: Type<any>, override: MetadataOverride<T>): void;
  setOverrides(overrides:
Array<[Type<any>, MetadataOverride<T>]>): void;
  resolve(type: Type<any>): T | null;
}
/**
 * Allows to
 * override ivy metadata for tests (via the `TestBed`).
 */
abstract class OverrideResolver<T> implements
Resolver<T> {
  private overrides = new Map<Type<any>, MetadataOverride<T>[]>();
  private resolved = new
Map<Type<any>, T | null>();

  abstract get type(): any;

  addOverride(type: Type<any>, override:
MetadataOverride<T>) {
    const overrides = this.overrides.get(type) || [];
    overrides.push(override);
    this.overrides.set(type, overrides);
    this.resolved.delete(type);
  }

  setOverrides(overrides:
Array<[Type<any>, MetadataOverride<T>]>) {
    this.overrides.clear();
    overrides.forEach(([, override])
=> {
      this.addOverride(type, override);
    });
  }

  getAnnotation(type: Type<any>): T | null {
    const
annotations = reflection.annotations(type);
    // Try to find the nearest known Type annotation and make sure that
    this annotation is an
    // instance of the type we are looking for, so we can use it for resolution. Note: there
    might
    // be multiple known annotations found due to the fact that Components can extend Directives (so
    // both
    Directive and Component annotations would be present), so we always check if the known
    // annotation has the
    right type.
    for (let i = annotations.length - 1; i >= 0; i--) {
      const annotation = annotations[i];
      const
isKnownType = annotation instanceof Directive || annotation instanceof Component ||
annotation instanceof
Pipe || annotation instanceof NgModule;
      if (isKnownType) {
        return annotation instanceof this.type ?
annotation as unknown as T : null;
      }
    }
    return null;
  }

  resolve(type: Type<any>): T | null {
    let
resolved: T | null = this.resolved.get(type) || null;
    if (!resolved) {
      resolved = this.getAnnotation(type);
    }
    if (resolved) {
      const overrides = this.overrides.get(type);
      if (overrides) {
        const overrider = new
MetadataOverrider();
        overrides.forEach(override => {
          resolved =
overrider.overrideMetadata(this.type, resolved!, override);
        });
      }
      this.resolved.set(type, resolved);
    }
    return resolved;
  }
}

export class DirectiveResolver extends OverrideResolver<Directive> {
  override get type() {
    return Directive;
  }
}

export class ComponentResolver extends OverrideResolver<Component> {
  override get type() {
    return Component;
  }
}

export class PipeResolver extends OverrideResolver<Pipe> {
  override get type() {
    return Pipe;
  }
}

export class NgModuleResolver extends OverrideResolver<NgModule> {
  override
get type() {
    return NgModule;
  }
}
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 *
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 * https://angular.io/license
 */
import { ResourceLoader } from '@angular/compiler';
import {
ApplicationInitStatus, Compiler, COMPILER_OPTIONS, Component, Directive, Injector, InjectorType,
LOCALE_ID, ModuleWithComponentFactories,
ModuleWithProviders, NgModule, NgModuleFactory, NgZone, Pipe, PlatformRef, Provider, resolveForwardRef,
Type, compileComponent as compileComponent, compileDirective as compileDirective, compileNgModuleDefs as
compileNgModuleDefs, compilePipe as compilePipe, DEFAULT_LOCALE_ID as DEFAULT_LOCALE_ID,
DirectiveDef as DirectiveDef, getInjectableDef as getInjectableDef, NG_COMP_DEF as NG_COMP_DEF,
NG_DIR_DEF as NG_DIR_DEF, NG_INJ_DEF as NG_INJ_DEF, NG_MOD_DEF as NG_MOD_DEF,
NG_PIPE_DEF as NG_PIPE_DEF, NgModuleFactory as R3NgModuleFactory, NgModuleTransitiveScopes as
NgModuleTransitiveScopes, NgModuleType as NgModuleType, patchComponentDefWithScope as
patchComponentDefWithScope, Render3ComponentFactory as ComponentFactory, Render3NgModuleRef as
NgModuleRef, setLocaleId as setLocaleId, transitiveScopesFor as transitiveScopesFor, InjectableDeclaration as

```

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InjectableDeclaration} from '@angular/core';\n\nimport {clearResolutionOfComponentResourcesQueue,
isComponentDefPendingResolution, resolveComponentResources, restoreComponentResolutionQueue} from
'././src/metadata/resource_loading';\n\nimport {ComponentDef, ComponentType} from '././src/render3';\n\nimport
{generateStandaloneInDeclarationsError} from '././src/render3/jit/module';\n\nimport {MetadataOverride} from
'./metadata_override';\n\nimport {ComponentResolver, DirectiveResolver, NgModuleResolver, PipeResolver,
Resolver} from './resolvers';\n\nimport {TestModuleMetadata} from './test_bed_common';\n\n\nenum
TestingModuleOverride {\n  DECLARATION,\n  OVERRIDE_TEMPLATE,\n}\n\n\nfunction
isTestingModuleOverride(value: unknown): value is TestingModuleOverride {\n  return value ===
TestingModuleOverride.DECLARATION ||\n    value ===
TestingModuleOverride.OVERRIDE_TEMPLATE;\n}\n\n\nfunction assertNoStandaloneComponents(\n  types:
Type<any>[], resolver: Resolver<any>, location: string) {\n  types.forEach(type => {\n    const component =
resolver.resolve(type);\n    if (component && component.standalone)
{\n      throw new Error(generateStandaloneInDeclarationsError(type, location));\n    }\n  });\n}\n\n\n// Resolvers for
Angular decorators\n\ntype Resolvers = {\n  module: Resolver<NgModule>,\n  component: Resolver<Directive>,\n
directive: Resolver<Component>,\n  pipe: Resolver<Pipe>,\n};\n\n\ninterface CleanupOperation {\n  fieldName:
string;\n  object: any;\n  originalValue: unknown;\n}\n\n\nexport class TestBedCompiler {\n  private
originalComponentResolutionQueue: Map<Type<any>, Component>|null = null;\n\n  // Testing module
configuration\n  private declarations: Type<any>[] = [];\n  private imports: Type<any>[] = [];\n  private providers:
Provider[] = [];\n  private schemas: any[] = [];\n\n  // Queues of components/directives/pipes that should be
recompiled.\n  private pendingComponents = new Set<Type<any>>();\n  private pendingDirectives = new
Set<Type<any>>();\n  private pendingPipes = new Set<Type<any>>();\n\n  // Keep track of all components and
directives, so we can
  patch Providers onto defs later.\n  private seenComponents = new Set<Type<any>>();\n  private seenDirectives =
new Set<Type<any>>();\n\n  // Keep track of overridden modules, so that we can collect all affected ones in the
module tree.\n  private overriddenModules = new Set<NgModuleType<any>>();\n\n  // Store resolved styles for
Components that have template overrides present and `styleUrls`\n  // defined at the same time.\n  private
existingComponentStyles = new Map<Type<any>, string[]>();\n\n  private resolvers: Resolvers =
initResolvers();\n\n  private componentToModuleScope = new Map<Type<any>,
Type<any>|TestingModuleOverride>();\n\n  // Map that keeps initial version of component/directive/pipe defs in
case\n  // we compile a Type again, thus overriding respective static fields. This is\n  // required to make sure we
restore defs to their initial states between test runs.\n  // Note: one class may have multiple defs (for example: mod
and inj in case of an\n  // NgModule), store
  all of them in a map.\n  private initialNgDefs = new Map<Type<any>, Map<string,
PropertyDescriptor|undefined>>());\n\n  // Array that keeps cleanup operations for initial versions of
component/directive/pipe/module\n  // defs in case TestBed makes changes to the originals.\n  private
defCleanupOps: CleanupOperation[] = [];\n\n  private _injector: Injector|null = null;\n  private compilerProviders:
Provider[]|null = null;\n\n  private providerOverrides: Provider[] = [];\n  private rootProviderOverrides: Provider[] =
[];\n  // Overrides for injectables with `{providedIn: SomeModule}` need to be tracked and added to that\n  //
module's provider list.\n  private providerOverridesByModule = new Map<InjectorType<any>, Provider[]>();\n
private providerOverridesByToken = new Map<any, Provider>();\n  private scopesWithOverriddenProviders = new
Set<Type<any>>();\n\n  private testModuleType: NgModuleType<any>;\n  private testModuleRef:
NgModuleRef<any>|null = null;\n\n  constructor(private platform:
PlatformRef, private additionalModuleTypes: Type<any>|Type<any>[]) {\n    class DynamicTestModule {\n    }
this.testModuleType = DynamicTestModule as any;\n  }\n\n  setCompilerProviders(providers: Provider[]|null): void
{\n    this.compilerProviders = providers;\n    this._injector = null;\n  }\n\n  configureTestingModule(moduleDef:
TestModuleMetadata): void {\n    // Enqueue any compilation tasks for the directly declared component.\n    if
(moduleDef.declarations !== undefined) {\n      // Verify that there are no standalone components\n      assertNoStandaloneComponents(\n        moduleDef.declarations, this.resolvers.component,\n

```

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\"TestBed.configureTestingModule\" call');\n    this.queueTypeArray(moduleDef.declarations,
TestingModuleOverride.DECLARATION);\n    this.declarations.push(...moduleDef.declarations);\n  }\n\n  //
Enqueue any compilation tasks for imported modules.\n  if (moduleDef.imports !== undefined) {\n
this.queueTypesFromModulesArray(moduleDef.imports);\n
    this.imports.push(...moduleDef.imports);\n  }\n\n  if (moduleDef.providers !== undefined) {\n
this.providers.push(...moduleDef.providers);\n  }\n\n  if (moduleDef.schemas !== undefined) {\n
this.schemas.push(...moduleDef.schemas);\n  }\n\n  overrideModule(ngModule: Type<any>, override:
MetadataOverride<NgModule>): void {\n    this.overriddenModules.add(ngModule as NgModuleType<any>);\n\n
// Compile the module right away.\n    this.resolvers.module.addOverride(ngModule, override);\n    const metadata =
this.resolvers.module.resolve(ngModule);\n    if (metadata === null) {\n      throw
invalidTypeError(ngModule.name, 'NgModule');\n    }\n\n    this.recompileNgModule(ngModule, metadata);\n\n    //
At this point, the module has a valid module def (mod), but the override may have introduced\n    // new declarations
or imported modules. Ingest any possible new types and add them to the\n    // current queue.\n
this.queueTypesFromModulesArray([ngModule]);\n
  }\n\n  overrideComponent(component: Type<any>, override: MetadataOverride<Component>): void {\n
this.verifyNoStandaloneFlagOverrides(component, override);\n    this.resolvers.component.addOverride(component,
override);\n    this.pendingComponents.add(component);\n  }\n\n  overrideDirective(directive: Type<any>, override:
MetadataOverride<Directive>): void {\n    this.verifyNoStandaloneFlagOverrides(directive, override);\n
this.resolvers.directive.addOverride(directive, override);\n    this.pendingDirectives.add(directive);\n  }\n\n
overridePipe(pipe: Type<any>, override: MetadataOverride<Pipe>): void {\n
this.verifyNoStandaloneFlagOverrides(pipe, override);\n    this.resolvers.pipe.addOverride(pipe, override);\n
this.pendingPipes.add(pipe);\n  }\n\n  private verifyNoStandaloneFlagOverrides(\n    type: Type<any>, override:
MetadataOverride<Component|Directive|Pipe>) {\n    if (override.add?.hasOwnProperty('standalone') ||
override.set?.hasOwnProperty('standalone'))\n      ||\n      override.remove?.hasOwnProperty('standalone')) {\n      throw new Error(\n        `An override for the
${type.name} class has the `standalone` flag. ` +\n        `Changing the `standalone` flag via TestBed overrides
is not supported.`);\n    }\n  }\n\n  overrideProvider(\n    token: any,\n    provider: {useFactory?: Function,
useValue?: any, deps?: any[], multi?: boolean}): void {\n    let providerDef: Provider;\n    if (provider.useFactory
!== undefined) {\n      providerDef = {\n        provide: token,\n        useFactory: provider.useFactory,\n        deps:
provider.deps || [],\n        multi: provider.multi\n      };\n    } else if (provider.useValue !== undefined) {\n
providerDef = {provide: token, useValue: provider.useValue, multi: provider.multi};\n    } else {\n      providerDef =
{provide: token};\n    }\n\n    const injectableDef: InjectableDeclaration<any>|null =\n      typeof token !== 'string'
? getInjectableDef(token) : null;\n
    const providedIn = injectableDef === null ? null : resolveForwardRef(injectableDef.providedIn);\n    const
overridesBucket =\n      providedIn === 'root' ? this.rootProviderOverrides : this.providerOverrides;\n
overridesBucket.push(providerDef);\n    // Keep overrides grouped by token as well for fast lookups using token\n
this.providerOverridesByToken.set(token, providerDef);\n    if (injectableDef !== null && providedIn !== null &&
typeof providedIn !== 'string') {\n      const existingOverrides = this.providerOverridesByModule.get(providedIn);\n
      if (existingOverrides !== undefined) {\n        existingOverrides.push(providerDef);\n      } else {\n
this.providerOverridesByModule.set(providedIn, [providerDef]);\n      }\n    }\n  }\n\n  overrideTemplateUsingTestingModule(type: Type<any>, template: string): void {\n
const def = (type as
any)[NG_COMP_DEF];\n    const hasStyleUrls = (): boolean => {\n      const metadata =
this.resolvers.component.resolve(type)!\n      as Component;\n      return !!metadata.styleUrls && metadata.styleUrls.length > 0;\n    };\n    const
overrideStyleUrls = !!def && !isComponentDefPendingResolution(type) && hasStyleUrls();\n\n    // In Ivy,
compiling a component does not require knowing the module providing the\n    // component's scope, so
overrideTemplateUsingTestingModule can be implemented purely via\n    // overrideComponent. Important:
overriding template requires full Component re-compilation,\n    // which may fail in case styleUrls are also present

```



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(thus Component is considered as required\n // resolution). In order to avoid this, we preemptively set styleUrls to
an empty array,\n // preserve current styles available on Component def and restore styles back once compilation\n
// is complete.\n const override = overrideStyleUrls ? {template, styles: [], styleUrls: []} : {template};\n
this.overrideComponent(type, {set: override});\n\n if (overrideStyleUrls && def.styles && def.styles.length
> 0) {\n this.existingComponentStyles.set(type, def.styles);\n }\n\n // Set the component's scope to be the
testing module.\n this.componentToModuleScope.set(type, TestingModuleOverride.OVERRIDE_TEMPLATE);\n
}\n\n async compileComponents(): Promise<void> {\n this.clearComponentResolutionQueue();\n // Run
compilers for all queued types.\n let needsAsyncResources = this.compileTypesSync();\n\n //
compileComponents() should not be async unless it needs to be.\n if (needsAsyncResources) {\n let
resourceLoader: ResourceLoader;\n let resolver = (url: string): Promise<string> => {\n if (!resourceLoader)
{\n resourceLoader = this.injector.get(ResourceLoader);\n }\n return
Promise.resolve(resourceLoader.get(url));\n }; \n await resolveComponentResources(resolver);\n }\n }\n\n
finalize(): NgModuleRef<any> {\n // One last compile\n this.compileTypesSync();\n\n // Create the testing
module itself.\n
this.compileTestModule();\n\n this.applyTransitiveScopes();\n\n this.applyProviderOverrides();\n\n // Patch
previously stored `styles` Component values (taken from cmp), in case these\n // Components have `styleUrls`
fields defined and template override was requested.\n this.patchComponentsWithExistingStyles();\n\n // Clear
the componentToModuleScope map, so that future compilations don't reset the scope of\n // every component.\n
this.componentToModuleScope.clear();\n\n const parentInjector = this.platform.injector;\n this.testModuleRef =
new NgModuleRef(this.testModuleType, parentInjector);\n\n // ApplicationInitStatus.runInitializers() is marked
@internal to core.\n // Cast it to any before accessing it.\n
(this.testModuleRef.injector.get(ApplicationInitStatus) as any).runInitializers();\n\n // Set locale ID after running
app initializers, since locale information might be updated while\n // running initializers. This is also consistent
with the execution order while bootstrapping an\n // app (see `packages/core/src/application_ref.ts` file).\n const
localeId = this.testModuleRef.injector.get(LOCALE_ID, DEFAULT_LOCALE_ID);\n setLocaleId(localeId);\n\n
return this.testModuleRef;\n }\n\n /**\n * @internal\n */\n\n _compileNgModuleSync(moduleType:
Type<any>): void {\n this.queueTypesFromModulesArray([moduleType]);\n this.compileTypesSync();\n
this.applyProviderOverrides();\n this.applyProviderOverridesInScope(moduleType);\n
this.applyTransitiveScopes();\n }\n\n /**\n * @internal\n */\n\n async _compileNgModuleAsync(moduleType:
Type<any>): Promise<void> {\n this.queueTypesFromModulesArray([moduleType]);\n await
this.compileComponents();\n this.applyProviderOverrides();\n
this.applyProviderOverridesInScope(moduleType);\n this.applyTransitiveScopes();\n }\n\n /**\n * @internal\n
*/\n\n _getModuleResolver(): Resolver<NgModule> {\n return this.resolvers.module;\n
}\n\n /**\n * @internal\n */\n\n _getComponentFactories(moduleType: NgModuleType):
ComponentFactory<any>[] {\n return maybeUnwrapFn(moduleType.mod.declarations).reduce((factories,
declaration) => {\n const componentDef = (declaration as any).cmp;\n componentDef && factories.push(new
ComponentFactory(componentDef, this.testModuleRef!));\n return factories;\n }, [] as
ComponentFactory<any>[]);\n }\n\n private compileTypesSync(): boolean {\n // Compile all queued
components, directives, pipes.\n let needsAsyncResources = false;\n
this.pendingComponents.forEach(declaration => {\n needsAsyncResources = needsAsyncResources ||
isComponentDefPendingResolution(declaration);\n const metadata =
this.resolvers.component.resolve(declaration);\n if (metadata === null) {\n throw
invalidTypeError(declaration.name, 'Component');\n }\n this.maybeStoreNgDef(NG_COMP_DEF,
declaration);\n compileComponent(declaration, metadata);\n
});\n this.pendingComponents.clear();\n\n this.pendingDirectives.forEach(declaration => {\n const
metadata = this.resolvers.directive.resolve(declaration);\n if (metadata === null) {\n throw
invalidTypeError(declaration.name, 'Directive');\n }\n this.maybeStoreNgDef(NG_DIR_DEF, declaration);\n
compileDirective(declaration, metadata);\n });\n this.pendingDirectives.clear();\n\n

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this.pendingPipes.forEach(declaration => {\n    const metadata = this.resolvers.pipe.resolve(declaration);\n    if
(metadata === null) {\n        throw invalidTypeError(declaration.name, 'Pipe');\n    }\n
this.maybeStoreNgDef(NG_PIPE_DEF, declaration);\n    compilePipe(declaration, metadata);\n });\n
this.pendingPipes.clear();\n\n    return needsAsyncResources;\n }\n\n private applyTransitiveScopes(): void {\n    if
(this.overriddenModules.size > 0) {\n        // Module overrides (via `TestBed.overrideModule`) might affect scopes
that were previously\n
        // calculated and stored in `transitiveCompileScopes`. If module overrides are present,\n        // collect all affected
modules and reset scopes to force their re-calculation.\n        const testingModuleDef = (this.testModuleType as
any)[NG_MOD_DEF];\n        const affectedModules =
this.collectModulesAffectedByOverrides(testingModuleDef.imports);\n        if (affectedModules.size > 0) {\n
affectedModules.forEach(moduleType => {\n            this.storeFieldOfDefOnType(moduleType as any,
NG_MOD_DEF, 'transitiveCompileScopes');\n            (moduleType as
any)[NG_MOD_DEF].transitiveCompileScopes = null;\n        });\n    }\n\n    const moduleToScope = new
Map<Type<any>|TestingModuleOverride, NgModuleTransitiveScopes>();\n    const getScopeOfModule = (\n
(moduleType: Type<any>|TestingModuleOverride): NgModuleTransitiveScopes => {\n        if
(!moduleToScope.has(moduleType)) {\n            const isTestingModule = isTestingModuleOverride(moduleType);\n
const
realType = isTestingModule ? this.testModuleType : moduleType as Type<any>;\n
moduleToScope.set(moduleType, transitiveScopesFor(realType));\n        }\n        return
moduleToScope.get(moduleType)!;\n    });\n\n    this.componentToModuleScope.forEach((moduleType,
componentType) => {\n        const moduleScope = getScopeOfModule(moduleType);\n
this.storeFieldOfDefOnType(componentType, NG_COMP_DEF, 'directiveDefs');\n
this.storeFieldOfDefOnType(componentType, NG_COMP_DEF, 'pipeDefs');\n        // `tView` that is stored on
component def contains information about directives and pipes\n        // that are in the scope of this component.
Patching component scope will cause `tView` to be\n        // changed. Store original `tView` before patching scope, so
the `tView` (including scope\n        // information) is restored back to its previous/original state before running next
test.\n        this.storeFieldOfDefOnType(componentType, NG_COMP_DEF, 'tView');\n
patchComponentDefWithScope((componentType
as any).cmp, moduleScope);\n    });\n\n    this.componentToModuleScope.clear();\n }\n\n private
applyProviderOverrides(): void {\n    const maybeApplyOverrides = (field: string) => (type: Type<any>) => {\n
const resolver = field === NG_COMP_DEF ? this.resolvers.component : this.resolvers.directive;\n    const
metadata = resolver.resolve(type)!;\n    if (this.hasProviderOverrides(metadata.providers)) {\n
this.patchDefWithProviderOverrides(type, field);\n    }\n    };\n
this.seenComponents.forEach(maybeApplyOverrides(NG_COMP_DEF));\n
this.seenDirectives.forEach(maybeApplyOverrides(NG_DIR_DEF));\n\n    this.seenComponents.clear();\n
this.seenDirectives.clear();\n }\n\n\n /**\n  * Applies provider overrides to a given type (either an NgModule or a
standalone component)\n  * and all imported NgModules and standalone components recursively.\n  */\n private
applyProviderOverridesInScope(type: Type<any>): void {\n    const hasScope
= isStandaloneComponent(type) || isNgModule(type);\n    // The function can be re-entered recursively while
inspecting dependencies\n    // of an NgModule or a standalone component. Exit early if we come across a\n    // type
that can not have a scope (directive or pipe) or the type is already\n    // processed earlier.\n    if (!hasScope ||
this.scopesWithOverriddenProviders.has(type)) {\n        return;\n    }\n
this.scopesWithOverriddenProviders.add(type);\n\n    // NOTE: the line below triggers JIT compilation of the
module injector,\n    // which also invokes verification of the NgModule semantics, which produces\n    // detailed
error messages. The fact that the code relies on this line being\n    // present here is suspicious and should be
refactored in a way that the line\n    // below can be moved (for ex. after an early exit check below).\n    const
injectorDef: any = (type as any)[NG_INJ_DEF];\n\n    // No provider overrides, exit early.\n    if
(this.providerOverridesByToken.size

```

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==== 0) return;\n\n  if (isStandaloneComponent(type)) {\n    // Visit all component dependencies and override
providers there.\n    const def = getComponentDef(type);\n    const dependencies =
maybeUnwrapFn(def.dependencies ?? []);\n    for (const dependency of dependencies) {\n
this.applyProviderOverridesInScope(dependency);\n    }\n  } else {\n    const providers = [\n
...injectorDef.providers,\n    ...(this.providerOverridesByModule.get(type as InjectorType<any>) || [])\n    ];\n
if (this.hasProviderOverrides(providers)) {\n    this.maybeStoreNgDef(NG_INJ_DEF, type);\n\n
this.storeFieldOfDefOnType(type, NG_INJ_DEF, 'providers');\n    injectorDef.providers =
this.getOverriddenProviders(providers);\n    }\n\n    // Apply provider overrides to imported modules recursively\n
const moduleDef = (type as any)[NG_MOD_DEF];\n    const imports =
maybeUnwrapFn(moduleDef.imports);\n    for (const importedModule
of imports) {\n    this.applyProviderOverridesInScope(importedModule);\n    }\n    // Also override the
providers on any ModuleWithProviders imports since those don't appear in\n    // the moduleDef.\n    for (const
importedModule of flatten(injectorDef.imports)) {\n    if (isModuleWithProviders(importedModule)) {\n
this.defCleanupOps.push({\n      object: importedModule,\n      fieldName: 'providers',\n
originalValue: importedModule.providers\n    });\n    importedModule.providers =
this.getOverriddenProviders(importedModule.providers);\n    }\n    }\n\n    private
patchComponentsWithExistingStyles(): void {\n    this.existingComponentStyles.forEach(\n      (styles, type) =>
(type as any)[NG_COMP_DEF].styles = styles);\n    this.existingComponentStyles.clear();\n    }\n\n    private
queueTypeArray(arr: any[], moduleType: Type<any>|TestingModuleOverride): void {\n    for (const value of arr)
{\n    if (Array.isArray(value))
{\n    this.queueTypeArray(value, moduleType);\n    } else {\n    this.queueType(value, moduleType);\n
}\n    }\n    }\n\n    private recompileNgModule(ngModule: Type<any>, metadata: NgModule): void {\n    // Cache the
initial ngModuleDef as it will be overwritten.\n    this.maybeStoreNgDef(NG_MOD_DEF, ngModule);\n
this.maybeStoreNgDef(NG_INJ_DEF, ngModule);\n\n    compileNgModuleDefs(ngModule as
NgModuleType<any>, metadata);\n    }\n\n    private queueType(type: Type<any>, moduleType:
Type<any>|TestingModuleOverride|null): void {\n    const component = this.resolvers.component.resolve(type);\n
if (component) {\n    // Check whether a give Type has respective NG def (cmp) and compile if def is\n    //
missing. That might happen in case a class without any Angular decorators extends another\n    // class where
Component/Directive/Pipe decorator is defined.\n    if (isComponentDefPendingResolution(type) ||
!type.hasOwnProperty(NG_COMP_DEF)) {\n
this.pendingComponents.add(type);\n    }\n    this.seenComponents.add(type);\n\n    // Keep track of the module
which declares this component, so later the component's scope\n    // can be set correctly. If the component has
already been recorded here, then one of several\n    // cases is true:\n    // * the module containing the component
was imported multiple times (common).\n    // * the component is declared in multiple modules (which is an
error).\n    // * the component was in 'declarations' of the testing module, and also in an imported module\n    // in
which case the module scope will be TestingModuleOverride.DECLARATION.\n    // *
overrideTemplateUsingTestingModule was called for the component in which case the module\n    // scope will
be TestingModuleOverride.OVERRIDE_TEMPLATE.\n    // If the component was previously in the testing
module's 'declarations' (meaning the\n    // current value is TestingModuleOverride.DECLARATION), then
`moduleType` is the component's\n    // real module, which was imported. This pattern is understood to mean that
the component\n    // should use its original scope, but that the testing module should also contain the\n    //
component in its scope.\n    // Note: standalone components have no associated NgModule, so the
`moduleType` can be `null`.\n    if (moduleType !== null && (!this.componentToModuleScope.has(type)
||\n    this.componentToModuleScope.get(type) === TestingModuleOverride.DECLARATION)) {\n
this.componentToModuleScope.set(type, moduleType);\n    }\n    return;\n    }\n\n    const directive =
this.resolvers.directive.resolve(type);\n    if (directive) {\n    if (!type.hasOwnProperty(NG_DIR_DEF)) {\n
this.pendingDirectives.add(type);\n    }\n    this.seenDirectives.add(type);\n    return;\n    }\n\n    const pipe =
this.resolvers.pipe.resolve(type);\n    if (pipe && !type.hasOwnProperty(NG_PIPE_DEF)) {\n

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this.pendingPipes.add(type);\n    return;\n    }\n    }\n\n    private queueTypesFromModulesArray(arr: any[]): void\n    {\n        // Because we may encounter the same NgModule while processing the imports and exports of an\n        // NgModule tree, we cache them in this set so we can skip ones that have already been seen\n        // encountered. In some test setups, this caching resulted in 10X runtime improvement.\n        const processedNgModuleDefs = new Set();\n        const queueTypesFromModulesArrayRecur = (arr: any[]): void => {\n            for (const value of arr) {\n                if (Array.isArray(value)) {\n                    queueTypesFromModulesArrayRecur(value);\n                } else if\n                (hasNgModuleDef(value)) {\n                    const def = value.mod;\n                    if (processedNgModuleDefs.has(def)) {\n                        continue;\n                    }\n                    processedNgModuleDefs.add(def);\n                    // Look through declarations, imports, and\n                    // exports, and queue\n                    // everything found there.\n                    this.queueTypeArray(maybeUnwrapFn(def.declarations),\n                    value);\n                    queueTypesFromModulesArrayRecur(maybeUnwrapFn(def.imports));\n                    queueTypesFromModulesArrayRecur(maybeUnwrapFn(def.exports));\n                } else if\n                (isModuleWithProviders(value)) {\n                    queueTypesFromModulesArrayRecur([value.ngModule]);\n                } else if\n                (isStandaloneComponent(value)) {\n                    this.queueType(value, null);\n                    const def =\n                    getComponentDef(value);\n                    const dependencies = maybeUnwrapFn(def.dependencies ?? []);\n                    dependencies.forEach((dependency) => {\n                        // Note: in AOT, the `dependencies` might also contain regular\n                        // (NgModule-based) Component, Directive and Pipes, so we handle\n                        // them separately and proceed\n                        // with recursive process for standalone\n                        // Components and NgModules only.\n                        if\n                        (isStandaloneComponent(dependency) || hasNgModuleDef(dependency)) {\n                            queueTypesFromModulesArrayRecur([dependency]);\n                        } else {\n                            this.queueType(dependency, null);\n                        }\n                    });\n                }\n            }\n        }\n        queueTypesFromModulesArrayRecur(arr);\n    }\n\n    // When module overrides (via `TestBed.overrideModule`) are\n    // present, it might affect all modules\n    // that import (even transitively) an overridden one. For all affected modules\n    // we need to\n    // recalculate their scopes for a given test run and restore original scopes at the end. The goal\n    // of\n    // this function is to collect all affected modules in a set for further processing. Example:\n    // if we have the following\n    // module hierarchy: A -> B -> C (where `->` means `imports`) and module\n    // `C` is overridden, we consider `A`\n    // and `B` as affected, since their scopes might become\n    // invalidated with the override.\n    private\n    collectModulesAffectedByOverrides(arr: any[]): Set<NgModuleType<any>> {\n        const seenModules = new Set<NgModuleType<any>>();\n        const affectedModules = new Set<NgModuleType<any>>();\n        const\n        calcAffectedModulesRecur\n        = (arr: any[], path: NgModuleType<any>[]): void => {\n            for (const value of arr) {\n                if\n                (Array.isArray(value)) {\n                    // If the value is an array, just flatten it (by invoking this function recursively),\n                    // keeping `"path"` the same.\n                    calcAffectedModulesRecur(value, path);\n                } else if\n                (hasNgModuleDef(value)) {\n                    if (seenModules.has(value)) {\n                        // If we've seen this module before and\n                        // it's included into "affected modules" list, mark\n                        // the whole path that leads to that module as affected, but\n                        // do not descend into its\n                        // imports, since we already examined them before.\n                        if\n                        (affectedModules.has(value)) {\n                            path.forEach(item => affectedModules.add(item));\n                        }\n                    } else {\n                        seenModules.add(value);\n                        if (this.overriddenModules.has(value)) {\n                            path.forEach(item => affectedModules.add(item));\n                        }\n                    }\n                }\n                // Examine module imports recursively to look for overridden modules.\n                const moduleDef =\n                (value as any)[NG_MOD_DEF];\n                calcAffectedModulesRecur(maybeUnwrapFn(moduleDef.imports),\n                path.concat(value));\n            }\n        }\n        calcAffectedModulesRecur(arr, []);\n        return affectedModules;\n    }\n\n    /**\n     * Preserve an original def (such as mod, inj, etc) before applying an override.\n     * Note: one class may\n     * have multiple defs (for example: mod and inj in case of\n     * an NgModule). If there is a def in a set already, don't\n     * override it, since\n     * an original one should be restored at the end of a test.\n     */\n    private\n    maybeStoreNgDef(prop: string, type: Type<any>) {\n        if (!this.initialNgDefs.has(type)) {\n            this.initialNgDefs.set(type, new Map());\n        }\n        const currentDefs = this.initialNgDefs.get(type)!;\n        if\n        (!currentDefs.has(prop)) {\n            const currentDef = Object.getOwnPropertyDescriptor(type, prop);\n
```

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currentDefs.set(prop,
  currentDef);\n  }\n }\n\n private storeFieldOfDefOnType(type: Type<any>, defField: string, fieldName: string):
void {\n  const def: any = (type as any)[defField];\n  const originalValue: any = def[fieldName];\n  this.defCleanupOps.push({object: def, fieldName, originalValue});\n }\n\n /**\n  * Clears current components
resolution queue, but stores the state of the queue, so we can\n  * restore it later. Clearing the queue is required
before we try to compile components (via\n  * `TestBed.compileComponents`), so that component defs are in sync
with the resolution queue.\n  *\n  private clearComponentResolutionQueue() {\n  if
(this.originalComponentResolutionQueue === null) {\n    this.originalComponentResolutionQueue = new Map();\n  }\n  clearResolutionOfComponentResourcesQueue().forEach(\n    (value, key) =>
this.originalComponentResolutionQueue!.set(key, value));\n }\n\n /**\n  * Restores component resolution queue to
the previously saved state.
This operation is performed\n  * as a part of restoring the state after completion of the current set of tests (that
might\n  * potentially mutate the state).\n  *\n  private restoreComponentResolutionQueue() {\n  if
(this.originalComponentResolutionQueue !== null) {\n  restoreComponentResolutionQueue(this.originalComponentResolutionQueue);\n
this.originalComponentResolutionQueue = null;\n  }\n }\n\n restoreOriginalState(): void {\n  // Process cleanup
ops in reverse order so the field's original value is restored correctly (in\n  // case there were multiple overrides for
the same field).\n  forEachRight(this.defCleanupOps, (op: CleanupOperation) => {\n    op.object[op.fieldName] =
op.originalValue;\n  });\n  // Restore initial component/directive/pipe defs\n  this.initialNgDefs.forEach(\n
(defs: Map<string, PropertyDescriptor|undefined>, type: Type<any>) => {\n    defs.forEach((descriptor, prop)
=> {\n      if (!descriptor) {\n
        // Delete operations are generally undesirable since they have performance\n        // implications on
objects they were applied to. In this particular case, situations\n        // where this code is invoked should be quite
rare to cause any noticeable impact,\n        // since it's applied only to some test cases (for example when class
with no\n        // annotations extends some @Component) when we need to clear 'cmp' field on a given\n
// class to restore its original state (before applying overrides and running tests).\n        delete (type as
any)[prop];\n      } else {\n        Object.defineProperty(type, prop, descriptor);\n      }\n    });\n  });\n  this.initialNgDefs.clear();\n  this.scopesWithOverriddenProviders.clear();\n
this.restoreComponentResolutionQueue();\n  // Restore the locale ID to the default value, this shouldn't be
necessary but we never know\n  setLocaleId(DEFAULT_LOCALE_ID);\n }\n\n private compileTestModule(): void {\n  class RootScopeModule {\n
compileNgModuleDefs(RootScopeModule as NgModuleType<any>, {\n    providers:
[...this.rootProviderOverrides],\n  });\n  const ngZone = new NgZone({enableLongStackTrace: true});\n  const
providers: Provider[] = [\n    {provide: NgZone, useValue: ngZone},\n    {provide: Compiler, useFactory: () =>
new R3TestCompiler(this)},\n    ...this.providers,\n    ...this.providerOverrides,\n  ];\n  const imports =
[RootScopeModule, this.additionalModuleTypes, this.imports || []];\n\n  // clang-format off\n  compileNgModuleDefs(this.testModuleType, {\n    declarations: this.declarations,\n    imports,\n    schemas:
this.schemas,\n    providers,\n  }, /* allowDuplicateDeclarationsInRoot */ true);\n  // clang-format on\n\n  this.applyProviderOverridesInScope(this.testModuleType);\n }\n\n get injector(): Injector {\n  if (this._injector
!== null) {\n    return this._injector;\n  }\n\n  const providers: Provider[] = [];\n  const compilerOptions =
this.platform.injector.get(COMPILER_OPTIONS);\n  compilerOptions.forEach(opts => {\n    if (opts.providers)
{\n      providers.push(opts.providers);\n    }\n  });\n  if (this.compilerProviders !== null) {\n
providers.push(...this.compilerProviders);\n  }\n\n  // TODO(ocombe): make this work with an Injector directly
instead of creating a module for it\n  class CompilerModule {\n    compileNgModuleDefs(CompilerModule as
NgModuleType<any>, {providers});\n  }\n  const CompilerModuleFactory = new
R3NgModuleFactory(CompilerModule);\n  this._injector =
CompilerModuleFactory.create(this.platform.injector).injector;\n  return this._injector;\n }\n\n // get overrides for

```

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a specific provider (if any)\n private getSingleProviderOverrides(provider: Provider): Provider|null {\n  const
token = getProviderToken(provider);\n  return this.providerOverridesByToken.get(token) || null;\n
}\n\n private getProviderOverrides(providers?: Provider[]): Provider[] {\n  if (!providers || !providers.length ||
this.providerOverridesByToken.size === 0) return [];\n  // There are two flattening operations here. The inner
flatten() operates on the metadata's\n  // providers and applies a mapping function which retrieves overrides for
each incoming\n  // provider. The outer flatten() then flattens the produced overrides array. If this is not\n  // done,
the array can contain other empty arrays (e.g. `[[], []]`) which leak into the\n  // providers array and contaminate
any error messages that might be generated.\n  return flatten(flatten(\n    providers, (provider: Provider) =>
this.getSingleProviderOverrides(provider) || []));\n }\n\n private getOverriddenProviders(providers?: Provider[]):
Provider[] {\n  if (!providers || !providers.length || this.providerOverridesByToken.size === 0) return [];\n  const
flattenedProviders = flatten<Provider[]>(providers);\n
  const overrides = this.getProviderOverrides(flattenedProviders);\n  const overriddenProviders =
[...flattenedProviders, ...overrides];\n  const final: Provider[] = [];\n  const seenOverriddenProviders = new
Set<Provider>();\n  // We iterate through the list of providers in reverse order to make sure provider overrides\n
// take precedence over the values defined in provider list. We also filter out all providers\n  // that have overrides,
keeping overridden values only. This is needed, since presence of a\n  // provider with `ngOnDestroy` hook will
cause this hook to be registered and invoked later.\n  forEachRight(overriddenProviders, (provider: any) => {\n
const token: any = getProviderToken(provider);\n  if (this.providerOverridesByToken.has(token)) {\n    if
(!seenOverriddenProviders.has(token)) {\n      seenOverriddenProviders.add(token);\n      // Treat all overridden
providers as `{multi: false}` (even if it's a multi-provider)
to\n      // make sure that provided override takes highest precedence and is not combined with\n      // other
instances of the same multi provider.\n      final.unshift({...provider, multi: false});\n    } else {\n
final.unshift(provider);\n    }\n  });\n  return final;\n }\n\n private hasProviderOverrides(providers?: Provider[]):
boolean {\n  return this.getProviderOverrides(providers).length > 0;\n }\n\n private
patchDefWithProviderOverrides(declaration: Type<any>, field: string): void {\n  const def = (declaration as
any)[field];\n  if (def && def.providersResolver) {\n    this.maybeStoreNgDef(field, declaration);\n    const
resolver = def.providersResolver;\n    const processProvidersFn = (providers: Provider[]) =>
this.getOverriddenProviders(providers);\n    this.storeFieldOfDefOnType(declaration, field, 'providersResolver');\n
def.providersResolver = (ngDef: DirectiveDef<any>) => resolver(ngDef, processProvidersFn);\n
  }\n }\n\nfunction initResolvers(): Resolvers {\n  return {\n    module: new NgModuleResolver(),\n
component: new ComponentResolver(),\n    directive: new DirectiveResolver(),\n    pipe: new PipeResolver()\n
};\n}\n\nfunction isStandaloneComponent<T>(value: Type<T>): value is ComponentType<T> {\n  const def =
getComponentDef(value);\n  return !!def?.standalone;\n}\n\nfunction getComponentDef(value:
ComponentType<unknown>): ComponentDef<unknown>;\nfunction getComponentDef(value: Type<unknown>):
ComponentDef<unknown>|null;\nfunction getComponentDef(value: Type<unknown>):
ComponentDef<unknown>|null {\n  return (value as any).cmp ?? null;\n}\n\nfunction hasNgModuleDef<T>(value:
Type<T>): value is NgModuleType<T> {\n  return value.hasOwnProperty('mod');\n}\n\nfunction
isNgModule<T>(value: Type<T>): boolean {\n  return hasNgModuleDef(value);\n}\n\nfunction
maybeUnwrapFn<T>(maybeFn: (() => T)|T): T {\n  return maybeFn instanceof Function ? maybeFn() :
maybeFn;\n}\n\nfunction flatten<T>(values:
any[], mapFn?: (value: T) => any): T[] {\n  const out: T[] = [];\n  values.forEach(value => {\n    if
(Array.isArray(value)) {\n      out.push(...flatten<T>(value, mapFn));\n    } else {\n      out.push(mapFn ?
mapFn(value) : value);\n    }\n  });\n  return out;\n}\n\nfunction getProviderField(provider: Provider, field: string)
{\n  return provider && typeof provider === 'object' && (provider as any)[field];\n}\n\nfunction
getProviderToken(provider: Provider) {\n  return getProviderField(provider, 'provide') || provider;\n}\n\nfunction
isModuleWithProviders(value: any): value is ModuleWithProviders<any> {\n  return
value.hasOwnProperty('ngModule');\n}\n\nfunction forEachRight<T>(values: T[], fn: (value: T, idx: number) =>
void): void {\n  for (let idx = values.length - 1; idx >= 0; idx--) {\n    fn(values[idx], idx);\n  }\n}\n\nfunction

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invalidTypeError(name: string, expectedType: string): Error {\n  return new Error(`${name} class doesn't have
@${expectedType} decorator
or is missing metadata.`);\n}\n\nclass R3TestCompiler implements Compiler {\n  constructor(private TestBed:
TestBedCompiler) {}\n\n  compileModuleSync<T>(moduleType: Type<T>): NgModuleFactory<T> {\n
this.testBed._compileNgModuleSync(moduleType);\n  return new R3NgModuleFactory(moduleType);\n }\n\n
async compileModuleAsync<T>(moduleType: Type<T>): Promise<NgModuleFactory<T>> {\n  await
this.testBed._compileNgModuleAsync(moduleType);\n  return new R3NgModuleFactory(moduleType);\n }\n\n
compileModuleAndAllComponentsSync<T>(moduleType: Type<T>): ModuleWithComponentFactories<T> {\n
const ngModuleFactory = this.compileModuleSync(moduleType);\n  const componentFactories =
this.testBed._getComponentFactories(moduleType as NgModuleType<T>);\n  return new
ModuleWithComponentFactories(ngModuleFactory, componentFactories);\n }\n\n  async
compileModuleAndAllComponentsAsync<T>(moduleType: Type<T>):\n
Promise<ModuleWithComponentFactories<T>> {\n  const ngModuleFactory =
await this.compileModuleAsync(moduleType);\n  const componentFactories =
this.testBed._getComponentFactories(moduleType as NgModuleType<T>);\n  return new
ModuleWithComponentFactories(ngModuleFactory, componentFactories);\n }\n\n  clearCache(): void {\n}\n\n
clearCacheFor(type: Type<any>): void {\n}\n\n  getModuleId(moduleType: Type<any>): string|undefined {\n  const
meta = this.testBed._getModuleResolver().resolve(moduleType);\n  return meta && meta.id || undefined;\n
}\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n//
The formatter and CI disagree on how this import statement should be formatted. Both try to keep\n// it on one line,
too, which has gotten very hard to read & manage. So disable the formatter for\n// this statement only.\n\n/* clang-
format off */\nimport {\n  Component,\n  Directive,\n  InjectFlags,\n
InjectionToken,\n  Injector,\n  NgModule,\n  NgZone,\n  Pipe,\n  PlatformRef,\n  ProviderToken,\n  Type,\n
flushModuleScopingQueueAsMuchAsPossible as flushModuleScopingQueueAsMuchAsPossible,\n
getUnknownElementStrictMode as getUnknownElementStrictMode,\n  getUnknownPropertyStrictMode as
getUnknownPropertyStrictMode,\n  Render3ComponentFactory as ComponentFactory,\n  Render3NgModuleRef as
NgModuleRef,\n  resetCompiledComponents as resetCompiledComponents,\n
setAllowDuplicateNgModuleIdsForTest as setAllowDuplicateNgModuleIdsForTest,\n
setUnknownElementStrictMode as setUnknownElementStrictMode,\n  setUnknownPropertyStrictMode as
setUnknownPropertyStrictMode,\n  stringify as stringify\n} from '@angular/core';\n\n/* clang-format on
*/\n\nimport {ComponentFixture} from './component_fixture';\nimport {MetadataOverride} from
 './metadata_override';\nimport {ComponentFixtureAutoDetect, ComponentFixtureNoNgZone,
ModuleTeardownOptions, TEARDOWN_TESTING_MODULE_ON_DESTROY_DEFAULT,
TestComponentRenderer, TestEnvironmentOptions, TestModuleMetadata,
THROW_ON_UNKNOWN_ELEMENTS_DEFAULT, THROW_ON_UNKNOWN_PROPERTIES_DEFAULT}
from './test_bed_common';\nimport {TestBedCompiler} from './test_bed_compiler';\n\n/**\n * Static methods
implemented by the `TestBed`.\n * \n * @publicApi\n */\nexport interface TestBedStatic extends TestBed {\n
new(...args: any[]): TestBed;\n}\n\n/**\n * @publicApi\n */\nexport interface TestBed {\n  get platform():
PlatformRef;\n\n  get ngModule(): Type<any>|Type<any>[];\n\n  /**\n * Initialize the environment for testing with
a compiler factory, a PlatformRef, and an\n * angular module. These are common to every test in the suite.\n * \n
* This may only be called once, to set up the common providers for the current test\n * suite on the current
platform. If you absolutely need to change the providers,\n * first use `resetTestEnvironment`.\n * \n * Test
modules and platforms for individual platforms are available from\n * '@angular/<platform_name>/testing'.\n
*/\n  initTestEnvironment(\n    ngModule: Type<any>|Type<any>[], platform: PlatformRef,\n    options?:
TestEnvironmentOptions): void;\n\n  /**\n * Reset the providers for the test injector.\n */\n  resetTestEnvironment(): void;\n\n  resetTestingModule(): TestBed;\n\n  configureCompiler(config: {providers?:
any[], useJit?: boolean}): void;\n\n  configureTestingModule(moduleDef: TestModuleMetadata): TestBed;\n\n

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compileComponents(): Promise<any>;\n\n inject<T>(token: ProviderToken<T>, notFoundValue?: T, flags?:
InjectFlags): T;\n inject<T>(token: ProviderToken<T>, notFoundValue: null, flags?: InjectFlags): T|null;\n\n /**
@deprecated from v9.0.0 use TestBed.inject *\n get<T>(token: ProviderToken<T>, notFoundValue?: T, flags?:
InjectFlags): any;\n\n /** @deprecated from v9.0.0 use TestBed.inject *\n get(token: any, notFoundValue?: any):
any;\n\n execute(tokens: any[], fn: Function, context?: any): any;\n\n overrideModule(ngModule: Type<any>,
override: MetadataOverride<NgModule>): TestBed;\n\n overrideComponent(component: Type<any>, override:
MetadataOverride<Component>): TestBed;\n\n overrideDirective(directive: Type<any>, override:
MetadataOverride<Directive>): TestBed;\n\n overridePipe(pipe: Type<any>, override: MetadataOverride<Pipe>):
TestBed;\n\n overrideTemplate(component: Type<any>, template: string): TestBed;\n\n /**\n * Overwrites all
providers for the given token with the given provider definition.\n * *\n overrideProvider(token: any, provider: {\n
useFactory: Function,\n deps: any[],\n }): TestBed;\n\n overrideProvider(token: any, provider: {useValue: any;}):
TestBed;\n\n overrideProvider(token: any, provider: {useFactory?: Function, useValue?: any, deps?: any[]}):\n
TestBed;\n\n overrideTemplateUsingTestingModule(component: Type<any>, template: string): TestBed;\n\n
createComponent<T>(component: Type<T>): ComponentFixture<T>;\n\n\nlet _nextRootElementId = 0;\n\n/**\n
* Returns a singleton
of the `TestBed` class.\n *\n * @publicApi\n */\nexport function getTestBed(): TestBed {\n return
TestBedImpl.INSTANCE;\n}\n\n/**\n * @description\n * Configures and initializes environment for unit testing
and provides methods for\n * creating components and services in unit tests.\n *\n * TestBed is the primary api for
writing unit tests for Angular applications and libraries.\n */\nexport class TestBedImpl implements TestBed {\n
private static _INSTANCE: TestBedImpl|null = null;\n\n static get INSTANCE(): TestBedImpl {\n return
TestBedImpl._INSTANCE = TestBedImpl._INSTANCE || new TestBedImpl();\n }\n\n /**\n * Teardown options
that have been configured at the environment level.\n * *\n Used as a fallback if no instance-level options have been
provided.\n */\n private static _environmentTeardownOptions: ModuleTeardownOptions|undefined;\n\n /**\n *
`"Error on unknown elements"` option that has been configured at the environment level.\n * *\n Used as a fallback if
no
instance-level option has been provided.\n */\n private static _environmentErrorOnUnknownElementsOption:
boolean|undefined;\n\n /**\n * `"Error on unknown properties"` option that has been configured at the
environment level.\n * *\n Used as a fallback if no instance-level option has been provided.\n */\n private static
_environmentErrorOnUnknownPropertiesOption: boolean|undefined;\n\n /**\n * Teardown options that have been
configured at the `TestBed` instance level.\n * *\n These options take precedence over the environment-level ones.\n
*/\n private _instanceTeardownOptions: ModuleTeardownOptions|undefined;\n\n /**\n * `"Error on unknown
elements"` option that has been configured at the `TestBed` instance level.\n * *\n This option takes precedence over
the environment-level one.\n */\n private _instanceErrorOnUnknownElementsOption: boolean|undefined;\n\n
/**\n * `"Error on unknown properties"` option that has been configured at the `TestBed` instance level.\n
* *\n This option takes precedence over the environment-level one.\n */\n private
_instanceErrorOnUnknownPropertiesOption: boolean|undefined;\n\n /**\n * Stores the previous `"Error on
unknown elements"` option value,\n * allowing to restore it in the reset testing module logic.\n */\n private
_previousErrorOnUnknownElementsOption: boolean|undefined;\n\n /**\n * Stores the previous `"Error on
unknown properties"` option value,\n * allowing to restore it in the reset testing module logic.\n */\n private
_previousErrorOnUnknownPropertiesOption: boolean|undefined;\n\n /**\n * Initialize the environment for testing
with a compiler factory, a PlatformRef, and an\n * angular module. These are common to every test in the suite.\n
*\n * This may only be called once, to set up the common providers for the current test\n * suite on the current
platform. If you absolutely need to change the providers,\n * first use `resetTestEnvironment`.\n *\n * Test
modules and platforms
for individual platforms are available from\n * '@angular/<platform_name>/testing'.\n *\n * @publicApi\n
*/\n\n static initTestEnvironment(\n ngModule: Type<any>|Type<any>[], platform: PlatformRef,\n options?:
TestEnvironmentOptions): TestBed {\n const testBed = TestBedImpl.INSTANCE;\n
testBed.initTestEnvironment(ngModule, platform, options);\n return testBed;\n }\n\n /**\n * Reset the providers

```



```

for the test injector.\n * \n * @publicApi\n * \n static resetTestEnvironment(): void {\n
TestBedImpl.INSTANCE.resetTestEnvironment();\n }\n\n static configureCompiler(config: {providers?: any[];\n
useJit?: boolean;});\n TestBed {\n return TestBedImpl.INSTANCE.configureCompiler(config);\n }\n\n /**\n *
Allows overriding default providers, directives, pipes, modules of the test injector,\n * which are defined in
test_injector.js\n * \n static configureTestingModule(moduleDef: TestModuleMetadata): TestBed {\n return
TestBedImpl.INSTANCE.configureTestingModule(moduleDef);\n
}\n\n /**\n * Compile components with a `templateUrl` for the test's NgModule.\n * It is necessary to call this
function\n * as fetching urls is asynchronous.\n * \n static compileComponents(): Promise<any> {\n return
TestBedImpl.INSTANCE.compileComponents();\n }\n\n static overrideModule(ngModule: Type<any>, override:
MetadataOverride<NgModule>): TestBed {\n return TestBedImpl.INSTANCE.overrideModule(ngModule,\n
override);\n }\n\n static overrideComponent(component: Type<any>, override: MetadataOverride<Component>):
TestBed {\n return TestBedImpl.INSTANCE.overrideComponent(component, override);\n }\n\n static
overrideDirective(directive: Type<any>, override: MetadataOverride<Directive>): TestBed {\n return
TestBedImpl.INSTANCE.overrideDirective(directive, override);\n }\n\n static overridePipe(pipe: Type<any>,\n
override: MetadataOverride<Pipe>): TestBed {\n return TestBedImpl.INSTANCE.overridePipe(pipe, override);\n
}\n\n static overrideTemplate(component: Type<any>, template: string): TestBed {\n return
TestBedImpl.INSTANCE.overrideTemplate(component, template);\n }\n\n /**\n * Overrides the template of the
given component, compiling the template\n * in the context of theTestingModule.\n * \n * Note: This works for
JIT and AOTed components as well.\n * \n static overrideTemplateUsingTestingModule(component: Type<any>,\n
template: string): TestBed {\n return
TestBedImpl.INSTANCE.overrideTemplateUsingTestingModule(component, template);\n }\n\n static
overrideProvider(token: any, provider: {\n useFactory: Function,\n deps: any[],\n }): TestBed;\n static
overrideProvider(token: any, provider: {\n useValue: any;});\n TestBed;\n static overrideProvider(token: any, provider:
{\n useFactory?: Function,\n useValue?: any,\n deps?: any[],\n }): TestBed {\n return
TestBedImpl.INSTANCE.overrideProvider(token, provider);\n }\n\n static inject<T>(token: ProviderToken<T>,\n
notFoundValue?: T, flags?: InjectFlags): T;\n static inject<T>(token: ProviderToken<T>, notFoundValue: null,\n
flags?: InjectFlags): T|null;\n static inject<T>(token: ProviderToken<T>, notFoundValue?: T|null, flags?:
InjectFlags): T|null {\n return TestBedImpl.INSTANCE.inject(token, notFoundValue, flags);\n }\n\n /**
@deprecated from v9.0.0 use TestBed.inject * \n static get<T>(token: ProviderToken<T>, notFoundValue?: T,\n
flags?: InjectFlags): any;\n /** @deprecated from v9.0.0 use TestBed.inject * \n static get(token: any,\n
notFoundValue?: any): any;\n /** @deprecated from v9.0.0 use TestBed.inject * \n static get(\n token: any,\n
notFoundValue: any = Injector.THROW_IF_NOT_FOUND,\n flags: InjectFlags = InjectFlags.Default): any {\n
return TestBedImpl.INSTANCE.inject(token, notFoundValue, flags);\n }\n\n static
createComponent<T>(component: Type<T>): ComponentFixture<T> {\n return
TestBedImpl.INSTANCE.createComponent(component);\n }\n\n static resetTestingModule():
TestBed {\n return TestBedImpl.INSTANCE.resetTestingModule();\n }\n\n static execute(tokens: any[], fn:
Function, context?: any): any {\n return TestBedImpl.INSTANCE.execute(tokens, fn, context);\n }\n\n static get
platform(): PlatformRef {\n return TestBedImpl.INSTANCE.platform;\n }\n\n static get ngModule():
Type<any>|Type<any>[] {\n return TestBedImpl.INSTANCE.ngModule;\n }\n\n // Properties\n\n platform:
PlatformRef = null!;\n ngModule: Type<any>|Type<any>[] = null!;\n\n private _compiler: TestBedCompiler|null =
null;\n private _testModuleRef: NgModuleRef<any>|null = null;\n\n private _activeFixtures:
ComponentFixture<any>[] = [];\n\n /**\n * Internal-only flag to indicate whether a module\n * scoping queue
has been checked and flushed already.\n * @nodoc\n * \n globalCompilationChecked = false;\n\n /**\n *
Initialize the environment for testing with a compiler factory, a PlatformRef, and an\n * angular module. These are
common to every
test in the suite.\n * \n * This may only be called once, to set up the common providers for the current test\n *
suite on the current platform. If you absolutely need to change the providers,\n * first use
`resetTestEnvironment`.\n * \n * Test modules and platforms for individual platforms are available from\n *

```

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'@angular/<platform_name>/testing'.\n * \n * @publicApi \n * \n initTestEnvironment(\n   ngModule:
Type<any>|Type<any>[], platform: PlatformRef,\n   options?: TestEnvironmentOptions): void {\n   if
(this.platform || this.ngModule) {\n     throw new Error('Cannot set base providers because it has already been
called');\n   }\n   TestBedImpl._environmentTeardownOptions = options?.teardown;\n   TestBedImpl._environmentErrorOnUnknownElementsOption = options?.errorOnUnknownElements;\n   TestBedImpl._environmentErrorOnUnknownPropertiesOption = options?.errorOnUnknownProperties;\n   this.platform = platform;\n   this.ngModule = ngModule;\n   this._compiler
= new TestBedCompiler(this.platform, this.ngModule);\n   // TestBed does not have an API which can reliably
detect the start of a test, and thus could be\n   // used to track the state of the NgModule registry and reset it
correctly. Instead, when we\n   // know we're in a testing scenario, we disable the check for duplicate NgModule
registration\n   // completely.\n   setAllowDuplicateNgModuleIdsForTest(true);\n } \n /** \n * Reset the
providers for the test injector.\n * \n * @publicApi \n * \n resetTestEnvironment(): void {\n   this.resetTestingModule();\n   this._compiler = null;\n   this.platform = null!;\n   this.ngModule = null!;\n   TestBedImpl._environmentTeardownOptions = undefined;\n   setAllowDuplicateNgModuleIdsForTest(false);\n } \n
resetTestingModule(): this {\n   this.checkGlobalCompilationFinished();\n   resetCompiledComponents();\n   if (this._compiler !== null) {\n     this.compiler.restoreOriginalState();\n   }\n   this._compiler
= new TestBedCompiler(this.platform, this.ngModule);\n   // Restore the previous value of the \"error on unknown
elements\" option\n   setUnknownElementStrictMode(\n     this._previousErrorOnUnknownElementsOption ??
THROW_ON_UNKNOWN_ELEMENTS_DEFAULT);\n   // Restore the previous value of the \"error on unknown
properties\" option\n   setUnknownPropertyStrictMode(\n     this._previousErrorOnUnknownPropertiesOption ??
THROW_ON_UNKNOWN_PROPERTIES_DEFAULT);\n   // We have to chain a couple of try/finally blocks,
because each step can\n   // throw errors and we don't want it to interrupt the next step and we also\n   // want an
error to be thrown at the end.\n   try {\n     this.destroyActiveFixtures();\n   } finally {\n     try {\n       if
(this.shouldTearDownTestingModule()) {\n         this.tearDownTestingModule();\n       }\n     } finally {\n
this._testModuleRef = null;\n     this._instanceTeardownOptions = undefined;\n     this._instanceErrorOnUnknownElementsOption
= undefined;\n     this._instanceErrorOnUnknownPropertiesOption = undefined;\n   }\n }\n   return this;\n } \n
configureCompiler(config: {providers?: any[]; useJit?: boolean; }): this {\n   if (config.useJit !== null) {\n
throw new Error('the Render3 compiler Jit mode is not configurable !');\n   }\n   if (config.providers !==
undefined) {\n     this.compiler.setCompilerProviders(config.providers);\n   }\n   return this;\n } \n
configureTestingModule(moduleDef: TestModuleMetadata): this {\n   this.assertNotInstantiated('R3TestBed.configureTestingModule', 'configure the test module');\n   // Trigger module
scoping queue flush before executing other TestBed operations in a test.\n   // This is needed for the first test
invocation to ensure that globally declared modules have\n   // their components scoped properly. See the
`checkGlobalCompilationFinished` function\n   // description for additional info.\n   this.checkGlobalCompilationFinished();\n   // Always re-assign the options, even if they're undefined.\n   // This ensures that we don't carry them between
tests.\n   this._instanceTeardownOptions = moduleDef.teardown;\n   this._instanceErrorOnUnknownElementsOption = moduleDef.errorOnUnknownElements;\n   this._instanceErrorOnUnknownPropertiesOption = moduleDef.errorOnUnknownProperties;\n   // Store the current
value of the strict mode option,\n   // so we can restore it later\n   this._previousErrorOnUnknownElementsOption
= getUnknownElementStrictMode();\n   setUnknownElementStrictMode(this.shouldThrowErrorOnUnknownElements());\n   this._previousErrorOnUnknownPropertiesOption = getUnknownPropertyStrictMode();\n   setUnknownPropertyStrictMode(this.shouldThrowErrorOnUnknownProperties());\n   this.compiler.configureTestingModule(moduleDef);\n   return this;\n } \n
compileComponents(): Promise<any>
{\n   return this.compiler.compileComponents();\n } \n inject<T>(token: ProviderToken<T>,

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notFoundValue?: T, flags?: InjectFlags): T;\n inject<T>(token: ProviderToken<T>, notFoundValue: null, flags?:
InjectFlags): T|null;\n inject<T>(token: ProviderToken<T>, notFoundValue?: T|null, flags?: InjectFlags): T|null {\n
  if (token as unknown === TestBed) {\n    return this as any;\n  }\n  const UNDEFINED = {} as unknown as
T;\n  const result = this.testModuleRef.injector.get(token, UNDEFINED, flags);\n  return result ===
UNDEFINED ? this.compiler.injector.get(token, notFoundValue, flags) as any : \n          result;\n
}\n\n /** @deprecated from v9.0.0 use TestBed.inject */\n get<T>(token: ProviderToken<T>, notFoundValue?: T,
flags?: InjectFlags): any;\n /** @deprecated from v9.0.0 use TestBed.inject */\n get(token: any, notFoundValue?:
any): any;\n /** @deprecated from v9.0.0 use TestBed.inject */\n get(token: any, notFoundValue: any =
Injector.THROW_IF_NOT_FOUND, \n    flags: InjectFlags = InjectFlags.Default): any {\n  return
this.inject(token,
  notFoundValue, flags);\n }\n\n execute(tokens: any[], fn: Function, context?: any): any {\n  const params =
tokens.map(t => this.inject(t));\n  return fn.apply(context, params);\n }\n\n overrideModule(ngModule:
Type<any>, override: MetadataOverride<NgModule>): this {\n  this.assertNotInstantiated('overrideModule',
'override module metadata');\n  this.compiler.overrideModule(ngModule, override);\n  return this;\n }\n\n
overrideComponent(component: Type<any>, override: MetadataOverride<Component>): this {\n
  this.assertNotInstantiated('overrideComponent', 'override component metadata');\n
  this.compiler.overrideComponent(component, override);\n  return this;\n }\n\n
overrideTemplateUsingTestingModule(component: Type<any>, template: string): this {\n
  this.assertNotInstantiated(\n    'R3TestBed.overrideTemplateUsingTestingModule', \n    'Cannot override
template when the test module has already been instantiated');\n
  this.compiler.overrideTemplateUsingTestingModule(component,
  template);\n  return this;\n }\n\n overrideDirective(directive: Type<any>, override:
MetadataOverride<Directive>): this {\n  this.assertNotInstantiated('overrideDirective', 'override directive
metadata');\n  this.compiler.overrideDirective(directive, override);\n  return this;\n }\n\n
overridePipe(pipe: Type<any>, override: MetadataOverride<Pipe>): this {\n  this.assertNotInstantiated('overridePipe', 'override pipe
metadata');\n  this.compiler.overridePipe(pipe, override);\n  return this;\n }\n\n /**\n * Overwrites all providers
for the given token with the given provider definition.\n */\n overrideProvider(token: any, provider: {useFactory?:
Function, useValue?: any, deps?: any[]}):\n  this {\n  this.assertNotInstantiated('overrideProvider', 'override
provider');\n  this.compiler.overrideProvider(token, provider);\n  return this;\n }\n\n
overrideTemplate(component: Type<any>, template: string): TestBed {\n
  return this.overrideComponent(component, {set: {template, templateUrl: null!}});\n }\n\n
createComponent<T>(type: Type<T>): ComponentFixture<T> {\n  const testComponentRenderer =
this.inject(TestComponentRenderer);\n  const rootElId = `root${_nextRootElementId++}`;\n
  testComponentRenderer.insertRootElement(rootElId);\n  const componentDef = (type as any).cmp;\n  if
(!componentDef) {\n    throw new Error(`It looks like '${stringify(type)}' has not been compiled.`);\n  }\n  //
TODO: Don't cast as `InjectionToken<boolean>`, proper type is boolean[]\n  const noNgZone =
this.inject(ComponentFixtureNoNgZone as InjectionToken<boolean>, false);\n  // TODO: Don't cast as
`InjectionToken<boolean>`, proper type is boolean[]\n  const autoDetect: boolean =\n
this.inject(ComponentFixtureAutoDetect as InjectionToken<boolean>, false);\n  const ngZone: NgZone|null =
noNgZone ? null : this.inject(NgZone, null);\n  const componentFactory = new
ComponentFactory(componentDef);\n
  const initComponents = () => {\n    const componentRef =\n      componentFactory.create(Injector.NULL, [],
`${rootElId}`, this.testModuleRef);\n    return new ComponentFixture<any>(componentRef, ngZone,
autoDetect);\n  }; \n  const fixture = ngZone ? ngZone.run initComponents) : initComponents();\n
  this._activeFixtures.push(fixture);\n  return fixture;\n }\n\n /**\n * @internal strip this from published d.ts files
due to\n * https://github.com/microsoft/TypeScript/issues/36216\n */\n private get compiler(): TestBedCompiler
{\n  if (this._compiler === null) {\n    throw new Error(`Need to call TestBed.initTestEnvironment() first`);\n
  }\n  return this._compiler;\n }\n\n /**\n * @internal strip this from published d.ts files due to\n *

```

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https://github.com/microsoft/TypeScript/issues/36216\n
*\n
private get testModuleRef(): NgModuleRef<any> {\n
  if (this._testModuleRef === null) {\n
    this._testModuleRef = this.compiler.finalize();\n
  }\n
  return this._testModuleRef;\n
}\n
private assertNotInstantiated(methodName: string, methodDescription: string) {\n
  if (this._testModuleRef !== null) {\n
    throw new Error(\n
      `Cannot ${methodDescription} when the test module has already been instantiated. ` +\n
      `Make sure you are not using \`${inject}\` before \`${methodName}\``);\n
  }\n
}\n
/**\n
 * Check whether the module scoping queue should be flushed, and flush it if needed.\n
 * When the TestBed is reset, it clears the JIT module compilation queue, cancelling any\n
 * in-progress module compilation. This creates a potential hazard - the very first time the\n
 * TestBed is initialized (or if it's reset without being initialized), there may be pending\n
 * compilations of modules declared in global scope. These compilations should be finished.\n
 * To ensure that globally declared modules have their components scoped properly, this function\n
 * is called whenever TestBed is initialized or reset. The _first_ time that this happens, prior\n
 * to any other operations, the scoping queue is flushed.\n
 */\n
private checkGlobalCompilationFinished(): void {\n
  // Checking _testNgModuleRef is null should not be necessary, but is left in as an additional\n
  // guard that compilations queued in tests (after instantiation) are never flushed accidentally.\n
  if (!this.globalCompilationChecked && this._testModuleRef === null) {\n
    flushModuleScopingQueueAsMuchAsPossible();\n
  }\n
  this.globalCompilationChecked = true;\n
}\n
private destroyActiveFixtures(): void {\n
  let errorCount = 0;\n
  this._activeFixtures.forEach((fixture) => {\n
    try {\n
      fixture.destroy();\n
    } catch (e) {\n
      errorCount++;\n
      console.error('Error during cleanup of component', {\n
        component: fixture.componentInstance,\n
        stacktrace: e,\n
      });\n
    }\n
  });\n
  this._activeFixtures = [];\n
  if (errorCount > 0 && this.shouldRethrowTeardownErrors()) {\n
    throw Error(\n
      `${errorCount} ${errorCount === 1 ? 'component' : 'components'} ` +\n
      `threw errors during cleanup`);\n
  }\n
}\n
shouldRethrowTeardownErrors(): boolean {\n
  const instanceOptions = this._instanceTeardownOptions;\n
  const environmentOptions = TestBedImpl._environmentTeardownOptions;\n
  // If the new teardown behavior hasn't been configured, preserve the old behavior.\n
  if (!instanceOptions && !environmentOptions) {\n
    return TEARDOWN_TESTING_MODULE_ON_DESTROY_DEFAULT;\n
  }\n
  // Otherwise use the configured behavior or default to rethrowing.\n
  return instanceOptions?.rethrowErrors ?? environmentOptions?.rethrowErrors ??\n
    this.shouldTearDownTestingModule();\n
}\n
shouldThrowErrorOnUnknownElements(): boolean {\n
  // Check if a configuration has been provided to throw when an unknown element is found\n
  return this._instanceErrorOnUnknownElementsOption ??\n
    TestBedImpl._environmentErrorOnUnknownElementsOption ??\n
    THROW_ON_UNKNOWN_ELEMENTS_DEFAULT;\n
}\n
shouldThrowErrorOnUnknownProperties(): boolean {\n
  // Check if a configuration has been provided to throw when an unknown property is found\n
  return this._instanceErrorOnUnknownPropertiesOption ??\n
    TestBedImpl._environmentErrorOnUnknownPropertiesOption ??\n
    THROW_ON_UNKNOWN_PROPERTIES_DEFAULT;\n
}\n
shouldTearDownTestingModule(): boolean {\n
  return this._instanceTeardownOptions?.destroyAfterEach ??\n
    TestBedImpl._environmentTeardownOptions?.destroyAfterEach ??\n
    TEARDOWN_TESTING_MODULE_ON_DESTROY_DEFAULT;\n
}\n
tearDownTestingModule() {\n
  // If the module ref has already been destroyed, we won't be able to get a test renderer.\n
  if (this._testModuleRef === null) {\n
    return;\n
  }\n
  // Resolve the renderer ahead of time, because we want to remove the root elements as the very\n
  // last step, but the injector will be destroyed as a part of the module ref destruction.\n
  const testRenderer = this.inject(TestComponentRenderer);\n
  try {\n
    this._testModuleRef.destroy();\n
  } catch (e) {\n
    if (this.shouldRethrowTeardownErrors()) {\n
      throw e;\n
    } else {\n
      console.error('Error during cleanup of a testing module', {\n
        component: this._testModuleRef.instance,\n
        stacktrace: e,\n
      });\n
    }\n
  }\n
  finally {\n
    testRenderer.removeAllRootElement?.();\n
  }\n
}\n
/**\n
 * @description\n
 * Configures and initializes environment for unit testing and provides methods for\n
 * creating components and services in unit

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tests.\n *\n * `TestBed` is the primary api for writing unit tests for Angular applications and libraries.\n *\n *
@publicApi\n *\nexport const TestBed: TestBedStatic = TestBedImpl;\n\n/**\n * Allows injecting dependencies in
`beforeEach`() and `it`() . Note: this function\n * (imported from the `@angular/core/testing` package)
can **only** be used to inject dependencies\n * in tests. To inject dependencies in your application code, use the
[ `inject` ](api/core/inject)\n * function from the `@angular/core` package instead.\n *\n * Example:\n *\n * ``\n *
beforeEach(inject([Dependency, AClass], (dep, object) => {\n * // some code that uses `dep` and `object`\n * //
...\n * }));\n *\n * it(..., inject([AClass], (object) => {\n * object.doSomething();\n * expect(...);\n * }));\n *\n *
*\n * @publicApi\n *\nexport function inject(tokens: any[], fn: Function): () => any {\n const testBed =
TestBedImpl.INSTANCE;\n // Not using an arrow function to preserve context passed from call site\n return
function(this: unknown) {\n return testBed.execute(tokens, fn, this);\n };}\n\n/**\n * @publicApi\n *\nexport
class InjectSetupWrapper {\n constructor(private _moduleDef: () => TestModuleMetadata) {} \n\n private
_addModule()\n {\n const moduleDef = this._moduleDef();\n if (moduleDef) {\n
TestBedImpl.configureTestingModule(moduleDef);\n
}\n }\n\n inject(tokens: any[], fn: Function): () => any {\n const self = this;\n // Not using an arrow function
to preserve context passed from call site\n return function(this: unknown) {\n self._addModule();\n return
inject(tokens, fn).call(this);\n };}\n }\n\n/**\n * @publicApi\n *\nexport function withModule(moduleDef:
TestModuleMetadata): InjectSetupWrapper;\nexport function withModule(moduleDef: TestModuleMetadata, fn:
Function): () => any;\nexport function withModule(moduleDef: TestModuleMetadata, fn?: Function|null): (() =>
any)|\n InjectSetupWrapper {\n if (fn) {\n // Not using an arrow function to preserve context passed from call
site\n return function(this: unknown) {\n const testBed = TestBedImpl.INSTANCE;\n if (moduleDef) {\n
testBed.configureTestingModule(moduleDef);\n }\n return fn.apply(this);\n };}\n }\n return new
InjectSetupWrapper(() => moduleDef);\n }\n\n", "/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n/**\n * Public Test
Library for unit testing Angular applications. Assumes that you are running\n * with Jasmine, Mocha, or a similar
framework which exports a beforeEach function and\n * allows tests to be asynchronous by either returning a
promise or using a 'done' parameter.\n *\nimport {resetFakeAsyncZone} from './fake_async';\nimport
{TestBedImpl} from './test_bed';\ndeclare var global: any;\nconst _global = <any>(typeof window ===
'undefined' ? global : window);\n\n// Reset the test providers and the fake async zone before each test.\nif
(_global.beforeEach) {\n _global.beforeEach(getCleanupHook(false));\n }\n\n// We provide both a `beforeEach` and
`afterEach`, because the updated behavior for\n// tearing down the module is supposed to run after the test so
that we can associate\n// teardown errors with the correct test.\nif (_global.afterEach) {\n
_global.afterEach(getCleanupHook(true));\n }\n\nfunction getCleanupHook(expectedTeardownValue: boolean) {\n
return () => {\n const testBed = TestBedImpl.INSTANCE;\n if (testBed.shouldTearDownTestingModule() ===
expectedTeardownValue) {\n testBed.resetTestingModule();\n resetFakeAsyncZone();\n }\n }\n }\n\n/**\n *
This API should be removed. But doing so seems to break `google3` and so it requires a bit of\n * investigation.\n
*\n * A work around is to mark it as `@codeGenApi` for now and investigate later.\n *\n * @codeGenApi\n *\n//
TODO(iminar): Remove this code in a safe way.\nexport const __core_private_testing_placeholder__ = ";\n", "/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n/**\n * Type used for
modifications
to metadata\n *\n * @publicApi\n *\nexport type MetadataOverride<T> = {\n add?: Partial<T>,\n remove?:
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Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\n/**\n * @module\n * @description\n * Entry point for all public APIs of the
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'./fake_async';\nexport {TestBed, getTestBed, TestBedStatic, inject, InjectSetupWrapper, withModule} from
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* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n// <reference
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*\nexport * from './src/testing';\n\n// This file only reexports content of the `src` folder. Keep it that way.\n", "/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n// This file is not used to
build this module. It is only used during editing\n// by the TypeScript language service and during build for
verification. `ngc`\n// replaces this file with production index.ts when it rewrites private symbol\n// names.\n\nexport
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```

# 1.205 angular-platform-browser 14.3.0

## 1.205.1 Available under license :

No license file was found, but licenses were detected in source scan.

```
/**
 * @license Angular v14.3.0
 * (c) 2010-2022 Google LLC. https://angular.io/
 * License: MIT
 */
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 *
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
```

Found in path(s):

```
* /opt/cola/permits/1784583492_1693546583.6396487/0/platform-browser-14-3-0-1-tgz/package/fesm2020/platform-browser.mjs
* /opt/cola/permits/1784583492_1693546583.6396487/0/platform-browser-14-3-0-1-tgz/package/fesm2015/testing.mjs
* /opt/cola/permits/1784583492_1693546583.6396487/0/platform-browser-14-3-0-1-tgz/package/fesm2020/testing.mjs
* /opt/cola/permits/1784583492_1693546583.6396487/0/platform-browser-14-3-0-1-tgz/package/fesm2015/platform-browser.mjs
* /opt/cola/permits/1784583492_1693546583.6396487/0/platform-browser-14-3-0-1-tgz/package/fesm2015/animations.mjs
* /opt/cola/permits/1784583492_1693546583.6396487/0/platform-browser-14-3-0-1-tgz/package/fesm2020/animations.mjs
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No license file was found, but licenses were detected in source scan.

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{"version":3,"file":"animations.mjs","sources":["../../../../packages/platform-browser/animations/src/animation_builder.ts","../../../../packages/platform-browser/animations/src/animation_renderer.ts","../../../../packages/platform-browser/animations/src/providers.ts","../../../../packages/platform-browser/animations/src/module.ts","../../../../packages/platform-browser/animations/src/private_export.ts","../../../../packages/platform-
```

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browser/animations/src/animations.ts", "../../../../../packages/platform-
browser/animations/public_api.ts", "../../../../../packages/platform-
browser/animations/index.ts", "../../../../../packages/platform-
browser/animations/animations.ts"], "sourcesContent": ["/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n
*/\nimport { AnimationBuilder, AnimationFactory, AnimationMetadata, AnimationOptions, AnimationPlayer,
sequence } from '@angular/animations';\nimport { DOCUMENT } from '@angular/common';\nimport { Inject,
Injectable, RendererFactory2, RendererType2, ViewEncapsulation } from '@angular/core';\nimport
{ AnimationRenderer } from './animation_renderer';\n\n@Injectable()\nexport class BrowserAnimationBuilder
extends AnimationBuilder {\n  private _nextAnimationId = 0;\n  private _renderer: AnimationRenderer;\n\n  constructor(rootRenderer: RendererFactory2, @Inject(DOCUMENT) doc: any) {\n    super();\n    const typeData
=\n    { id: '0', encapsulation: ViewEncapsulation.None, styles: [], data: { animation: [] } } as\n
RendererType2;\n    this._renderer = rootRenderer.createRenderer(doc.body, typeData) as AnimationRenderer;\n
  }\n\n  build(animation: AnimationMetadata|AnimationMetadata[]): AnimationFactory {\n    const id =
this._nextAnimationId.toString();\n    this._nextAnimationId++;\n
    const entry = Array.isArray(animation) ? sequence(animation) : animation;\n
    issueAnimationCommand(this._renderer, null, id, 'register', [entry]);\n    return new BrowserAnimationFactory(id,
this._renderer);\n  }\n}\n\nexport class BrowserAnimationFactory extends AnimationFactory {\n
  constructor(private _id: string, private _renderer: AnimationRenderer) {\n    super();\n  }\n\n  create(element: any,
options?: AnimationOptions): AnimationPlayer {\n    return new RendererAnimationPlayer(this._id, element,
options || {}, this._renderer);\n  }\n}\n\nexport class RendererAnimationPlayer implements AnimationPlayer {\n
  public parentPlayer: AnimationPlayer|null = null;\n  private _started = false;\n\n  constructor(\n    public id: string,
public element: any, options: AnimationOptions,\n    private _renderer: AnimationRenderer) {\n
    this._command('create', options);\n  }\n\n  private _listen(eventName: string, callback: (event: any) => any): () =>
void {\n    return this._renderer.listen(this.element,
`@${this.id}:${eventName}`, callback);\n  }\n\n  private _command(command: string, ...args: any[]) {\n    return
issueAnimationCommand(this._renderer, this.element, this.id, command, args);\n  }\n\n  onDone(fn: () => void):
void {\n    this._listen('done', fn);\n  }\n\n  onStart(fn: () => void): void {\n    this._listen('start', fn);\n
}\n\n  onDestroy(fn: () => void): void {\n    this._listen('destroy', fn);\n  }\n\n  init(): void {\n    this._command('init');\n
}\n\n  hasStarted(): boolean {\n    return this._started;\n  }\n\n  play(): void {\n    this._command('play');\n
this._started = true;\n  }\n\n  pause(): void {\n    this._command('pause');\n  }\n\n  restart(): void {\n
this._command('restart');\n  }\n\n  finish(): void {\n    this._command('finish');\n  }\n\n  destroy(): void {\n
this._command('destroy');\n  }\n\n  reset(): void {\n    this._command('reset');\n    this._started = false;\n  }\n\n
setPosition(p: number): void {\n
    this._command('setPosition', p);\n  }\n\n  getPosition(): number {\n    return
this._renderer.engine.players[+this.id]?.getPosition() ?? 0;\n  }\n\n  public totalTime = 0;\n\n  function
issueAnimationCommand(\n    renderer: AnimationRenderer, element: any, id: string, command: string, args: any[]):
any {\n    return renderer.setProperty(element, `@${id}:${command}`, args);\n  }\n\n}/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\nimport { AnimationTriggerMetadata }
from '@angular/animations';\nimport { AnimationEngine as AnimationEngine } from
'@angular/animations/browser';\nimport { Injectable, NgZone, Renderer2, RendererFactory2, RendererStyleFlags2,
RendererType2 } from '@angular/core';\n\nconst ANIMATION_PREFIX = '@';\nconst
DISABLE_ANIMATIONS_FLAG = '@.disabled';\n\n// Define a recursive type to allow for nested arrays of
`AnimationTriggerMetadata`.\n
Note that an\n// interface declaration is used as TypeScript prior to 3.7 does not support recursive type\n//
references, see https://github.com/microsoft/TypeScript/pull/33050 for details.\n\ntype

```

```

NestedAnimationTriggerMetadata = AnimationTriggerMetadata|RecursiveAnimationTriggerMetadata;\ninterface
RecursiveAnimationTriggerMetadata extends Array<NestedAnimationTriggerMetadata>
{\n\n@Injectable()\nexport class AnimationRendererFactory implements RendererFactory2 {\n private _currentId:
number = 0;\n private _microtaskId: number = 1;\n private _animationCallbacksBuffer: [(e: any) => any, any][] =
[];\n private _rendererCache = new Map<Renderer2, BaseAnimationRenderer>();\n private _cdRecurDepth = 0;\n
private promise: Promise<any> = Promise.resolve(0);\n\n constructor(\n private delegate: RendererFactory2,
private engine: AnimationEngine, private _zone: NgZone) {\n engine.onRemovalComplete = (element: any,
delegate: Renderer2) => {\n // Note: if
a component element has a leave animation, and a host leave animation,\n // the view engine will call
`removeChild` for the parent\n // component renderer as well as for the child component renderer.\n //
Therefore, we need to check if we already removed the element.\n const parentNode =
delegate?.parentNode(element);\n if (parentNode) {\n delegate.removeChild(parentNode, element);\n }
};\n\n createRenderer(hostElement: any, type: RendererType2): Renderer2 {\n const
EMPTY_NAMESPACE_ID = ";\n // cache the delegates to find out which cached delegate can\n // be used by
which cached renderer\n const delegate = this.delegate.createRenderer(hostElement, type);\n if (!hostElement ||
!type || !type.data || !type.data['animation']) {\n let renderer: BaseAnimationRenderer|undefined =
this._rendererCache.get(delegate);\n if (!renderer) {\n // Ensure that the renderer is removed from the cache
on destroy\n //
since it may contain references to detached DOM nodes.\n const onRendererDestroy = () =>
this._rendererCache.delete(delegate);\n renderer =\n new
BaseAnimationRenderer(EMPTY_NAMESPACE_ID, delegate, this.engine, onRendererDestroy);\n // only
cache this result when the base renderer is used\n this._rendererCache.set(delegate, renderer);\n }
\n return
renderer;\n }\n\n const componentId = type.id;\n const namespaceId = type.id + '-' + this._currentId;\n
this._currentId++;\n\n this.engine.register(namespaceId, hostElement);\n\n const registerTrigger = (trigger:
NestedAnimationTriggerMetadata) => {\n if (Array.isArray(trigger)) {\n trigger.forEach(registerTrigger);\n
} else {\n this.engine.registerTrigger(componentId, namespaceId, hostElement, trigger.name, trigger);\n }
};\n const animationTriggers = type.data['animation'] as NestedAnimationTriggerMetadata[];\n
animationTriggers.forEach(registerTrigger);\n\n
return new AnimationRenderer(this, namespaceId, delegate, this.engine);\n }\n\n begin() {\n
this._cdRecurDepth++;\n if (this.delegate.begin) {\n this.delegate.begin();\n }\n }\n\n private
_scheduleCountTask() {\n // always use promise to schedule microtask instead of use Zone\n
this.promise.then(() => {\n this._microtaskId++;\n });\n }\n\n /** @internal *\n
scheduleListenerCallback(count: number, fn: (e: any) => any, data: any) {\n if (count >= 0 && count <
this._microtaskId) {\n this._zone.run(() => fn(data));\n return;\n }\n\n if
(this._animationCallbacksBuffer.length == 0) {\n Promise.resolve(null).then(() => {\n this._zone.run(() =>
{\n this._animationCallbacksBuffer.forEach(tuple => {\n const [fn, data] = tuple;\n fn(data);\n
});\n this._animationCallbacksBuffer = [];\n });\n });\n }\n\n
this._animationCallbacksBuffer.push([fn,
data]);\n }\n\n end() {\n this._cdRecurDepth--;\n // this is to prevent animations from running twice when an
inner\n // component does CD when a parent component instead has inserted it\n if (this._cdRecurDepth == 0)
{\n this._zone.runOutsideAngular(() => {\n this._scheduleCountTask();\n
this.engine.flush(this._microtaskId);\n });\n }\n\n if (this.delegate.end) {\n this.delegate.end();\n }\n }\n\n
whenRenderingDone(): Promise<any> {\n return this.engine.whenRenderingDone();\n }\n}\n\nexport class
BaseAnimationRenderer implements Renderer2 {\n constructor(\n protected namespaceId: string, public
delegate: Renderer2, public engine: AnimationEngine,\n private _onDestroy?: () => void) {\n this.destroyNode
= this.delegate.destroyNode ? (n) => delegate.destroyNode!(n) : null;\n }\n\n get data() {\n return
this.delegate.data;\n }\n\n destroyNode: ((n: any) => void)|null;\n\n destroy(): void {\n
this.engine.destroy(this.namespaceId,

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this.delegate);\n this.delegate.destroy();\n this._onDestroy?.();\n }\n\n createElement(name: string,
namespace?: string|null|undefined) {\n return this.delegate.createElement(name, namespace);\n }\n\n createComment(value: string) {\n return this.delegate.createComment(value);\n }\n\n createText(value: string)
{\n return this.delegate.createText(value);\n }\n\n appendChild(parent: any, newChild: any): void {\n
this.delegate.appendChild(parent, newChild);\n this.engine.onInsert(this.namespaceId, newChild, parent, false);\n
}\n\n insertBefore(parent: any, newChild: any, refChild: any, isMove: boolean = true): void {\n
this.delegate.insertBefore(parent, newChild, refChild);\n // If `isMove` true than we should animate this insert.\n
this.engine.onInsert(this.namespaceId, newChild, parent, isMove);\n }\n\n removeChild(parent: any, oldChild: any,
isHostElement: boolean): void {\n this.engine.onRemove(this.namespaceId,
oldChild, this.delegate, isHostElement);\n }\n\n selectRootElement(selectorOrNode: any, preserveContent?:
boolean) {\n return this.delegate.selectRootElement(selectorOrNode, preserveContent);\n }\n\n parentNode(node: any) {\n return this.delegate.parentNode(node);\n }\n\n nextSibling(node: any) {\n return
this.delegate.nextSibling(node);\n }\n\n setAttribute(el: any, name: string, value: string, namespace?:
string|null|undefined): void {\n this.delegate.setAttribute(el, name, value, namespace);\n }\n\n
removeAttribute(el: any, name: string, namespace?: string|null|undefined): void {\n
this.delegate.removeAttribute(el, name, namespace);\n }\n\n addClass(el: any, name: string): void {\n
this.delegate.addClass(el, name);\n }\n\n removeClass(el: any, name: string): void {\n
this.delegate.removeClass(el, name);\n }\n\n setStyle(el: any, style: string, value: any, flags?:
RendererStyleFlags2|undefined): void {\n this.delegate.setStyle(el, style, value,
flags);\n }\n\n removeStyle(el: any, style: string, flags?: RendererStyleFlags2|undefined): void {\n
this.delegate.removeStyle(el, style, flags);\n }\n\n setProperty(el: any, name: string, value: any): void {\n if
(name.charAt(0) == ANIMATION_PREFIX && name == DISABLE_ANIMATIONS_FLAG) {\n
this.disableAnimations(el, !!value);\n } else {\n this.delegate.setProperty(el, name, value);\n }\n }\n\n
setValue(node: any, value: string): void {\n this.delegate.setValue(node, value);\n }\n\n listen(target: any,
eventName: string, callback: (event: any) => boolean | void): () => void {\n return this.delegate.listen(target,
eventName, callback);\n }\n\n protected disableAnimations(element: any, value: boolean) {\n
this.engine.disableAnimations(element, value);\n }\n\n\nexport class AnimationRenderer extends
BaseAnimationRenderer implements Renderer2 {\n constructor(\n public factory: AnimationRendererFactory,
namespaceId: string, delegate: Renderer2,\n engine: AnimationEngine, onDestroy?: () => void) {\n super(namespaceId, delegate, engine, onDestroy);\n
this.namespaceId = namespaceId;\n }\n\n override setProperty(el: any, name: string, value: any): void {\n if
(name.charAt(0) == ANIMATION_PREFIX) {\n if (name.charAt(1) == '.' && name ==
DISABLE_ANIMATIONS_FLAG) {\n value = value === undefined ? true : !!value;\n
this.disableAnimations(el, value as boolean);\n } else {\n this.engine.process(this.namespaceId, el,
name.slice(1), value);\n }\n } else {\n this.delegate.setProperty(el, name, value);\n }\n }\n\n override
listen(\n target: 'window'|'document'|'body'|any, eventName: string,\n callback: (event: any) => any): () =>
void {\n if (eventName.charAt(0) == ANIMATION_PREFIX) {\n const element =
resolveElementFromTarget(target);\n let name = eventName.slice(1);\n let phase = ";\n // @listener.phase
is for trigger animation callbacks\n // @@listener is for animation builder callbacks\n if (name.charAt(0) != ANIMATION_PREFIX) {\n
[name, phase] = parseTriggerCallbackName(name);\n }\n return this.engine.listen(this.namespaceId, element,
name, phase, event => {\n const countId = (event as any)['_data'] || -1;\n
this.factory.scheduleListenerCallback(countId, callback, event);\n });\n }\n return this.delegate.listen(target,
eventName, callback);\n }\n\n\nfunction resolveElementFromTarget(target: 'window'|'document'|'body'|any): any
{\n switch (target) {\n case 'body':\n return document.body;\n case 'document':\n return document;\n
case 'window':\n return window;\n default:\n return target;\n }\n }\n\nfunction
parseTriggerCallbackName(triggerName: string) {\n const dotIndex = triggerName.indexOf('.');\n const trigger =
triggerName.substring(0, dotIndex);\n const phase = triggerName.slice(dotIndex + 1);\n return [trigger,

```



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phase];\n}\n", "/**\n
 * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport
 {AnimationBuilder} from '@angular/animations';\nimport { AnimationDriver, AnimationEngine as
AnimationEngine, AnimationStyleNormalizer as AnimationStyleNormalizer, NoopAnimationDriver as
NoopAnimationDriver, WebAnimationsDriver as WebAnimationsDriver, WebAnimationsStyleNormalizer as
WebAnimationsStyleNormalizer} from '@angular/animations/browser';\nimport { DOCUMENT} from
 '@angular/common';\nimport { ANIMATION_MODULE_TYPE, ApplicationRef, Inject, Injectable, NgZone,
OnDestroy, Provider, RendererFactory2} from '@angular/core';\nimport { DomRendererFactory2 as
DomRendererFactory2} from '@angular/platform-browser';\nimport { BrowserAnimationBuilder} from
 './animation_builder';\nimport { AnimationRendererFactory} from './animation_renderer';\n\n@Injectable()\nexport
class InjectableAnimationEngine extends AnimationEngine implements OnDestroy {\n // The `ApplicationRef` is
injected here explicitly to force the dependency ordering.\n // Since the `ApplicationRef` should be created earlier
before the `AnimationEngine`, they\n // both have `ngOnDestroy` hooks and `flush()` must be called after all views
are destroyed.\n constructor(\n   @Inject(DOCUMENT) doc: any, driver: AnimationDriver, normalizer:
AnimationStyleNormalizer,\n   appRef: ApplicationRef) {\n   super(doc.body, driver, normalizer);\n } \n\n
ngOnDestroy(): void {\n   this.flush();\n }\n}\n\nexport function instantiateDefaultStyleNormalizer() {\n return
new WebAnimationsStyleNormalizer();\n }\n\nexport function instantiateRendererFactory(\n   renderer:
DomRendererFactory2, engine: AnimationEngine, zone: NgZone) {\n   return new
AnimationRendererFactory(renderer, engine, zone);\n }\n\nconst SHARED_ANIMATION_PROVIDERS:
Provider[] = [\n   {provide: AnimationBuilder, useClass: BrowserAnimationBuilder},\n
   {provide: AnimationStyleNormalizer, useFactory: instantiateDefaultStyleNormalizer},\n   {provide:
AnimationEngine, useClass: InjectableAnimationEngine}, {\n   provide: RendererFactory2,\n   useFactory:
instantiateRendererFactory,\n   deps: [DomRendererFactory2, AnimationEngine, NgZone]\n }];\n\n/**\n *
Separate providers from the actual module so that we can do a local modification in Google3 to\n * include them in
the BrowserModule.\n */\nexport const BROWSER_ANIMATIONS_PROVIDERS: Provider[] = [\n   {provide:
AnimationDriver, useFactory: () => new WebAnimationsDriver()},\n   {provide: ANIMATION_MODULE_TYPE,
useValue: 'BrowserAnimations'}, ...SHARED_ANIMATION_PROVIDERS\n];\n\n/**\n * Separate providers from
the actual module so that we can do a local modification in Google3 to\n * include them in the
BrowserTestingModule.\n */\nexport const BROWSER_NOOP_ANIMATIONS_PROVIDERS: Provider[] = [\n
   {provide: AnimationDriver, useClass: NoopAnimationDriver},\n   {provide:
ANIMATION_MODULE_TYPE, useValue: 'NoopAnimations'},
...SHARED_ANIMATION_PROVIDERS\n];\n\n", "/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {ModuleWithProviders, NgModule, Provider} from
 '@angular/core';\nimport {BrowserModule} from '@angular/platform-browser';\n\nimport
 {BROWSER_ANIMATIONS_PROVIDERS, BROWSER_NOOP_ANIMATIONS_PROVIDERS} from
 './providers';\n\n/**\n * Object used to configure the behavior of { @link BrowserAnimationsModule}\n *
@publicApi\n */\nexport interface BrowserAnimationsModuleConfig {\n /**\n * Whether animations should be
disabled. Passing this is identical to providing the\n * `NoopAnimationsModule`, but it can be controlled based on
a runtime value.\n */\n disableAnimations?: boolean;\n }\n\n/**\n * Exports `BrowserModule` with additional
[dependency-injection providers](guide/glossary#provider)\n
 * for use with animations. See [Animations](guide/animations).\n */\n @publicApi\n */\n @NgModule({\n exports:
[BrowserModule],\n providers: BROWSER_ANIMATIONS_PROVIDERS,\n })\nexport class
BrowserAnimationsModule {\n /**\n * Configures the module based on the specified object.\n */\n * @param
config Object used to configure the behavior of the `BrowserAnimationsModule`.\n * @see
`BrowserAnimationsModuleConfig`\n */\n * @usageNotes\n * When registering the
`BrowserAnimationsModule`, you can use the `withConfig`\n * function as follows:\n * ```\n * @NgModule({\n

```

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* imports: [BrowserAnimationsModule.withConfig(config)]\n * })\n * class MyNgModule {\n * ``\n * /\n
static withConfig(config: BrowserAnimationsModuleConfig):\n
ModuleWithProviders<BrowserAnimationsModule> {\n return {\n ngModule: BrowserAnimationsModule,\n
providers: config.disableAnimations ? BROWSER_NOOP_ANIMATIONS_PROVIDERS :\n

```

BROWSER\_ANIMATIONS\_PROVIDERS\n };\n }\n\n/\*\*\n \* Returns the set of [dependency-injection providers](guide/glossary#provider)\n \* to enable animations in an application. See [animations guide](guide/animations)\n \* to learn more about animations in Angular.\n \* @usageNotes\n \* The function is useful when you want to enable animations in an application\n \* bootstrapped using the `bootstrapApplication` function. In this scenario there\n \* is no need to import the `BrowserAnimationsModule` NgModule at all, just add\n \* providers returned by this function to the `providers` list as show below.\n \* ```typescript\n \* bootstrapApplication(RootComponent, {\n \* providers: [\n \* provideAnimations()\n \* ]\n \* });\n \* ```\n \* @publicApi\n \* @developerPreview\n \*/\nexport function provideAnimations(): Provider[] {\n // Return a copy to prevent changes to the original array in case any in-place\n // alterations are performed to the `provideAnimations` call results

```

in app code.\n return [...BROWSER_ANIMATIONS_PROVIDERS];\n}\n\n/**\n * A null player that must be imported to allow disabling of animations.\n * @publicApi\n */\n@NgModule({\n exports: [BrowserModule],\n providers: BROWSER_NOOP_ANIMATIONS_PROVIDERS,\n})\nexport class NoopAnimationsModule {\n\n/**\n * Returns the set of [dependency-injection providers](guide/glossary#provider)\n * to disable animations in an application. See [animations guide](guide/animations)\n * to learn more about animations in Angular.\n * @usageNotes\n * The function is useful when you want to bootstrap an application using\n * the `bootstrapApplication` function, but you need to disable animations\n * (for example, when running tests).\n * ```typescript\n * bootstrapApplication(RootComponent, {\n * providers: [\n * provideNoopAnimations()\n * ]\n * });\n * ```\n * @publicApi\n * @developerPreview\n */\nexport function provideNoopAnimations(): Provider[] {\n // Return a copy to
```

```

prevent changes to the original array in case any in-place\n // alterations are performed to the `provideNoopAnimations` call results in app code.\n return
```

```

[...BROWSER_NOOP_ANIMATIONS_PROVIDERS];\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nexport {BrowserAnimationBuilder as BrowserAnimationBuilder, BrowserAnimationFactory as BrowserAnimationFactory} from './animation_builder';\nexport {AnimationRenderer as AnimationRenderer, AnimationRendererFactory as AnimationRendererFactory} from './animation_renderer';\nexport {InjectableAnimationEngine as InjectableAnimationEngine} from './providers';\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n*/\n\n@module\n
```

```

* @description\n * Entry point for all animation APIs of the animation browser package.\n */\nexport {ANIMATION_MODULE_TYPE} from '@angular/core';\nexport {BrowserAnimationsModule, BrowserAnimationsModuleConfig, NoopAnimationsModule, provideAnimations, provideNoopAnimations} from './module';\n\nexport * from './private_export';\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n*/\n\n@module\n * @description\n * Entry point for all public APIs of this package.\n */\nexport * from './src/animations';\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\n\n// This file is not used to build this module. It is only used during editing\n// by the TypeScript language
```

```

service and during build for verification. `ngc` replaces this file with production index.ts when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n\n"/**\n * Generated bundle index. Do not edit.\n */\n\nexport *
```

from

```
./index';\n"],"names":["AnimationEngine","WebAnimationsStyleNormalizer","AnimationStyleNormalizer","DomR  
endererFactory2","WebAnimationsDriver","NoopAnimationDriver"],"mappings":";;AAAA;AAMG;A  
AQQ,MAAO,uBAAwB,SAAQ,gBAAgB,CAAA;IAI3D,WAAy,CAAA,YAA8B,EAAoB,GAAQ,EAAA;AACpE,  
QAAA,KAak,EAAE,CAAC;AAJF,QAAA,IAAgB,CAAA,gBAAA,GAAG,CAAC,CAAC;QAK3B,MAAM,QAA  
Q,GACV,EAAc,EAAE,EAAE,GAAG,EAAE,aAAa,EAAE,iBAaIB,CAAC,IAAI,EAAE,MAAM,EAAE,EAAE,E  
AAE,IAAI,EAAE,EAAC,SAAS,EAAE,EAAE,EAAC,EACrE,CAAC;AACIB,QAAA,IAAI,CAAC,SAAS,GAAG,  
YAAy,CAAC,cAAc,CAAC,GAAG,CAAC,IAAI,EAAE,QAAQ,CAAsB,CAAC;KACvF;AAED,IAAA,KAak,CA  
AC,SAAGD,EAAA;QACpD,MAAM,EAAE,GAAG,IAAI,CAAC,gBAAgB,CAAC,QAAQ,EAAE,CAAC;QAC5C,I  
AAI,CAAC,gBAAgB,EAAE,CAAC;AACxB,QAAA,MAAM,KAak,GAAG,KAak,CAAC,OAAO,CAAC,SAAS,  
CAAC,GAAG,QAAQ,CAAC,SAAS,CAAC,GAAG,SAAS,CAAC;AACzE,QAAA,qBAAqB,CAAC,IAAI,CAAC,S  
AAS,EAAE,IAAI,EAAE,EAAE,EAAE,UAAU,EAAE,CAAC,KAak,CAAC,CAAC,CAAC;QACrE,OAAO,IAAI,  
uBAAuB,CAAC,EAAE,EAAE,IAAI,CAAC,SAAS,CAAC,CAAC;KACxD;AAIBU,uBAAA,CAAA,IAAA,GAAA  
,EAAA,CAAA,kBAAA,CAAA,EAAA,UAAA,EAAA,QAAA,EAAA,OAAA,EAAA,mBAAA,EAAA,QAAA,EAA  
A,EAAA,EAAA,IAAA,EAAA,uBAAuB,kDAIkB,QAAQ,EAAA,CAAA,EAAA,MAAA,EAAA,EAAA,CAAA,eA  
AA,CAAA,UAAA,EAAA,CAAA,CAAA;mIAJjD,uBAAuB,EAAA,CAAA,CAAA;sGAAvB,uBAAuB,EAAA,UA  
AA,EAAA,CAAA;kBADnC,UAAU;;;8BAKoC,MAAM;+BAAC,QAAQ,CAAA;;;AAiBxD,MAAO,uBAAwB,SA  
AQ,gBAAgB,CAAA;IAC3D,WAAoB,CAAA,GAAW,EAAU,SAA4B,EAAA;AACnE,QAAA,KAak,EAAE,CAA  
C;AADU,QAAA,IAAG,CAAA,GAAA,GAH,GAAG,CAAQ;AAAU,QAAA,IAAS,CAAA,SAAA,GAAT,SAAS,  
CAAmB;KAEPe;IAED,MAAM,CAAC,OAAy,EAAE,OAA0B,EAAA;AAC7C,QAAA,OAAO,IAAI,uBAAuB,CA  
AC,IAAI,CAAC,GAAG,EAAE,OAAO,EAAE,OAAO,IAAI,EAAE,EAAE,IAAI,CAAC,SAAS,CAAC,CAAC;KA  
CtF;AACF,CAAA;MAEY,uBAAuB,CAAA;AAIIC,IAAA,WAAA,CACW,EAAU,EAAS,OAAy,EAAE,OAAyB,E  
ACzD,SAA4B,EAAA;AAD7B,QAAA,IAAE,CAAA,EAAA,GAAF,EAAE,CAAQ;AAAS,QAAA,IAAO,CAAA,O  
AAA,GAAP,OAAO,CAAK;AAC9B,QAAA,IAAS,CAAA,SAAA,GAAT,SAAS,CAAmB;AALjC,QAAA,IAAY,C  
AAA,YAAA,GAAYB,IAAI,CAAC;AACzC,QAAA,IAAQ,CAAA,QAAA,GAAG,KAak,CAAC;AASeIB,QAAA,I  
AAS,CAAA,SAAA,GAAG,CAAC,CAAC;AAjEnB,QAAA,IAAI,CAAC,QAAQ,CAAC,QAAQ,EAAE,OAAO,CA  
AC,CAAC;KACIC;IAEO,OAAO,CAAC,SAaiB,EAAE,QAA6B,EAAA;QAC9D,OAAO,IAAI,CAAC,SAAS,CAA  
C,MAAM,CAAC,IAAI,CAAC,OAAO,EAAE,KAak,IAAI,CAAC,EAAE,CAAI,CAAA,EAAA,SAAS,EAAE,EA  
AE,QAAQ,CAAC,CAAC;KACnF;AAEO,IAAA,QAAQ,CAAC,OAAe,EAAE,GAAG,IAAW,EAAA;AAC9C,QA  
AA,OAAO,qBAAqB,CAAC,IAAI,CAAC,SAAS,EAAE,IAAI,CAAC,OAAO,EAAE,IAAI,CAAC,EAAE,EAAE,O  
AAO,EAAE,IAAI,CAAC,CAAC;KACpF;AAED,IAAA,MAAM,CAAC,EAAC,EAAA;AACnB,QAAA,IAAI,CAA  
C,OAAO,CAAC,MAAM,EAAE,EAAE,CAAC,CAAC;KACIB;AAED,IAAA,OAAO,CAAC,EAAC,EAAA;AACp  
B,QAAA,IAAI,CAAC,OAAO,CAAC,OAAO,EAAE,EAAE,CAAC,CAAC;KAC3B;AAED,IAAA,SAAS,CAAC,E  
AAc,EAAA;AACtB,QAAA,IAAI,CAAC,OAAO,CAAC,SAAS,EAAE,EAAE,CAAC,CAAC;KAC7B;IAED,IAAI,  
GAAA;AACF,QAAA,IAAI,CAAC,QAAQ,CAAC,MAAM,CAAC,CAAC;KACvB;IAED,UAAU,GAAA;QACR,O  
AAO,IAAI,CAAC,QAAQ,CAAC;KACtB;IAED,IAAI,GAAA;AACF,QAAA,IAAI,CAAC,QAAQ,CAAC,MAAM,  
CAAC,CAAC;AACtB,QAAA,IAAI,CAAC,QAAQ,GAAG,IAAI,CAAC;KACtB;IAED,KAak,GAAA;AACH,QA  
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No license file was found, but licenses were detected in source scan.

/\*\*

\* @license Angular v14.3.0

\* (c) 2010-2022 Google LLC. <https://angular.io/>

\* License: MIT

\*/

Found in path(s):

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browser/testing/index.ts","../../../../../packages/platform-browser/testing/testing.ts"],"sourcesContent":["/**\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-  
style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { getDOM as  
getDOM } from '@angular/common';\nimport { NgZone, global as global } from '@angular/core';\nexport class  
BrowserDetection {\n  private _overrideUa: string|null;\n  private get _ua(): string {\n    if (typeof this._overrideUa  
===  
'string') {\n      return this._overrideUa;\n    }\n    return getDOM() ? getDOM().getUserAgent() : '';\n  }\n  static  
setup() {\n    return new BrowserDetection(null);\n  }\n  constructor(ua: string|null) {\n    this._overrideUa = ua;\n  }\n  get isFirefox(): boolean {\n    return this._ua.indexOf('Firefox') > -1;\n  }\n  get isAndroid(): boolean {\n
```

```

return this._ua.indexOf('Mozilla/5.0') > -1 && this._ua.indexOf('Android') > -1 &&\n
this._ua.indexOf('AppleWebKit') > -1 && this._ua.indexOf('Chrome') === -1 &&\n    this._ua.indexOf('IEMobile')
=== -1;\n }\n\n get isEdge(): boolean {\n    return this._ua.indexOf('Edge') > -1;\n }\n\n get isWebkit(): boolean {\n
    return this._ua.indexOf('AppleWebKit') > -1 && this._ua.indexOf('Edge') === -1 &&\n
this._ua.indexOf('IEMobile') === -1;\n }\n\n get isIOS7(): boolean {\n    return (this._ua.indexOf('iPhone OS 7') > -
1 || this._ua.indexOf('iPad OS 7') > -1) &&\n    this._ua.indexOf('IEMobile') === -1;\n
}\n\n get isSlow(): boolean {\n    return this.isAndroid || this.isIOS7;\n }\n\n get isChromeDesktop(): boolean {\n
return this._ua.indexOf('Chrome') > -1 && this._ua.indexOf('Mobile Safari') === -1 &&\n
this._ua.indexOf('Edge') === -1;\n }\n\n // "Old Chrome" means Chrome 3X, where there are some discrepancies
in the Intl API.\n // Android 4.4 and 5.X have such browsers by default (respectively 30 and 39).\n get
isOldChrome(): boolean {\n    return this._ua.indexOf('Chrome') > -1 && this._ua.indexOf('Chrome/3') > -1 &&\n
this._ua.indexOf('Edge') === -1;\n }\n\n get supportsCustomElements() {\n    return (typeof
(<any>global).customElements !== 'undefined');\n }\n\n get supportsDeprecatedCustomCustomElementsV0() {\n
return (typeof (document as any).registerElement !== 'undefined');\n }\n\n get supportsRegExUnicodeFlag():
boolean {\n    return RegExp.prototype.hasOwnProperty('unicode');\n }\n\n get supportsShadowDom() {\n    const
testEl = document.createElement('div');\n
    return (typeof testEl.attachShadow !== 'undefined');\n }\n\n get supportsDeprecatedShadowDomV0() {\n
const testEl = document.createElement('div') as any;\n    return (typeof testEl.createShadowRoot !== 'undefined');\n
}\n\n get supportsTemplateElement() {\n    const testEl = document.createElement('template') as any;\n    return
(typeof testEl.content !== 'undefined');\n }\n}\n\nexport const browserDetection: BrowserDetection =
BrowserDetection.setup();\n\nexport function dispatchEvent(element: any, eventType: any): Event {\n    const evt:
Event = getDOM().getDefaultDocument().createEvent('Event');\n    evt.initEvent(eventType, true, true);\n
getDOM().dispatchEvent(element, evt);\n    return evt;\n}\n\nexport function createMouseEvent(eventType: string):
MouseEvent {\n    const evt: MouseEvent = getDOM().getDefaultDocument().createEvent('MouseEvent');\n
    evt.initEvent(eventType, true, true);\n    return evt;\n}\n\nexport function el(html: string): HTMLElement {\n
    return <HTMLElement>getContent(createTemplate(html)).firstChild;\n}\n\nexport function normalizeCSS(css:
string): string {\n    return css.replace(/\\s+/g, ' ').replace(/:/g, ':').replace(/"/g, '').replace(/'/g,
'')\n    .replace(/url\\(((\\|\\/|\\s)(.+)\\(((\\|\\/|\\s)\\)\\(\\|\\s*/g, (...match: string[]) => `url("${match[2]}")`)\n
.replace(/\\[\\((+)([^\"]\\|\\)|\\)/g, (...match: string[]) => `[${match[1]}=${match[2]}]`);\n}\n\nfunction
getAttributeMap(element: any): Map<string, string> {\n    const res = new Map<string, string>();\n    const elAttrs =
element.attributes;\n    for (let i = 0; i < elAttrs.length; i++) {\n        const attrib = elAttrs.item(i);\n        res.set(attrib.name,
attrib.value);\n    }\n    return res;\n}\n\nconst _selfClosingTags = ['br', 'hr', 'input'];\n\nexport function
stringifyElement(el: any /** TODO #9100 */): string {\n    let result = '';\n    if (getDOM().isElementNode(el)) {\n
const tagName = el.tagName.toLowerCase();\n    // Opening tag\n
    result += `<${tagName}`;\n    // Attributes in an ordered way\n    const attributeMap = getAttributeMap(el);\n
const sortedKeys = Array.from(attributeMap.keys()).sort();\n    for (const key of sortedKeys) {\n        const
lowerCaseKey = key.toLowerCase();\n        let attValue = attributeMap.get(key);\n\n        if (typeof attValue !==
'string') {\n            result += ` ${lowerCaseKey}`;\n        } else {\n            // Browsers order style rules differently. Order
them alphabetically for consistency.\n            if (lowerCaseKey === 'style') {\n                attValue = attValue.split(/
?/).filter(s => !!s).sort().map(s => `${s};`);join(' ');\n            }\n            result += `
${lowerCaseKey}=${attValue}`;\n        }\n    }\n    result += '>';\n    // Children\n    const childrenRoot =
templateAwareRoot(el);\n    const children = childrenRoot ? childrenRoot.childNodes : [];\n    for (let j = 0; j <
children.length; j++) {\n        result += stringifyElement(children[j]);\n    }\n    // Closing
tag\n    if (_selfClosingTags.indexOf(tagName) === -1) {\n        result += `</${tagName}>`; \n    } else if
(isCommentNode(el)) {\n        result += `<!--${el.nodeValue}-->`; \n    } else {\n        result += el.textContent;\n    }\n
}\n\nreturn result;\n}\n\nexport function createNgZone(): NgZone {\n    return new NgZone({enableLongStackTrace: true,
shouldCoalesceEventChangeDetection: false});\n}\n\nexport function isCommentNode(node: Node): boolean {\n
return node.nodeType === Node.COMMENT_NODE;\n}\n\nexport function isTextNode(node: Node): boolean {\n

```



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return node.nodeType === Node.TEXT_NODE;\n}\n\nexport function getContent(node: Node): Node {\n  if\n  ('content' in node) {\n    return (<any>node).content;\n  } else {\n    return node;\n  }\n}\n\nexport function\n  templateAwareRoot(el: Node): any {\n    return getDOM().isElementNode(el) && el.nodeName === 'TEMPLATE' ?\n    getContent(el) : el;\n}\n\nexport function setCookie(name: string, value: string) {\n  // document.cookie is magical,\n  assigning into\n  it assigns/overrides one cookie value, but does\n  // not clear other cookies.\n  document.cookie =\n  encodeURIComponent(name) + '=' + encodeURIComponent(value);\n}\n\nexport function\n  supportsWebAnimation(): boolean {\n    return typeof (<any>Element).prototype['animate'] ===\n    'function';\n}\n\nexport function hasStyle(element: any, styleName: string, styleValue?: string|null): boolean {\n  const value = element.style[styleName] || '';\n  return styleValue ? value == styleValue : value.length >\n  0;\n}\n\nexport function hasClass(element: any, className: string): boolean {\n  return\n  element.classList.contains(className);\n}\n\nexport function sortedClassList(element: any): any[] {\n  return\n  Array.prototype.slice.call(element.classList, 0).sort();\n}\n\nexport function createTemplate(html: any):\n  HTMLDivElement {\n    const t = getDOM().getDefaultDocument().createElement('template');\n    t.innerHTML = html;\n    return t;\n}\n\nexport function childNodesAsList(el: Node): any[] {\n  const childNodes = el.childNodes;\n  const res = [];\n  for (let i = 0; i < childNodes.length; i++) {\n    res[i] = childNodes[i];\n  }\n  return\n  res;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is\n  governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport { APP_ID, createPlatformFactory, NgModule, NgZone, PLATFORM_INITIALIZER, platformCore,\n  StaticProvider } from '@angular/core';\nimport { BrowserModule, BrowserDomAdapter as BrowserDomAdapter }\n  from '@angular/platform-browser';\nimport { BrowserDetection, createNgZone } from './browser_util';\n\nfunction\n  initBrowserTests() {\n    BrowserDomAdapter.makeCurrent();\n    BrowserDetection.setup();\n  }\n\nconst\n  _TEST_BROWSER_PLATFORM_PROVIDERS: StaticProvider[] =\n  [{ provide: PLATFORM_INITIALIZER,\n  useValue: initBrowserTests, multi: true }];\n\n/**\n * Platform for testing\n *\n * @publicApi\n */\nexport const\n  platformBrowserTesting =\n  createPlatformFactory(platformCore,\n  'browserTesting', _TEST_BROWSER_PLATFORM_PROVIDERS);\n\n/**\n * NgModule for testing.\n *\n * @publicApi\n */\n@NgModule({\n  exports: [BrowserModule],\n  providers: [\n    { provide: APP_ID, useValue:\n  'a'},\n    { provide: NgZone, useFactory: createNgZone, } ]\n})\nexport class BrowserTestingModule\n  {\n  }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is\n  governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport\n * @module\n * @description\n * Entry point for all public APIs of the platform-browser/testing\n  package.\n */\nexport * from './browser';\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n  https://angular.io/license\n */\n\n// <reference types="jasmine" />\n\n/**\n * @module\n * @description\n * Entry\n  point for all public\n  APIs of this package.\n */\nexport * from './src/testing';\n\n"/**\n * @license\n * Copyright Google LLC All Rights\n  Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n  LICENSE file at https://angular.io/license\n */\n\n// This file is not used to build this module. It is only used during\n  editing\n// by the TypeScript language service and during build for verification. `ngc`\n// replaces this file with\n  production index.ts when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n\n"/**\n * Generated\n  bundle index. Do not edit.\n */\nexport * from\n  './index';\n\n"],"names":["getDOM","global","BrowserDomAdapter"],"mappings":";;;;;;;;;;AAAA;;;;;;AAMG;MAKU\n.gBAAgB,CAAA;AAc3B,IAAA,WAAA,CAAY,EAAe,EAAA;AACzB,QAAA,IAAI,CAAC,WAAW,GAAG,EAA\nE,CAAC;KACvB;AAAd,IAAA,IAAY,GAAG,GAAA;AACb,QAAA,IAAI,OAAO,IAAI,CAAC,WAAW,KAAK,Q\nAAQ,EAAE;YACxC,OAAO,IAAI,CAAC,WAAW,CAAC;AACzB,SAAA;AAED,QAAA,OAAOA,OAAM,EAAE,\nGAAGA,OAAM,EAAE,CAAC,YAAY,EAAE,GAAG,EAAE,CAAC;KACd;AAED,IAAA,OAAO,KAAK,GAA\nA;AACV,QAAA,OAAO,IAAI,gBAAgB,CAAC,IAAI,CAAC,CAAC;KACnC;AAMD,IAAA,IAAI,SAAS,GAAA;\nQACX,OAAO,IAAI,CAAC,GAAG,CAAC,OAAO,CAAC,SAAS,CAAC,GAAG,CAAC,CAAC,CAAC;KACzC;A

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```
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AAC5C,qBAAA;iBACF,CAAA;;;ACvCD;;;;;AAMG;;ACNH;;;;;AAMG;;ACNH;;;;;AAMG;;ACNH;;AAEG;;;;"
}
```

Found

in path(s):

```
* /opt/cola/permits/1784583492_1693546583.6396487/0/platform-browser-14-3-0-1-
tgz/package/fesm2015/testing.mjs.map
```

No license file was found, but licenses were detected in source scan.

```
{"version":3,"file":"animations.mjs","sources":["../../../../packages/platform-
browser/animations/src/animation_builder.ts","../../../../packages/platform-
browser/animations/src/animation_renderer.ts","../../../../packages/platform-
browser/animations/src/providers.ts","../../../../packages/platform-
browser/animations/src/module.ts","../../../../packages/platform-
browser/animations/src/private_export.ts","../../../../packages/platform-
browser/animations/src/animations.ts","../../../../packages/platform-
browser/animations/public_api.ts","../../../../packages/platform-
browser/animations/index.ts","../../../../packages/platform-
browser/animations/animations.ts"],"sourcesContent":["/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n
*\nimport {AnimationBuilder, AnimationFactory, AnimationMetadata, AnimationOptions, AnimationPlayer,
sequence} from '@angular/animations';\nimport {DOCUMENT} from '@angular/common';\nimport {Inject,
Injectable, RendererFactory2, RendererType2, ViewEncapsulation} from '@angular/core';\nimport
{AnimationRenderer} from './animation_renderer';\n\n@Injectable()\nexport class BrowserAnimationBuilder
extends AnimationBuilder {\n  private _nextAnimationId = 0;\n  private _renderer: AnimationRenderer;\n\n  constructor(rootRenderer: RendererFactory2, @Inject(DOCUMENT) doc: any) {\n    super();\n    const typeData
=\n    {id: '0', encapsulation: ViewEncapsulation.None, styles: [], data: {animation: []}} as\n
RendererType2;\n    this._renderer = rootRenderer.createRenderer(doc.body, typeData) as AnimationRenderer;\n
}\n\n  build(animation: AnimationMetadata|AnimationMetadata[]): AnimationFactory {\n    const id =
this._nextAnimationId.toString();\n    this._nextAnimationId++;\n
    const entry = Array.isArray(animation) ? sequence(animation) : animation;\n
    issueAnimationCommand(this._renderer, null, id, 'register', [entry]);\n    return new BrowserAnimationFactory(id,
this._renderer);\n  }\n}\n\nexport class BrowserAnimationFactory extends AnimationFactory {\n
  constructor(private _id: string, private _renderer: AnimationRenderer) {\n    super();\n  }\n\n  create(element: any,
options?: AnimationOptions): AnimationPlayer {\n    return new RendererAnimationPlayer(this._id, element,
options || {}, this._renderer);\n  }\n}\n\nexport class RendererAnimationPlayer implements AnimationPlayer {\n
  public parentPlayer: AnimationPlayer|null = null;\n  private _started = false;\n\n  constructor(\n    public id: string,
    public element: any, options: AnimationOptions,\n    private _renderer: AnimationRenderer) {\n
```

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this._command('create', options);\n }\n\n private _listen(eventName: string, callback: (event: any) => any): () =>
void {\n return this._renderer.listen(this.element,
`@@${this.id}:${eventName}`, callback);\n }\n\n private _command(command: string, ...args: any[]) {\n return
issueAnimationCommand(this._renderer, this.element, this.id, command, args);\n }\n\n onDone(fn: () => void):
void {\n this._listen('done', fn);\n }\n\n onStart(fn: () => void): void {\n this._listen('start', fn);\n }\n\n
onDestroy(fn: () => void): void {\n this._listen('destroy', fn);\n }\n\n init(): void {\n this._command('init');\n
}\n\n hasStarted(): boolean {\n return this._started;\n }\n\n play(): void {\n this._command('play');\n
this._started = true;\n }\n\n pause(): void {\n this._command('pause');\n }\n\n restart(): void {\n
this._command('restart');\n }\n\n finish(): void {\n this._command('finish');\n }\n\n destroy(): void {\n
this._command('destroy');\n }\n\n reset(): void {\n this._command('reset');\n this._started = false;\n }\n\n
setPosition(p: number): void {\n
this._command('setPosition', p);\n }\n\n getPosition(): number {\n return
this._renderer.engine.players[+this.id]?.getPosition() ?? 0;\n }\n\n public totalTime = 0;\n\n\nfunction
issueAnimationCommand(\n renderer: AnimationRenderer, element: any, id: string, command: string, args: any[]):
any {\n return renderer.setProperty(element, `@@${id}:${command}`, args);\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { AnimationTriggerMetadata }
from '@angular/animations';\nimport { AnimationEngine as AnimationEngine } from
'@angular/animations/browser';\nimport { Injectable, NgZone, Renderer2, RendererFactory2, RendererStyleFlags2,
RendererType2 } from '@angular/core';\n\nconst ANIMATION_PREFIX = '@';\nconst
DISABLE_ANIMATIONS_FLAG = '@.disabled';\n\n// Define a recursive type to allow for nested arrays of
`AnimationTriggerMetadata`.\n\nNote that an\n// interface declaration is used as TypeScript prior to 3.7 does not support recursive type\n//
references, see https://github.com/microsoft/TypeScript/pull/33050 for details.\n\ntype
NestedAnimationTriggerMetadata = AnimationTriggerMetadata | RecursiveAnimationTriggerMetadata;\n\ninterface
RecursiveAnimationTriggerMetadata extends Array<NestedAnimationTriggerMetadata>
{\n}\n\n@Injectable()\nexport class AnimationRendererFactory implements RendererFactory2 {\n private _currentId:
number = 0;\n private _microtaskId: number = 1;\n private _animationCallbacksBuffer: [(e: any) => any, any][] =
[];\n private _rendererCache = new Map<Renderer2, BaseAnimationRenderer>();\n private _cdRecurDepth = 0;\n
private promise: Promise<any> = Promise.resolve(0);\n\n constructor(\n private delegate: RendererFactory2,
private engine: AnimationEngine, private _zone: NgZone) {\n engine.onRemovalComplete = (element: any,
delegate: Renderer2) => {\n // Note: if
a component element has a leave animation, and a host leave animation,\n // the view engine will call
`removeChild` for the parent\n // component renderer as well as for the child component renderer.\n //
Therefore, we need to check if we already removed the element.\n const parentNode =
delegate?.parentNode(element);\n if (parentNode) {\n delegate.removeChild(parentNode, element);\n }\n
};\n }\n\n createRenderer(hostElement: any, type: RendererType2): Renderer2 {\n const
EMPTY_NAMESPACE_ID = "";\n // cache the delegates to find out which cached delegate can\n // be used by
which cached renderer\n const delegate = this.delegate.createRenderer(hostElement, type);\n if (!hostElement ||
!type || !type.data || !type.data['animation']) {\n let renderer: BaseAnimationRenderer | undefined =
this._rendererCache.get(delegate);\n if (!renderer) {\n // Ensure that the renderer is removed from the cache
on destroy\n //
since it may contain references to detached DOM nodes.\n const onRendererDestroy = () =>
this._rendererCache.delete(delegate);\n renderer =\n new
BaseAnimationRenderer(EMPTY_NAMESPACE_ID, delegate, this.engine, onRendererDestroy);\n // only
cache this result when the base renderer is used\n this._rendererCache.set(delegate, renderer);\n }\n return
renderer;\n }\n\n const componentId = type.id;\n const namespaceId = type.id + '-' + this._currentId;\n
this._currentId++;\n\n this.engine.register(namespaceId, hostElement);\n\n const registerTrigger = (trigger:

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NestedAnimationTriggerMetadata => {\n  if (Array.isArray(trigger)) {\n    trigger.forEach(registerTrigger);\n  } else {\n    this.engine.registerTrigger(componentId, namespaceId, hostElement, trigger.name, trigger);\n  }\n};\n const animationTriggers = type.data['animation'] as NestedAnimationTriggerMetadata[];\nanimationTriggers.forEach(registerTrigger);\n\n  return new AnimationRenderer(this, namespaceId, delegate, this.engine);\n }\n\n begin() {\n  this._cdRecurDepth++;\n  if (this.delegate.begin) {\n    this.delegate.begin();\n  }\n }\n\n private\n  _scheduleCountTask() {\n    // always use promise to schedule microtask instead of use Zone\n    this.promise.then(() => {\n      this._microtaskId++;\n    });\n  }\n\n  /** @internal */\n  scheduleListenerCallback(count: number, fn: (e: any) => any, data: any) {\n    if (count >= 0 && count <\n    this._microtaskId) {\n      this._zone.run(() => fn(data));\n      return;\n    }\n    if\n    (this._animationCallbacksBuffer.length == 0) {\n      Promise.resolve(null).then(() => {\n        this._zone.run(() =>\n        {\n          this._animationCallbacksBuffer.forEach(tuple => {\n            const [fn, data] = tuple;\n            fn(data);\n          });\n          this._animationCallbacksBuffer = [];\n        });\n      });\n    }\n    this._animationCallbacksBuffer.push([fn,\n    data]);\n  }\n\n  end() {\n    this._cdRecurDepth--;\n    // this is to prevent animations from running twice when an\n    inner\n    // component does CD when a parent component instead has inserted it\n    if (this._cdRecurDepth == 0)\n    {\n      this._zone.runOutsideAngular(() => {\n        this._scheduleCountTask();\n        this.engine.flush(this._microtaskId);\n      });\n    }\n    if (this.delegate.end) {\n      this.delegate.end();\n    }\n  }\n\n  whenRenderingDone(): Promise<any> {\n    return this.engine.whenRenderingDone();\n  }\n}\n\nexport class\n  BaseAnimationRenderer implements Renderer2 {\n  constructor(\n    protected namespaceId: string, public\n    delegate: Renderer2, public engine: AnimationEngine,\n    private _onDestroy?: () => void) {\n    this.destroyNode\n    = this.delegate.destroyNode ? (n) => delegate.destroyNode!(n) : null;\n  }\n\n  get data() {\n    return\n    this.delegate.data;\n  }\n\n  destroyNode: ((n: any) => void)|null;\n\n  destroy(): void {\n    this.engine.destroy(this.namespaceId,\n    this.delegate);\n    this.delegate.destroy();\n    this._onDestroy?.();\n  }\n\n  createElement(name: string,\n  namespace?: string|null|undefined) {\n    return this.delegate.createElement(name, namespace);\n  }\n\n  createComment(value: string) {\n    return this.delegate.createComment(value);\n  }\n\n  createText(value: string)\n  {\n    return this.delegate.createText(value);\n  }\n\n  appendChild(parent: any, newChild: any): void {\n    this.delegate.appendChild(parent, newChild);\n    this.engine.onInsert(this.namespaceId, newChild, parent, false);\n  }\n\n  insertBefore(parent: any, newChild: any, refChild: any, isMove: boolean = true): void {\n    this.delegate.insertBefore(parent, newChild, refChild);\n    // If `isMove` true than we should animate this insert.\n    this.engine.onInsert(this.namespaceId, newChild, parent, isMove);\n  }\n\n  removeChild(parent: any, oldChild: any,\n  isHostElement: boolean): void {\n    this.engine.onRemove(this.namespaceId,\n    oldChild, this.delegate, isHostElement);\n  }\n\n  selectRootElement(selectorOrNode: any, preserveContent?:\n  boolean) {\n    return this.delegate.selectRootElement(selectorOrNode, preserveContent);\n  }\n\n  parentNode(node: any) {\n    return this.delegate.parentNode(node);\n  }\n\n  nextSibling(node: any) {\n    return\n    this.delegate.nextSibling(node);\n  }\n\n  setAttribute(el: any, name: string, value: string, namespace?:\n  string|null|undefined): void {\n    this.delegate.setAttribute(el, name, value, namespace);\n  }\n\n  removeAttribute(el: any, name: string, namespace?: string|null|undefined): void {\n    this.delegate.removeAttribute(el, name, namespace);\n  }\n\n  addClass(el: any, name: string): void {\n    this.delegate.addClass(el, name);\n  }\n\n  removeClass(el: any, name: string): void {\n    this.delegate.removeClass(el, name);\n  }\n\n  setStyle(el: any, style: string, value: any, flags?:\n  RendererStyleFlags2|undefined): void {\n    this.delegate.setStyle(el, style, value,\n    flags);\n  }\n\n  removeStyle(el: any, style: string, flags?: RendererStyleFlags2|undefined): void {\n    this.delegate.removeStyle(el, style, flags);\n  }\n\n  setProperty(el: any, name: string, value: any): void {\n    if\n    (name.charAt(0) == ANIMATION_PREFIX && name == DISABLE_ANIMATIONS_FLAG) {\n      this.disableAnimations(el, !!value);\n    } else {\n      this.delegate.setProperty(el, name, value);\n    }\n  }\n\n  setValue(node: any, value: string): void {\n    this.delegate.setValue(node, value);\n  }\n\n  listen(target: any,

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eventName: string, callback: (event: any) => boolean | void): () => void {\n  return this.delegate.listen(target,
eventName, callback);\n }\n\n protected disableAnimations(element: any, value: boolean) {\n
this.engine.disableAnimations(element, value);\n }\n\n\nexport class AnimationRenderer extends
BaseAnimationRenderer implements Renderer2 {\n  constructor(\n    public factory: AnimationRendererFactory,
namespaceId: string, delegate: Renderer2,\n
    engine: AnimationEngine, onDestroy?: () => void) {\n    super(namespaceId, delegate, engine, onDestroy);\n
this.namespaceId = namespaceId;\n }\n\n  override setProperty(el: any, name: string, value: any): void {\n    if
(name.charAt(0) == ANIMATION_PREFIX) {\n      if (name.charAt(1) == '.' && name ==
DISABLE_ANIMATIONS_FLAG) {\n        value = value === undefined ? true : !!value;\n
this.disableAnimations(el, value as boolean);\n      } else {\n        this.engine.process(this.namespaceId, el,
name.slice(1), value);\n      }\n    } else {\n      this.delegate.setProperty(el, name, value);\n    }\n }\n\n  override
listen(\n    target: 'window'|'document'|'body'|any, eventName: string,\n    callback: (event: any) => any): () =>
void {\n    if (eventName.charAt(0) == ANIMATION_PREFIX) {\n      const element =
resolveElementFromTarget(target);\n      let name = eventName.slice(1);\n      let phase = ";\n      // @listener.phase
is for trigger animation callbacks\n
      // @@listener is for animation builder callbacks\n      if (name.charAt(0) != ANIMATION_PREFIX) {\n
[name, phase] = parseTriggerCallbackName(name);\n      }\n      return this.engine.listen(this.namespaceId, element,
name, phase, event => {\n        const countId = (event as any)['_data'] || -1;\n
this.factory.scheduleListenerCallback(countId, callback, event);\n      });\n    }\n    return this.delegate.listen(target,
eventName, callback);\n }\n\n  function resolveElementFromTarget(target: 'window'|'document'|'body'|any): any
{\n    switch (target) {\n      case 'body':\n        return document.body;\n      case 'document':\n        return document;\n
      case 'window':\n        return window;\n      default:\n        return target;\n    }\n }\n\n  function
parseTriggerCallbackName(triggerName: string) {\n    const dotIndex = triggerName.indexOf('.');\n    const trigger =
triggerName.substring(0, dotIndex);\n    const phase = triggerName.slice(dotIndex + 1);\n    return [trigger,
phase];\n }\n\n"/**\n
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport
{AnimationBuilder} from '@angular/animations';\nimport {AnimationDriver, AnimationEngine as
AnimationEngine, AnimationStyleNormalizer as AnimationStyleNormalizer, NoopAnimationDriver as
NoopAnimationDriver, WebAnimationsDriver as WebAnimationsDriver, WebAnimationsStyleNormalizer as
WebAnimationsStyleNormalizer} from '@angular/animations/browser';\nimport {DOCUMENT} from
'@angular/common';\nimport {ANIMATION_MODULE_TYPE, ApplicationRef, Inject, Injectable, NgZone,
OnDestroy, Provider, RendererFactory2} from '@angular/core';\nimport {DomRendererFactory2 as
DomRendererFactory2} from '@angular/platform-browser';\nimport {BrowserAnimationBuilder} from
'./animation_builder';\nimport {AnimationRendererFactory} from './animation_renderer';\n\n@Injectable()\nexport
class InjectableAnimationEngine extends AnimationEngine implements OnDestroy {\n  // The `ApplicationRef` is
injected here explicitly to force the dependency ordering.\n  // Since the `ApplicationRef` should be created earlier
before the `AnimationEngine`, they\n  // both have `ngOnDestroy` hooks and `flush()` must be called after all views
are destroyed.\n  constructor(\n    @Inject(DOCUMENT) doc: any, driver: AnimationDriver, normalizer:
AnimationStyleNormalizer,\n    appRef: ApplicationRef) {\n    super(doc.body, driver, normalizer);\n }\n\n  ngOnDestroy(): void {\n    this.flush();\n }\n\n\nexport function instantiateDefaultStyleNormalizer() {\n  return
new WebAnimationsStyleNormalizer();\n }\n\nexport function instantiateRendererFactory(\n  renderer:
DomRendererFactory2, engine: AnimationEngine, zone: NgZone) {\n  return new
AnimationRendererFactory(renderer, engine, zone);\n }\n\nconst SHARED_ANIMATION_PROVIDERS:
Provider[] = [\n  {provide: AnimationBuilder, useClass: BrowserAnimationBuilder},\n
  {provide: AnimationStyleNormalizer, useFactory: instantiateDefaultStyleNormalizer},\n  {provide:
AnimationEngine, useClass: InjectableAnimationEngine},\n  {provide: RendererFactory2,\n    useFactory:
instantiateRendererFactory,\n    deps: [DomRendererFactory2, AnimationEngine, NgZone]\n }];\n\n/**\n *

```

Separate providers from the actual module so that we can do a local modification in Google3 to include them in the BrowserModule.

```

export const BROWSER_ANIMATIONS_PROVIDERS: Provider[] = [
  { provide: AnimationDriver, useFactory: () => new WebAnimationsDriver() },
  { provide: ANIMATION_MODULE_TYPE, useValue: 'BrowserAnimations' },
  ...SHARED_ANIMATION_PROVIDERS
];

```

Separate providers from the actual module so that we can do a local modification in Google3 to include them in the BrowserTestingModule.

```

export const BROWSER_NOOP_ANIMATIONS_PROVIDERS: Provider[] = [
  { provide: AnimationDriver, useClass: NoopAnimationDriver },
  { provide: ANIMATION_MODULE_TYPE, useValue: 'NoopAnimations' },
  ...SHARED_ANIMATION_PROVIDERS
];

```

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```

import { ModuleWithProviders, NgModule, Provider } from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';
import { BROWSER_ANIMATIONS_PROVIDERS, BROWSER_NOOP_ANIMATIONS_PROVIDERS } from './providers';

Object used to configure the behavior of { @link BrowserAnimationsModule }

@publicApi
export interface BrowserAnimationsModuleConfig {
  /** Whether animations should be disabled. Passing this is identical to providing the `NoopAnimationsModule`, but it can be controlled based on a runtime value.
   *
   * @param disableAnimations? boolean;
   */
  disableAnimations?: boolean;
}

Exports `BrowserModule` with additional [dependency-injection providers](guide/glossary#provider) for use with animations. See [Animations](guide/animations).

@publicApi
@NgModule({
  exports: [BrowserModule],
  providers: BROWSER_ANIMATIONS_PROVIDERS,
})
export class BrowserAnimationsModule {
  /** Configures the module based on the specified object.
   *
   * @param config Object used to configure the behavior of the `BrowserAnimationsModule`.
   *
   * @see `BrowserAnimationsModuleConfig`
   *
   * @usageNotes
   * When registering the `BrowserAnimationsModule`, you can use the `withConfig` function as follows:
   *
   * ```
   * @NgModule({
   *   imports: [BrowserAnimationsModule.withConfig(config)]
   * })
   * class MyNgModule {
   *   ...
   *   static withConfig(config: BrowserAnimationsModuleConfig):
   *     ModuleWithProviders<BrowserAnimationsModule> {
   *     return {
   *       ngModule: BrowserAnimationsModule,
   *       providers: config.disableAnimations ? BROWSER_NOOP_ANIMATIONS_PROVIDERS :

```

```

    BROWSER_ANIMATIONS_PROVIDERS
    };
  }
}

```

Returns the set of [dependency-injection providers](guide/glossary#provider) to enable animations in an application. See [animations guide](guide/animations) to learn more about animations in Angular.

The function is useful when you want to enable animations in an application bootstrapped using the `bootstrapApplication` function. In this scenario there is no need to import the `BrowserAnimationsModule` NgModule at all, just add providers returned by this function to the `providers` list as show below.

```

bootstrapApplication(RootComponent, {
  providers: [
    provideAnimations()
  ]
});

```

The function is useful when you want to bootstrap an application using the `bootstrapApplication` function, but you need to disable animations (for example, when running tests).

```

bootstrapApplication(RootComponent, {
  providers: [
    provideNoopAnimations()
  ]
});

```

The function is useful when you want to bootstrap an application using the `bootstrapApplication` function, but you need to disable animations (for example, when running tests).

```

in app code.
return [...BROWSER_ANIMATIONS_PROVIDERS];

```

A null player that must be imported to allow disabling of animations.

```

@publicApi
@NgModule({
  exports: [BrowserModule],
  providers: BROWSER_NOOP_ANIMATIONS_PROVIDERS,
})
export class NoopAnimationsModule {
  /** Returns the set of [dependency-injection providers](guide/glossary#provider) to disable animations in an application. See [animations guide](guide/animations) to learn more about animations in Angular.
   *
   * @usageNotes
   * The function is useful when you want to bootstrap an application using the `bootstrapApplication` function, but you need to disable animations (for example, when running tests).
   *
   * ```
   * bootstrapApplication(RootComponent, {
   *   providers: [
   *     provideNoopAnimations()
   *   ]
   * });
   *
   * @publicApi
   * @developerPreview
   * export function provideNoopAnimations():

```



```

Provider[] {\n // Return a copy to
  prevent changes to the original array in case any in-place\n // alterations are performed to the
  `provideNoopAnimations` call results in app code.\n return
[...BROWSER_NOOP_ANIMATIONS_PROVIDERS];\n}\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\nexport {BrowserAnimationBuilder as BrowserAnimationBuilder,
BrowserAnimationFactory as BrowserAnimationFactory} from './animation_builder';\nexport {AnimationRenderer
as AnimationRenderer, AnimationRendererFactory as AnimationRendererFactory} from
 './animation_renderer';\nexport {InjectableAnimationEngine as InjectableAnimationEngine} from
 './providers';\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n/**\n * @module\n
  * @description\n * Entry point for all animation APIs of the animation browser package.\n *\nexport
{ANIMATION_MODULE_TYPE} from '@angular/core';\nexport {BrowserAnimationsModule,
BrowserAnimationsModuleConfig, NoopAnimationsModule, provideAnimations, provideNoopAnimations} from
 './module';\n\nexport * from './private_export';\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n/**\n * @module\n * @description\n * Entry point for all public
APIs of this package.\n *\nexport * from './src/animations';\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\n// This file is not used to build this module. It is only used during
editing\n// by the TypeScript language
  service and during build for verification. `ngc`\n// replaces this file with production index.ts when it rewrites private
symbol\n// names.\n\nexport * from './public_api';\n"/**\n * Generated bundle index. Do not edit.\n *\n\nexport *
from
 './index';\n"], "names": ["AnimationEngine", "WebAnimationsStyleNormalizer", "AnimationStyleNormalizer", "DomR
endererFactory2", "WebAnimationsDriver", "NoopAnimationDriver"], "mappings": ";;;;;;;;;;AAAA;AAMG;A
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QAAA,KAAK,EAAE,CAAC;QAJF,IAAgB,CAAA,gBAAA,GAAG,CAAC,CAAC;QAK3B,MAAM,QAAQ,GAC
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```

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introduce XSS risks.\n */\n\nexport abstract class GenericBrowserDomAdapter extends DomAdapter {\n  readonly
supportsDOMEvents: boolean = true;\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {parseCookieValue as parseCookieValue, setRootDomAdapter as
setRootDomAdapter} from '@angular/common';\n\nimport {GenericBrowserDomAdapter}
from './generic_browser_adapter';\n\n\n/**\n * A `DomAdapter` powered by full browser DOM APIs.\n * @security Tread carefully! Interacting with the DOM directly is dangerous and\n * can introduce XSS risks.\n */\n\n
tslint:disable:requireParameterType no-console\n\nexport class BrowserDomAdapter extends
GenericBrowserDomAdapter {\n  static makeCurrent() {\n    setRootDomAdapter(new BrowserDomAdapter());\n
  }\n\n  onAndCancel(el: Node, evt: any, listener: any): Function {\n    el.addEventListener(evt, listener, false);\n
  }\n\n  // Needed to follow Dart's subscription semantic, until fix of\n  //
https://code.google.com/p/dart/issues/detail?id=17406\n  return () => {\n    el.removeEventListener(evt, listener,
false);\n  };\n\n  dispatchEvent(el: Node, evt: any) {\n    el.dispatchEvent(evt);\n  }\n\n  remove(node: Node): void
{\n    if (node.parentNode) {\n      node.parentNode.removeChild(node);\n    }\n  }\n\n  createElement(tagName:
string, doc?: Document): HTMLElement\n    {\n      doc = doc || this.getDefaultDocument();\n      return doc.createElement(tagName);\n    }\n\n  createHtmlDocument(): Document {\n    return document.implementation.createHTMLDocument('fakeTitle');\n  }\n\n  getDefaultDocument(): Document {\n    return document;\n  }\n\n  isElementNode(node: Node): boolean {\n
return node.nodeType === Node.ELEMENT_NODE;\n  }\n\n  isShadowRoot(node: any): boolean {\n    return node
instanceof DocumentFragment;\n  }\n\n  /**\n   * @deprecated No longer being used in Ivy code. To be removed in
version 14.\n   */\n  getGlobalEventTarget(doc: Document, target: string): EventTarget|null {\n    if (target ===
'window') {\n      return window;\n    }\n    if (target === 'document') {\n      return doc;\n    }\n    if (target ===
'body') {\n      return doc.body;\n    }\n    return null;\n  }\n\n  getBaseHref(doc: Document): string|null {\n    const href
= getBaseElementHref();\n    return href == null ? null : relativePath(href);\n  }\n\n  resetBaseElement(): void {\n
baseElement

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= null;\n }\n getUserAgent(): string {\n return window.navigator.userAgent;\n }\n getCookie(name: string):
string|null {\n return parseCookieValue(document.cookie, name);\n }\n}\n\nlet baseElement: HTMLElement|null
= null;\nfunction getBaseElementHref(): string|null {\n baseElement = baseElement ||
document.querySelector('base');\n return baseElement ? baseElement.getAttribute('href') : null;\n}\n\n// based on
urlUtils.js in AngularJS 1\nlet urlParsingNode: HTMLAnchorElement|undefined;\nfunction relativePath(url: any):
string {\n urlParsingNode = urlParsingNode || document.createElement('a');\n urlParsingNode.setAttribute('href',
url);\n const pathName = urlParsingNode.pathname;\n return pathName.charAt(0) === '/' ? pathName :
`/${pathName}`;\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport
{DOCUMENT, getDOM as getDOM} from '@angular/common';\nimport {APP_INITIALIZER,
ApplicationInitStatus, InjectionToken, Injector, StaticProvider} from '@angular/core';\n\n/**\n * An id that
identifies a particular application being bootstrapped, that should\n * match across the client/server boundary.\n
*/\nexport const TRANSITION_ID = new InjectionToken('TRANSITION_ID');\n\nexport function
appInitializerFactory(transitionId: string, document: any, injector: Injector) {\n return () => {\n // Wait for all
application initializers to be completed before removing the styles set by\n // the server.\n
injector.get(ApplicationInitStatus).donePromise.then(() => {\n const dom = getDOM();\n const styles:
HTMLCollectionOf<HTMLStyleElement> =\n document.querySelectorAll('style[ng-
transition=\\'$${transitionId}\\']');\n for (let i = 0; i < styles.length; i++) {\n dom.remove(styles[i]);\n
});\n });\n }\n\nexport const SERVER_TRANSITION_PROVIDERS:
StaticProvider[] = [\n {\n provide: APP_INITIALIZER,\n useFactory: appInitializerFactory,\n deps:
[TRANSITION_ID, DOCUMENT, Injector],\n multi: true\n },\n];\n\n",/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {getDOM as getDOM} from
'@angular/common';\nimport {GetTestability, Testability, TestabilityRegistry, global as global} from
'@angular/core';\n\nexport class BrowserGetTestability implements GetTestability {\n addToWindow(registry:
TestabilityRegistry): void {\n global['getAngularTestability'] = (elem: any, findInAncestors: boolean = true) =>
{\n const testability = registry.findTestabilityInTree(elem, findInAncestors);\n if (testability == null) {\n
throw new Error('Could not find testability for element.);\n }\n return testability;\n };\n\n
global['getAllAngularTestabilities']
= () => registry.getAllTestabilities();\n\n global['getAllAngularRootElements'] = () =>
registry.getAllRootElements();\n\n const whenAllStable = (callback: any /** TODO #9100 */) => {\n const
testabilities = global['getAllAngularTestabilities']();\n let count = testabilities.length;\n let didWork = false;\n
const decrement = function(didWork_: any /** TODO #9100 */) {\n didWork = didWork || didWork_;\n
count--;\n if (count == 0) {\n callback(didWork);\n }\n };\n
testabilities.forEach(function(testability: any /** TODO #9100 */) {\n testability.whenStable(decrement);\n
});\n });\n\n if (!global['frameworkStabilizers']) {\n global['frameworkStabilizers'] = [];\n }\n
global['frameworkStabilizers'].push(whenAllStable);\n }\n\n findTestabilityInTree(registry: TestabilityRegistry,
elem: any, findInAncestors: boolean):\n Testability|null {\n if (elem == null) {\n
return null;\n }\n const t = registry.getTestability(elem);\n if (t != null) {\n return t;\n } else if
(!findInAncestors) {\n return null;\n }\n if (getDOM().isShadowRoot(elem)) {\n return
this.findTestabilityInTree(registry, (<any>elem).host, true);\n }\n return this.findTestabilityInTree(registry,
elem.parentElement, true);\n }\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {XhrFactory} from '@angular/common';\nimport {Injectable} from
'@angular/core';\n\n/**\n * A factory for `HttpXhrBackend` that uses the `XMLHttpRequest` browser API.\n
*/\n@Injectable()\nexport class BrowserXhr implements XhrFactory {\n build(): XMLHttpRequest {\n return
new XMLHttpRequest();\n }\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use

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of this source

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code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\nimport {getDOM as getDOM} from '@angular/common';\nimport {Inject, Injectable, InjectionToken, NgZone} from '@angular/core';\n\n/**\n * The injection token for the event-manager plug-in service.\n */\n\n@publicApi\n\nexport const EVENT_MANAGER_PLUGINS = new\nInjectionToken<EventManagerPlugin[]>('EventManagerPlugins');\n\n/**\n * An injectable service that provides\n event management for Angular\n * through a browser plug-in.\n */\n\n@publicApi\n\n@Injectable()\nexport class\nEventManager {\n  private _plugins: EventManagerPlugin[];\n  private _eventNameToPlugin = new Map<string,\nEventManagerPlugin>();\n\n  /**\n   * Initializes an instance of the event-manager service.\n   */\n  constructor(@Inject(EVENT_MANAGER_PLUGINS) plugins: EventManagerPlugin[], private _zone: NgZone) {\n    plugins.forEach(p => p.manager = this);\n    this._plugins = plugins.slice().reverse();\n  }\n\n  /**\n   * Registers a handler for a specific element and event.\n   */\n  @param element The HTML\n element to receive event notifications.\n  * @param eventName The name of the event to listen for.\n  * @param\n handler A function to call when the notification occurs. Receives the\n * event object as an argument.\n  *\n @returns A callback function that can be used to remove the handler.\n *\n addEventListener(element:\nHTMLElement, eventName: string, handler: Function): Function {\n  const plugin =\nthis._findPluginFor(eventName);\n  return plugin.addEventListener(element, eventName, handler);\n }\n\n /**\n  * Registers a global handler for an event in a target view.\n  */\n  @param target A target for global event\n notifications. One of \"window\", \"document\", or \"body\".\n  * @param eventName The name of the event to\n listen for.\n  * @param handler A function to call when the notification occurs. Receives the\n * event object as an\n argument.\n\n  * @returns A callback function that can be used to remove the handler.\n  * @deprecated No longer being used in\n Ivy code. To be removed in version 14.\n *\n addGlobalEventListener(target: string, eventName: string, handler:\nFunction): Function {\n  const plugin = this._findPluginFor(eventName);\n  return\nplugin.addGlobalEventListener(target, eventName, handler);\n }\n\n /**\n  * Retrieves the compilation zone in\n which event listeners are registered.\n  */\n  @internal\n  @getZone(): NgZone {\n    return this._zone;\n  }\n\n  /**\n   * @internal\n   */\n  _findPluginFor(eventName: string): EventManagerPlugin {\n    const plugin =\nthis._eventNameToPlugin.get(eventName);\n    if (plugin) {\n      return plugin;\n    }\n\n    const plugins =\nthis._plugins;\n    for (let i = 0; i < plugins.length; i++) {\n      const plugin = plugins[i];\n      if\n(plugin.supports(eventName)) {\n        this._eventNameToPlugin.set(eventName, plugin);\n        return plugin;\n      }\n    }\n\n    throw new Error(`No\n event manager plugin found for event ${eventName}`);\n  }\n}\n\nexport abstract class EventManagerPlugin {\n  constructor(private _doc: any) {}\n\n  // TODO(issue/24571): remove '!'.\n  manager!: EventManager;\n\n  abstract\nsupports(eventName: string): boolean;\n\n  abstract\naddEventListener(element: HTMLElement, eventName: string,\nhandler: Function): Function;\n\n  addGlobalEventListener(element: string, eventName: string, handler: Function):\nFunction {\n    const target: HTMLElement = getDOM().getGlobalEventTarget(this._doc, element);\n    if (!target)\n{\n      throw new Error(`Unsupported event target ${target} for event ${eventName}`);\n    }\n\n    return\nthis.addEventListener(target, eventName, handler);\n  }\n}\n\n",\n\n/**\n * @license\n * Copyright Google LLC All\n Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n LICENSE file at https://angular.io/license\n *\nimport {DOCUMENT, getDOM as getDOM} from\n '@angular/common';\nimport\n {Inject, Injectable, OnDestroy} from '@angular/core';\n\n@Injectable()\nexport class SharedStylesHost {\n  /**\n   * @internal\n   */\n  protected _stylesSet = new Set<string>();\n\n  addStyles(styles: string[]): void {\n    const additions\n= new Set<string>();\n    styles.forEach(style => {\n      if (!this._stylesSet.has(style)) {\n        this._stylesSet.add(style);\n        additions.add(style);\n      }\n    });\n    this.onStylesAdded(additions);\n  }\n\n  onStylesAdded(additions: Set<string>): void {\n  }\n\n  getAllStyles(): string[] {\n    return\nArray.from(this._stylesSet);\n  }\n}\n\n@Injectable()\nexport class DomSharedStylesHost extends\nSharedStylesHost implements OnDestroy {\n  // Maps all registered host nodes to a list of style nodes that have been
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added to the host node.\n private _hostNodes = new Map<Node, Node[]>();\n\n
constructor(@Inject(DOCUMENT) private _doc: any) {\n super();\n this._hostNodes.set(_doc.head, []);\n }\n\n
private _addStylesToHost(styles:
Set<string>, host: Node, styleNodes: Node[]): void {\n styles.forEach((style: string) => {\n const styleEl =
this._doc.createElement('style');\n styleEl.textContent = style;\n
styleNodes.push(host.appendChild(styleEl));\n });\n }\n\n
addHost(hostNode: Node): void {\n const
styleNodes: Node[] = [];\n this._addStylesToHost(this._stylesSet, hostNode, styleNodes);\n
this._hostNodes.set(hostNode, styleNodes);\n }\n\n
removeHost(hostNode: Node): void {\n const styleNodes =
this._hostNodes.get(hostNode);\n if (styleNodes) {\n styleNodes.forEach(removeStyle);\n }\n
this._hostNodes.delete(hostNode);\n }\n\n
override onStylesAdded(additions: Set<string>): void {\n
this._hostNodes.forEach((styleNodes, hostNode) => {\n this._addStylesToHost(additions, hostNode,
styleNodes);\n });\n }\n\n
ngOnDestroy(): void {\n this._hostNodes.forEach(styleNodes =>
styleNodes.forEach(removeStyle));\n }\n\n
function removeStyle(styleNode: Node):
void {\n getDOM().remove(styleNode);\n }\n\n
"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\n
import {APP_ID, Inject, Injectable, Renderer2, RendererFactory2,
RendererStyleFlags2, RendererType2, ViewEncapsulation} from '@angular/core';\n\n
import {EventManager} from './events/event_manager';\n\n
import {DomSharedStylesHost} from './shared_styles_host';\n\n
export const
NAMESPACE_URI: {[ns: string]: string} = {\n 'svg': 'http://www.w3.org/2000/svg',\n 'xhtml':
'http://www.w3.org/1999/xhtml',\n 'xlink': 'http://www.w3.org/1999/xlink',\n 'xml':
'http://www.w3.org/XML/1998/namespace',\n 'xmlns': 'http://www.w3.org/2000/xmlns',\n 'math':
'http://www.w3.org/1998/MathML/',\n };
\n\n
const COMPONENT_REGEX = /%COMP%/g;\n\n
const NG_DEV_MODE = typeof ngDevMode === 'undefined' || !ngDevMode;\n\n
export const
COMPONENT_VARIABLE = '%COMP%';\n\n
export
const HOST_ATTR = `_ngghost-${COMPONENT_VARIABLE}`;\n\n
export const CONTENT_ATTR =
`_ngcontent-${COMPONENT_VARIABLE}`;\n\n
export function shimContentAttribute(componentShortId:
string): string {\n return CONTENT_ATTR.replace(COMPONENT_REGEX, componentShortId);\n }\n\n
export
function shimHostAttribute(componentShortId: string): string {\n return
HOST_ATTR.replace(COMPONENT_REGEX, componentShortId);\n }\n\n
export function flattenStyles(\n
compId: string, styles: Array<any|any[]>, target: string[]): string[] {\n for (let i = 0; i < styles.length; i++) {\n let
style = styles[i];\n\n
if (Array.isArray(style)) {\n flattenStyles(compId, style, target);\n } else {\n style =
style.replace(COMPONENT_REGEX, compId);\n target.push(style);\n }\n }\n\n
return target;\n }\n\n
function
decoratePreventDefault(eventHandler: Function): Function {\n // `DebugNode.triggerEventHandler` needs to know
if the listener was created with\n // decoratePreventDefault or is a listener
added outside the Angular context so it can handle the\n // two differently. In the first case, the special
`__ngUnwrap__` token is passed to the unwrap\n // the listener (see below).\n return (event: any) => {\n // Ivy
uses `__ngUnwrap__` as a special token that allows us to unwrap the function\n // so that it can be invoked
programmatically by `DebugNode.triggerEventHandler`. The debug_node\n // can inspect the listener toString
contents for the existence of this special token. Because\n // the token is a string literal, it is ensured to not be
modified by compiled code.\n if (event === `__ngUnwrap__`) {\n return eventHandler;\n }\n\n
const
allowDefaultBehavior = eventHandler(event);\n if (allowDefaultBehavior === false) {\n // TODO(tbosch):
move preventDefault into event plugins...\n event.preventDefault();\n event.returnValue = false;\n }\n\n
return undefined;\n };
\n\n
let hasLoggedNativeEncapsulationWarning = false;\n\n
@Inject()
export
class DomRendererFactory2 implements RendererFactory2 {\n private rendererByCompId = new Map<string,
Renderer2>();\n private defaultRenderer: Renderer2;\n\n
constructor(\n private eventManager: EventManager,
private sharedStylesHost: DomSharedStylesHost,\n @Inject(APP_ID) private appId: string) {\n
this.defaultRenderer = new DefaultDomRenderer2(eventManager);\n }\n\n
createRenderer(element: any, type:
RendererType2|null): Renderer2 {\n if (!element || !type) {\n return this.defaultRenderer;\n }\n\n
switch

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(type.encapsulation) {\n  case ViewEncapsulation.Emulated: {\n    let renderer =
this.rendererByCompId.get(type.id);\n    if (!renderer) {\n      renderer = new
EmulatedEncapsulationDomRenderer2(\n        this.eventManager, this.sharedStylesHost, type, this.appId);\n
this.rendererByCompId.set(type.id, renderer);\n    }\n
(<EmulatedEncapsulationDomRenderer2>renderer).applyToHost(element);\n
    return renderer;\n  }\n  // @ts-ignore TODO: Remove as part of FW-2290. TS complains about us dealing
with an enum\n  // value that is not known (but previously was the value for ViewEncapsulation.Native)\n  case
1:\n  case ViewEncapsulation.ShadowDom:\n    // TODO(FW-2290): remove the `case 1:` fallback logic and
the warning in v12.\n    if ((typeof ngDevMode === 'undefined' || ngDevMode) &&\n      // @ts-ignore
TODO: Remove as part of FW-2290. TS complains about us dealing with an\n      // enum value that is not
known (but previously was the value for\n      // ViewEncapsulation.Native)\n    !hasLoggedNativeEncapsulationWarning && type.encapsulation === 1) {\n
hasLoggedNativeEncapsulationWarning = true;\n      console.warn(\n        'ViewEncapsulation.Native is no
longer supported. Falling back to ViewEncapsulation.ShadowDom. The fallback will be removed in v12.);\n
    }\n    return new ShadowDomRenderer(this.eventManager,
this.sharedStylesHost, element, type);\n  default: {\n    if (!this.rendererByCompId.has(type.id)) {\n      const
styles = flattenStyles(type.id, type.styles, []);\n      this.sharedStylesHost.addStyles(styles);\n
this.rendererByCompId.set(type.id, this.defaultRenderer);\n    }\n    return this.defaultRenderer;\n  }\n}\n
}\n\n begin() {\n end() {\n}\n}\n\nclass DefaultDomRenderer2 implements Renderer2 {\n data: {[key: string]: any}
= Object.create(null);\n\n constructor(private eventManager: EventManager) {\n\n destroy(): void {\n\n
destroyNode = null;\n\n createElement(name: string, namespace?: string): any {\n  if (namespace) {\n    //
TODO: `|| namespace` was added in\n    //
https://github.com/angular/angular/commit/2b9cc8503d48173492c29f5a271b61126104fbdb to\n    // support how
Ivy passed around the namespace URI rather than short name at the time. It did\n    // not, however extend the
support
to other parts of the system (setAttribute, setAttribute,\n    // and the ServerRenderer). We should decide what
exactly the semantics for dealing with\n    // namespaces should be and make it consistent.\n    // Related issues:\n
// https://github.com/angular/angular/issues/44028\n    // https://github.com/angular/angular/issues/44883\n
return document.createElementNS(NAMESPACE_URIS[namespace] || namespace, name);\n  }\n\n return
document.createElement(name);\n }\n\n createComment(value: string): any {\n  return
document.createComment(value);\n }\n\n createText(value: string): any {\n  return
document.createTextNode(value);\n }\n\n appendChild(parent: any, newChild: any): void {\n  const targetParent
= isTemplateNode(parent) ? parent.content : parent;\n  targetParent.appendChild(newChild);\n }\n\n
insertBefore(parent: any, newChild: any, refChild: any): void {\n  if (parent) {\n    const targetParent =
isTemplateNode(parent) ? parent.content
: parent;\n    targetParent.insertBefore(newChild, refChild);\n  }\n }\n\n removeChild(parent: any, oldChild:
any): void {\n  if (parent) {\n    parent.removeChild(oldChild);\n  }\n }\n\n selectRootElement(selectorOrNode:
string|any, preserveContent?: boolean): any {\n  let el: any = typeof selectorOrNode === 'string' ?
document.querySelector(selectorOrNode) : \n      selectorOrNode;\n  if (!el) {\n
throw new Error(`The selector "${selectorOrNode}" did not match any elements`);\n  }\n  if (!preserveContent)
{\n    el.textContent = "";\n  }\n  return el;\n }\n\n parentNode(node: any): any {\n  return node.parentNode;\n
}\n\n nextSibling(node: any): any {\n  return node.nextSibling;\n }\n\n setAttribute(el: any, name: string, value:
string, namespace?: string): void {\n  if (namespace) {\n    name = namespace + ':' + name;\n    const
namespaceUri = NAMESPACE_URIS[namespace];\n    if (namespaceUri)
{\n      el.setAttributeNS(namespaceUri, name, value);\n    } else {\n      el.setAttribute(name, value);\n    }\n
} else {\n  el.setAttribute(name, value);\n }\n }\n\n removeAttribute(el: any, name: string, namespace?: string):
void {\n  if (namespace) {\n    const namespaceUri = NAMESPACE_URIS[namespace];\n    if (namespaceUri)
{\n      el.removeAttributeNS(namespaceUri, name);\n    } else {\n

```

```

el.removeAttribute(`${namespace}:${name}`);\n  }\n } else {\n  el.removeAttribute(name);\n  }\n }\n\naddClass(el: any, name: string): void {\n  el.classList.add(name);\n  }\n\nremoveClass(el: any, name: string): void\n{\n  el.classList.remove(name);\n  }\n\nsetStyle(el: any, style: string, value: any, flags: RendererStyleFlags2):\nvoid {\n  if (flags & (RendererStyleFlags2.DashCase | RendererStyleFlags2.Important)) {\n  el.style.setProperty(style, value, flags & RendererStyleFlags2.Important ? 'important' : '');\n  } else {\n  el.style[style] = value;\n  }\n  }\n\nremoveStyle(el: any, style: string, flags: RendererStyleFlags2):\nvoid {\n  if (flags & RendererStyleFlags2.DashCase) {\n  el.style.removeProperty(style);\n  } else {\n  // IE\n  requires " instead of null\n  // see https://github.com/angular/angular/issues/7916\n  el.style[style] = "";\n  }\n  }\n\nsetProperty(el: any, name: string, value: any): void {\n  NG_DEV_MODE &&\n  checkNoSyntheticProp(name, 'property');\n  el[name] = value;\n  }\n\nsetValue(node: any, value: string): void {\n  node.nodeValue = value;\n  }\n\nlisten(target: 'window'|'document'|'body'|any, event: string, callback: (event: any)\n=> boolean):\n  () => void {\n  NG_DEV_MODE && checkNoSyntheticProp(event, 'listener');\n  if (typeof\n  target === 'string') {\n  return <() => void>this.eventManager.addGlobalEventListener(\n  target, event,\n  decoratePreventDefault(callback));\n  }\n  return <() => void>this.eventManager.addEventListener(\n  target, event, decoratePreventDefault(callback)) as () => void;\n  }\n}\n\nconst AT_CHARCODE = ((() =>\n'@'.charCodeAt(0));\nfunction checkNoSyntheticProp(name: string, nameKind: string) {\n  if\n  (name.charCodeAt(0) === AT_CHARCODE) {\n  throw new Error(`Unexpected synthetic ${nameKind} ${name}`\n  found. Please make sure that:\n  - Either `BrowserAnimationsModule` or `NoopAnimationsModule` are\n  imported in your application.\n  - There is corresponding configuration for the animation named `_${\n  name}`\n  defined in the `animations` field of the `@Component` decorator (see\n  https://angular.io/api/core/Component#animations.`);\n  }\n}\n\nfunction isTemplateNode(node: any): node is\nHTMLTemplateElement {\n  return node.tagName === 'TEMPLATE' && node.content !== undefined;\n  }\n}\n\nclass\nEmulatedEncapsulationDomRenderer2 extends DefaultDomRenderer2 {\n  private contentAttr: string;\n  private\n  hostAttr: string;\n\n  constructor(\n  eventManager: EventManager, sharedStylesHost: DomSharedStylesHost,\n  private component:\n  RendererType2, appId: string) {\n  super(eventManager);\n  const styles = flattenStyles(appId + '-' +\n  component.id, component.styles, []);\n  sharedStylesHost.addStyles(styles);\n\n  this.contentAttr =\n  shimContentAttribute(appId + '-' + component.id);\n  this.hostAttr = shimHostAttribute(appId + '-' +\n  component.id);\n  }\n\n  applyToHost(element: any) {\n  super.setAttribute(element, this.hostAttr, "");\n  }\n\n  override createElement(parent: any, name: string): Element {\n  const el = super.createElement(parent, name);\n  super.setAttribute(el, this.contentAttr, "");\n  return el;\n  }\n}\n\nclass ShadowDomRenderer extends\nDefaultDomRenderer2 {\n  private shadowRoot: any;\n\n  constructor(\n  eventManager: EventManager, private\n  sharedStylesHost: DomSharedStylesHost,\n  private hostEl: any, component: RendererType2) {\n  super(eventManager);\n  this.shadowRoot =\n  (hostEl as any).attachShadow({mode: 'open'});\n  this.sharedStylesHost.addHost(this.shadowRoot);\n  const\n  styles = flattenStyles(component.id, component.styles, []);\n  for (let i = 0; i < styles.length; i++) {\n  const\n  styleEl = document.createElement('style');\n  styleEl.textContent = styles[i];\n  this.shadowRoot.appendChild(styleEl);\n  }\n  }\n\n  private nodeOrShadowRoot(node: any): any {\n  return node\n  === this.hostEl ? this.shadowRoot : node;\n  }\n\n  override destroy() {\n  this.sharedStylesHost.removeHost(this.shadowRoot);\n  }\n\n  override appendChild(parent: any, newChild: any):\n  void {\n  return super.appendChild(this.nodeOrShadowRoot(parent), newChild);\n  }\n\n  override\n  insertBefore(parent: any, newChild: any, refChild: any): void {\n  return\n  super.insertBefore(this.nodeOrShadowRoot(parent), newChild, refChild);\n  }\n\n  override removeChild(parent: any,\n  oldChild: any): void {\n  return super.removeChild(this.nodeOrShadowRoot(parent), oldChild);\n  }\n\n  override parentNode(node: any): any {\n  return\n  this.nodeOrShadowRoot(super.parentNode(this.nodeOrShadowRoot(node)));\n  }\n}\n\n"/**\n * @license\n *\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license\n * that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {DOCUMENT} from

```

```

'@angular/common';\nimport {Inject, Injectable} from '@angular/core';\nimport {EventManagerPlugin} from
'./event_manager';\n\n@Injectable()\nexport class DomEventsPlugin extends EventManagerPlugin {\n
constructor(@Inject(DOCUMENT) doc: any) {\n  super(doc);\n }\n\n // This plugin should come last in the list of
plugins, because it accepts all\n // events.\n override supports(eventName: string): boolean {\n  return true;\n
}\n\n override addEventListener(element: HTMLElement, eventName: string, handler: Function): Function {\n
element.addEventListener(eventName, handler as EventListener, false);\n
  return () => this.removeEventListener(element, eventName, handler as EventListener);\n }\n\n
removeEventListener(target: any, eventName: string, callback: Function): void {\n  return
target.removeEventListener(eventName, callback as EventListener);\n }\n}\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {DOCUMENT, getDOM as getDOM} from
'@angular/common';\nimport {Inject, Injectable, NgZone} from '@angular/core';\nimport {EventManagerPlugin}
from './event_manager';\n\n/**\n * Defines supported modifiers for key events.\n */\nconst MODIFIER_KEYS =
['alt', 'control', 'meta', 'shift'];\n\n// The following values are here for cross-browser compatibility and to match the
W3C standard\n// cf https://www.w3.org/TR/DOM-Level-3-Events-key/\nconst _keyMap: {[k: string]: string} = {\n
  '\\b': 'Backspace',\n  '\\t': 'Tab',\n  '\\x7F': 'Delete',\n  '\\x1B': 'Escape',\n  'Del': 'Delete',\n  'Esc': 'Escape',\n  'Left': 'ArrowLeft',\n  'Right':
'ArrowRight',\n  'Up': 'ArrowUp',\n  'Down': 'ArrowDown',\n  'Menu': 'ContextMenu',\n  'Scroll': 'ScrollLock',\n
  'Win': 'OS'\n};\n\n/**\n * Retrieves modifiers from key-event objects.\n */\nconst MODIFIER_KEY_GETTERS:
{[key: string]: (event: KeyboardEvent) => boolean} = {\n  'alt': (event: KeyboardEvent) => event.altKey,\n
  'control': (event: KeyboardEvent) => event.ctrlKey,\n  'meta': (event: KeyboardEvent) => event.metaKey,\n
  'shift': (event: KeyboardEvent) => event.shiftKey\n};\n\n/**\n * @publicApi\n * A browser plug-in that provides support
for handling of key events in Angular.\n */\n@Injectable()\nexport class KeyEventsPlugin extends
EventManagerPlugin {\n  /**\n   * Initializes an instance of the browser plug-in.\n   * @param doc The document in
which key events will be detected.\n   */\n  constructor(@Inject(DOCUMENT) doc: any) {\n    super(doc);\n  }\n\n
  /**\n   * Reports whether a named key event is supported.\n   * @param eventName The event name to query.\n   *
@return True if the named key event is supported.\n   */\n  override supports(eventName: string): boolean {\n
    return KeyEventsPlugin.parseEventName(eventName) != null;\n  }\n\n  /**\n   * Registers a handler for a specific
element and key event.\n   * @param element The HTML element to receive event notifications.\n   * @param
eventName The name of the key event to listen for.\n   * @param handler A function to call when the notification
occurs. Receives the\n   * event object as an argument.\n   * @returns The key event that was registered.\n   */\n
  override addEventListener(element: HTMLElement, eventName: string, handler: Function): Function {\n    const
parsedEvent = KeyEventsPlugin.parseEventName(eventName);\n    const outsideHandler =\n
    KeyEventsPlugin.eventCallback(parsedEvent['fullKey'], handler, this.manager.getZone());\n    return
this.manager.getZone().runOutsideAngular()\n    => {\n      return getDOM().onAndCancel(element, parsedEvent['domEventName'], outsideHandler);\n    };\n  }\n\n
  /**\n   * Parses the user provided full keyboard event definition and normalizes it for\n   * later internal use. It
ensures the string is all lowercase, converts special\n   * characters to a standard spelling, and orders all the values
consistently.\n   * @param eventName The name of the key event to listen for.\n   * @returns an object with
the full, normalized string, and the dom event name\n   * or null in the case when the event doesn't match a keyboard
event.\n   */\n  static parseEventName(eventName: string): {fullKey: string, domEventName: string}|null {\n    const
parts: string[] = eventName.toLowerCase().split('.');\n    const domEventName = parts.shift();\n    if ((parts.length
=== 0) || !(domEventName === 'keydown' || domEventName === 'keyup')) {\n      return null;\n    }\n    const key
= KeyEventsPlugin._normalizeKey(parts.pop());\n\n    let fullKey = '';\n    let codeIX = parts.indexOf('code');\n    if (codeIX > -1) {\n      parts.splice(codeIX, 1);\n
      fullKey = 'code.';\n    }\n    MODIFIER_KEYS.forEach(modifierName => {\n      const index: number =
parts.indexOf(modifierName);\n      if (index > -1) {\n        parts.splice(index, 1);\n        fullKey += modifierName +
'.';\n      }\n    });\n    fullKey += key;\n\n    if (parts.length != 0 || key.length === 0) {\n      // returning null instead of

```

```

throwing to let another plugin process the event\n    return null;\n    }\n\n    // NOTE: Please don't rewrite this as so,
as it will break JSCompiler property renaming.\n    //    The code must remain in the `result['domEventName']`
form.\n    // return { domEventName, fullKey};\n    const result: { fullKey: string, domEventName: string } = {} as
any;\n    result['domEventName'] = domEventName;\n    result['fullKey'] = fullKey;\n    return result;\n    }\n\n    /**\n    * Determines whether the actual
keys pressed match the configured key code string.\n    * The `fullKeyCode` event is normalized in the
`parseEventName` method when the\n    * event is attached to the DOM during the `addEventListener` call. This is
unseen\n    * by the end user and is normalized for internal consistency and parsing.\n    * @param event The
keyboard event.\n    * @param fullKeyCode The normalized user defined expected key event string\n    * @returns
boolean.\n    */\n    static matchEventFullKeyCode(event: KeyboardEvent, fullKeyCode: string): boolean {\n    let
keycode = _keyMap[event.key] || event.key;\n    let key = ";\n    if (fullKeyCode.indexOf('code.') > -1) {\n
keycode = event.code;\n    key = 'code.';\n    }\n    // the keycode could be unidentified so we have to check here\n
if (keycode === null || !keycode) return false;\n    keycode = keycode.toLowerCase();\n    if (keycode === ' ') {\n
keycode = 'space'; // for readability\n    } else if (keycode === '.') {\n    keycode =
'dot'; // because '.' is used as a separator in event names\n    }\n    MODIFIER_KEYS.forEach(modifierName =>
{\n    if (modifierName !== keycode) {\n    const modifierGetter =
MODIFIER_KEY_GETTERS[modifierName];\n    if (modifierGetter(event)) {\n    key += modifierName +
.';\n    }\n    }\n    });\n    key += keycode;\n    return key === fullKeyCode;\n    }\n\n    /**\n    * Configures a
handler callback for a key event.\n    * @param fullKey The event name that combines all simultaneous
keystrokes.\n    * @param handler The function that responds to the key event.\n    * @param zone The zone in which
the event occurred.\n    * @returns A callback function.\n    */\n    static eventCallback(fullKey: string, handler:
Function, zone: NgZone): Function {\n    return (event: KeyboardEvent) => {\n    if
(KeyEventsPlugin.matchEventFullKeyCode(event, fullKey)) {\n    zone.runGuarded(() => handler(event));\n
}\n    };\n    }\n\n    /** @internal */\n    static _normalizeKey(keyName:
string): string {\n    // TODO: switch to a Map if the mapping grows too much\n    switch (keyName) {\n    case
'esc':\n    return 'escape';\n    default:\n    return keyName;\n    }\n    }\n\n    /**\n    * @license\n    * Copyright
Google LLC All Rights Reserved.\n    * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n    */\n\n    import { CommonModule, DOCUMENT,
XhrFactory, PLATFORM_BROWSER_ID as PLATFORM_BROWSER_ID } from '@angular/common';\n    import
{ APP_ID, ApplicationModule, ApplicationRef, createPlatformFactory, ErrorHandler, ImportedNgModuleProviders,
Inject, InjectionToken, ModuleWithProviders, NgModule, NgZone, Optional, PLATFORM_ID,
PLATFORM_INITIALIZER, platformCore, PlatformRef, Provider, RendererFactory2, SkipSelf, StaticProvider,
Testability, TestabilityRegistry, Type, INJECTOR_SCOPE as INJECTOR_SCOPE, internalCreateApplication as
internalCreateApplication, setDocument, TESTABILITY
as TESTABILITY, TESTABILITY_GETTER as TESTABILITY_GETTER } from '@angular/core';\n    import
{ BrowserDomAdapter } from './browser/browser_adapter';\n    import { SERVER_TRANSITION_PROVIDERS,
TRANSITION_ID } from './browser/server-transition';\n    import { BrowserGetTestability } from
'./browser/testability';\n    import { BrowserXhr } from './browser/xhr';\n    import { DomRendererFactory2 } from
'./dom/dom_renderer';\n    import { DomEventsPlugin } from './dom/events/dom_events';\n    import
{ EVENT_MANAGER_PLUGINS, EventManager } from './dom/events/event_manager';\n    import
{ KeyEventsPlugin } from './dom/events/key_events';\n    import { DomSharedStylesHost, SharedStylesHost } from
'./dom/shared_styles_host';\n\n    const NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
!ngDevMode;\n\n    /**\n    * Set of config options available during the application bootstrap operation.\n    */\n
* @developerPreview\n    * @publicApi\n    */\n    export interface ApplicationConfig {\n    /**\n    * List of providers that
should be available to the root component and
all its children.\n    */\n    providers: Array<Provider|ImportedNgModuleProviders>;\n    }\n\n    /**\n    * Bootstraps an
instance of an Angular application and renders a standalone component as the\n    * application's root component.
More information about standalone components can be found in [this\n    * guide](guide/standalone-components).\n

```

```

*\n * @usageNotes\n * The root component passed into this function *must* be a standalone one (should have the\n
* `standalone: true` flag in the `@Component` decorator config).\n *\n * ```typescript\n * @Component({\n * standalone: true,\n * template: 'Hello world!\n * })\n * class RootComponent {}\n *\n * const appRef: ApplicationRef = await bootstrapApplication(RootComponent);\n *\n * ```\n *\n * You can add the list of providers that should be available in the application injector by\n * specifying the `providers` field in an object passed as the second argument:\n *\n * ```typescript\n * await bootstrapApplication(RootComponent, {\n * providers: [\n * {provide: BACKEND_URL, useValue: 'https://yourdomain.com/api'}\n * ]\n * });\n *\n * ```\n *\n * The `importProvidersFrom` helper method can be used to collect all providers from any\n * existing NgModule (and transitively from all NgModules that it imports):\n *\n * ```typescript\n * await bootstrapApplication(RootComponent, {\n * providers: [\n * importProvidersFrom(SomeNgModule)\n * ]\n * });\n *\n * ```\n *\n * Note: the `bootstrapApplication` method doesn't include [Testability](api/core/Testability) by\n * default. You can add [Testability](api/core/Testability) by getting the list of necessary\n * providers using `provideProtractorTestingSupport()` function and adding them into the `providers`\n * array, for example:\n *\n * ```typescript\n * import {provideProtractorTestingSupport} from '@angular/platform-browser';\n *\n * await bootstrapApplication(RootComponent, {\n * providers: [provideProtractorTestingSupport()]\n * });\n *\n * ```\n *\n * @param rootComponent A reference to a standalone component that should be rendered.\n *\n * @param options Extra configuration for the bootstrap operation, see `ApplicationConfig` for\n * additional info.\n *\n * @returns A promise that returns an `ApplicationRef` instance once resolved.\n *\n * @publicApi\n * @developerPreview\n */\n\nexport function bootstrapApplication(\n rootComponent: Type<unknown>, options?: ApplicationConfig): Promise<ApplicationRef> {\n return\n internalCreateApplication({rootComponent, ...createProvidersConfig(options)});\n }\n\n/**\n * Create an instance of an Angular application without bootstrapping any components. This is useful\n * for the situation where one wants to decouple application environment creation (a platform and\n * associated injectors) from rendering components on a screen. Components can be subsequently\n * bootstrapped on the returned `ApplicationRef`.\n *\n * @param options Extra configuration for the application environment, see `ApplicationConfig` for\n * additional info.\n *\n * @returns A promise that returns an `ApplicationRef` instance once resolved.\n *\n * @publicApi\n * @developerPreview\n */\n\nexport function createApplication(options?: ApplicationConfig) {\n return\n internalCreateApplication(createProvidersConfig(options));\n }\n\nfunction createProvidersConfig(options?: ApplicationConfig) {\n return {\n appProviders: [\n ...BROWSER_MODULE_PROVIDERS,\n ...(options?.providers ?? []),\n ],\n platformProviders: INTERNAL_BROWSER_PLATFORM_PROVIDERS\n };\n }\n\n/**\n * Returns a set of providers required to setup [Testability](api/core/Testability) for an\n * application bootstrapped using the `bootstrapApplication` function. The set of providers is\n * needed to support testing an application with Protractor (which relies on the Testability APIs\n * to be present).\n *\n * @returns An array of providers required to setup Testability for an application and make it\n * available for testing using Protractor.\n *\n * @developerPreview\n */\n\nexport function provideProtractorTestingSupport(): Provider[] {\n // Return a copy to prevent changes to the original array in case any in-place\n // alterations are performed to the `provideProtractorTestingSupport` call results in app code.\n return [...TESTABILITY_PROVIDERS];\n }\n\nexport function initDomAdapter() {\n BrowserDomAdapter.makeCurrent();\n }\n\nexport function errorHandler(): ErrorHandler {\n return new ErrorHandler();\n }\n\nexport function _document(): any {\n // Tell ivy about the global document\n setDocument(document);\n return document;\n }\n\nexport const\n INTERNAL_BROWSER_PLATFORM_PROVIDERS: StaticProvider[] = [\n {provide: PLATFORM_ID, useValue: PLATFORM_BROWSER_ID},\n {provide: PLATFORM_INITIALIZER, useValue: initDomAdapter, multi: true},\n {provide: DOCUMENT, useFactory: _document, deps: []},\n ];\n\n/**\n * A factory function that returns a `PlatformRef` instance associated with browser service\n * providers.\n *\n * @publicApi\n * @developerPreview\n */\n\nexport const platformBrowser: (extraProviders?: StaticProvider[]) => PlatformRef =\n createPlatformFactory(platformCore, 'browser', INTERNAL_BROWSER_PLATFORM_PROVIDERS);\n\n

```

Internal marker to signal whether providers from the `BrowserModule` are already present in DI. This is needed to avoid loading `BrowserModule` providers twice. We can't rely on the `BrowserModule` presence itself, since the standalone-based bootstrap just imports `BrowserModule` providers without referencing the module itself.

```

const BROWSER_MODULE_PROVIDERS_MARKER =
  new InjectionToken(NG_DEV_MODE ?
    'BrowserModule Providers Marker' : '');
const TESTABILITY_PROVIDERS = [
  { provide: TESTABILITY_GETTER, useClass: BrowserGetTestability, deps: [], },
  { provide: TESTABILITY, useClass: Testability, deps: [NgZone, TestabilityRegistry, TESTABILITY_GETTER] },
  { provide: Testability, // Also provide as `Testability` for backwards-compatibility.
    useClass: Testability, deps: [NgZone, TestabilityRegistry, TESTABILITY_GETTER] },
];
const BROWSER_MODULE_PROVIDERS: Provider[] = [
  { provide: INJECTOR_SCOPE, useValue: 'root' },
  { provide: ErrorHandler, useFactory: errorHandler, deps: [] },
  { provide: EVENT_MANAGER_PLUGINS, useClass: DomEventsPlugin, multi: true, deps: [DOCUMENT, NgZone, PLATFORM_ID] },
  { provide: EVENT_MANAGER_PLUGINS, useClass: KeyEventsPlugin, multi: true, deps: [DOCUMENT] },
  { provide: DomRendererFactory2, useClass: DomRendererFactory2, deps: [EventManager, DomSharedStylesHost, APP_ID] },
  { provide: RendererFactory2, useExisting: DomRendererFactory2 },
  { provide: SharedStylesHost, useExisting: DomSharedStylesHost },
  { provide: DomSharedStylesHost, useClass: DomSharedStylesHost, deps: [DOCUMENT] },
  { provide: EventManager, useClass: EventManager, deps: [EVENT_MANAGER_PLUGINS, NgZone] },
  { provide: XhrFactory, useClass: BrowserXhr, deps: [] },
];
NG_DEV_MODE ? { provide: BROWSER_MODULE_PROVIDERS_MARKER, useValue: true } : [];

```

\* Exports required infrastructure for all Angular apps. \* Included by default in all Angular apps created with the CLI \* `new` command. \* Re-exports `CommonModule` and `ApplicationModule`, making their exports and providers available to all apps.

```

@publicApi
@NgModule({
  providers: [
    ...BROWSER_MODULE_PROVIDERS,
    ...TESTABILITY_PROVIDERS
  ],
  exports: [CommonModule, ApplicationModule],
})
export class BrowserModule {
  constructor(@Optional() @SkipSelf()
    @Inject(BROWSER_MODULE_PROVIDERS_MARKER)
    providersAlreadyPresent: boolean | null) {
    if (NG_DEV_MODE && providersAlreadyPresent) {
      throw new Error(
        `Providers from the \`${BrowserModule}\` have already been loaded. If you need access
        to common directives such as NgIf and NgFor, import the \`${CommonModule}\` instead.`);
    }
  }
}

```

\* Configures a browser-based app to transition from a server-rendered app, if one is present on the page.

```

@param
params An object containing an identifier for the app to transition.
* The ID must match between the client and server versions of the app.
* @returns The reconfigured `BrowserModule` to import into the app's root `AppModule`.
*/
static withServerTransition(params: { appId: string }):
ModuleWithProviders<BrowserModule> {
  return {
    ngModule: BrowserModule,
    providers: [
      { provide: APP_ID, useValue: params.appId },
      { provide: TRANSITION_ID, useExisting: APP_ID },
      ...SERVER_TRANSITION_PROVIDERS,
    ],
  };
}

```

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```

import { DOCUMENT, DomAdapter as DomAdapter, getDOM as getDOM } from '@angular/common';
import { Inject, Injectable, inject } from '@angular/core';

```

\* Represents the attributes of an HTML `` element. The element itself is represented by the internal `HTMLMetaElement`.

```

@see [HTML meta tag](https://developer.mozilla.org/docs/Web/HTML/Element/meta)
@see `Meta`
@publicApi
export type MetaDefinition = {
  charset?: string;
  content?: string;
  httpEquiv?: string;
  id?: string;
  itemprop?: string;
  name?: string;
  property?: string;
  scheme?: string;
  url?: string;
} & {
  //
  TODO(IgorMinar): this type looks wrong
  [prop: string]: string;
};

```

\* Factory to create a `Meta` service instance for the current DOM document.

```

export function createMeta() {
  return new Meta(inject(DOCUMENT));
}

```

\* A service for managing HTML `` tags. \* Properties of the `MetaDefinition` object match the attributes of the HTML `` tag. These tags define document metadata that is important for

\* things like configuring a Content Security Policy, defining browser compatibility and security settings, setting HTTP Headers, defining rich content for social sharing, and Search Engine Optimization (SEO). To identify specific `<meta>` tags in a document, use an attribute selection string in the format `"tag_attribute='value string'"`. For example, an `attrSelector` value of `"name='description'"` matches a tag whose `name` attribute has the value `"description"`. Selectors are used with the `querySelector()` Document method, in the format `meta[{attrSelector}]`. @see [HTML meta tag](https://developer.mozilla.org/docs/Web/HTML/Element/meta) @see [Document.querySelector()](https://developer.mozilla.org/docs/Web/API/Document/querySelector)

```

@publicApi
@Injectable({providedIn: 'root', useFactory: createMeta, deps: []})
export class Meta {
  private _dom: DomAdapter;
  constructor(@Inject(DOCUMENT) private _doc: any) {
    this._dom = getDOM();
  }
  /**
   * Retrieves or creates a specific <meta> tag element in the current HTML document. In searching for an existing tag, Angular attempts to match the name or property attribute values in the provided tag definition, and verifies that all other attribute values are equal. If an existing element is found, it is returned and is not modified in any way.
   * @param tag The definition of a <meta> element to match or create.
   * @param forceCreation True to create a new element without checking whether one already exists.
   * @returns The existing element with the same attributes and values if found, the new element if no match is found, or null if the tag parameter is not defined.
   */
  addTag(tag: MetaDefinition, forceCreation: boolean = false): HTMLMetaElement | null {
    if (!tag) return null;
    return this._getOrCreateElement(tag, forceCreation);
  }
  /**
   * Retrieves or creates a set of <meta> tag elements in the current HTML document. In searching for an existing tag, Angular attempts to match the name or property attribute values in the provided tag definition, and verifies that all other attribute values are equal.
   * @param tags An array of tag definitions to match or create.
   * @param forceCreation True to create new elements without checking whether they already exist.
   * @returns The matching elements if found, or the new elements.
   */
  addTags(tags: MetaDefinition[], forceCreation: boolean = false): HTMLMetaElement[] {
    if (!tags) return [];
    return tags.reduce((result: HTMLMetaElement[], tag: MetaDefinition) => {
      if (tag) {
        result.push(this._getOrCreateElement(tag, forceCreation));
      }
      return result;
    }, []);
  }
  /**
   * Retrieves a <meta> tag element in the current HTML document.
   * @param attrSelector The tag attribute and value to match against, in the format "tag_attribute='value string'".
   * @returns The matching element, if any.
   */
  getTag(attrSelector: string): HTMLMetaElement | null {
    if (!attrSelector) return null;
    return this._doc.querySelector(`meta[${attrSelector}]`) || null;
  }
  /**
   * Retrieves a set of <meta> tag elements in the current HTML document.
   * @param attrSelector The tag attribute and value to match against, in the format "tag_attribute='value string'".
   * @returns The matching elements, if any.
   */
  getTags(attrSelector: string): HTMLMetaElement[] {
    if (!attrSelector) return [];
    const list /*NodeList*/ = this._doc.querySelectorAll(`meta[${attrSelector}]`);
    return list ? [].slice.call(list) : [];
  }
  /**
   * Modifies an existing <meta> tag element in the current HTML document.
   * @param tag The tag description with which to replace the existing tag content.
   * @param selector A tag attribute and value to match against, to identify an existing tag. A string in the format "tag_attribute='value string'". If not supplied, matches a tag with the same name or property attribute value as the replacement tag.
   * @return The modified element.
   */
  updateTag(tag: MetaDefinition, selector?: string): HTMLMetaElement | null {
    if (!tag) return null;
    selector = selector || this._parseSelector(tag);
    const meta: HTMLMetaElement = this.getTag(selector)!;
    if (meta) {
      return this._setMetaElementAttributes(tag, meta);
    }
    return this._getOrCreateElement(tag, true);
  }
  /**
   * Removes an existing <meta> tag element from the current HTML document.
   * @param attrSelector A tag attribute and value to match against, to identify an existing tag. A string in the format "tag_attribute='value string'".
   */
  removeTag(attrSelector: string): void {
    this.removeTagElement(this.getTag(attrSelector)!);
  }
  /**
   * Removes an existing <meta> tag element

```



```

from the current HTML document.\n * @param meta The tag definition to match against to identify an existing
tag.\n */\n removeTagElement(meta: HTMLMetaElement): void {\n if (meta) {\n this._dom.remove(meta);\n }\n }\n\n private _getOrCreateElement(meta: MetaDefinition, forceCreation: boolean = false):\n HTMLMetaElement {\n if (!forceCreation) {\n const selector: string = this._parseSelector(meta);\n // It's
allowed to have multiple elements with the same name so it's not enough to\n // just check that element with the
same name already present on the page. We also need to\n // check if element has tag attributes\n const elem =
this.getTags(selector).filter(elem => this._containsAttributes(meta, elem))[0];\n if (elem !== undefined) return
elem;\n }\n const element: HTMLMetaElement = this._dom.createElement('meta') as HTMLMetaElement;\n
this._setMetaElementAttributes(meta, element);\n const head = this._doc.getElementsByTagName('head')[0];\n
head.appendChild(element);\n return element;\n }\n\n private _setMetaElementAttributes(tag: MetaDefinition,
el: HTMLMetaElement): HTMLMetaElement {\n Object.keys(tag).forEach(\n (prop: string) =>
el.setAttribute(this._getMetaKeyMap(prop), tag[prop]));\n return el;\n }\n\n private _parseSelector(tag:
MetaDefinition): string {\n const attr: string = tag.name ? 'name' : 'property';\n return
`${attr}=${tag[tag[attr]]}`;\n }\n\n private _containsAttributes(tag: MetaDefinition, elem: HTMLMetaElement):
boolean {\n return Object.keys(tag).every(\n (key: string) => elem.getAttribute(this._getMetaKeyMap(key))
=== tag[key]);\n }\n\n private _getMetaKeyMap(prop: string): string {\n return META_KEYS_MAP[prop] ||
prop;\n }\n}\n\n/**\n * Mapping for MetaDefinition properties with their correct meta attribute names\n */\nconst
META_KEYS_MAP: {[prop: string]: string;} = {\n httpEquiv: 'http-equiv'\n};\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {DOCUMENT, getDOM as getDOM} from
'@angular/common';\nimport {Inject, Injectable, inject} from '@angular/core';\n\n/**\n * Factory to create Title
service.\n */\nexport function createTitle() {\n return new Title(inject(DOCUMENT));\n}\n\n/**\n * A service that
can be used to get and set the title of a current HTML document.\n * Since an Angular application can't be
bootstrapped on the entire HTML document (<html> tag)\n * it is not possible to bind to the `text` property of the
`HTMLTitleElement` elements\n * (representing the <title> tag). Instead, this service can be used to set and get
the current\n * title value.\n */\n * @publicApi\n */\n@Injectable({providedIn: 'root', useFactory: createTitle, deps:
[]})\nexport class Title {\n constructor(@Inject(DOCUMENT) private _doc: any)\n {}\n\n /**\n * Get the title of the current HTML document.\n */\n getTitle(): string {\n return this._doc.title;\n
}\n\n /**\n * Set the title of the current HTML document.\n * @param newTitle\n */\n setTitle(newTitle:
string) {\n this._doc.title = newTitle || '';\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {global as global} from '@angular/core';\n\nconst
CAMEL_CASE_REGEXP = /[A-Z]/g;\nconst DASH_CASE_REGEXP = /[a-z]/g;\n\nexport function
camelCaseToDashCase(input: string): string {\n return input.replace(CAMEL_CASE_REGEXP, (...m: string[]) =>
'-' + m[1].toLowerCase());\n}\n\nexport function dashCaseToCamelCase(input: string): string {\n return
input.replace(DASH_CASE_REGEXP, (...m: string[]) => m[1].toUpperCase());\n}\n\n/**\n * Exports the value
under a given `name` in
the global property `ng`. For example `ng.probe` if\n * `name` is `probe`.\n * @param name Name under which it
will be exported. Keep in mind this will be a property of the\n * global `ng` object.\n * @param value The value to
export.\n */\nexport function exportNgVar(name: string, value: any): void {\n if (typeof COMPILED ===
'undefined' || !COMPILED) {\n // Note: we can't export `ng` when using closure enhanced optimization as:\n // -
closure declares globals itself for minified names, which sometimes clobber our `ng` global\n // - we can't declare
a closure extern as the namespace `ng` is already used within Google\n // for typings for angularJS (via
`goog.provide('ng...')`).\n const ng = global['ng'] = (global['ng'] as {[key: string]: any} | undefined) || {};\n
ng[name] = value;\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file
at https://angular.io/license\n */\n\nconst win = typeof window !== 'undefined' && window || <any>{};\nexport
{win as window};\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source

```

```

code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 *
 * \n\nimport {ApplicationRef, ComponentRef} from '@angular/core';\nimport {window} from
 './browser';\n\nexport class ChangeDetectionPerfRecord {\n  constructor(public msPerTick: number, public
 numTicks: number) {\n  }\n}\n\n/**\n * Entry point for all Angular profiling-related debug tools. This object
 * corresponds to the `ng.profiler` in the dev console.\n *
 * \n\nexport class AngularProfiler {\n  appRef:
 ApplicationRef;\n\n  constructor(ref: ComponentRef<any>) {\n    this.appRef = ref.injector.get(ApplicationRef);\n
  }\n\n  // tslint:disable:no-console\n  /**\n   * Exercises change detection in a loop and then prints the average
 amount of
   * time in milliseconds
   *
   * how long a single round of change detection takes for
   * the current state of the UI. It runs a minimum of 5
 rounds for a minimum
   * of 500 milliseconds.\n   *
   * Optionally, a user may pass a `config` parameter
 containing a map of
   * options. Supported options are:\n   *
   * `record` (boolean) - causes the profiler to record
 a CPU profile while
   * it exercises the change detector. Example:\n   *
   * ```\n   *
   * ng.profiler.timeChangeDetection({record: true})\n   *
   * ```\n   *
   * \n\nexport function timeChangeDetection(config: any):
 ChangeDetectionPerfRecord {\n  const record = config && config['record'];\n  const profileName = 'Change
 Detection';\n  // Profiler is not available in Android browsers without dev tools opened\n  const
 isProfilerAvailable = window.console.profile != null;\n  if (record && isProfilerAvailable) {\n
 window.console.profile(profileName);\n  }\n  const start = performanceNow();\n  let numTicks = 0;\n  while
 (numTicks < 5 || (performanceNow()
 - start) < 500) {\n    this.appRef.tick();\n    numTicks++;\n  }\n  const end = performanceNow();\n  if (record
 && isProfilerAvailable) {\n    window.console.profileEnd(profileName);\n  }\n  const msPerTick = (end - start) /
 numTicks;\n  window.console.log(`ran ${numTicks} change detection cycles`);\n
 window.console.log(`${msPerTick.toFixed(2)} ms per check`);\n  return new
 ChangeDetectionPerfRecord(msPerTick, numTicks);\n}\n\nfunction performanceNow() {\n  return
 window.performance && window.performance.now ? window.performance.now() :\n
 new Date().getTime();\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of
 this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at
 https://angular.io/license\n *
 * \n\nimport {ComponentRef} from '@angular/core';\nimport {exportNgVar} from
 './../dom/util';\nimport {AngularProfiler} from './common_tools';\n\nconst
 PROFILER_GLOBAL_NAME = 'profiler';\n\n/**\n * Enabled Angular debug tools that are accessible via your
 browser's\n * developer console.\n *
 * Usage:\n *
 * 1. Open developer console (e.g. in Chrome Ctrl + Shift +
 j)\n *
 * 1. Type `ng.` (usually the console will show auto-complete suggestion)\n *
 * 1. Try the change detection profiler
 `ng.profiler.timeChangeDetection()`\n *
 * then hit Enter.\n *
 * @publicApi\n *
 * \n\nexport function
 enableDebugTools<T>(ref: ComponentRef<T>): ComponentRef<T> {\n
 exportNgVar(PROFILER_GLOBAL_NAME, new AngularProfiler(ref));\n  return ref;\n}\n\n/**\n * Disables
 Angular tools.\n *
 * @publicApi\n *
 * \n\nexport function disableDebugTools(): void {\n
 exportNgVar(PROFILER_GLOBAL_NAME, null);\n}\n\n", /**\n * @license\n * Copyright Google LLC All Rights
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 * found in the
 LICENSE file at https://angular.io/license\n *
 * \n\nimport {DOCUMENT} from '@angular/common';\nimport
 {APP_ID, inject, Injectable, NgModule} from '@angular/core';\n\nexport function escapeHtml(text: string):
 string {\n  const escapedText: {[k: string]: string} = {\n    '&': '&a;',\n    '\\': '&q;',\n    '\\\"': '&s;',\n    '<': '&l;',\n    '>':
 '&g;',\n  };\n  return text.replace(/([<>])/g, s => escapedText[s]);\n}\n\nexport function unescapeHtml(text:
 string): string {\n  const unescapedText: {[k: string]: string} = {\n    '&a;': '&',\n    '&q;': '\\',\n    '&s;': '\\\"',\n    '&l;':
 '<',\n    '&g;': '>',\n  };\n  return text.replace(/([&]+)/g, s => unescapedText[s]);\n}\n\n/**\n * A type-safe key to use
 with `TransferState`.\n *
 * Example:\n *
 * ```\n *
 * const COUNTER_KEY =
 makeStateKey<number>('counter');\n *
 * let value = 10;\n *
 * transferState.set(COUNTER_KEY, value);\n *
 * ```\n *
 * @publicApi\n *
 * \n\nexport type StateKey<T> = string & {\n  __not_a_string: never,\n  __value_type?:
 T,\n}\n\n/**\n * Create a `StateKey<T>` that can be used to store value of type

```

```

T with `TransferState`.
Example:
const COUNTER_KEY =
makeStateKey<number>('counter');
let value = 10;
transferState.set(COUNTER_KEY, value);

@publicApi
export function makeStateKey<T = void>(key: string): StateKey<T> {
  return key as StateKey<T>;
}

A key value store that is transferred from the application on the server side to the application on the client side.
The `TransferState` is available as an injectable token.
On the client, just inject this token using DI and use it, it will be lazily initialized.
On the server it's already included if `renderApplication` function is used.
Otherwise, import the `ServerTransferStateModule` module to make the `TransferState` available.
The values in the store are serialized/deserialized using JSON.stringify/JSON.parse.
So only boolean, number, string, null and non-class objects will be serialized and deserialized in a non-lossy manner.

@publicApi
@Injectable({
  providedIn: 'root',
  useFactory: () => {
    const doc = inject(DOCUMENT);
    const appId = inject(APP_ID);
    const state = new TransferState();
    state.store = retrieveTransferredState(doc, appId);
    return state;
  }
})
export class TransferState {
  private store: {[k: string]: unknown|undefined} = {};
  private onSerializeCallbacks: {[k: string]: () => unknown|undefined} = {};

  /**
   * Get the value corresponding to a key. Return `defaultValue` if key is not found.
   */
  get<T>(key: StateKey<T>, defaultValue: T): T {
    return this.store[key] !== undefined ? this.store[key] as T : defaultValue;
  }

  /**
   * Set the value corresponding to a key.
   */
  set<T>(key: StateKey<T>, value: T): void {
    this.store[key] = value;
  }

  /**
   * Remove a key from the store.
   */
  remove<T>(key: StateKey<T>): void {
    delete this.store[key];
  }

  /**
   * Test whether a key exists in the store.
   */
  hasKey<T>(key: StateKey<T>): boolean {
    return this.store.hasOwnProperty(key);
  }

  /**
   * Indicates whether the state is empty.
   */
  get isEmpty(): boolean {
    return Object.keys(this.store).length === 0;
  }

  /**
   * Register a callback to provide the value for a key when `toJson` is called.
   */
  onSerialize<T>(key: StateKey<T>, callback: () => T): void {
    this.onSerializeCallbacks[key] = callback;
  }

  /**
   * Serialize the current state of the store to JSON.
   */
  toJson(): string {
    // Call the onSerialize callbacks and put those values into the store.
    for (const key in this.onSerializeCallbacks) {
      if (this.onSerializeCallbacks.hasOwnProperty(key)) {
        try {
          this.store[key] = this.onSerializeCallbacks[key]();
        } catch (e) {
          console.warn('Exception in onSerialize callback: ', e);
        }
      }
    }
    return JSON.stringify(this.store);
  }

  retrieveTransferredState(doc: Document, appId: string) {
    // Locate the script tag with the JSON data transferred from the server.
    // The id of the script tag is set to the Angular appId + 'state'.
    const script = doc.getElementById(appId + '-state');
    let initialState = {};
    if (script && script.textContent) {
      // Avoid using any here as it triggers lint errors in google3 (any is not allowed).
      initialState = JSON.parse(unescapeHtml(script.textContent)) as {};
    } catch (e) {
      console.warn('Exception while restoring TransferState for app ' + appId, e);
    }
    return initialState;
  }
}

@NgModule({})
export class BrowserTransferStateModule {}

/**
 * @license
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 */
import {getDOM as getDOM} from '@angular/common';
import {DebugElement, DebugNode, Predicate, Type} from '@angular/core';

Predicates for use with {@link DebugElement}'s query functions.

@publicApi
export class By {
  /**
   * Match all nodes.
   */
  @usageNotes
  ### Example
  * {@example platform-browser/dom/debug/ts/by/by.ts region='by_all'}

  static all(): Predicate<DebugNode> {
    return () => true;
  }

  /**
   * Match elements by the given CSS selector.
   */
  @usageNotes
  ### Example
  * {@example platform-browser/dom/debug/ts/by/by.ts region='by_css'}

  static css(selector: string): Predicate<DebugElement> {
    return (debugElement) => {
      return debugElement.nativeElement !== null ?
        elementMatches(debugElement.nativeElement,

```

```

selector):\n      false;\n    };\n  }\n\n  /**\n   * Match nodes that have the given directive present.\n   *\n   * @usageNotes\n   * ### Example\n   *\n   * {@example platform-browser/dom/debug/ts/by/by.ts\n   region='by_directive'}\n   *\n   * ^\n   * static directive(type: Type<any>): Predicate<DebugNode> {\n   *   return (debugNode)\n   => debugNode.providerTokens!.indexOf(type) !== -1;\n   * }\n\n  function elementMatches(n: any, selector: string):\n  boolean {\n   * if (getDOM().isElementNode(n)) {\n   *   return n.matches && n.matches(selector) ||\n   *   n.msMatchesSelector && n.msMatchesSelector(selector) ||\n   *   n.webkitMatchesSelector &&\n   *   n.webkitMatchesSelector(selector);\n   * }\n   * return false;\n   * }\n\n  /**\n   * @license\n   * Copyright Google LLC All\n   * Rights Reserved.\n   * Use of this source code is governed by an MIT-style license that can be\n   * found in the\n   * LICENSE file at https://angular.io/license\n   *\n  import {DOCUMENT} from '@angular/common';\n  import\n  {Inject, Injectable, InjectionToken, NgModule, Optional, Provider, Console as Console} from\n  '@angular/core';\n  import {EVENT_MANAGER_PLUGINS, EventManagerPlugin} from\n  './event_manager';\n\n  /**\n   * Supported HammerJS recognizer event names.\n   *\n   * ^\n   * const EVENT_NAMES = {\n   *   // pan\n   *   'pan': true,\n   *   'panstart': true,\n   *   'panmove': true,\n   *   'panend': true,\n   *   'pancancel': true,\n   *   'panleft': true,\n   *   'panright': true,\n   *   'panup': true,\n   *   'pandown': true,\n   *   // pinch\n   *   'pinch': true,\n   *   'pinchstart': true,\n   *   'pinchmove':\n   *   true,\n   *   'pinchend': true,\n   *   'pinchcancel': true,\n   *   'pinchin': true,\n   *   'pinchout': true,\n   *   // press\n   *   'press': true,\n   *   'pressup': true,\n   *   // rotate\n   *   'rotate': true,\n   *   'rotatestart': true,\n   *   'rotatemove': true,\n   *   'rotateend': true,\n   *   'rotatecancel': true,\n   *   // swipe\n   *   'swipe': true,\n   *   'swipeleft': true,\n   *   'swiperight': true,\n   *   'swipeup': true,\n   *   'swipedown': true,\n   *   // tap\n   *   'tap': true,\n   *   'doubletap': true\n   * }; \n\n  /**\n   * DI token for providing\n   * [HammerJS](https://hammerjs.github.io/) support to Angular.\n   *\n   * @see `HammerGestureConfig`\n   *\n   * @ngModule HammerModule\n   *\n   * @publicApi\n   * ^\n   * export const HAMMER_GESTURE_CONFIG = new\n   * InjectionToken<HammerGestureConfig>('HammerGestureConfig');\n\n  /**\n   * Function that loads HammerJS,\n   * returning a promise that is resolved once HammerJs is loaded.\n   *\n   * @publicApi\n   * ^\n   * export type\n   * HammerLoader = () => Promise<void>;\n\n  /**\n   * Injection token used to provide a { @link HammerLoader } to\n   * Angular.\n   *\n   * @publicApi\n   * ^\n   * export const HAMMER_LOADER = new\n   * InjectionToken<HammerLoader>('HammerLoader');\n\n  export interface HammerInstance {\n   * on(eventName:\n   * string, callback?: Function): void;\n   * off(eventName: string, callback?: Function): void;\n   * destroy?():\n   * void;\n   * }\n\n  /**\n   * An injectable [HammerJS Manager](https://hammerjs.github.io/api/#hammermanager)\n   * for\n   * gesture recognition. Configures specific event recognition.\n   *\n   * @publicApi\n   * ^\n   * @Injectable()\n   * export class\n   * HammerGestureConfig\n   *\n   * {\n   *   /**\n   *    * A set of supported event names for gestures to be used in Angular.\n   *    * Angular supports all built-in\n   *    * recognizers, as listed in\n   *    * [HammerJS documentation](https://hammerjs.github.io/).\n   *    * ^\n   *    * events: string[] =\n   *    * [];\n   *    * /**\n   *    * Maps gesture event names to a set of configuration options\n   *    * that specify overrides to the default\n   *    * values for specific properties.\n   *    * ^\n   *    * The key is a supported event name to be configured,\n   *    * and the options\n   *    * object contains a set of properties, with override values\n   *    * to be applied to the named recognizer event.\n   *    * For\n   *    * example, to disable recognition of the rotate event, specify\n   *    * `{"rotate": {"enable": false}}`.\n   *    * ^\n   *    * Properties that are not present take the HammerJS default values.\n   *    * For information about which properties are\n   *    * supported for which events,\n   *    * and their allowed and default values, see\n   *    * [HammerJS\n   *    * documentation](https://hammerjs.github.io/).\n   *    * ^\n   *    * overrides: {[key: string]:\n   *    * Object} = {};\n   *    * /**\n   *    * Properties whose default values can be overridden for a given event.\n   *    * Different sets\n   *    * of properties apply to different events.\n   *    * For information about which properties are supported for which\n   *    * events,\n   *    * and their allowed and default values, see\n   *    * [HammerJS\n   *    * documentation](https://hammerjs.github.io/).\n   *    * ^\n   *    * options?: {\n   *    *   cssProps?: any;\n   *    *   domEvents?: boolean;\n   *    *   enable?: boolean | ((manager: any) => boolean);\n   *    *   preset?: any[];\n   *    *   touchAction?: string;\n   *    *   recognizers?:\n   *    *   any[];\n   *    *   inputClass?: any;\n   *    *   inputTarget?: EventTarget;\n   *    *   };\n   *    * /**\n   *    * Creates a [HammerJS\n   *    * Manager](https://hammerjs.github.io/api/#hammermanager)\n   *    * and attaches it to a given HTML element.\n   *    * ^\n   *    * @param element The element that will recognize gestures.\n   *    * @returns A HammerJS event-manager object.\n   *    * ^\n   *    * buildHammer(element: HTMLElement): HammerInstance {\n   *    *   const mc = new Hammer!(element,\n   *    *   this.options);\n   *    *   mc.get('pinch').set({enable:

```

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true});\n mc.get('rotate').set({enable: true});\n\n for (const eventName in this.overrides) {\n
mc.get(eventName).set(this.overrides[eventName]);\n }\n\n return mc;\n }\n}\n\n/**\n * Event plugin that adds
Hammer support to an application.\n *\n * @ngModule HammerModule\n */\n@injectable()\nexport class
HammerGesturesPlugin extends EventManagerPlugin {\n private _loaderPromise: Promise<void>|null = null;\n\n
constructor(\n @Inject(DOCUMENT) doc: any,\n @Inject(HAMMER_GESTURE_CONFIG) private
_config: HammerGestureConfig, private console: Console,\n @Optional() @Inject(HAMMER_LOADER)
private loader?: HammerLoader|null) {\n super(doc);\n }\n\n override supports(eventName: string): boolean {\n
if (!EVENT_NAMES.hasOwnProperty(eventName.toLowerCase()) && !this.isCustomEvent(eventName)) {\n
return false;\n }\n\n if (!(window as any).Hammer && !this.loader) {\n if (typeof ngDevMode ===
'undefined' || ngDevMode) {\n this.console.warn(\n
`The \`${eventName}\` event cannot be bound because Hammer.JS is not ` +\n
`loaded and no
custom loader has been specified.`);\n }\n\n return false;\n }\n\n return true;\n }\n\n override
addEventListener(element: HTML<Element>, eventName: string, handler: Function): Function {\n const zone =
this.manager.getZone();\n eventName = eventName.toLowerCase();\n\n // If Hammer is not present but a loader
is specified, we defer adding the event listener\n // until Hammer is loaded.\n if (!(window as any).Hammer &&
this.loader) {\n this._loaderPromise = this._loaderPromise || zone.runOutsideAngular(() => this.loader!());\n //
This `addEventListener` method returns a function to remove the added listener.\n // Until Hammer is loaded, the
returned function needs to *cancel* the registration rather\n // than remove anything.\n let cancelRegistration
= false;\n let deregister: Function = () => {\n
cancelRegistration = true;\n }; \n\n zone.runOutsideAngular(\n () => this._loaderPromise!\n
.then(() => {\n // If Hammer isn't actually loaded when the custom loader resolves, give up.\n
if (!(window as any).Hammer) {\n if (typeof ngDevMode === 'undefined' || ngDevMode) {\n
this.console.warn(\n `The custom HAMMER_LOADER completed, but Hammer.JS is
not present.`);\n }\n\n deregister = () => {};\n return;\n }\n\n
if (!cancelRegistration) {\n // Now that Hammer is loaded and the listener is being loaded
for real,\n // the deregistration function changes from canceling registration to\n //
removal.\n deregister = this.addEventListener(element,\n
eventName, handler);\n }\n\n })\n .catch(() => {\n if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n this.console.warn(\n `The
\`${eventName}\` event cannot be bound because the custom ` +\n
`Hammer.JS loader failed.`);\n }\n\n deregister = () => {};\n });\n\n // Return a function that *executes*
`deregister` (and not `deregister` itself) so that we\n // can change the behavior of `deregister` once the listener
is added. Using a closure in\n // this way allows us to avoid any additional data structures to track listener
removal.\n return () => {\n deregister();\n }; \n }\n\n return zone.runOutsideAngular(() => {\n //
Creating the manager bind events, must be done outside of angular\n const mc =
this._config.buildHammer(element);\n\n const callback = function(eventObj: HammerInput) {\n zone.runGuarded(function() {\n
handler(eventObj);\n });\n });\n mc.on(eventName, callback);\n return () => {\n
mc.off(eventName, callback);\n // destroy mc to prevent memory leak\n if (typeof mc.destroy ===
'function') {\n mc.destroy();\n }\n });\n }\n\n isCustomEvent(eventName: string): boolean {\n
return this._config.events.indexOf(eventName) > -1;\n }\n}\n\n/**\n * Adds support for HammerJS.\n *\n * Import
this module at the root of your application so that Angular can work with\n * HammerJS to detect gesture events.\n
*\n * Note that applications still need to include the HammerJS script itself. This module\n * simply sets up the
coordination layer between HammerJS and Angular's EventManager.\n *\n * @publicApi\n */\n@ngModule({\n
providers: [\n {\n provide: EVENT_MANAGER_PLUGINS,\n useClass: HammerGesturesPlugin,\n
multi: true,\n deps: [DOCUMENT, HAMMER_GESTURE_CONFIG, Console, [new Optional(),
HAMMER_LOADER]]\n },\n {\n provide: HAMMER_GESTURE_CONFIG,\n useClass: HammerGestureConfig,\n
deps: []\n },\n ]\n})\nexport class HammerModule {\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights

```

Reserved.

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```

import {DOCUMENT} from '@angular/common';
import {forwardRef, Inject, Injectable, Injector, Sanitizer, SecurityContext, _sanitizeHtml as _sanitizeHtml, _sanitizeUrl as _sanitizeUrl, allowSanitizationBypassAndThrow as allowSanitizationBypassOrThrow, bypassSanitizationTrustHtml as bypassSanitizationTrustHtml, bypassSanitizationTrustResourceUrl as bypassSanitizationTrustResourceUrl, bypassSanitizationTrustScript as bypassSanitizationTrustScript, bypassSanitizationTrustStyle as bypassSanitizationTrustStyle, bypassSanitizationTrustUrl as bypassSanitizationTrustUrl, BypassType as BypassType, getSanitizationBypassType as getSanitizationBypassType, unwrapSafeValue as unwrapSafeValue} from '@angular/core';
export {SecurityContext};

/**
 * Marker interface for a value that's safe to use in a particular context.
 */
@publicApi
export interface SafeValue {}

/**
 * Marker interface for a value that's safe to use as HTML.
 */
@publicApi
export interface SafeHtml extends SafeValue {}

/**
 * Marker interface for a value that's safe to use as style (CSS).
 */
@publicApi
export interface SafeStyle extends SafeValue {}

/**
 * Marker interface for a value that's safe to use as JavaScript.
 */
@publicApi
export interface SafeScript extends SafeValue {}

/**
 * Marker interface for a value that's safe to use as a URL linking to a document.
 */
@publicApi
export interface SafeUrl extends SafeValue {}

/**
 * Marker interface for a value that's safe to use as a URL to load executable code from.
 */
@publicApi
export interface SafeResourceUrl extends SafeValue {}

DomSanitizer helps preventing Cross Site Scripting Security bugs (XSS) by sanitizing values to be safe to use in the different DOM contexts. For example, when binding a URL in an <a [href]="someValue"> hyperlink, someValue will be sanitized so that an attacker cannot inject e.g. a javascript: URL that would execute code on the website. In specific situations, it might be necessary to disable sanitization, for example if the application genuinely needs to produce a javascript: style link with a dynamic value in it. Users can bypass security by constructing a value with one of the bypassSecurityTrust... methods, and then binding to that value from the template. These situations should be very rare, and extraordinary care must be taken to avoid creating a Cross Site Scripting (XSS) security bug!

When using bypassSecurityTrust..., make sure to call the method as early as possible and as close as possible to the source of the value, to make it easy to verify no security bug is created by its use. It is not required (and not recommended) to bypass security if the value is safe, e.g. a URL that does not start with a suspicious protocol, or an HTML snippet that does not contain dangerous code. The sanitizer leaves safe values intact.

@security Calling any of the bypassSecurityTrust... APIs disables Angular's built-in sanitization for the value passed in. Carefully check and audit all values and code paths going into this call. Make sure any user data is appropriately escaped for this security context. For more detail, see the [Security Guide](https://g.co/ng/security).

@publicApi
@Injectable({providedIn: 'root', useExisting: forwardRef(() => DomSanitizerImpl)})
export abstract class DomSanitizer implements Sanitizer {
  /**
   * Sanitizes a value for use in the given SecurityContext.
   * If value is trusted for the context, this method will unwrap the contained safe value and use it directly. Otherwise, value will be sanitized to be safe in the given context, for example by replacing URLs that have an unsafe protocol part (such as javascript:). The implementation is responsible to make sure that the value can definitely be safely used in the given context.
   */
  abstract sanitize(context: SecurityContext, value: SafeValue|string|null): string|null;

  /**
   * Bypass security and trust the given value to be safe HTML. Only use this when the bound HTML is unsafe (e.g. contains <script> tags) and the code should be executed. The sanitizer will leave safe HTML intact, so in most situations this method should not be used.
   */
  /**
   * ***WARNING:*** calling this method with untrusted user data exposes your application to XSS security risks!
   */
  abstract bypassSecurityTrustHtml(value: string): SafeHtml;

  /**
   * Bypass security and trust the given value to be safe style value (CSS).
   */
  /**
   * ***WARNING:*** calling this method with untrusted user data exposes your application to XSS security risks!
   */
  abstract bypassSecurityTrustStyle(value: string): SafeStyle;

  /**
   * Bypass security and trust the given value to be safe JavaScript.
   */
  /**
   * ***WARNING:*** calling this

```

```

method with untrusted user data exposes your application to XSS\n * security risks!\n */\n abstract
bypassSecurityTrustScript(value: string): SafeScript;\n\n /**\n * Bypass security and trust the given value to be a
safe style URL, i.e. a value that can be used\n * in hyperlinks or `<img src>`.\n */\n * **WARNING:** calling
this method with untrusted user data exposes your application to XSS\n * security risks!\n */\n abstract
bypassSecurityTrustUrl(value: string): SafeUrl;\n\n /**\n * Bypass security
and trust the given value to be a safe resource URL, i.e. a location that may\n * be used to load executable code
from, like `<script src>`, or `<iframe src>`.\n */\n * **WARNING:** calling this method with untrusted user data
exposes your application to XSS\n * security risks!\n */\n abstract bypassSecurityTrustResourceUrl(value:
string): SafeResourceUrl;\n}\n\nexport function domSanitizerImplFactory(injector: Injector) {\n return new
DomSanitizerImpl(injector.get(DOCUMENT));\n}\n\n@Injectable({providedIn: 'root', useFactory:
domSanitizerImplFactory, deps: [Injector]})\nexport class DomSanitizerImpl extends DomSanitizer {\n
constructor(@Inject(DOCUMENT) private _doc: any) {\n super();\n }\n\n override sanitize(ctx: SecurityContext,
value: SafeValue|string|null): string|null {\n if (value == null) return null;\n switch (ctx) {\n case
SecurityContext.NONE:\n return value as string;\n case SecurityContext.HTML:\n if
(allowSanitizationBypassOrThrow(value,
BypassType.Html)) {\n return unwrapSafeValue(value);\n } else {\n return _sanitizeHtml(this._doc,
String(value)).toString();\n } case SecurityContext.STYLE:\n if (allowSanitizationBypassOrThrow(value,
BypassType.Style)) {\n return unwrapSafeValue(value);\n } else {\n return value as string;\n } case
SecurityContext.SCRIPT:\n if (allowSanitizationBypassOrThrow(value, BypassType.Script)) {\n return
unwrapSafeValue(value);\n } else {\n throw new Error('unsafe value used in a script context');\n } case
SecurityContext.URL:\n if (allowSanitizationBypassOrThrow(value, BypassType.Url)) {\n return
unwrapSafeValue(value);\n } else {\n return _sanitizeUrl(String(value));\n } case
SecurityContext.RESOURCE_URL:\n if (allowSanitizationBypassOrThrow(value, BypassType.ResourceUrl))
{\n return unwrapSafeValue(value);\n } else {\n throw new Error(\n 'unsafe
value used in a resource URL context (see https://g.co/ng/security#xss)');\n default:\n throw new
Error(`Unexpected SecurityContext ${ctx} (see https://g.co/ng/security#xss)`);\n }\n }\n }\n\n override
bypassSecurityTrustHtml(value: string): SafeHtml {\n return bypassSanitizationTrustHtml(value);\n }\n\n override
bypassSecurityTrustStyle(value: string): SafeStyle {\n return bypassSanitizationTrustStyle(value);\n }\n\n override
bypassSecurityTrustScript(value: string): SafeScript {\n return bypassSanitizationTrustScript(value);\n }\n\n
override bypassSecurityTrustUrl(value: string): SafeUrl {\n return bypassSanitizationTrustUrl(value);\n }\n\n
override bypassSecurityTrustResourceUrl(value: string): SafeResourceUrl {\n return
bypassSanitizationTrustResourceUrl(value);\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n
*/\n\nexport {getDOM} from '@angular/common';\nexport {initDomAdapter as initDomAdapter,
INTERNAL_BROWSER_PLATFORM_PROVIDERS as INTERNAL_BROWSER_PLATFORM_PROVIDERS}
from './browser';\nexport {BrowserDomAdapter as BrowserDomAdapter} from './browser/browser_adapter';\nexport
{TRANSITION_ID as TRANSITION_ID} from './browser/server-transition';\nexport {BrowserGetTestability as
BrowserGetTestability} from './browser/testability';\nexport {escapeHtml as escapeHtml} from
'./browser/transfer_state';\nexport {DomRendererFactory2 as DomRendererFactory2, flattenStyles as flattenStyles,
NAMESPACE_URIS as NAMESPACE_URIS, shimContentAttribute as shimContentAttribute, shimHostAttribute
as shimHostAttribute} from './dom/dom_renderer';\nexport {DomEventsPlugin as DomEventsPlugin} from
'./dom/events/dom_events';\nexport {HammerGesturesPlugin as HammerGesturesPlugin} from
'./dom/events/hammer_gestures';\nexport {KeyEventsPlugin as KeyEventsPlugin} from
'./dom/events/key_events';\nexport
{DomSharedStylesHost as DomSharedStylesHost, SharedStylesHost as SharedStylesHost} from
'./dom/shared_styles_host';\nexport {DomSanitizerImpl as DomSanitizerImpl} from
'./security/dom_sanitization_service';\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n

```

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```

    * @module
    * @description
    * Entry point for all public APIs of the
    * platform-browser package.
    *
    * @publicApi
    *
    * @license
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    * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at
    * https://angular.io/license
    *
    * @module
    * @description
    * Entry point for all public APIs of this package.
    *
    * This file only reexports content of the `src` folder. Keep it that way.
    *
    * @license
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    *
    * Use of this source code is governed by an MIT-style license that can be found
    * in the LICENSE file at https://angular.io/license
    *
    * This file is not used to build this module. It is only used
    * during editing by the TypeScript language service and during build for verification. `ngc` replaces this file
    * with production index.ts when it rewrites private symbol names.
    *
    * Generated bundle index. Do not edit.
    *
    * from './index';
    * names: ["DomAdapter", "setRootDomAdapter", "parseCookieValue", "getDOM", "global", "NG_DEV_
    * MODE", "internalCreateApplication", "PLATFORM_BROWSER_ID", "TESTABILITY_GETTER", "TESTABILIT
    * Y", "INJECTOR_SCOPE", "window", "Console", "allowSanitizationBypassOrThrow", "unwrapSafeValue", "_sanitize
    * Html", "_sanitizeUrl", "bypassSanitizationTrustHtml", "bypassSanitizationTrustStyle", "bypassSanitizationTrustScript
    * ", "bypassSanitizationTrustUrl", "bypassSanitizationTrustResourceUrl"], mappings: ";;;;;;;;;AAAA;;;;;;;;;AAMG;AA
    * MH;;;;;;;;;AAKG;AACG,MAAgB,wBAAYB,SAAQA,WAAU,CAAA;AAAJE,IAAA,WAAA,GAAA;;QACW,IAAiB,
    * CAAA,iBAAA,GAAY,IAAI,CAAC;KAC5C;AAAA;ACpBD;;;;;;;;;AAMG;AAMH;;;;;;;;;AAKG;AACH;AACM,MAA
    * O,iBAaKB,SAAQ,wBAAwB,CAAA;AAC7D,IAAA,OAAO,WAAW,GAAA;AACHB,QAAAC,kBAaiB,CAAC,IA
    * AI,iBAaiB,EAAE,CAAC,CAAC;KAC5C;AAED,IAAA,WAAW,CAAC,EAAQ,EAAE,GAAQ,EAAE,QAAA,EAA
    * A;QAC3C,EAAE,CAAC,gBAaGB,CAAC,GAAG,EAAE,QAAQ,EAAE,KAAK,CAAC,CAAC;;AAG1C,QAAA,
    * OAAO,MAAK;YACV,EAAE,CAAC,mBAaMB,CAAC,GAAG,EAAE,QAAQ,EAAE,KAAK,CAAC,CAAC;AAC
    * /C,SAAC,CAAC;KACH;IACD,aAAa,CAAC,EAAQ,EAAE,GAAQ,EAAA;AAC9B,QAAA,EAAE,CAAC,aAAa,C
    * AAC,GAAG,CAAC,CAAC;KACvB;AACD,IAAA,MAAM,CAAC,IAAU,EAAA;QACf,IAAI,IAAI,CAAC,UAUU
    * ,EAAE;AACnB,YAAA,IAAI,CAAC,UAUU,CAAC,WAAW,CAAC,IAAI,CAAC,CAAC;AACnC,SAAA;KACf;I
    * ACD,aAAa,CAAC,OAAe,EAAE,GAAC,EAAA;AAC3C,QAAA,GAAG,GAAG,GAAG,IAAI,IAAI,CAAC,kBAaK
    * B,EAAE,CAAC;AACvC,QAAA,OAAO,GAAG,CAAC,aAAa,CAAC,OAAO,CAAC,CAAC;KACnC;IACD,kBAA
    * kB,GAAA;QACHB,OAAO,QAAQ,CAAC,cAAc,CAAC,kBAaKB,CAAC,WAAW,CAAC,CAAC;KACHe;IACD,k
    * BAaKB,GAAA;AACHB,QAAA,OAAO,QAAQ,CAAC;KACjB;AAED,IAAA,aAAa,CAAC,IAAU,EAAA;AACtB,
    * QAAA,OAAO,IAAI,CAAC,QAAQ,KAAK,IAAI,CAAC,YAAY,CAAC;KAC5C;AAED,IAAA,YAAY,CAAC,IAA
    * S,EAAA;QACpB,OAAO,IAAI,YAAY,gBAaGB,CAAC;KACzC;;IAGD,oBAAoB,CAAC,GAAa,EAAE,MAAc,E
    * AAA;QACHd,IAAI,MAAM,KAAK,QAAQ,EAAE;AACvB,YAAA,OAAO,MAAM,CAAC;AACf,SAAA;QACD,IAAI,MAAM,K
    * AAK,MAAM,EAAE;YACrB,OAAO,GAAG,CAAC,IAAI,CAAC;AACjB,SAAA;AACD,QAAA,OAAO,IAAI,CA
  
```



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Q,EAAA;IAC5B,cAAc,GAAG,cAAc,IAAI,QAAQ,CAAC,aAAa,CAAC,GAAG,CAAC,CAAC;AAC/D,IAAA,cA  
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YAAA,KAAC,IAAI,CAAC,GAAG,CAAC,EAAE,CAAC,GAAG,MAAM,CAAC,MAAM,EAAE,CAAC,EAAE,E  
AAE;gBACtC,GAAG,CAAC,MAAM,CAAC,MAAM,CAAC,CAAC,CAAC,CAAC;AACvB,aAAA;AACH  
,SAAC,CAAC,CAAC;AACL,KAAC,CAAC;AACJ,CAAC;AAEM,MAAM,2BAA2B,GAAqB;AAC3D,IAAA;AA  
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AU,EAAA,UAAA,EAAA,CAAA;kBADtB,UAAU;;;ACdX;;;;;AAMG;AAKH;;;AAIG;MACU,qBAAqB,GAC9B,  
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browser/src/dom/debug/by.ts", "../..../..../packages/platform-
browser/src/dom/events/hammer_gestures.ts", "../..../..../packages/platform-
browser/src/security/dom_sanitization_service.ts", "../..../..../packages/platform-
browser/src/private_export.ts", "../..../..../packages/platform-
browser/src/version.ts", "../..../..../packages/platform-browser/src/platform-
browser.ts", "../..../..../packages/platform-browser/public_api.ts", "../..../..../packages/platform-
browser/index.ts", "../..../..../packages/platform-browser/platform-browser.ts"], "sourcesContent": ["/**\n
 * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport
{DomAdapter as DomAdapter} from '@angular/common';\n\n\n/**\n * Provides DOM operations in any browser
environment.\n *\n * @security Tread carefully! Interacting with the DOM directly is dangerous and\n * can
introduce XSS risks.\n *\nexport abstract class GenericBrowserDomAdapter extends DomAdapter {\n  readonly
supportsDOMEvents: boolean = true;\n}\n"/>**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\nimport {parseCookieValue as parseCookieValue, setRootDomAdapter as
setRootDomAdapter} from '@angular/common';\n\n\nimport {GenericBrowserDomAdapter}
from './generic_browser_adapter';\n\n/**\n * A `DomAdapter` powered by full browser DOM APIs.\n *\n *
@security Tread carefully! Interacting with the DOM directly is dangerous and\n * can introduce XSS risks.\n
*/\n\nexport class BrowserDomAdapter extends
GenericBrowserDomAdapter {\n  static makeCurrent() {\n    setRootDomAdapter(new BrowserDomAdapter());\n
  }\n\n  onAndCancel(el: Node, evt: any, listener: any): Function {\n    el.addEventListener(evt, listener, false);\n
  }\n\n  // Needed to follow Dart's subscription semantic, until fix of\n
// https://code.google.com/p/dart/issues/detail?id=17406\n  return () => {\n    el.removeEventListener(evt, listener,
false);\n  }; \n}\n\n  dispatchEvent(el: Node, evt: any) {\n    el.dispatchEvent(evt);\n  }\n\n  remove(node: Node): void
{\n    if (node.parentNode) {\n      node.parentNode.removeChild(node);\n    }\n  }\n\n  createElement(tagName:
string, doc?: Document): HTMLElement
{\n    doc = doc || this.getDefaultDocument();\n    return doc.createElement(tagName);\n  }\n\n  createHtmlDocument(): Document {\n
return document.implementation.createHTMLDocument('fakeTitle');\n }\n\n  getDefaultDocument(): Document {\n
return document;\n }\n\n  isElementNode(node: Node): boolean {\n
return node.nodeType === Node.ELEMENT_NODE;\n }\n\n  isShadowRoot(node: any): boolean {\n    return node
instanceof DocumentFragment;\n }\n\n  /** @deprecated No longer being used in Ivy code. To be removed in
version 14. *\n  getGlobalEventTarget(doc: Document, target: string): EventTarget|null {\n    if (target ===
'window') {\n      return window;\n    }\n    if (target === 'document') {\n      return doc;\n    }\n    if (target ===
'body') {\n      return doc.body;\n    }\n    return null;\n  }\n\n  getBaseHref(doc: Document): string|null {\n
const href = getBaseElementHref();\n    return href == null ? null : relativePath(href);\n  }\n\n  resetBaseElement(): void {\n
baseElement = null;\n }\n\n  getUserAgent(): string {\n    return window.navigator.userAgent;\n }\n\n  getCookie(name: string):
string|null {\n    return parseCookieValue(document.cookie, name);\n }\n}\n\n\nlet baseElement: HTMLElement|null
= null;\n\nfunction getBaseElementHref(): string|null {\n    baseElement = baseElement ||
document.querySelector('base');\n    return baseElement ? baseElement.getAttribute('href') : null;\n}\n\n// based on
```

```

urlUtils.js in AngularJS 1\nlet urlParsingNode: HTMLAnchorElement[undefined];\nfunction relativePath(url: any):
string {\n  urlParsingNode = urlParsingNode || document.createElement('a');\n  urlParsingNode.setAttribute('href',
url);\n  const pathName = urlParsingNode.pathname;\n  return pathName.charAt(0) === '/' ? pathName :
`/${pathName}`;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport
{DOCUMENT, getDOM as getDOM} from '@angular/common';\nimport {APP_INITIALIZER,
ApplicationInitStatus, InjectionToken, Injector, StaticProvider} from '@angular/core';\n\n/**\n * An id that
identifies a particular application being bootstrapped, that should\n * match across the client/server boundary.\n
*/\nexport const TRANSITION_ID = new InjectionToken('TRANSITION_ID');\n\nexport function
appInitializerFactory(transitionId: string, document: any, injector: Injector) {\n  return () => {\n    // Wait for all
application initializers to be completed before removing the styles set by\n    // the server.\n    injector.get(ApplicationInitStatus).donePromise.then(() => {\n      const dom = getDOM();\n      const styles:
HTMLCollectionOf<HTMLStyleElement> =\n        document.querySelectorAll(`style[ng-
transition=${transitionId}]`);\n      for (let i = 0; i < styles.length; i++) {\n        dom.remove(styles[i]);\n      }\n    });\n  }\n}\n\nexport const SERVER_TRANSITION_PROVIDERS:
StaticProvider[] = [\n  {\n    provide: APP_INITIALIZER,\n    useFactory: appInitializerFactory,\n    deps:
[TRANSITION_ID, DOCUMENT, Injector],\n    multi: true\n  },\n];\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport {getDOM as getDOM} from
 '@angular/common';\nimport {GetTestability, Testability, TestabilityRegistry, global as global} from
 '@angular/core';\n\nexport class BrowserGetTestability implements GetTestability {\n  addToWindow(registry:
TestabilityRegistry): void {\n    global['getAngularTestability'] = (elem: any, findInAncestors: boolean = true) =>
{\n      const testability = registry.findTestabilityInTree(elem, findInAncestors);\n      if (testability == null) {\n
        throw new Error('Could not find testability for element.);\n      }\n      return testability;\n    };\n\n    global['getAllAngularTestabilities']
= () => registry.getAllTestabilities();\n\n    global['getAllAngularRootElements'] = () =>
registry.getAllRootElements();\n\n    const whenAllStable = (callback: any /** TODO #9100 */) => {\n      const
testabilities = global['getAllAngularTestabilities']();\n      let count = testabilities.length;\n      let didWork = false;\n      const decrement = function(didWork_: any /** TODO #9100 */) {\n        didWork = didWork || didWork_;\n        count--;\n        if (count == 0) {\n          callback(didWork);\n        }\n      };\n      testabilities.forEach(function(testability: any /** TODO #9100 */) {\n        testability.whenStable(decrement);\n      });\n    };\n\n    if (!global['frameworkStabilizers']) {\n      global['frameworkStabilizers'] = [];\n    }\n    global['frameworkStabilizers'].push(whenAllStable);\n  }\n\n  findTestabilityInTree(registry: TestabilityRegistry,
elem: any, findInAncestors: boolean):\n  Testability|null {\n    if (elem == null) {\n      return null;\n    }\n    const t = registry.getTestability(elem);\n    if (t != null) {\n      return t;\n    } else if
(!findInAncestors) {\n      return null;\n    }\n    if (getDOM().isShadowRoot(elem)) {\n      return
this.findTestabilityInTree(registry, (<any>elem).host, true);\n    }\n    return this.findTestabilityInTree(registry,
elem.parentElement, true);\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n *
Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {XhrFactory} from '@angular/common';\nimport {Injectable} from
 '@angular/core';\n\n/**\n * A factory for `HttpXhrBackend` that uses the `XMLHttpRequest` browser API.\n
*/\n@Injectable()\nexport class BrowserXhr implements XhrFactory {\n  build(): XMLHttpRequest {\n    return
new XMLHttpRequest();\n  }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {getDOM as getDOM} from '@angular/common';\nimport {Inject, Injectable, InjectionToken,
NgZone} from '@angular/core';\n\n/**\n * The injection token for the event-manager plug-in service.\n */\n

```

```
@publicApi\n *export const EVENT_MANAGER_PLUGINS =\n new\n InjectionToken<EventManagerPlugin[]>('EventManagerPlugins');\n\n\n * An injectable service that provides\n event management for Angular\n * through a browser plug-in.\n * * @publicApi\n *export class\n EventManager {\n private _plugins: EventManagerPlugin[];\n private _eventNameToPlugin = new Map<string,\n EventManagerPlugin>();\n\n\n * Initializes an instance of the event-manager service.\n *\n constructor(@Inject(EVENT_MANAGER_PLUGINS) plugins: EventManagerPlugin[], private _zone: NgZone) {\n plugins.forEach(p => p.manager = this);\n this._plugins = plugins.slice().reverse();\n }\n\n\n * Registers a handler for a specific element and event.\n * * @param element The HTML\n element to receive event notifications.\n * * @param eventName The name of the event to listen for.\n * * @param\n handler A function to call when the notification occurs. Receives the\n * event object as an argument.\n * * @returns A callback function that can be used to remove the handler.\n * *addEventListener(element:\n HTML<Element>, eventName: string, handler: Function): Function {\n const plugin =\n this._findPluginFor(eventName);\n return plugin.addEventListener(element, eventName, handler);\n }\n\n\n * Registers a global handler for an event in a target view.\n * * @param target A target for global event\n notifications. One of \"window\", \"document\", or \"body\".\n * * @param eventName The name of the event to\n listen for.\n * * @param handler A function to call when the notification occurs. Receives the\n * event object as an\n argument.\n\n * @returns A callback function that can be used to remove the handler.\n * @deprecated No longer being used in\n Ivy code. To be removed in version 14.\n * *addGlobalEventListener(target: string, eventName: string, handler:\n Function): Function {\n const plugin = this._findPluginFor(eventName);\n return\n plugin.addGlobalEventListener(target, eventName, handler);\n }\n\n\n * Retrieves the compilation zone in\n which event listeners are registered.\n * *getZone(): NgZone {\n return this._zone;\n }\n\n\n * @internal\n * _findPluginFor(eventName: string): EventManagerPlugin {\n const plugin =\n this._eventNameToPlugin.get(eventName);\n if (plugin) {\n return plugin;\n }\n\n\n const plugins =\n this._plugins;\n for (let i = 0; i < plugins.length; i++) {\n const plugin = plugins[i];\n if\n (plugin.supports(eventName)) {\n this._eventNameToPlugin.set(eventName, plugin);\n return plugin;\n }\n }\n\n\n throw new Error(`No\n event manager plugin found for event ${eventName}`);\n }\n}\n\n\nexport abstract class EventManagerPlugin {\n constructor(private _doc: any) {}\n\n\n // TODO(issue/24571): remove '!'.\n manager!: EventManager;\n\n\n abstract supports(eventName: string): boolean;\n\n\n abstract addEventListener(element: HTML<Element>, eventName: string,\n handler: Function): Function;\n\n\n addGlobalEventListener(element: string, eventName: string, handler: Function):\n Function {\n const target: HTML<Element> = getDOM().getGlobalEventTarget(this._doc, element);\n if (!target)\n {\n throw new Error(`Unsupported event target ${target} for event ${eventName}`);\n }\n\n\n return\n this.addEventListener(target, eventName, handler);\n }\n}\n\n\n\n\n * @license\n * Copyright Google LLC All\n Rights Reserved.\n\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n LICENSE file at https://angular.io/license\n\n\nimport {DOCUMENT, getDOM as getDOM} from\n '@angular/common';\nimport\n {Inject, Injectable, OnDestroy} from '@angular/core';\n\n\n@Inject()export class SharedStylesHost {\n\n\n * @internal\n * _protected _stylesSet = new Set<string>();\n\n\n addStyles(styles: string[]): void {\n const additions\n = new Set<string>();\n styles.forEach(style => {\n if (!this._stylesSet.has(style)) {\n this._stylesSet.add(style);\n additions.add(style);\n }\n });\n this.onStylesAdded(additions);\n }\n\n\n onStylesAdded(additions: Set<string>): void {\n }\n\n\n getAllStyles(): string[] {\n return\n Array.from(this._stylesSet);\n }\n}\n\n\n@Inject()export class DomSharedStylesHost extends\n SharedStylesHost implements OnDestroy {\n // Maps all registered host nodes to a list of style nodes that have been\n added to the host node.\n private _hostNodes = new Map<Node, Node[]>();\n\n\n constructor(@Inject(DOCUMENT) private _doc: any) {\n super();\n this._hostNodes.set(_doc.head, []);\n }\n\n\n private _addStylesToHost(styles:
```



```

Set<string>, host: Node, styleNodes: Node[]): void {\n  styles.forEach((style: string) => {\n    const styleEl =
this._doc.createElement('style');\n    styleEl.textContent = style;\n
styleNodes.push(host.appendChild(styleEl));\n  });\n}\n\n addHost(hostNode: Node): void {\n  const
styleNodes: Node[] = [];\n  this._addStylesToHost(this._stylesSet, hostNode, styleNodes);\n
this._hostNodes.set(hostNode, styleNodes);\n }\n\n removeHost(hostNode: Node): void {\n  const styleNodes =
this._hostNodes.get(hostNode);\n  if (styleNodes) {\n    styleNodes.forEach(removeStyle);\n  }\n
this._hostNodes.delete(hostNode);\n }\n\n override onStylesAdded(additions: Set<string>): void {\n
this._hostNodes.forEach((styleNodes, hostNode) => {\n  this._addStylesToHost(additions, hostNode,
styleNodes);\n });\n }\n\n ngOnDestroy(): void {\n  this._hostNodes.forEach(styleNodes =>
styleNodes.forEach(removeStyle));\n }\n}\n\nfunction removeStyle(styleNode: Node):
void {\n  getDOM().remove(styleNode);\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport { APP_ID, Inject, Injectable, Renderer2, RendererFactory2,
RendererStyleFlags2, RendererType2, ViewEncapsulation } from '@angular/core';\n\nimport {EventManager} from
'./events/event_manager';\n\nimport {DomSharedStylesHost} from './shared_styles_host';\n\nexport const
NAMESPACE_URI: {[ns: string]: string} = {\n  'svg': 'http://www.w3.org/2000/svg',\n  'xhtml':
'http://www.w3.org/1999/xhtml',\n  'xlink': 'http://www.w3.org/1999/xlink',\n  'xml':
'http://www.w3.org/XML/1998/namespace',\n  'xmlns': 'http://www.w3.org/2000/xmlns/',\n  'math':
'http://www.w3.org/1998/MathML/',\n};\n\nconst COMPONENT_REGEX = /%COMP%/g;\n\nconst
NG_DEV_MODE = typeof ngDevMode === 'undefined' || !ngDevMode;\n\nexport const
COMPONENT_VARIABLE = '%COMP%';\n\nexport
const HOST_ATTR = `_ngghost-${COMPONENT_VARIABLE}`;\n\nexport const CONTENT_ATTR =
`_ngcontent-${COMPONENT_VARIABLE}`;\n\nexport function shimContentAttribute(componentShortId:
string): string {\n  return CONTENT_ATTR.replace(COMPONENT_REGEX, componentShortId);\n}\n\nexport
function shimHostAttribute(componentShortId: string): string {\n  return
HOST_ATTR.replace(COMPONENT_REGEX, componentShortId);\n}\n\nexport function flattenStyles(\n
compId: string, styles: Array<any|any[]>, target: string[]): string[] {\n  for (let i = 0; i < styles.length; i++) {\n    let
style = styles[i];\n\n    if (Array.isArray(style)) {\n      flattenStyles(compId, style, target);\n    } else {\n      style =
style.replace(COMPONENT_REGEX, compId);\n      target.push(style);\n    }\n  }\n  return target;\n}\n\nfunction
decoratePreventDefault(eventHandler: Function): Function {\n  // `DebugNode.triggerEventHandler` needs to know
if the listener was created with\n  // decoratePreventDefault or is a listener
added outside the Angular context so it can handle the\n  // two differently. In the first case, the special
`__ngUnwrap__` token is passed to the unwrap\n  // the listener (see below).\n  return (event: any) => {\n    // Ivy
uses `__ngUnwrap__` as a special token that allows us to unwrap the function\n    // so that it can be invoked
programmatically by `DebugNode.triggerEventHandler`. The debug_node\n    // can inspect the listener toString
contents for the existence of this special token. Because\n    // the token is a string literal, it is ensured to not be
modified by compiled code.\n    if (event === `__ngUnwrap__`) {\n      return eventHandler;\n    }\n\n    const
allowDefaultBehavior = eventHandler(event);\n    if (allowDefaultBehavior === false) {\n      // TODO(tbosch):
move preventDefault into event plugins...\n      event.preventDefault();\n      event.returnValue = false;\n    }\n\n    return undefined;\n  };\n}\n\nlet hasLoggedNativeEncapsulationWarning = false;\n\n@Injectable()\nexport
class DomRendererFactory2 implements RendererFactory2 {\n  private rendererByCompId = new Map<string,
Renderer2>();\n  private defaultRenderer: Renderer2;\n\n  constructor(\n    private eventManager: EventManager,\n
private sharedStylesHost: DomSharedStylesHost,\n    @Inject(APP_ID) private appId: string) {\n    this.defaultRenderer = new DefaultDomRenderer2(eventManager);\n  }\n\n  createRenderer(element: any, type:
RendererType2|null): Renderer2 {\n    if (!element || !type) {\n      return this.defaultRenderer;\n    }\n\n    switch
(type.encapsulation) {\n      case ViewEncapsulation.Emulated: {\n        let renderer =
this.rendererByCompId.get(type.id);\n        if (!renderer) {\n          renderer = new
EmulatedEncapsulationDomRenderer2(\n            this.eventManager, this.sharedStylesHost, type, this.appId);\n

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this.rendererByCompId.set(type.id, renderer);\n    }\n
(<EmulatedEncapsulationDomRenderer2>renderer).applyToHost(element);\n
    return renderer;\n    }\n    // @ts-ignore TODO: Remove as part of FW-2290. TS complains about us dealing
with an enum\n    // value that is not known (but previously was the value for ViewEncapsulation.Native)\n    case
1:\n    case ViewEncapsulation.ShadowDom:\n        // TODO(FW-2290): remove the `case 1:` fallback logic and
the warning in v12.\n        if ((typeof ngDevMode === 'undefined' || ngDevMode) &&\n            // @ts-ignore
TODO: Remove as part of FW-2290. TS complains about us dealing with an\n            // enum value that is not
known (but previously was the value for\n            // ViewEncapsulation.Native)\n            !hasLoggedNativeEncapsulationWarning && type.encapsulation === 1) {\n
hasLoggedNativeEncapsulationWarning = true;\n            console.warn(\n                'ViewEncapsulation.Native is no
longer supported. Falling back to ViewEncapsulation.ShadowDom. The fallback will be removed in v12.);\n
        }\n\n        return new ShadowDomRenderer(this.eventManager,
this.sharedStylesHost, element, type);\n        default: {\n            if (!this.rendererByCompId.has(type.id)) {\n                const
styles = flattenStyles(type.id, type.styles, []);\n                this.sharedStylesHost.addStyles(styles);\n
this.rendererByCompId.set(type.id, this.defaultRenderer);\n            }\n            return this.defaultRenderer;\n        }\n    }\n
}\n\n begin() {\n end() {\n}\n}\n\nclass DefaultDomRenderer2 implements Renderer2 {\n data: {[key: string]: any}
= Object.create(null);\n constructor(private eventManager: EventManager) {\n\n destroy(): void {\n\n
destroyNode = null;\n\n createElement(name: string, namespace?: string): any {\n    if (namespace) {\n        //
TODO: `|| namespace` was added in\n        //
https://github.com/angular/angular/commit/2b9cc8503d48173492c29f5a271b61126104fbdb to\n        // support how
Ivy passed around the namespace URI rather than short name at the time. It did\n        // not, however extend the
support
to other parts of the system (setAttribute, setAttribute,\n        // and the ServerRenderer). We should decide what
exactly the semantics for dealing with\n        // namespaces should be and make it consistent.\n        // Related issues:\n
// https://github.com/angular/angular/issues/44028\n        // https://github.com/angular/angular/issues/44883\n
return document.createElementNS(NAMESPACE_URIS[namespace] || namespace, name);\n    }\n\n    return
document.createElement(name);\n    }\n\n    createComment(value: string): any {\n        return
document.createComment(value);\n    }\n\n    createText(value: string): any {\n        return
document.createText(value);\n    }\n\n    appendChild(parent: any, newChild: any): void {\n        const targetParent
= isTemplateNode(parent) ? parent.content : parent;\n        targetParent.appendChild(newChild);\n    }\n\n
insertBefore(parent: any, newChild: any, refChild: any): void {\n        if (parent) {\n            const targetParent =
isTemplateNode(parent) ? parent.content
: parent;\n            targetParent.insertBefore(newChild, refChild);\n        }\n\n        removeChild(parent: any, oldChild:
any): void {\n            if (parent) {\n                parent.removeChild(oldChild);\n            }\n        }\n\n
selectRootElement(selectorOrNode: string|any, preserveContent?: boolean): any {\n        let el: any = typeof selectorOrNode === 'string' ?
document.querySelector(selectorOrNode) : \n            selectorOrNode;\n        if (!el) {\n
throw new Error(`The selector "${selectorOrNode}" did not match any elements`);\n        }\n        if (!preserveContent)
{\n            el.textContent = '';\n        }\n        return el;\n    }\n\n    parentNode(node: any): any {\n        return node.parentNode;\n
}\n\n    nextSibling(node: any): any {\n        return node.nextSibling;\n    }\n\n    setAttribute(el: any, name: string, value:
string, namespace?: string): void {\n        if (namespace) {\n            name = namespace + ':' + name;\n            const
namespaceUri = NAMESPACE_URIS[namespace];\n            if (namespaceUri)
{\n                el.setAttributeNS(namespaceUri, name, value);\n            }\n        } else {\n            el.setAttribute(name, value);\n        }\n
}\n\n    removeAttribute(el: any, name: string, namespace?: string):
void {\n        if (namespace) {\n            const namespaceUri = NAMESPACE_URIS[namespace];\n            if (namespaceUri)
{\n                el.removeAttributeNS(namespaceUri, name);\n            }\n        } else {\n
el.removeAttribute(`${namespace}:${name}`);\n        }\n    }\n\n    removeAttribute(name: string, namespace?: string):
void {\n        el.classList.add(name);\n    }\n\n    removeClass(el: any, name: string): void {\n        el.classList.remove(name);\n    }\n\n
setStyle(el: any, style: string, value: any, flags: RendererStyleFlags2):

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void {\n  if (flags & (RendererStyleFlags2.DashCase | RendererStyleFlags2.Important)) {\n
el.style.setProperty(style, value, flags & RendererStyleFlags2.Important ? 'important' : '');\n
  } else {\n    el.style[style] = value;\n  }\n}\n\n removeStyle(el: any, style: string, flags: RendererStyleFlags2):
void {\n  if (flags & RendererStyleFlags2.DashCase) {\n    el.style.removeProperty(style);\n  } else {\n    // IE
requires " instead of null\n    // see https://github.com/angular/angular/issues/7916\n    el.style[style] = ""; \n  }\n}\n\n setProperty(el: any, name: string, value: any): void {\n  NG_DEV_MODE &&
checkNoSyntheticProp(name, 'property');\n  el[name] = value;\n}\n\n setValue(node: any, value: string): void {\n
node.nodeValue = value;\n}\n\n listen(target: 'window'|'document'|'body'|any, event: string, callback: (event: any)
=> boolean):\n  () => void {\n  NG_DEV_MODE && checkNoSyntheticProp(event, 'listener');\n  if (typeof
target === 'string') {\n    return <() => void>this.eventManager.addGlobalEventListener(\n      target, event,
decoratePreventDefault(callback));\n  }\n  return <() => void>this.eventManager.addEventListener(\n
target, event, decoratePreventDefault(callback)) as () => void;\n}\n}\n\nconst AT_CHARCODE = (() =>
'@'.charCodeAt(0));\nfunction checkNoSyntheticProp(name: string, nameKind: string) {\n  if
(name.charCodeAt(0) === AT_CHARCODE) {\n    throw new Error(`Unexpected synthetic ${nameKind} ${name}
found. Please make sure that:\n  - Either `BrowserAnimationsModule` or `NoopAnimationsModule` are
imported in your application.\n  - There is corresponding configuration for the animation named ``${\n
name}`` defined in the `animations` field of the `@Component` decorator (see
https://angular.io/api/core/Component#animations.`);\n  }\n}\n\nfunction isTemplateNode(node: any): node is
HTMLTemplateElement {\n  return node.tagName === 'TEMPLATE' && node.content !== undefined;\n}\n\n\nclass
EmulatedEncapsulationDomRenderer2 extends DefaultDomRenderer2 {\n  private contentAttr: string;\n  private
hostAttr: string;\n\n  constructor(\n    eventManager: EventManager, sharedStylesHost: DomSharedStylesHost,\n    private component:
RendererType2, appId: string) {\n    super(eventManager);\n    const styles = flattenStyles(appId + '-' +
component.id, component.styles, []);\n    sharedStylesHost.addStyles(styles);\n\n    this.contentAttr =
shimContentAttribute(appId + '-' + component.id);\n    this.hostAttr = shimHostAttribute(appId + '-' +
component.id);\n  }\n\n  applyToHost(element: any) {\n    super.setAttribute(element, this.hostAttr, "");\n  }\n\n
override createElement(parent: any, name: string): Element {\n    const el = super.createElement(parent, name);\n
super.setAttribute(el, this.contentAttr, "");\n    return el;\n  }\n}\n\n\nclass ShadowDomRenderer extends
DefaultDomRenderer2 {\n  private shadowRoot: any;\n\n  constructor(\n    eventManager: EventManager, private
sharedStylesHost: DomSharedStylesHost,\n    private hostEl: any, component: RendererType2) {\n
super(eventManager);\n    this.shadowRoot =
(hostEl as any).attachShadow({mode: 'open'});\n    this.sharedStylesHost.addHost(this.shadowRoot);\n    const
styles = flattenStyles(component.id, component.styles, []);\n    for (let i = 0; i < styles.length; i++) {\n    const
styleEl = document.createElement('style');\n    styleEl.textContent = styles[i];\n
this.shadowRoot.appendChild(styleEl);\n  }\n}\n\n  private nodeOrShadowRoot(node: any): any {\n    return node
=== this.hostEl ? this.shadowRoot : node;\n  }\n\n  override destroy() {\n
this.sharedStylesHost.removeHost(this.shadowRoot);\n  }\n\n  override appendChild(parent: any, newChild: any):
void {\n    return super.appendChild(this.nodeOrShadowRoot(parent), newChild);\n  }\n\n  override
insertBefore(parent: any, newChild: any, refChild: any): void {\n    return
super.insertBefore(this.nodeOrShadowRoot(parent), newChild, refChild);\n  }\n\n  override removeChild(parent: any,
oldChild: any): void {\n    return super.removeChild(this.nodeOrShadowRoot(parent), oldChild);\n  }\n\n
override parentNode(node: any): any {\n    return
this.nodeOrShadowRoot(super.parentNode(this.nodeOrShadowRoot(node)));\n  }\n}\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {DOCUMENT} from
'@angular/common';\nimport {Inject, Injectable} from '@angular/core';\nimport {EventManagerPlugin} from
'./event_manager';\n\n@Injectable()\nexport class DomEventsPlugin extends EventManagerPlugin {\n
constructor(@Inject(DOCUMENT) doc: any) {\n  super(doc);\n}\n\n // This plugin should come last in the list of

```

```

plugins, because it accepts all\n // events.\n override supports(eventName: string): boolean {\n  return true;\n
}\n\n override addEventListener(element: HTMLElement, eventName: string, handler: Function): Function {\n
element.addEventListener(eventName, handler as EventListener, false);\n
  return () => this.removeEventListener(element, eventName, handler as EventListener);\n }
\n\n removeEventListener(target: any, eventName: string, callback: Function): void {\n  return
target.removeEventListener(eventName, callback as EventListener);\n }
\n\n"/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {DOCUMENT, getDOM as getDOM} from
'@angular/common';\nimport {Inject, Injectable, NgZone} from '@angular/core';\nimport {EventManagerPlugin}
from './event_manager';\n\n/**\n * Defines supported modifiers for key events.\n */\nconst MODIFIER_KEYS =
['alt', 'control', 'meta', 'shift'];\n\n// The following values are here for cross-browser compatibility and to match the
W3C standard\n// cf https://www.w3.org/TR/DOM-Level-3-Events-key\nconst _keyMap: {[k: string]: string} = {\n
  '\b': 'Backspace',\n  '\t': 'Tab',\n
  '\x7F': 'Delete',\n  '\x1B': 'Escape',\n  'Del': 'Delete',\n  'Esc': 'Escape',\n  'Left': 'ArrowLeft',\n  'Right':
'ArrowRight',\n  'Up': 'ArrowUp',\n  'Down': 'ArrowDown',\n  'Menu': 'ContextMenu',\n  'Scroll': 'ScrollLock',\n
  'Win': 'OS'};\n\n/**\n * Retrieves modifiers from key-event objects.\n */\nconst MODIFIER_KEY_GETTERS:
{[key: string]: (event: KeyboardEvent) => boolean} = {\n  'alt': (event: KeyboardEvent) => event.altKey,\n
  'control': (event: KeyboardEvent) => event.ctrlKey,\n  'meta': (event: KeyboardEvent) => event.metaKey,\n
  'shift': (event: KeyboardEvent) => event.shiftKey\n};\n\n/**\n * @publicApi\n * A browser plug-in that provides support
for handling of key events in Angular.\n */\n@Injectable()\nexport class KeyEventsPlugin extends
EventManagerPlugin {\n  /**\n   * Initializes an instance of the browser plug-in.\n   * @param doc The document in
which key events will be detected.\n   */\n  constructor(@Inject(DOCUMENT) doc: any) {\n    super(doc);\n  }\n
  /**\n   * Reports whether a named key event is supported.\n   * @param eventName The event name to query.\n   *
@return True if the named key event is supported.\n   */\n  override supports(eventName: string): boolean {\n
    return KeyEventsPlugin.parseEventName(eventName) != null;\n  }\n
  /**\n   * Registers a handler for a specific element and key event.\n   * @param element The HTML element to receive event notifications.\n
   * @param eventName The name of the key event to listen for.\n   * @param handler A function to call when the notification
occurs. Receives the\n   * event object as an argument.\n   * @returns The key event that was registered.\n   */\n
  override addEventListener(element: HTMLElement, eventName: string, handler: Function): Function {\n    const
parsedEvent = KeyEventsPlugin.parseEventName(eventName);\n    const outsideHandler =\n
    KeyEventsPlugin.eventCallback(parsedEvent['fullKey'], handler, this.manager.getZone());\n    return
this.manager.getZone().runOutsideAngular()\n    => {\n      return getDOM().onAndCancel(element, parsedEvent['domEventName'], outsideHandler);\n    };\n
  }\n
  /**\n   * Parses the user provided full keyboard event definition and normalizes it for\n   * later internal use. It
ensures the string is all lowercase, converts special\n   * characters to a standard spelling, and orders all the values
consistently.\n   * @param eventName The name of the key event to listen for.\n   * @returns an object with
the full, normalized string, and the dom event name\n   * or null in the case when the event doesn't match a keyboard
event.\n   */\n  static parseEventName(eventName: string): {fullKey: string, domEventName: string}|null {\n    const
parts: string[] = eventName.toLowerCase().split('.');\n    const domEventName = parts.shift();\n    if ((parts.length
=== 0) || !(domEventName === 'keydown' || domEventName === 'keyup')) {\n      return null;\n    }\n    const key
= KeyEventsPlugin._normalizeKey(parts.pop());\n
    let fullKey = '';\n    let codeIX = parts.indexOf('code');\n    if (codeIX > -1) {\n      parts.splice(codeIX, 1);\n
      fullKey = 'code.';\n    }\n    MODIFIER_KEYS.forEach(modifierName => {\n      const index: number =
parts.indexOf(modifierName);\n      if (index > -1) {\n        parts.splice(index, 1);\n        fullKey += modifierName +
'.';\n      }\n    });\n    fullKey += key;\n    if (parts.length != 0 || key.length === 0) {\n      // returning null instead of
throwing to let another plugin process the event\n      return null;\n    }\n    // NOTE: Please don't rewrite this as o,
as it will break JSCompiler property renaming.\n    // The code must remain in the `result['domEventName']`
form.\n    // return {domEventName, fullKey};\n    const result: {fullKey: string, domEventName: string} = {} as

```

```

any;\n  result['domEventName'] = domEventName;\n  result['fullKey'] = fullKey;\n  return result;\n }\n\n /**\n * Determines whether the actual
keys pressed match the configured key code string.\n * The `fullKeyCode` event is normalized in the
`parseEventName` method when the\n * event is attached to the DOM during the `addEventListener` call. This is
unseen\n * by the end user and is normalized for internal consistency and parsing.\n * \n * @param event The
keyboard event.\n * @param fullKeyCode The normalized user defined expected key event string\n * @returns
boolean.\n */\n static matchEventFullKeyCode(event: KeyboardEvent, fullKeyCode: string): boolean {\n  let
keycode = _keyMap[event.key] || event.key;\n  let key = ";\n  if (fullKeyCode.indexOf('code.') > -1) {\n
keycode = event.code;\n  key = 'code.';\n  }\n  // the keycode could be unidentified so we have to check here\n
if (keycode == null || !keycode) return false;\n  keycode = keycode.toLowerCase();\n  if (keycode === ' ') {\n
keycode = 'space'; // for readability\n  } else if (keycode === '.') {\n  keycode =
'dot'; // because '.' is used as a separator in event names\n  }\n  MODIFIER_KEYS.forEach(modifierName =>
{\n  if (modifierName !== keycode) {\n  const modifierGetter =
MODIFIER_KEY_GETTERS[modifierName];\n  if (modifierGetter(event)) {\n  key += modifierName +
';\n  }\n  }\n  });\n  key += keycode;\n  return key === fullKeyCode;\n }\n\n /**\n * Configures a
handler callback for a key event.\n * @param fullKey The event name that combines all simultaneous
keystrokes.\n * @param handler The function that responds to the key event.\n * @param zone The zone in which
the event occurred.\n * @returns A callback function.\n */\n static eventCallback(fullKey: string, handler:
Function, zone: NgZone): Function {\n  return (event: KeyboardEvent) => {\n  if
(KeyEventsPlugin.matchEventFullKeyCode(event, fullKey)) {\n  zone.runGuarded(() => handler(event));\n
}\n  };\n }\n\n /** @internal *\n static _normalizeKey(keyName:
string): string {\n  // TODO: switch to a Map if the mapping grows too much\n  switch (keyName) {\n  case
'esc':\n  return 'escape';\n  default:\n  return keyName;\n  }\n }\n\n /**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {CommonModule, DOCUMENT,
XhrFactory, PLATFORM_BROWSER_ID as PLATFORM_BROWSER_ID} from '@angular/common';\nimport
{APP_ID, ApplicationModule, ApplicationRef, createPlatformFactory, ErrorHandler, ImportedNgModuleProviders,
Inject, InjectionToken, ModuleWithProviders, NgModule, NgZone, Optional, PLATFORM_ID,
PLATFORM_INITIALIZER, platformCore, PlatformRef, Provider, RendererFactory2, SkipSelf, StaticProvider,
Testability, TestabilityRegistry, Type, INJECTOR_SCOPE as INJECTOR_SCOPE, internalCreateApplication as
internalCreateApplication, setDocument, TESTABILITY
as TESTABILITY, TESTABILITY_GETTER as TESTABILITY_GETTER} from '@angular/core';\nimport
{BrowserDomAdapter} from './browser/browser_adapter';\nimport {SERVER_TRANSITION_PROVIDERS,
TRANSITION_ID} from './browser/server-transition';\nimport {BrowserGetTestability} from
'./browser/testability';\nimport {BrowserXhr} from './browser/xhr';\nimport {DomRendererFactory2} from
'./dom/dom_renderer';\nimport {DomEventsPlugin} from './dom/events/dom_events';\nimport
{EVENT_MANAGER_PLUGINS, EventManager} from './dom/events/event_manager';\nimport
{KeyEventsPlugin} from './dom/events/key_events';\nimport {DomSharedStylesHost, SharedStylesHost} from
'./dom/shared_styles_host';\n\nconst NG_DEV_MODE = typeof ngDevMode === 'undefined' ||
!ngDevMode;\n\n /**\n * Set of config options available during the application bootstrap operation.\n * \n *
@developerPreview\n * @publicApi\n */\nexport interface ApplicationConfig {\n /**\n * List of providers that
should be available to the root component and
all its children.\n */\n providers: Array<Provider|ImportedNgModuleProviders>;\n\n /**\n * Bootstraps an
instance of an Angular application and renders a standalone component as the\n * application's root component.
More information about standalone components can be found in [this\n * guide](guide/standalone-components).\n *
\n * @usageNotes\n * The root component passed into this function *must* be a standalone one (should have the\n
* `standalone: true` flag in the `@Component` decorator config).\n * \n * ``typescript\n * @Component({\n *
standalone: true,\n * template: 'Hello world!'\n * })\n * class RootComponent {}\n * \n * const appRef:

```

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ApplicationRef = await bootstrapApplication(RootComponent);
// You can add the list of providers that
// should be available in the application injector by
// specifying the `providers` field in an object passed as the
// second argument:
import { bootstrapApplication } from '@angular/platform-browser';
import { provideBackendUrl } from 'your-domain-api';

bootstrapApplication(RootComponent, {
  providers: [
    provideBackendUrl('https://yourdomain.com/api')
  ]
});

// The `importProvidersFrom` helper method can be used to collect all providers from any
// existing NgModule (and transitively from all NgModules that it imports):
import { bootstrapApplication } from '@angular/platform-browser';
import { importProvidersFrom } from '@angular/core';
import { SomeNgModule } from 'some-ng-module';

bootstrapApplication(RootComponent, {
  providers: [
    importProvidersFrom(SomeNgModule)
  ]
});

// Note: the `bootstrapApplication` method doesn't include [Testability](api/core/Testability) by
// default. You can add [Testability](api/core/Testability) by getting the list of necessary
// providers using `provideProtractorTestingSupport()` function and adding them into the
// `providers` array, for example:
import { provideProtractorTestingSupport } from '@angular/platform-browser';

bootstrapApplication(RootComponent, {
  providers: [
    provideProtractorTestingSupport()
  ]
});

// @param rootComponent A reference to a standalone
// component that should be rendered.
// @param options Extra configuration for the bootstrap operation, see
// `ApplicationConfig` for additional info.
// @returns A promise that returns an `ApplicationRef` instance
// once resolved.
// @publicApi
// @developerPreview
export function bootstrapApplication(
  rootComponent: Type<unknown>, options?: ApplicationConfig): Promise<ApplicationRef> {
  return internalCreateApplication({
    rootComponent, ...createProvidersConfig(options)
  });
}

// Create an instance of an Angular application without bootstrapping any components.
// This is useful for the situation where one wants to decouple application environment
// creation (a platform and associated injectors) from rendering components on a screen.
// Components can be subsequently bootstrapped on the returned `ApplicationRef`.
// @param options Extra configuration for the application environment, see `ApplicationConfig`
// for additional info.
// @returns A promise that returns an `ApplicationRef` instance once resolved.
// @publicApi
// @developerPreview
export function createApplication(
  options?: ApplicationConfig): Promise<ApplicationRef> {
  return internalCreateApplication(createProvidersConfig(options));
}

function createProvidersConfig(
  options?: ApplicationConfig): Provider[] {
  return [
    ...BROWSER_MODULE_PROVIDERS,
    ...(options?.providers ?? []),
    ...INTERNAL_BROWSER_PLATFORM_PROVIDERS
  ];
}

// Returns a set of providers required to setup [Testability](api/core/Testability) for an
// application bootstrapped using the `bootstrapApplication` function. The set of providers is
// needed to support testing an application with Protractor (which relies on the Testability
// APIs to be present).
// @returns An array of providers required to setup Testability for an application and
// make it available for testing using Protractor.
// @developerPreview
export function provideProtractorTestingSupport(): Provider[] {
  // Return a copy to prevent changes to the original array in case any in-place
  // alterations are performed to the `provideProtractorTestingSupport` call results
  // in app code.
  return [...TESTABILITY_PROVIDERS];
}

export function initDomAdapter(): BrowserDomAdapter {
  return new BrowserDomAdapter().makeCurrent();
}

export function errorHandler(): ErrorHandler {
  return new ErrorHandler();
}

export function _document(): any {
  // Tell ivy about the global document
  return document;
}

export const INTERNAL_BROWSER_PLATFORM_PROVIDERS: StaticProvider[] = [
  { provide: PLATFORM_ID, useValue: PLATFORM_BROWSER_ID },
  { provide: PLATFORM_INITIALIZER, useValue: initDomAdapter, multi: true },
  { provide: DOCUMENT, useFactory: _document, deps: [] }
];

// A factory function that returns a `PlatformRef` instance associated with browser
// service providers.
// @publicApi
export const platformBrowser: (extraProviders?: StaticProvider[]) => PlatformRef =
  createPlatformFactory(platformCore, 'browser', INTERNAL_BROWSER_PLATFORM_PROVIDERS);

// Internal marker to signal whether providers from the `BrowserModule` are already
// present in DI. This is needed to avoid loading `BrowserModule` providers twice.
// We can't rely on the `BrowserModule` presence itself, since the standalone-based
// bootstrap just imports `BrowserModule` providers without referencing the module
// itself.

```

```

*const BROWSER_MODULE_PROVIDERS_MARKER = new InjectionToken(NG_DEV_MODE ?
'BrowserModule Providers Marker' : '');
const TESTABILITY_PROVIDERS = [
  { provide: TESTABILITY_GETTER, useClass: BrowserGetTestability, deps: [] },
  { provide: TESTABILITY, useClass: Testability, deps: [NgZone, TestabilityRegistry, TESTABILITY_GETTER] },
  { provide: Testability, // Also provide as `Testability` for backwards-compatibility.
    useClass: Testability, deps: [NgZone, TestabilityRegistry, TESTABILITY_GETTER] }
];
const BROWSER_MODULE_PROVIDERS: Provider[] = [
  { provide: INJECTOR_SCOPE, useValue: 'root' },
  { provide: ErrorHandler, useFactory: errorHandler, deps: [] },
  { provide: EVENT_MANAGER_PLUGINS, useClass: DomEventsPlugin, multi: true,
    deps: [DOCUMENT, NgZone, PLATFORM_ID] },
  { provide: EVENT_MANAGER_PLUGINS, useClass: KeyEventsPlugin, multi: true,
    deps: [DOCUMENT] },
  { provide: DomRendererFactory2, useClass: DomRendererFactory2,
    deps: [EventManager, DomSharedStylesHost, APP_ID] },
  { provide: RendererFactory2, useExisting: DomRendererFactory2 },
  { provide: SharedStylesHost, useExisting: DomSharedStylesHost },
  { provide: DomSharedStylesHost, useClass: DomSharedStylesHost,
    deps: [DOCUMENT] },
  { provide: EventManager, useClass: EventManager,
    deps: [EVENT_MANAGER_PLUGINS, NgZone] },
  { provide: XhrFactory, useClass: BrowserXhr, deps: [] }
];
NG_DEV_MODE ? { provide: BROWSER_MODULE_PROVIDERS_MARKER, useValue: true } : [];
*/

* Exports required infrastructure for all Angular apps.
* Included by default in all Angular apps created with the CLI
* `new` command.
* Re-exports `CommonModule` and `ApplicationModule`, making their
* exports and providers available to all apps.
* @publicApi
*/
@NgModule({
  providers: [
    ...BROWSER_MODULE_PROVIDERS,
    ...TESTABILITY_PROVIDERS
  ],
  exports: [CommonModule, ApplicationModule]
})
export class BrowserModule {
  constructor(@Optional() @SkipSelf()
    @Inject(BROWSER_MODULE_PROVIDERS_MARKER)
    providersAlreadyPresent: boolean | null) {}
  if (NG_DEV_MODE && providersAlreadyPresent) {
    throw new Error(
      `Providers from the \\`BrowserModule\\` have already been loaded. If you need access `
      + ` ` to common directives such as NgIf and NgFor, import the \\`CommonModule\\` instead.`);
  }
}
*/

* Configures a browser-based app to transition from a server-rendered app, if
* one is present on the page.
* @param params An object containing an identifier for the app to transition.
* The ID must match between the client and server versions of the app.
* @returns The reconfigured `BrowserModule` to import into the app's root
`AppModule`.
*/
static withServerTransition(params: { appId: string }):
ModuleWithProviders<BrowserModule> {
  return {
    ngModule: BrowserModule,
    providers: [
      { provide: APP_ID, useValue: params.appId },
      { provide: TRANSITION_ID, useExisting: APP_ID },
      ...SERVER_TRANSITION_PROVIDERS
    ],
  };
}
}
*/

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* found in the LICENSE file at https://angular.io/license
*/
import { DOCUMENT, DomAdapter as DomAdapter, getDOM as getDOM } from '@angular/common';
import { Inject, Injectable, inject } from '@angular/core';
*/

* Represents the attributes of an HTML `` element. The element itself is
* represented by the internal `HTMLMetaElement`.
* @see [HTML meta tag](https://developer.mozilla.org/docs/Web/HTML/Element/meta)
* @see `Meta`
* @publicApi
*/
export type MetaDefinition = {
  charset?: string;
  content?: string;
  httpEquiv?: string;
  id?: string;
  itemprop?: string;
  name?: string;
  property?: string;
  scheme?: string;
  url?: string;
} & {
  //
  // TODO(IgorMinar): this type looks wrong
  [prop: string]: string;
};
*/

* Factory to create a `Meta` service instance for the current DOM document.
*/
export function createMeta() {
  return new Meta(inject(DOCUMENT));
}
*/

* A service for managing HTML `` tags.
* Properties of the `MetaDefinition` object match the attributes of the
* HTML `` tag. These tags define document metadata that is important for
* things like configuring a Content Security Policy, defining browser compatibility
* and security settings, setting HTTP Headers, defining rich content for social sharing,
* and Search Engine Optimization (SEO).
* To identify specific `` tags in a document, use an attribute selection
* string in the format

```

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`"tag_attribute='value string'`.n * For example, an `attrSelector` value of `"name='description'"` matches a tag\n
* whose `name` attribute has the value `"description"`.n * Selectors are used with the `querySelector()` Document
method,\n * in the format `meta[{attrSelector}]`.n *\n * @see [HTML meta
tag](https://developer.mozilla.org/docs/Web/HTML/Element/meta)\n * @see
[Document.querySelector()](https://developer.mozilla.org/docs/Web/API/Document/querySelector)\n *\n *\n
* @publicApi\n *\n @Injectable({providedIn: 'root', useFactory: createMeta, deps: []})\n export class Meta {\n
private _dom: DomAdapter;\n constructor(@Inject(DOCUMENT) private _doc:
any) {\n this._dom = getDOM();\n }\n /**\n * Retrieves or creates a specific `` tag element in the
current HTML document.\n * In searching for an existing tag, Angular attempts to match the `name` or `property`
attribute\n * values in the provided tag definition, and verifies that all other attribute values are equal.\n * If
an existing element is found, it is returned and is not modified in any way.\n * @param tag The definition of a
`<meta>` element to match or create.\n * @param forceCreation True to create a new element without checking
whether one already exists.\n * @returns The existing element with the same attributes and values if found,\n *
the new element if no match is found, or `null` if the tag parameter is not defined.\n */\n addTag(tag:
MetaDefinition, forceCreation: boolean = false): HTMLMetaElement|null {\n if (!tag) return null;\n return
this._getOrCreateElement(tag, forceCreation);\n }\n /**\n * Retrieves or creates a set of
`<meta>` tag elements in the current HTML document.\n * In searching for an existing tag, Angular attempts to
match the `name` or `property` attribute\n * values in the provided tag definition, and verifies that all other attribute
values are equal.\n * @param tags An array of tag definitions to match or create.\n * @param forceCreation True
to create new elements without checking whether they already exist.\n * @returns The matching elements if found,
or the new elements.\n */\n addTags(tags: MetaDefinition[], forceCreation: boolean = false):
HTMLMetaElement[] {\n if (!tags) return [];\n return tags.reduce((result: HTMLMetaElement[], tag:
MetaDefinition) => {\n if (tag) {\n result.push(this._getOrCreateElement(tag, forceCreation));\n }\n
}\n return result;\n }, []);\n }\n /**\n * Retrieves a `` tag element in the current HTML document.\n
* @param attrSelector The tag attribute and value to match against, in the format\n * `"tag_attribute='value
string'"`.n * @returns The matching element, if any.\n */\n getTag(attrSelector: string):
HTMLMetaElement|null {\n if (!attrSelector) return null;\n return
this._doc.querySelector(`meta[${attrSelector}]`) || null;\n }\n /**\n * Retrieves a set of `` tag elements
in the current HTML document.\n * @param attrSelector The tag attribute and value to match against, in the format\n
* `"tag_attribute='value string'"`.n * @returns The matching elements, if any.\n */\n getTags(attrSelector:
string): HTMLMetaElement[] {\n if (!attrSelector) return [];\n const list /*NodeList*/ =
this._doc.querySelectorAll(`meta[${attrSelector}]`);\n return list ? [].slice.call(list) : [];\n }\n /**\n
* Modifies an existing `` tag element in the current HTML document.\n * @param tag The tag description with
which to replace the existing tag content.\n * @param selector A tag attribute and value to match against, to identify\n
* an existing
tag. A string in the format `"tag_attribute=`value string`"`.n * If not supplied, matches a tag with the same
`name` or `property` attribute value as the\n * replacement tag.\n * @return The modified element.\n */\n
updateTag(tag: MetaDefinition, selector?: string): HTMLMetaElement|null {\n if (!tag) return null;\n selector =
selector || this._parseSelector(tag);\n const meta: HTMLMetaElement = this.getTag(selector!);\n if (meta) {\n
return this._setMetaElementAttributes(tag, meta);\n }\n return this._getOrCreateElement(tag, true);\n }\n
/**\n * Removes an existing `` tag element from the current HTML document.\n * @param attrSelector A
tag attribute and value to match against, to identify\n * an existing tag. A string in the format
`"tag_attribute=`value string`"`.n * @param selector A tag attribute and value to match against, to identify\n
* an existing
tag. A string in the format `"tag_attribute=`value string`"`.n * If not supplied, matches a tag with the same
`name` or `property` attribute value as the\n * replacement tag.\n * @return The modified element.\n */\n
removeTag(attrSelector: string): void {\n this.removeTagElement(this.getTag(attrSelector!);\n }\n /**\n
* Removes an existing `` tag element from the current HTML document.\n * @param meta The tag definition
to match against to identify an existing tag.\n * @param selector A tag attribute and value to match against, to
identify\n * an existing tag. A string in the format `"tag_attribute=`value string`"`.n * @returns The
modified element.\n */\n removeTagElement(meta: HTMLMetaElement): void {\n if (meta) {\n this._dom.remove(meta);\n
}\n }\n private _getOrCreateElement(meta: MetaDefinition, forceCreation: boolean = false):
HTMLMetaElement {\n if (!forceCreation) {\n const selector: string = this._parseSelector(meta);\n // It's

```



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allowed to have multiple elements with the same name so it's not enough to\n    // just check that element with the
same name already present on the page. We also need to\n    // check if element has tag attributes\n    const elem =
this.getTags(selector).filter(elem => this._containsAttributes(meta, elem))[0];\n    if (elem !== undefined) return
elem;\n    }\n    const element: HTMLMetaElement = this._dom.createElement('meta') as HTMLMetaElement;\n    this._setMetaElementAttributes(meta, element);\n    const head = this._doc.getElementsByTagName('head')[0];\n    head.appendChild(element);\n    return element;\n    }\n\n    private _setMetaElementAttributes(tag: MetaDefinition,
el: HTMLMetaElement): HTMLMetaElement {\n    Object.keys(tag).forEach(\n        (prop: string) =>
el.setAttribute(this._getMetaKeyMap(prop), tag[prop]));\n    return el;\n    }\n\n    private _parseSelector(tag:
MetaDefinition): string {\n    const attr: string = tag.name ? 'name' : 'property';\n    return
`${attr}=${tag[tag[attr]]}`;\n    }\n\n    private _containsAttributes(tag: MetaDefinition, elem: HTMLMetaElement):
boolean {\n    return Object.keys(tag).every(\n        (key: string) => elem.getAttribute(this._getMetaKeyMap(key))
=== tag[key]);\n    }\n\n    private _getMetaKeyMap(prop: string): string {\n    return META_KEYS_MAP[prop] ||
prop;\n    }\n\n    /**\n     * Mapping for MetaDefinition properties with their correct meta attribute names\n     */\n    const
META_KEYS_MAP: {[prop: string]: string} = {\n    httpEquiv: 'http-equiv';\n    },\n    /**\n     * @license\n     * Copyright
Google LLC All Rights Reserved.\n     * Use of this source code is governed by an MIT-style license that can be\n     *
found in the LICENSE file at https://angular.io/license\n     */\n\n    import {DOCUMENT, getDOM as getDOM} from
'@angular/common';\n    import {Inject, Injectable, inject} from '@angular/core';\n\n    /**\n     * Factory to create Title
service.\n     */\n    export function createTitle() {\n    return new Title(inject(DOCUMENT));\n    }\n\n    /**\n     * A service that
can be used to get and set the title of a current HTML document.\n     * Since an Angular application can't be
bootstrapped on the entire HTML document (<html> tag)\n     * it is not possible to bind to the `text` property of the
`HTMLTitleElement` elements\n     * (representing the <title> tag). Instead, this service can be used to set and get
the current\n     * title value.\n     */\n    @publicApi\n    @Injectable({providedIn: 'root', useFactory: createTitle, deps:
[]})\n    export class Title {\n    constructor(@Inject(DOCUMENT) private _doc: any)\n    {\n    }\n\n    /**\n     * Get the title of the current HTML document.\n     */\n    getTitle(): string {\n    return this._doc.title;\n    }\n\n    /**\n     * Set the title of the current HTML document.\n     */\n    @param newTitle\n    setTitle(newTitle:
string) {\n    this._doc.title = newTitle || '';\n    }\n\n    /**\n     * @license\n     * Copyright Google LLC All Rights
Reserved.\n     * Use of this source code is governed by an MIT-style license that can be\n     * found in the
LICENSE file at https://angular.io/license\n     */\n\n    import {global as global} from '@angular/core';\n    const
CAMEL_CASE_REGEXP = /[A-Z]/g;\n    const DASH_CASE_REGEXP = /[a-z]/g;\n\n    export function
camelCaseToDashCase(input: string): string {\n    return input.replace(CAMEL_CASE_REGEXP, (...m: string[]) =>
'-' + m[1].toLowerCase());\n    }\n\n    export function dashCaseToCamelCase(input: string): string {\n    return
input.replace(DASH_CASE_REGEXP, (...m: string[]) => m[1].toUpperCase());\n    }\n\n    /**\n     * Exports the value
under a given `name` in
the global property `ng`. For example `ng.probe` if\n     * `name` is `probe`.\n     */\n    @param name Name under which it
will be exported. Keep in mind this will be a property of the\n     * global `ng` object.\n     */\n    @param value The value to
export.\n     */\n    export function exportNgVar(name: string, value: any): void {\n    if (typeof COMPILED ===
'undefined' || !COMPILED) {\n    // Note: we can't export `ng` when using closure enhanced optimization as:\n    // -
closure declares globals itself for minified names, which sometimes clobber our `ng` global\n    // - we can't declare
a closure extern as the namespace `ng` is already used within Google\n    // for typings for angularJS (via
`goog.provide('ng...')`).\n    const ng = global['ng'] = (global['ng'] as {[key: string]: any} | undefined) || {};\n    ng[name] = value;\n    }\n\n    /**\n     * @license\n     * Copyright Google LLC All Rights Reserved.\n     * Use of this
source code is governed by an MIT-style license that can be\n     * found in the LICENSE file
at https://angular.io/license\n     */\n    const win = typeof window !== 'undefined' && window || <any>{};\n    export
{win as window};\n\n    /**\n     * @license\n     * Copyright Google LLC All Rights Reserved.\n     * Use of this source
code is governed by an MIT-style license that can be\n     * found in the LICENSE file at https://angular.io/license\n     */\n\n    import {ApplicationRef, ComponentRef} from '@angular/core';\n    import {window} from
'./browser';\n    export class ChangeDetectionPerfRecord {\n    constructor(public msPerTick: number, public
numTicks: number) {\n    }\n\n    /**\n     * Entry point for all Angular profiling-related debug tools. This object\n     *

```

corresponds to the `ng.profiler` in the dev console.

```

export class AngularProfiler {
  appRef: ApplicationRef;
  constructor(ref: ComponentRef<any>) {
    this.appRef = ref.injector.get(ApplicationRef);
  }
  // tslint:disable:no-console
  /**
   * Exercises change detection in a loop and then prints the average amount of
   * time in milliseconds
   * how long a single round of change detection takes for
   * the current state of the UI. It runs a minimum of 5 rounds for a minimum
   * of 500 milliseconds.
   * Optionally, a user may pass a `config` parameter containing a map of
   * options. Supported options are:
   * `record` (boolean) - causes the profiler to record a CPU profile while
   * it exercises the change detector. Example:
   *
   * ng.profiler.timeChangeDetection({record: true})
   *
   * timeChangeDetection(config: any): ChangeDetectionPerfRecord {
   *   const record = config && config['record'];
   *   const profileName = 'Change Detection';
   *   // Profiler is not available in Android browsers without dev tools opened
   *   const isProfilerAvailable = window.console.profile != null;
   *   if (record && isProfilerAvailable) {
   *     window.console.profile(profileName);
   *   }
   *   const start = performanceNow();
   *   let numTicks = 0;
   *   while (numTicks < 5 || (performanceNow() - start) < 500) {
   *     this.appRef.tick();
   *     numTicks++;
   *   }
   *   const end = performanceNow();
   *   if (record && isProfilerAvailable) {
   *     window.console.profileEnd(profileName);
   *   }
   *   const msPerTick = (end - start) / numTicks;
   *   window.console.log(`ran ${numTicks} change detection cycles`);
   *   window.console.log(`${msPerTick.toFixed(2)} ms per check`);
   *   return new ChangeDetectionPerfRecord(msPerTick, numTicks);
   * }
  }
  function performanceNow() {
    return window.performance && window.performance.now ? window.performance.now() :
    new Date().getTime();
  }
}

```

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```

import { ComponentRef } from '@angular/core';
import { exportNgVar } from '../dom/util';
import { AngularProfiler } from './common_tools';
const PROFILER_GLOBAL_NAME = 'profiler';
/**
 * Enabled Angular debug tools that are accessible via your browser's
 * developer console.
 * Usage:
 * 1. Open developer console (e.g. in Chrome Ctrl + Shift + j)
 * 1. Type `ng.` (usually the console will show auto-complete suggestion)
 * 1. Try the change detection profiler `ng.profiler.timeChangeDetection()`
 * then hit Enter.
 * @publicApi
 */
export function enableDebugTools<T>(ref: ComponentRef<T>): ComponentRef<T> {
  exportNgVar(PROFILER_GLOBAL_NAME, new AngularProfiler(ref));
  return ref;
}
/**
 * Disables Angular tools.
 * @publicApi
 */
export function disableDebugTools(): void {
  exportNgVar(PROFILER_GLOBAL_NAME, null);
}
@license Copyright Google LLC All Rights Reserved. Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
import { DOCUMENT } from '@angular/common';
import { APP_ID, inject, Injectable, NgModule } from '@angular/core';
export function escapeHtml(text: string): string {
  const escapedText: {[k: string]: string} = {
    '&': '&amp;',
    '"': '&quot;',
    '\\': '&bsol;',
    '<': '&lt;',
    '>': '&gt;',
  };
  return text.replace(/&["<>]/g, s => escapedText[s]);
}
export function unescapeHtml(text: string): string {
  const unescapedText: {[k: string]: string} = {
    '&': '&',
    '&quot;': '"',
    '&bsol;': '\\',
    '&lt;': '<',
    '&gt;': '>',
  };
  return text.replace(/&[^\s;]+/g, s => unescapedText[s]);
}
/**
 * A type-safe key to use with `TransferState`.
 * Example:
 *
 * const COUNTER_KEY = makeStateKey<number>('counter');
 * let value = 10;
 * transferState.set(COUNTER_KEY, value);
 *
 * @publicApi
 */
export type StateKey<T> = string & {
  __not_a_string: never;
  __value_type?: T;
};
/**
 * Create a `StateKey<T>` that can be used to store value of type T with `TransferState`.
 * Example:
 *
 * const COUNTER_KEY = makeStateKey<number>('counter');
 * let value = 10;
 * transferState.set(COUNTER_KEY, value);
 *
 * @publicApi
 */
export function makeStateKey<T = void>(key: string): StateKey<T> {
  return key as StateKey<T>;
}
/**
 * A key value store that is transferred from the application on the server side to the application on the client side. The `TransferState` is available as an injectable token. On the client,

```

just inject this token using DI and use it, it will be lazily initialized. On the server it's already included if `renderApplication` function is used. Otherwise, import the `ServerTransferStateModule` module to make the `TransferState` available. The values in the store are serialized/deserialized using JSON.stringify/JSON.parse. So only boolean, number, string, null and non-class objects will be serialized and deserialized in a non-lossy manner.

```

* @publicApi
@Injectable({
  providedIn: 'root',
  useFactory: () => {
    const doc = inject(DOCUMENT);
    const appId = inject(APP_ID);
    const state = new TransferState();
    state.store = retrieveTransferredState(doc, appId);
    return state;
  })
export class TransferState {
  private store: {[k: string]: unknown|undefined} = {};
  private onSerializeCallbacks: {[k: string]: () => unknown | undefined} = {};
  /**
   * Get the value corresponding to a key. Return `defaultValue` if key is not found.
   */
  get<T>(key: StateKey<T>, defaultValue: T): T {
    return this.store[key] !== undefined ? this.store[key] as T : defaultValue;
  }
  /**
   * Set the value corresponding to a key.
   */
  set<T>(key: StateKey<T>, value: T): void {
    this.store[key] = value;
  }
  /**
   * Remove a key from the store.
   */
  remove<T>(key: StateKey<T>): void {
    delete this.store[key];
  }
  /**
   * Test whether a key exists in the store.
   */
  hasKey<T>(key: StateKey<T>) {
    return this.store.hasOwnProperty(key);
  }
  /**
   * Indicates whether the state is empty.
   */
  get isEmpty(): boolean {
    return Object.keys(this.store).length === 0;
  }
  /**
   * Register a callback to provide the value for a key when `toJson` is called.
   */
  onSerialize<T>(key: StateKey<T>, callback: () => T): void {
    this.onSerializeCallbacks[key] = callback;
  }
  /**
   * Serialize the current state of the store to JSON.
   */
  toJson(): string {
    // Call the onSerialize callbacks and put those values into the store.
    for (const key in this.onSerializeCallbacks) {
      if (this.onSerializeCallbacks.hasOwnProperty(key)) {
        try {
          this.store[key] = this.onSerializeCallbacks[key]();
        } catch (e) {
          console.warn('Exception in onSerialize callback: ', e);
        }
      }
    }
    return JSON.stringify(this.store);
  }
}

retrieveTransferredState(doc: Document, appId: string) {
  // Locate the script tag with the JSON data transferred from the server.
  // The id of the script tag is set to the Angular appId + 'state'.
  const script = doc.getElementById(appId + '-state');
  let initialState = {};
  if (script && script.textContent) {
    // Avoid using any here as it triggers lint errors in google3 (any is not allowed).
    initialState = JSON.parse(unescapeHtml(script.textContent)) as {};
  } catch (e) {
    console.warn('Exception while restoring TransferState for app ' + appId, e);
  }
  return initialState;
}

/**
 * NgModule to install on the client side while using the `TransferState` to transfer state from server to client.
 */
* @publicApi
* @deprecated no longer needed, you can inject the `TransferState` in an app without providing this module.
* @NgModule({})
export class BrowserTransferStateModule {
  /**
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   */
  import { getDOM as getDOM } from '@angular/common';
  import { DebugElement, DebugNode, Predicate, Type } from '@angular/core';
  /**
   * Predicates for use with {@link DebugElement}'s query functions.
   */
  * @publicApi
  * @export class By {
    /**
     * Match all nodes.
     */
    * @usageNotes
    * ### Example
    * { @example platform-browser/dom/debug/ts/by/by.ts region='by_all' }
    */
    static all(): Predicate<DebugNode> {
      return () => true;
    }
    /**
     * Match elements by the given CSS selector.
     */
    * @usageNotes
    * ### Example
    * { @example platform-browser/dom/debug/ts/by/by.ts region='by_css' }
    */
    static css(selector: string): Predicate<DebugElement> {
      return (debugElement) => {
        return debugElement.nativeElement !== null ? elementMatches(debugElement.nativeElement, selector) : false;
      };
    }
    /**
     * Match nodes that have the given directive present.
     */
    * @usageNotes
    * ### Example
    * { @example platform-browser/dom/debug/ts/by/by.ts region='by_directive' }
    */
    static directive(type: Type<any>): Predicate<DebugNode> {
      return (debugNode) => debugNode.providerTokens!.indexOf(type) !== -1;
    }
  }
  function elementMatches(n: any, selector: string): boolean {
    if (getDOM().isElementNode(n)) {
      return n.matches && n.matches(selector) || n.msMatchesSelector && n.msMatchesSelector(selector) || n.webkitMatchesSelector &&

```

```

n.webkitMatchesSelector(selector);\n }\n\n return false;\n}\n"/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n *\n\nimport {DOCUMENT} from '@angular/common';\nimport
{Inject, Injectable, InjectionToken, NgModule, Optional, Provider, Console as Console} from
'@angular/core';\n\nimport {EVENT_MANAGER_PLUGINS, EventManagerPlugin} from
'./event_manager';\n\n\n/**\n * Supported HammerJS recognizer event names.\n *\n\nconst EVENT_NAMES = {\n
// pan\n 'pan': true,\n 'panstart': true,\n 'panmove': true,\n 'panend': true,\n 'pancancel': true,\n 'panleft': true,\n
'panright': true,\n 'panup': true,\n 'pandown': true,\n // pinch\n 'pinch': true,\n 'pinchstart': true,\n 'pinchmove':
true,\n 'pinchend': true,\n 'pinchcancel': true,\n 'pinchin': true,\n 'pinchout': true,\n // press\n 'press': true,\n
'pressup': true,\n // rotate\n 'rotate': true,\n 'rotatestart': true,\n 'rotatemove': true,\n 'rotateend': true,\n
'rotatcancel': true,\n // swipe\n 'swipe': true,\n 'swipeleft': true,\n 'swiperight': true,\n 'swipeup': true,\n
'swipedown': true,\n // tap\n 'tap': true,\n 'doubletap': true;\n};\n\n/**\n * DI token for providing
[HammerJS](https://hammerjs.github.io/) support to Angular.\n * @see `HammerGestureConfig`\n *\n *
@ngModule HammerModule\n * @publicApi\n */\n\nexport const HAMMER_GESTURE_CONFIG = new
InjectionToken<HammerGestureConfig>('HammerGestureConfig');\n\n\n/**\n * Function that loads HammerJS,
returning a promise that is resolved once HammerJs is loaded.\n *\n * @publicApi\n */\n\nexport type
HammerLoader = () => Promise<void>;\n\n\n/**\n * Injection token used to provide a {@link HammerLoader} to
Angular.\n *\n * @publicApi\n */\n\nexport const HAMMER_LOADER = new
InjectionToken<HammerLoader>('HammerLoader');\n\n\nexport interface HammerInstance {\n\n on(eventName:
string, callback?: Function): void;\n\n off(eventName: string, callback?: Function): void;\n\n destroy?():
void;\n}\n\n\n/**\n * An injectable [HammerJS Manager](https://hammerjs.github.io/api/#hammermanager)\n * for
gesture recognition. Configures specific event recognition.\n *\n * @publicApi\n */\n\n@Injectable()\nexport class
HammerGestureConfig\n\n /**\n * A set of supported event names for gestures to be used in Angular.\n * Angular supports all built-in
recognizers, as listed in\n * [HammerJS documentation](https://hammerjs.github.io/).\n * \n events: string[] =
[];\n\n /**\n * Maps gesture event names to a set of configuration options\n * that specify overrides to the default
values for specific properties.\n * \n * The key is a supported event name to be configured,\n * and the options
object contains a set of properties, with override values\n * to be applied to the named recognizer event.\n * For
example, to disable recognition of the rotate event, specify\n * `{"rotate": {"enable": false}}`.\n * \n *
Properties that are not present take the HammerJS default values.\n * For information about which properties are
supported for which events,\n * and their allowed and default values, see\n * [HammerJS
documentation](https://hammerjs.github.io/).\n * \n overrides: {[key: string]:
Object} = {};\n\n /**\n * Properties whose default values can be overridden for a given event.\n * Different sets
of properties apply to different events.\n * For information about which properties are supported for which
events,\n * and their allowed and default values, see\n * [HammerJS
documentation](https://hammerjs.github.io/).\n * \n options?: {\n\n cssProps?: any;\n\n domEvents?: boolean;\n\n
enable?: boolean | ((manager: any) => boolean);\n\n preset?: any[];\n\n touchAction?: string;\n\n recognizers?:
any[];\n\n inputClass?: any;\n\n inputTarget?: EventTarget;\n\n };\n\n\n /**\n * Creates a [HammerJS
Manager](https://hammerjs.github.io/api/#hammermanager)\n * and attaches it to a given HTML element.\n *
@param element The element that will recognize gestures.\n * @returns A HammerJS event-manager object.\n *
\n buildHammer(element: HTMLElement): HammerInstance {\n\n const mc = new Hammer!(element,
this.options);\n\n mc.get('pinch').set({enable:
true});\n\n mc.get('rotate').set({enable: true});\n\n for (const eventName in this.overrides) {\n\n
mc.get(eventName).set(this.overrides[eventName]);\n\n }\n\n return mc;\n }\n}\n\n\n /**\n * Event plugin that adds
Hammer support to an application.\n *\n * @ngModule HammerModule\n */\n\n@Injectable()\nexport class
HammerGesturesPlugin extends EventManagerPlugin {\n\n private _loaderPromise: Promise<void>|null = null;\n\n\n constructor(\n\n @Inject(DOCUMENT) doc: any,\n\n @Inject(HAMMER_GESTURE_CONFIG) private
_config: HammerGestureConfig, private console: Console,\n\n @Optional() @Inject(HAMMER_LOADER)

```

```

private loader?: HammerLoader|null) {\n  super(doc);\n }\n\n override supports(eventName: string): boolean {\n
if (!EVENT_NAMES.hasOwnProperty(eventName.toLowerCase()) && !this.isCustomEvent(eventName)) {\n
return false;\n }\n\n if (!(window as any).Hammer && !this.loader) {\n  if (typeof ngDevMode ===
'undefined' || ngDevMode) {\n    this.console.warn(\n
  `The \`${eventName}\` event cannot be bound because HammerJS is not ` +\n    `loaded and no
custom loader has been specified.`);\n  }\n  return false;\n }\n\n return true;\n }\n\n override
addEventListener(element: HTMLElement, eventName: string, handler: Function): Function {\n  const zone =
this.manager.getZone();\n  eventName = eventName.toLowerCase();\n\n  // If Hammer is not present but a loader
is specified, we defer adding the event listener\n  // until Hammer is loaded.\n  if (!(window as any).Hammer &&
this.loader) {\n    this._loaderPromise = this._loaderPromise || zone.runOutsideAngular(() => this.loader!());\n    //
This `addEventListener` method returns a function to remove the added listener.\n    // Until Hammer is loaded, the
returned function needs to *cancel* the registration rather\n    // than remove anything.\n    let cancelRegistration
= false;\n    let deregister: Function = () => {\n
cancelRegistration = true;\n  };;\n\n  zone.runOutsideAngular(\n    () => this._loaderPromise!\n
.then(() => {\n    // If Hammer isn't actually loaded when the custom loader resolves, give up.\n
if (!(window as any).Hammer) {\n    if (typeof ngDevMode === 'undefined' || ngDevMode) {\n
this.console.warn(\n    `The custom HAMMER_LOADER completed, but HammerJS is
not present.`);\n    }\n    deregister = () => {};\n    return;\n    }\n\n
if (!cancelRegistration) {\n    // Now that Hammer is loaded and the listener is being loaded
for real,\n    // the deregistration function changes from canceling registration to\n    //
removal.\n    deregister = this.addEventListener(element,
eventName, handler);\n    }\n    })\n    .catch(() => {\n    if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n    this.console.warn(\n    `The
\`${eventName}\` event cannot be bound because the custom ` +\n    `HammerJS loader failed.`);\n
    }\n    deregister = () => {};\n    });;\n\n    // Return a function that *executes*
`deregister` (and not `deregister` itself) so that we\n    // can change the behavior of `deregister` once the listener is
added. Using a closure in\n    // this way allows us to avoid any additional data structures to track listener
removal.\n    return () => {\n    deregister();\n  };;\n  }\n\n  return zone.runOutsideAngular(() => {\n    //
Creating the manager bind events, must be done outside of angular\n    const mc =
this._config.buildHammer(element);\n
const callback = function(eventObj: HammerInput) {\n    zone.runGuarded(function() {\n
handler(eventObj);\n    });;\n  };;\n  mc.on(eventName, callback);\n  return () => {\n
mc.off(eventName, callback);\n    // destroy mc to prevent memory leak\n    if (typeof mc.destroy ===
'function') {\n    mc.destroy();\n    }\n  };;\n  }\n\n  isCustomEvent(eventName: string): boolean {\n
return this._config.events.indexOf(eventName) > -1;\n  }\n}\n\n/**\n * Adds support for HammerJS.\n * Import
this module at the root of your application so that Angular can work with\n * HammerJS to detect gesture events.\n
*\n * Note that applications still need to include the HammerJS script itself. This module\n * simply sets up the
coordination layer between HammerJS and Angular's EventManager.\n * \n * @publicApi\n */\n\n@NgModule({\n
providers: [\n  {\n    provide: EVENT_MANAGER_PLUGINS,\n    useClass: HammerGesturesPlugin,\n
multi: true,\n    deps: [DOCUMENT, HAMMER_GESTURE_CONFIG, Console, [new Optional(),
HAMMER_LOADER]]\n  },\n  {\n    provide: HAMMER_GESTURE_CONFIG, useClass: HammerGestureConfig,\n
deps: []\n  }\n])\n\nexport class HammerModule {\n}\n\n/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport {DOCUMENT} from '@angular/common';\nimport
{forwardRef, Inject, Injectable, Injector, Sanitizer, SecurityContext, _sanitizeHtml as _sanitizeHtml, _sanitizeUrl as
_sanitizeUrl, allowSanitizationBypassAndThrow as allowSanitizationBypassOrThrow, bypassSanitizationTrustHtml as
bypassSanitizationTrustHtml, bypassSanitizationTrustResourceUrl as bypassSanitizationTrustResourceUrl,
bypassSanitizationTrustScript as bypassSanitizationTrustScript, bypassSanitizationTrustStyle as

```

```

bypassSanitizationTrustStyle, bypassSanitizationTrustUrl
  as bypassSanitizationTrustUrl, BypassType as BypassType, getSanitizationBypassType as
getSanitizationBypassType, unwrapSafeValue as unwrapSafeValue } from '@angular/core';\n\nexport
{SecurityContext};\n\n\n/**\n * Marker interface for a value that's safe to use in a particular context.\n *\n *
@publicApi\n */\nexport interface SafeValue {} \n\n/**\n * Marker interface for a value that's safe to use as
HTML.\n *\n * @publicApi\n */\nexport interface SafeHtml extends SafeValue {} \n\n/**\n * Marker interface for a
value that's safe to use as style (CSS).\n *\n * @publicApi\n */\nexport interface SafeStyle extends SafeValue
{} \n\n/**\n * Marker interface for a value that's safe to use as JavaScript.\n *\n * @publicApi\n */\nexport interface
SafeScript extends SafeValue {} \n\n/**\n * Marker interface for a value that's safe to use as a URL linking to a
document.\n *\n * @publicApi\n */\nexport interface SafeUrl extends SafeValue {} \n\n/**\n * Marker interface for
a value that's safe
  to use as a URL to load executable code from.\n *\n * @publicApi\n */\nexport interface SafeResourceUrl extends
SafeValue {} \n\n/**\n * DomSanitizer helps preventing Cross Site Scripting Security bugs (XSS) by sanitizing\n *
values to be safe to use in the different DOM contexts.\n *\n * For example, when binding a URL in an `` tags) and the code should be executed. The sanitizer will\n * leave safe HTML
intact, so in most situations this method should not be used.\n *\n * ***WARNING:*** calling this method with
untrusted user data exposes your application to XSS\n * security risks!\n *\n *
    */\n abstract bypassSecurityTrustHtml(value: string): SafeHtml;\n\n /**\n * Bypass security and trust the given
value to be safe style value (CSS).\n *\n * ***WARNING:*** calling this method with untrusted user data exposes
your application to XSS\n * security risks!\n *\n *
    */\n abstract bypassSecurityTrustStyle(value: string): SafeStyle;\n\n
    /**\n * Bypass security and trust the given value to be safe JavaScript.\n *\n * ***WARNING:*** calling this
method with untrusted user data exposes your application to XSS\n * security risks!\n *\n *
    */\n abstract bypassSecurityTrustScript(value: string): SafeScript;\n\n
    /**\n * Bypass security and trust the given value to be a
safe style URL, i.e. a value that can be used\n * in hyperlinks or ``.\n *\n * ***WARNING:*** calling
this method with untrusted user data exposes your application to XSS\n * security risks!\n *\n *
    */\n abstract bypassSecurityTrustUrl(value: string): SafeUrl;\n\n
    /**\n * Bypass security

```

and trust the given value to be a safe resource URL, i.e. a location that may be used to load executable code from, like `<script src>`, or `<iframe src>`.

**WARNING:** calling this method with untrusted user data exposes your application to XSS security risks!

```

abstract bypassSecurityTrustResourceUrl(value: string): SafeResourceUrl;
}

export function domSanitizerImplFactory(injector: Injector) {
  return new DomSanitizerImpl(injector.get(DOCUMENT));
}

@Injectable({providedIn: 'root', useFactory: domSanitizerImplFactory, deps: [Injector]})
export class DomSanitizerImpl extends DomSanitizer {
  constructor(@Inject(DOCUMENT) private _doc: any) {
    super();
  }

  override sanitize(ctx: SecurityContext, value: SafeValue|string|null): string|null {
    if (value == null) return null;
    switch (ctx) {
      case SecurityContext.NONE:
        return value as string;
      case SecurityContext.HTML:
        if (allowSanitizationBypassOrThrow(value, BypassType.Html)) {
          return unwrapSafeValue(value);
        }
        return _sanitizeHtml(this._doc, String(value)).toString();
      case SecurityContext.STYLE:
        if (allowSanitizationBypassOrThrow(value, BypassType.Style)) {
          return unwrapSafeValue(value);
        }
        return value as string;
      case SecurityContext.SCRIPT:
        if (allowSanitizationBypassOrThrow(value, BypassType.Script)) {
          return unwrapSafeValue(value);
        }
        throw new Error('unsafe value used in a script context');
      case SecurityContext.URL:
        if (allowSanitizationBypassOrThrow(value, BypassType.Url)) {
          return unwrapSafeValue(value);
        }
        return _sanitizeUrl(String(value));
      case SecurityContext.RESOURCE_URL:
        if (allowSanitizationBypassOrThrow(value, BypassType.ResourceUrl)) {
          return unwrapSafeValue(value);
        }
        throw new Error('unsafe value used in a resource URL context (see https://g.co/ng/security#xss)');
      default:
        throw new Error(`Unexpected SecurityContext ${ctx} (see https://g.co/ng/security#xss)`);
    }
  }

  override bypassSecurityTrustHtml(value: string): SafeHtml {
    return bypassSanitizationTrustHtml(value);
  }

  override bypassSecurityTrustStyle(value: string): SafeStyle {
    return bypassSanitizationTrustStyle(value);
  }

  override bypassSecurityTrustScript(value: string): SafeScript {
    return bypassSanitizationTrustScript(value);
  }

  override bypassSecurityTrustUrl(value: string): SafeUrl {
    return bypassSanitizationTrustUrl(value);
  }

  override bypassSecurityTrustResourceUrl(value: string): SafeResourceUrl {
    return bypassSanitizationTrustResourceUrl(value);
  }
}

```

"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*/\n\nexport {getDOM} from '@angular/common';\nexport {initDomAdapter as initDomAdapter, INTERNAL\_BROWSER\_PLATFORM\_PROVIDERS as INTERNAL\_BROWSER\_PLATFORM\_PROVIDERS} from './browser';\nexport {BrowserDomAdapter as BrowserDomAdapter} from './browser/browser\_adapter';\nexport {TRANSITION\_ID as TRANSITION\_ID} from './browser/server-transition';\nexport {BrowserGetTestability as BrowserGetTestability} from './browser/testability';\nexport {escapeHtml as escapeHtml} from './browser/transfer\_state';\nexport {DomRendererFactory2 as DomRendererFactory2, flattenStyles as flattenStyles, NAMESPACE\_URIS as NAMESPACE\_URIS, shimContentAttribute as shimContentAttribute, shimHostAttribute as shimHostAttribute} from './dom/dom\_renderer';\nexport {DomEventsPlugin as DomEventsPlugin} from './dom/events/dom\_events';\nexport {HammerGesturesPlugin as HammerGesturesPlugin} from './dom/events/hammer\_gestures';\nexport {KeyEventsPlugin as KeyEventsPlugin} from './dom/events/key\_events';\nexport {DomSharedStylesHost as DomSharedStylesHost, SharedStylesHost as SharedStylesHost} from './dom/shared\_styles\_host';\nexport {DomSanitizerImpl as DomSanitizerImpl} from './security/dom\_sanitization\_service';\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \*/\n\nexport {Version} from '@angular/core';\n"/\*\*\n \* @publicApi\n \*/\nexport const VERSION = new Version('14.3.0');\n"/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \*\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at

```
https://angular.io/license\n *\n\nexport { ApplicationConfig, bootstrapApplication, BrowserModule,
createApplication, platformBrowser, provideProtractorTestingSupport }
from './browser';\nexport { Meta, MetaDefinition } from './browser/meta';\nexport { Title } from
 './browser/title';\nexport { disableDebugTools, enableDebugTools } from './browser/tools/tools';\nexport
{ BrowserTransferStateModule, makeStateKey, StateKey, TransferState } from './browser/transfer_state';\nexport
{ By } from './dom/debug/by';\nexport { EVENT_MANAGER_PLUGINS, EventManager } from
 './dom/events/event_manager';\nexport { HAMMER_GESTURE_CONFIG, HAMMER_LOADER,
HammerGestureConfig, HammerLoader, HammerModule } from './dom/events/hammer_gestures';\nexport
{ DomSanitizer, SafeHtml, SafeResourceUrl, SafeScript, SafeStyle, SafeUrl, SafeValue } from
 './security/dom_sanitization_service';\n\nexport * from './private_export';\nexport { VERSION } from
 './version';\n", "/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\n/**\n * @module\n
 * @description\n * Entry point for all public APIs of this package.\n *\n\nexport * from './src/platform-browser';\n\n
This file only reexports content of the `src` folder. Keep it that way.\n", "/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\n\n// This file is not used to build this module. It is only used
during editing\n// by the TypeScript language service and during build for verification. `ngc`\n// replaces this file
with production index.ts when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n", "/**\n *
Generated bundle index. Do not edit.\n *\n\nexport * from
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#### Angular

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The sources for this package are in the main [Angular](<https://github.com/angular/angular>) repo. Please file issues and pull requests against that repo.

Usage information and reference details can be found in [Angular documentation](<https://angular.io/docs>).

License: MIT

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```
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 *
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
```

Found in path(s):

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No license file was found, but licenses were detected in source scan.

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i < elAttrs.length; i++) {\n        const attrib = elAttrs.item(i);\n        res.set(attrib.name, attrib.value);\n      }\n      return res;\n    }\n\n    const _selfClosingTags = ['br', 'hr', 'input'];\n    export function\n    stringifyElement(el: any /** TODO #9100 */): string {\n      let result = '';\n      if (getDOM().isElementNode(el)) {\n        const tagName = el.tagName.toLowerCase();\n        // Opening tag\n
```



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    result += `<${tagName}`;\n\n // Attributes in an ordered way\n    const attributeMap = getAttributeMap(el);\n    const sortedKeys = Array.from(attributeMap.keys()).sort();\n    for (const key of sortedKeys) {\n        const\n        lowerCaseKey = key.toLowerCase();\n        let attValue = attributeMap.get(key);\n        if (typeof attValue !==\n        'string') {\n            result += ` ${lowerCaseKey}`;\n        } else {\n            // Browsers order style rules differently. Order\n            them alphabetically for consistency.\n            if (lowerCaseKey === 'style') {\n                attValue = attValue.split(/,\n            ?/).filter(s => !!s).sort().map(s => ` ${s}`);.join('');\n            }\n            result += `
${lowerCaseKey}=${attValue}`;\n        }\n    }\n    result += '>';\n\n // Children\n    const childrenRoot =\n    templateAwareRoot(el);\n    const children = childrenRoot ? childrenRoot.childNodes : [];\n    for (let j = 0; j <\n    children.length; j++) {\n        result += stringifyElement(children[j]);\n    }\n\n // Closing\n    tag\n    if (_selfClosingTags.indexOf(tagName) === -1) {\n        result += `</${tagName}>`;\n    } else if\n    (isCommentNode(el)) {\n        result += `<!--${el.nodeValue}-->`;\n    } else {\n        result += el.textContent;\n    }\n\n    return result;\n}\n\nexport function createNgZone(): NgZone {\n    return new NgZone({enableLongStackTrace: true,\n    shouldCoalesceEventChangeDetection: false});\n}\n\nexport function isCommentNode(node: Node): boolean {\n    return node.nodeType === Node.COMMENT_NODE;\n}\n\nexport function isTextNode(node: Node): boolean {\n    return node.nodeType === Node.TEXT_NODE;\n}\n\nexport function getContent(node: Node): Node {\n    if\n    ('content' in node) {\n        return (<any>node).content;\n    } else {\n        return node;\n    }\n}\n\nexport function\n    templateAwareRoot(el: Node): any {\n        return getDOM().isElementNode(el) && el.nodeName === 'TEMPLATE' ?\n        getContent(el) : el;\n    }\n\nexport function setCookie(name: string, value: string) {\n    // document.cookie is magical,\n    assigning into\n    it assigns/overrides one cookie value, but does\n    // not clear other cookies.\n    document.cookie =\n    encodeURIComponent(name) + '=' + encodeURIComponent(value);\n}\n\nexport function\n    supportsWebAnimation(): boolean {\n        return typeof (<any>Element).prototype['animate'] ===\n        'function';\n    }\n\nexport function hasStyle(element: any, styleName: string, styleValue?: string|null): boolean {\n    const value = element.style[styleName] || '';\n    return styleValue ? value === styleValue : value.length >\n    0;\n}\n\nexport function hasClass(element: any, className: string): boolean {\n    return\n    element.classList.contains(className);\n}\n\nexport function sortedClassList(element: any): any[] {\n    return\n    Array.prototype.slice.call(element.classList, 0).sort();\n}\n\nexport function createTemplate(html: any):\n    HTMLInputElement {\n        const t = getDOM().getDefaultDocument().createElement('template');\n        t.innerHTML = html;\n        return t;\n    }\n\nexport function childNodesAsList(el: Node): any[] {\n    const childNodes = el.childNodes;\n    const res = [];\n    for (let i = 0; i < childNodes.length; i++) {\n        res[i] = childNodes[i];\n    }\n    return\n    res;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is\n    governed by an MIT-style license that can be\n    * found in the LICENSE file at https://angular.io/license\n    */\nimport { APP_ID, createPlatformFactory, NgModule, NgZone, PLATFORM_INITIALIZER, platformCore,\n    StaticProvider } from '@angular/core';\nimport { BrowserModule, BrowserDomAdapter as BrowserDomAdapter }\n    from '@angular/platform-browser';\nimport { BrowserDetection, createNgZone } from './browser_util';\n\nfunction\n    initBrowserTests() {\n        BrowserDomAdapter.makeCurrent();\n        BrowserDetection.setup();\n    }\n\nconst\n    _TEST_BROWSER_PLATFORM_PROVIDERS: StaticProvider[] = [\n        {provide: PLATFORM_INITIALIZER,\n        useValue: initBrowserTests, multi: true}];\n\n/**\n * Platform for testing\n * \n * @publicApi\n */\nexport const\n    platformBrowserTesting =\n    createPlatformFactory(platformCore,\n    'browserTesting', _TEST_BROWSER_PLATFORM_PROVIDERS);\n\n/**\n * NgModule for testing.\n * \n * \n * @publicApi\n */\n@NgModule({\n    exports: [BrowserModule],\n    providers: [\n        {provide: APP_ID, useValue:\n        'a'},\n        {provide: NgZone, useFactory: createNgZone,\n        ]})\nexport class BrowserTestingModule\n    {\n    }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is\n    governed by an MIT-style license that can be\n    * found in the LICENSE file at https://angular.io/license\n    */\n\n/**\n * @module\n * @description\n * Entry point for all public APIs of the platform-browser/testing\n    package.\n */\nexport * from './browser';\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n    * found in the LICENSE file at\n    https://angular.io/license\n */\n\n/// <reference types='jasmine' />\n\n/**\n * @module\n * @description\n * Entry

```

point for all public

APIs of this package.\n \* ^\nexport \* from './src/testing';\n", "/\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at https://angular.io/license\n \* ^\n\n// This file is not used to build this module. It is only used during editing\n// by the TypeScript language service and during build for verification. `ngc`\n// replaces this file with production index.ts when it rewrites private symbol\n// names.\n\nexport \* from './public\_api';\n", "/\*\*\n \* Generated bundle index. Do not edit.\n \* ^\n\nexport \* from

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EG;;;"}  
}

Found

in path(s):

\* /opt/cola/permits/1784583492\_1693546583.6396487/0/platform-browser-14-3-0-1-  
tgz/package/fesm2020/testing.mjs.map

# 1.206 angular-compiler 14.3.0

## 1.206.1 Available under license :

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## 1.207 angular-forms 14.3.0

### 1.207.1 Available under license :

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```
/**
 * @license Angular v14.3.0
 * (c) 2010-2022 Google LLC. https://angular.io/
 * License: MIT
 */
```

Found in path(s):

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/index.d.ts

No license file was found, but licenses were detected in source scan.

```
/**
 * @license
 * Copyright Google LLC All Rights Reserved.
 *
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
```

Found in path(s):

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/checkbox\_value\_accessor.mjs

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/control\_container.mjs

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/reactive\_directives/form\_group\_directive.mjs

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/reactive\_directives/form\_group\_directive.mjs

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\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/reactive\_directives/form\_group\_directive.mjs

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\*

/opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/errors.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/model/form\_array.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/util.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/ng\_control\_status.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/shared.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/form\_builder.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/validators.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/ng\_model.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/model/form\_control.mjs  
\*  
/opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/radio\_control\_value\_accessor.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/template\_driven\_errors.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/ng\_no\_validate\_directive.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/abstract\_form\_group\_directive.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/control\_value\_accessor.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/reactive\_errors.mjs  
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\*  
/opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/ng\_form.mjs  
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\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/validators.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/version.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/ng\_model\_group.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/select\_multiple\_control\_value\_accessor.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/reactive\_directives/form\_control\_directive.mjs  
\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/directives/select\_control\_value\_accessor.mjs  
\*

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/opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
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* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/directives/error_examples.mjs
* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/form_providers.mjs
* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/directives/reactive_directives/form_group_name.mjs
* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/model/form_group.mjs
* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/directives/ng_control.mjs
* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/directives/form_interface.mjs
* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/directives/range_value_accessor.mjs
*
/opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-tgz/package/esm2020/src/forms.mjs
* /opt/cola/permits/1784583527_1693546591.9448414/0/forms-14-3-0-1-
tgz/package/esm2020/src/model/abstract_model.mjs
No license file was found, but licenses were detected in source scan.
```

```
{"version":3,"file":"forms.mjs","sources":["../../../../packages/forms/src/directives/control_value_accessor.ts","../../../../packages/forms/src/directives/checkbox_value_accessor.ts","../../../../packages/forms/src/directives/default_value_accessor.ts","../../../../packages/forms/src/validators.ts","../../../../packages/forms/src/directives/abstract_control_directive.ts","../../../../packages/forms/src/directives/ng_control.ts","../../../../packages/forms/src/directives/control_container.ts","../../../../packages/forms/src/directives/ng_control_status.ts","../../../../packages/forms/src/directives/error_examples.ts","../../../../packages/forms/src/directives/reactive_errors.ts","../../../../packages/forms/src/model/abstract_model.ts","../../../../packages/forms/src/model/form_group.ts","../../../../packages/forms/src/directives/shared.ts","../../../../packages/forms/src/directives/ng_form.ts","../../../../packages/forms/src/util.ts","../../../../packages/forms/src/model/form_control.ts","../../../../packages/forms/src/directives/abstract_form_group_directive.ts","../../../../packages/forms/src/directives/template_driven_errors.ts","../../../../packages/forms/src/directives/ng_model_group.ts","../../../../packages/forms/src/directives/ng_model.ts","../../../../packages/forms/src/directives/ng_no_validate_directive.ts","../../../../packages/forms/src/directives/number_value_accessor.ts","../../../../packages/forms/src/directives/radio_control_value_accessor.ts","../../../../packages/forms/src/directives/range_value_accessor.ts","../../../../packages/forms/src/directives/reactive_directives/form_control_directive.ts","../../../../packages/forms/src/directives/reactive_directives/form_group_directive.ts","../../../../packages/forms/src/directives/reactive_directives/form_group_name.ts","../../../../packages/forms/src/directives/reactive_directives/form_control_name.ts","../../../../packages/forms/src/directives/select_control_value_accessor.ts","../../../../packages/forms/src/directives/select_multiple_control_value_accessor.ts","../../../../packages/forms/src/directives/validators.ts","../../../../packages/forms/src/directives.ts","../../../../packages/forms/src/form_providers.ts","../../../../packages/forms/src/model/form_array.ts","../../../../packages/forms/src/form_builder.ts","../../../../packages/forms/src/version.ts","../../../../packages/forms/src/forms.ts","../../../../packages/forms/public_api.ts","../../../../packages/forms/index.ts","../../../../packages/forms/forms.ts"],"sourceContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be
```

```

* found in the LICENSE file at https://angular.io/license\n *\n\nimport {Directive, ElementRef, InjectionToken,
Renderer2} from '@angular/core';\n\n/**\n * @description\n * Defines an interface that acts as a bridge between the
Angular forms API and a\n * native element in the DOM.\n *\n * Implement this interface to create a custom form
control directive\n * that integrates with Angular forms.\n *\n * @see DefaultValueAccessor\n *\n * @publicApi\n *\n\nexport interface ControlValueAccessor {\n /**\n * @description\n * Writes a new value to the element.\n *\n * This method is called by the forms API to write to the view when programmatic\n * changes from model to
view are requested.\n *\n * @usageNotes\n * ### Write a value to the element\n *\n * The following example
writes a value to the native DOM element.\n *\n * ```ts\n * writeValue(value: any): void {\n *
this._renderer.setProperty(this._elementRef.nativeElement, 'value', value);\n * }\n * ```\n
*\n * @param obj The new value for the element\n *\n writeValue(obj: any): void;\n\n /**\n *
*\n * @description\n * Registers a callback function that is called when the control's value\n * changes in the UI.\n
*\n * This method is called by the forms API on initialization to update the form\n * model when values
propagate from the view to the model.\n *\n * When implementing the `registerOnChange` method in your own
value accessor,\n * save the given function so your class calls it at the appropriate time.\n *\n * @usageNotes\n
* ### Store the change function\n *\n * The following example stores the provided function as an internal
method.\n *\n * ```ts\n * registerOnChange(fn: (_: any) => void): void {\n * this._onChange = fn;\n * }\n
*\n * When the value changes in the UI, call the registered\n * function to allow the forms API to update
itself:\n *\n * ```ts\n * host: {\n * '(change)': '_onChange($event.target.value)\n
*\n * }\n * ```\n *\n * @param fn The callback function to register\n *\n registerOnChange(fn: any): void;\n\n
/**\n * @description\n * Registers a callback function that is called by the forms API on initialization\n * to
update the form model on blur.\n *\n * When implementing `registerOnTouched` in your own value accessor,
save the given\n * function so your class calls it when the control should be considered\n * blurred or
`'touched'`.\n *\n * @usageNotes\n * ### Store the callback function\n *\n * The following example stores
the provided function as an internal method.\n *\n * ```ts\n * registerOnTouched(fn: any): void {\n *
this._onTouched = fn;\n * }\n * ```\n *\n * On blur (or equivalent), your class should call the registered
function to allow\n * the forms API to update itself:\n *\n * ```ts\n * host: {\n * '(blur)': '_onTouched()'\n
*\n * }\n * ```\n *\n * @param fn The callback function to register\n
*\n registerOnTouched(fn: any): void;\n\n /**\n * @description\n * Function that is called by the forms API
when the control status changes to\n * or from 'DISABLED'. Depending on the status, it enables or disables the\n
* appropriate DOM element.\n *\n * @usageNotes\n * The following is an example of writing the disabled
property to a native DOM element:\n *\n * ```ts\n * setDisabledState(isDisabled: boolean): void {\n *
this._renderer.setProperty(this._elementRef.nativeElement, 'disabled', isDisabled);\n * }\n * ```\n *\n * @param
isDisabled The disabled status to set on the element\n *\n setDisabledState?(isDisabled: boolean):
void;\n\n /**\n * Base class for all ControlValueAccessor classes defined in Forms package.\n * Contains
common logic and utility functions.\n *\n * Note: this is an *internal-only* class and should not be extended or used
directly in\n * applications code.\n *\n @Directive()\n\nexport class BaseControlValueAccessor
{\n /**\n * The registered callback function called when a change or input event occurs on the input\n *
element.\n * @nodoc\n *\n onChange = (_: any) => {};\n\n /**\n * The registered callback function called
when a blur event occurs on the input element.\n * @nodoc\n *\n onTouched = () => {};\n\n constructor(private
_renderer: Renderer2, private _elementRef: ElementRef) {\n\n /**\n * Helper method that sets a property on a
target element using the current Renderer\n * implementation.\n * @nodoc\n *\n protected setProperty(key:
string, value: any): void {\n this._renderer.setProperty(this._elementRef.nativeElement, key, value);\n }\n\n /**\n
* Registers a function called when the control is touched.\n * @nodoc\n *\n registerOnTouched(fn: () => void):
void {\n this.onTouched = fn;\n }\n\n /**\n * Registers a function called when the control value changes.\n *
*\n @nodoc\n *\n registerOnChange(fn: (_: any) => {}): void {\n this.onChange
= fn;\n }\n\n /**\n * Sets the \"disabled\" property on the range input element.\n * @nodoc\n *\n
setDisabledState(isDisabled: boolean): void {\n this.setProperty('disabled', isDisabled);\n }\n\n /**\n * Base
class for all built-in ControlValueAccessor classes (except DefaultValueAccessor, which is\n * used in case no other

```



CVAs can be found). We use this class to distinguish between default CVA, built-in CVAs and custom CVAs, so that Forms logic can recognize built-in CVAs and treat custom ones with higher priority (when both built-in and custom CVAs are present). Note: this is an internal-only class and should not be extended or used directly in applications code.

```

@Directive()
export class BuiltInControlValueAccessor extends
BaseControlValueAccessor {
  // Used to provide a `ControlValueAccessor` for form controls.
  // See `DefaultValueAccessor` for how to implement one.
  @publicApi
  export const
  NG_VALUE_ACCESSOR
  = new InjectionToken<ReadOnlyArray<ControlValueAccessor>>('NgValueAccessor');
  // Copyright Google LLC All Rights Reserved.
  // Use of this source code is governed by an MIT-style license
  // that can be found in the LICENSE file at https://angular.io/license
  import { Directive, ElementRef,
  forwardRef, Renderer2 } from '@angular/core';
  import { BuiltInControlValueAccessor, ControlValueAccessor,
  NG_VALUE_ACCESSOR } from './control_value_accessor';
  export const CHECKBOX_VALUE_ACCESSOR:
  any = {
    provide: NG_VALUE_ACCESSOR,
    useExisting: forwardRef(() =>
  CheckboxControlValueAccessor),
    multi: true,
  };
  // @description
  // A `ControlValueAccessor` for
  // writing a value and listening to changes on a checkbox input
  // element.
  // @usageNotes
  // ### Using a
  // checkbox with a reactive form.
  // The following example shows how to use a checkbox with a reactive form.
  // `ts`
  // const rememberLoginControl = new FormControl();
  // ``
  // <input type="checkbox" [formControl]="rememberLoginControl">
  // @ngModule ReactiveFormsModule
  // @ngModule FormsModule
  // @publicApi
  // @Directive({
  // selector:
  // 'input[type=checkbox][formControlName],input[type=checkbox][formControl],input[type=checkbox][ngModel]',
  // host: { '(change)': 'onChange($event.target.checked)', '(blur)': 'onTouched()' },
  // providers:
  // [CHECKBOX_VALUE_ACCESSOR]
  // })
  // export class CheckboxControlValueAccessor extends
  // BuiltInControlValueAccessor implements
  // ControlValueAccessor {
  //   // Sets the "checked" property on
  //   the input element.
  //   @nodoc
  //   writeValue(value: any): void {
  //     this.setProperty('checked', value);
  //   }
  // }
  // Copyright Google LLC All Rights Reserved.
  // Use of this source code is
  // governed by an MIT-style license that can be found in the LICENSE file at https://angular.io/license
  // import { getDOM as getDOM } from '@angular/common';
  // import
  // { Directive, ElementRef, forwardRef, Inject, InjectionToken, Optional, Renderer2 } from '@angular/core';
  // import
  // { BaseControlValueAccessor, ControlValueAccessor, NG_VALUE_ACCESSOR } from
  // './control_value_accessor';
  // export const DEFAULT_VALUE_ACCESSOR: any = {
  //   provide:
  //   NG_VALUE_ACCESSOR,
  //   useExisting: forwardRef(() => DefaultValueAccessor),
  //   multi: true,
  // };
  // We must check whether the agent is Android because composition events
  // behave differently between iOS and
  // Android.
  // @function
  // _isAndroid(): boolean {
  //   const userAgent = getDOM() ? getDOM().getUserAgent() : "";
  //   return /android (\\d+)/.test(userAgent.toLowerCase());
  // }
  // @description
  // Provide this token to control
  // if form directives buffer IME input until
  // the "compositionend" event occurs.
  // @publicApi
  // export
  // const COMPOSITION_BUFFER_MODE = new InjectionToken<boolean>('CompositionEventMode');
  // The default `ControlValueAccessor` for writing a value and
  // listening to changes on input
  // elements. The accessor is used by the `FormControlDirective`,
  // `FormControlName`, and `NgModel` directives.
  // { @searchKeywords ngDefaultControl }
  // @usageNotes
  // ### Using the default value accessor
  // The following example shows how to use an
  // input element that activates the default value accessor
  // (in this case, a text field).
  // `ts`
  // const
  // firstNameControl = new FormControl();
  // ``
  // <input type="text"
  // [formControl]="firstNameControl">
  // This value accessor is used by default for `<input
  // type="text">` and `<textarea>`
  // elements, but you could also use it for custom components that have similar
  // behavior and do not require special
  // processing. In order to attach the default value accessor to a custom element,
  // add the `ngDefaultControl` attribute as shown below.
  // ``
  // <custom-input-component
  // ngDefaultControl [(ngModel)]=value"></custom-input-component>

```

```

`n *n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n * @publicApi\n
*@Directive({\n selector:\n
'input:not([type=checkbox])[formControlName],textarea[formControlName],input:not([type=checkbox])[formContr
ol],textarea[formControl],input:not([type=checkbox])[ngModel],textarea[ngModel],[ngDefaultControl]',\n //
TODO: vsavkin replace the above selector with the one below it once\n //
https://github.com/angular/angular/issues/3011 is implemented\n // selector:
'[ngModel],[formControl],[formControlName]',\n host: {\n '(input)':
'$any(this)._handleInput($event.target.value)',\n '(blur)': 'onTouched()',\n '(compositionstart)':
'$any(this)._compositionStart()',\n '(compositionend)': '$any(this)._compositionEnd($event.target.value)\n },\n
providers: [DEFAULT_VALUE_ACCESSOR]\n})\nexport class DefaultValueAccessor extends
BaseControlValueAccessor implements ControlValueAccessor {\n /** Whether the user is creating a composition
string (IME events). */\n
private _composing = false;\n\n constructor(\n renderer: Renderer2, elementRef: ElementRef,\n
@Optional() @Inject(COMPOSITION_BUFFER_MODE) private _compositionMode: boolean) {\n
super(renderer, elementRef);\n if (this._compositionMode === null) {\n this._compositionMode =
!_isAndroid();\n }\n }\n\n /**\n * Sets the "value" property on the input element.\n * @nodoc\n */\n
writeValue(value: any): void {\n const normalizedValue = value === null ? '' : value;\n this.setProperty('value',
normalizedValue);\n }\n\n /** @internal */\n _handleInput(value: any): void {\n if (!this._compositionMode ||
(this._compositionMode && !this._composing)) {\n this.onChange(value);\n }\n }\n\n /** @internal */\n
_compositionStart(): void {\n this._composing = true;\n }\n\n /** @internal */\n _compositionEnd(value: any):
void {\n this._composing = false;\n this._compositionMode && this.onChange(value);\n }\n\n /**\n *
@license\n * Copyright
\n * Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {InjectionToken, isObservable as
isObservable, isPromise as isPromise, RuntimeError as RuntimeError} from '@angular/core';\nimport {forkJoin,
from, Observable} from 'rxjs';\nimport {map} from 'rxjs/operators';\nimport {AsyncValidator, AsyncValidatorFn,
ValidationErrors, Validator, ValidatorFn} from './directives/validators';\nimport {RuntimeErrorCode} from
'./errors';\nimport {AbstractControl} from './model/abstract_model';\n\nconst NG_DEV_MODE = typeof
ngDevMode === 'undefined' || !!ngDevMode;\n\nfunction isEmptyInputValue(value: any): boolean {\n /**\n *
Check if the object is a string or array before evaluating the length attribute.\n * This avoids falsely rejecting
objects that contain a custom length attribute.\n * For example, the object {id: 1, length: 0, width: 0} should not
be returned as empty.\n */\n return value == null ||\n ((typeof value === 'string' || Array.isArray(value)) &&
value.length === 0);\n}\n\nfunction isValidLength(value: any): boolean {\n // non-strict comparison is intentional,
to check for both `null` and `undefined` values\n return value != null && typeof value.length ===
'number';\n}\n\n/**\n * @description\n * An `InjectionToken` for registering additional synchronous validators used
with\n * `AbstractControl`s.\n * @see `NG_ASYNC_VALIDATORS`\n * @usageNotes\n * ###
Providing a custom validator\n * The following example registers a custom validator directive. Adding the
validator to the\n * existing collection of validators requires the `multi: true` option.\n * ```typescript\n *
@Directive({\n * selector: '[customValidator]',\n * providers: [{provide: NG_VALIDATORS, useExisting:
CustomValidatorDirective, multi: true}]\n * })\n * class CustomValidatorDirective implements Validator {\n *
validate(control:
\n * AbstractControl): ValidationErrors | null {\n * return { 'custom': true };,\n * }\n * }\n * ```\n * @publicApi\n
*\n */\n\nexport const NG_VALIDATORS = new InjectionToken<Array<Validator|Function>>('NgValidators');\n\n/**\n *
@description\n * An `InjectionToken` for registering additional asynchronous validators used with\n *
`AbstractControl`s.\n * @see `NG_VALIDATORS`\n * @usageNotes\n * ### Provide a custom async
validator directive\n * The following example implements the `AsyncValidator` interface to create an\n * async
validator directive with a custom error key.\n * ```typescript\n * @Directive({\n * selector:
'[customAsyncValidator]',\n * providers: [{provide: NG_ASYNC_VALIDATORS, useExisting:

```

```

CustomAsyncValidatorDirective, multi: true}}) class CustomAsyncValidatorDirective implements
AsyncValidator {
  validate(control: AbstractControl): Promise<ValidationErrors|null> {
    return
    Promise.resolve({'custom': true});
  }
}
export const NG_ASYNC_VALIDATORS = [
  new
  InjectionToken<Array<Validator|Function>>('NgAsyncValidators'),
  {
    provide: AsyncValidator,
    useValue: new NgAsyncValidator(),
    multi: true,
  },
]
}
}

A regular expression that matches
valid e-mail addresses.
At a high level, this regexp matches e-mail addresses of the format `local-part@tld`,
where:
- `local-part` consists of one or more of the allowed characters (alphanumeric and some
punctuation
symbols).
- `local-part` cannot begin or end with a period (.).
- `local-part` cannot be longer than 64
characters.
- `tld` consists of one or more `labels` separated by periods (.). For example `localhost` or
`foo.com`.
- A `label` consists of one or more of the allowed characters (alphanumeric, dashes (-) and
periods (.)).
- A `label` cannot begin or end with a dash (-) or a period (.).
- A `label` cannot be longer
than 63 characters.
- The whole address cannot be longer than 254 characters.
## Implementation
background
This regexp was ported over from AngularJS (see there for git history):
https://github.com/angular/angular.js/blob/c133ef836/src/ng/directive/input.js#L27
It is based on the
[WHATWG version](https://html.spec.whatwg.org/multipage/input.html#valid-e-mail-address) with
some
enhancements to incorporate more RFC rules (such as rules related to domain names and the
lengths of different
parts of the address). The main differences from the WHATWG version are:
- Disallow `local-part` to begin or
end with a period (.).
- Disallow `local-part` length to exceed 64 characters.
- Disallow total address
length to exceed 254 characters.
See [this commit](https://github.com/angular/angular.js/commit/f3f5cf72e)
for more details.
const EMAIL_REGEXP = /^(?=.{1,254}$)(?=.{1,64}@)[a-zA-Z0-9!#$%&'*/+=?^_{|}~-]+(?:\[a-zA-Z0-9!#$%&'*/+=?^_{|}~-]+\)*@[a-zA-Z0-9](?:[a-zA-Z0-9-]{0,61}[a-zA-Z0-9])?(\.?[a-zA-Z0-9-]{0,61}[a-zA-Z0-9])?*$;

* @description
Provides a set of built-in validators that can be used by form controls.
A validator is a
function that processes a `FormControl` or collection of
controls and returns an error map or null. A null map
means that validation has passed.
* @see [Form Validation](/guide/form-validation)
* @publicApi
export class Validators {
  * @description
Validator that requires the control's value to be greater
than or equal to the provided number.
* @usageNotes
### Validate against a minimum of 3
typescript
const control = new FormControl(2, Validators.min(3));
console.log(control.errors); // {min: {min: 3, actual: 2}}
* @returns
A validator function that
returns an error map with the
`min` property if the validation check fails, otherwise `null`.
* @see
`updateValueAndValidity()`
static min(min:
number): ValidatorFn {
  return minValidator(min);
}
}
* @description
Validator that requires
the control's value to be less than or equal to the provided number.
* @usageNotes
### Validate
against a maximum of 15
typescript
const control = new FormControl(16, Validators.max(15));
console.log(control.errors); // {max: {max: 15, actual: 16}}
* @returns
A validator function
that returns an error map with the
`max` property if the validation check fails, otherwise `null`.
* @see
`updateValueAndValidity()`
static max(max: number): ValidatorFn {
  return maxValidator(max);
}
}
* @description
Validator that requires the control have a non-empty value.
* @usageNotes
### Validate that the field is non-empty
typescript
const control = new
FormControl("", Validators.required);
console.log(control.errors);
// {required: true}
* @returns
An error map with the `required` property
if the validation
check fails, otherwise `null`.
* @see
`updateValueAndValidity()`
static required(control:
AbstractControl): ValidationErrors|null {
  return requiredValidator(control);
}
}
* @description
Validator that requires the control's value be true. This validator is commonly
used for required checkboxes.
* @usageNotes
### Validate that the field value is true
typescript
const control =
new FormControl('some value', Validators.requiredTrue);
console.log(control.errors); // {required: true}
* @returns
An error map that contains the `required` property
set to `true` if the validation check
fails, otherwise `null`.
* @see
`updateValueAndValidity()`
static requiredTrue(control:

```

AbstractControl): ValidationErrors|null

```
{\n  return requiredTrueValidator(control);\n }\n\n /**\n  * @description\n  * Validator that requires the control's value pass an email validation test.\n  *\n  * Tests the value using a [regular\n  * expression](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Regular_Expressions)\n  * pattern suitable for common use cases. The pattern is based on the definition of a valid email\n  * address in the [WHATWG HTML\n  * specification](https://html.spec.whatwg.org/multipage/input.html#valid-e-mail-address)\n  * with\n  * some enhancements to incorporate more RFC rules (such as rules related to domain names and the\n  * lengths of different parts of the address).\n  *\n  * The differences from the WHATWG version include:\n  * - Disallow `local-part` (the part before the `@` symbol) to begin or end with a period (`.`).\n  * - Disallow `local-part` to be longer than 64 characters.\n  * - Disallow the whole address to be longer than 254 characters.\n  *\n  * If this pattern does not satisfy your business needs, you can use `Validators.pattern()` to\n  * validate the value against a different pattern.\n  *\n  * @usageNotes\n  * \n  * ### Validate that the field matches a valid email pattern\n  * \n  * ```typescript\n  * const control = new FormControl('bad@', Validators.email);\n  * \n  * console.log(control.errors); // {email: true}\n  * ```\n  *\n  * @returns An error map with the `email` property\n  * if the validation check fails, otherwise `null`.\n  *\n  * @see `updateValueAndValidity()`\n  *\n  * /\n  * static email(control: AbstractControl): ValidationErrors|null {\n  *   return emailValidator(control);\n  * }\n  * }\n  * }\n  * \n  * @description\n  * Validator that requires the length of the control's value to be greater than or equal\n  * to the provided minimum length. This validator is also provided by default if you use the\n  * the HTML5 `minlength` attribute. Note that the `minLength` validator is intended to be used\n  * \n  * only for types that have a numeric `length` property, such as strings or arrays. The\n  * `minLength` validator logic is also not invoked for values when their `length` property is 0\n  * (for example in case of an empty string or an empty array), to support optional controls. You\n  * can use the standard `required` validator if empty values should not be considered valid.\n  *\n  * @usageNotes\n  * \n  * ### Validate that the field has a minimum of 3 characters\n  * \n  * ```typescript\n  * const control = new FormControl('ng', Validators.minLength(3));\n  * \n  * console.log(control.errors); // {minlength: {requiredLength: 3, actualLength: 2}}\n  * ```\n  *\n  * html\n  * <input minlength="5">\n  * \n  * @returns A validator function that returns an error map with the\n  * `minlength` property if the validation check fails, otherwise `null`.\n  *\n  * @see `updateValueAndValidity()`\n  *\n  * /\n  * static minLength(minLength: number): ValidatorFn\n  * {\n  *   return minLengthValidator(minLength);\n  * }\n  * }\n  * }\n  * \n  * @description\n  * Validator that requires the length of the control's value to be less than or equal\n  * to the provided maximum length. This validator is also provided by default if you use the\n  * the HTML5 `maxlength` attribute. Note that the `maxLength` validator is intended to be used\n  * only for types that have a numeric `length` property, such as strings or arrays.\n  *\n  * @usageNotes\n  * \n  * ### Validate that the field has maximum of 5 characters\n  * \n  * ```typescript\n  * const control = new FormControl('Angular', Validators.maxLength(5));\n  * \n  * console.log(control.errors); //\n  * {maxlength: {requiredLength: 5, actualLength: 7}}\n  * ```\n  *\n  * html\n  * <input maxlength="5">\n  * \n  * @returns A validator function that returns an error map with the\n  * `maxlength` property if the validation check fails, otherwise `null`.\n  *\n  * @see `updateValueAndValidity()`\n  *\n  * /\n  * static maxLength(maxLength: number): ValidatorFn {\n  *   return maxLengthValidator(maxLength);\n  * }\n  * }\n  * }\n  * \n  * @description\n  * Validator that requires the control's value to match a regex pattern. This validator is also\n  * provided by default if you use the HTML5 `pattern` attribute.\n  *\n  * @usageNotes\n  * \n  * ### Validate that the field only contains letters or spaces\n  * \n  * ```typescript\n  * const control = new FormControl('1', Validators.pattern('[a-zA-Z ]*')); \n  * \n  * console.log(control.errors); // {pattern:\n  * {requiredPattern: '^([a-zA-Z ]*$)', actualValue: '1'}}\n  * ```\n  *\n  * html\n  * <input pattern="[a-zA-Z ]*">\n  * \n  * ### Pattern matching with the global or sticky flag\n  * \n  * `RegExp` objects created with the `g` or `y` flags that are passed into `Validators.pattern`\n  * can produce different results on the same input when validations are run consecutively. This is\n  * due to how the behavior of `RegExp.prototype.test` is\n  * specified in [ECMA-262](https://tc39.es/ecma262/#sec-regexpbuiltinexec)\n  * (`RegExp` preserves the index of the last match when the global or sticky flag is used).\n  * \n  * Due to this behavior, it
```

is recommended that when using `Validators.pattern`` you **do not** pass in a `RegExp`` object with either the global or sticky `flag`` enabled.

```

typescript // Not recommended (since the `g` flag is used)
const controlOne = new FormControl('1', Validators.pattern(/foo/g)); // Good
const controlTwo = new FormControl('1', Validators.pattern(/foo/));
`
@param pattern A regular expression to be used as is to test the values, or a string.
If a string is passed, the `^` character is prepended and the `$` character is appended to the provided string (if not already present), and the resulting regular expression is used to test the values.
@returns A validator function

```

```

that returns an error map with the `pattern` property if the validation check fails, otherwise `null`.
@see `updateValueAndValidity()`
static pattern(pattern: string|RegExp): ValidatorFn {
  return patternValidator(pattern);
}
`
description Validator that performs no operation.
@see `updateValueAndValidity()`
static nullValidator(control: AbstractControl): ValidationErrors|null {
  return nullValidator(control);
}
`
description Compose multiple validators into a single function that returns the union of the individual error maps for the provided control.
@returns A validator function that returns an error map with the merged error maps of the validators if the validation check fails, otherwise `null`.
@see `updateValueAndValidity()`
static compose(validators: null): null;
static compose(validators: (ValidatorFn|null|undefined)[]):

```

```

ValidatorFn|null;
static compose(validators: (ValidatorFn|null|undefined)[]|null): ValidatorFn|null {
  return compose(validators);
}
`
description Compose multiple async validators into a single function that returns the union of the individual error objects for the provided control.
@returns A validator function that returns an error map with the merged error objects of the async validators if the validation check fails, otherwise `null`.
@see `updateValueAndValidity()`
static composeAsync(validators: (AsyncValidatorFn|null)[]): AsyncValidatorFn|null {
  return composeAsync(validators);
}
}
`
description Validator that requires the control's value to be greater than or equal to the provided number.
See `Validators.min` for additional information.
export function minValidator(min: number): ValidatorFn {
  return (control: AbstractControl): ValidationErrors|null => {
    if (isEmptyInputValue(control.value) || isEmptyInputValue(min))
      return null; // don't validate empty values to allow optional controls
    const value = parseFloat(control.value); // Controls with NaN values after parsing should be treated as not having a minimum, per the HTML forms spec: https://www.w3.org/TR/html5/forms.html#attr-input-min
    return !isNaN(value) && value < min ? {'min': {'min': min, 'actual': control.value}} : null;
  };
}
`
description Validator that requires the control's value to be less than or equal to the provided number.
See `Validators.max` for additional information.
export function maxValidator(max: number): ValidatorFn {
  return (control: AbstractControl): ValidationErrors|null => {
    if (isEmptyInputValue(control.value) || isEmptyInputValue(max))
      return null; // don't validate empty values to allow optional controls
    const value =

```

```

parseFloat(control.value); // Controls with NaN values after parsing should be treated as not having a maximum, per the HTML forms spec:
https://www.w3.org/TR/html5/forms.html#attr-input-max
return !isNaN(value) && value > max ? {'max': {'max': max, 'actual': control.value}} : null;
};
}
`
description Validator that requires the control have a non-empty value.
See `Validators.required` for additional information.
export function requiredValidator(control: AbstractControl): ValidationErrors|null {
  return isEmptyInputValue(control.value) ? {'required': true} : null;
}
`
description Validator that requires the control's value be true. This validator is commonly used for required checkboxes.
See `Validators.requiredTrue` for additional information.
export function requiredTrueValidator(control: AbstractControl): ValidationErrors|null {
  return control.value === true ? null : {'required': true};
}
}
`
description Validator that requires the control's value pass an email validation test.
See `Validators.email`

```

```

for additional information.
export function emailValidator(control: AbstractControl): ValidationErrors|null {
  if (isEmptyInputValue(control.value))
    return null; // don't validate empty values to allow optional controls
  return EMAIL_REGEXP.test(control.value) ? null : {'email': true};
}
`
description Validator that requires the length of the control's value to be greater than or equal to the provided minimum length.
See

```

```

`Validators.minLength` for additional information.\n */\nexport function minLengthValidator(minLength: number):
ValidatorFn {\n return (control: AbstractControl): ValidationErrors|null => {\n if
(isEmptyInputValue(control.value) || !hasValidLength(control.value)) {\n // don't validate empty values to allow
optional controls\n // don't validate values without `length` property\n return null;\n }\n\n return
control.value.length < minLength ?\n {'minlength': {'requiredLength': minLength, 'actualLength':
control.value.length}}
:\n null;\n };\n}\n\n/**\n * Validator that requires the length of the control's value to be less than or equal\n *
to the provided maximum length. See `Validators.maxLength` for additional information.\n */\nexport function
maxLengthValidator(maxLength: number): ValidatorFn {\n return (control: AbstractControl): ValidationErrors|null
=> {\n return hasValidLength(control.value) && control.value.length > maxLength ?\n {'maxlength':
{'requiredLength': maxLength, 'actualLength': control.value.length}} :\n null;\n };\n}\n\n/**\n * Validator that
requires the control's value to match a regex pattern.\n * See `Validators.pattern` for additional information.\n
*/\nexport function patternValidator(pattern: string|RegExp): ValidatorFn {\n if (!pattern) return nullValidator;\n
let regex: RegExp;\n let regexStr: string;\n if (typeof pattern === 'string') {\n regexStr = ";\n\n if
(pattern.charAt(0) !== '^') regexStr += '^';\n\n regexStr += pattern;\n\n if (pattern.charAt(pattern.length - 1) !== '$')
regexStr += '$';\n\n regex = new RegExp(regexStr);\n } else {\n regexStr = pattern.toString();\n regex = pattern;\n
}\n return (control: AbstractControl): ValidationErrors|null =>
{\n if (isEmptyInputValue(control.value)) {\n return null; // don't validate empty values to allow optional
controls\n }\n const value: string = control.value;\n return regex.test(value) ? null :\n
{'pattern': {'requiredPattern': regexStr, 'actualValue': value}};\n };\n}\n\n/**\n * Function that has `ValidatorFn`
shape, but performs no operation.\n */\nexport function nullValidator(control: AbstractControl):
ValidationErrors|null {\n return null;\n }\n\nfunction isPresent(o: any): boolean {\n return o != null;\n }\n\nexport
function toObservable(value: any): Observable<any> {\n const obs = isPromise(value) ? from(value) : value;\n if
(NG_DEV_MODE && !(isObservable(obs))) {\n let errorMessage
= `Expected async validator to return Promise or Observable.`;\n // A synchronous validator will return object or
null.\n if (typeof value === 'object') {\n errorMessage += '\n ' Are you using a synchronous validator where
an async validator is expected?';\n }\n throw new
RuntimeError(RuntimeErrorCode.WRONG_VALIDATOR_RETURN_TYPE, errorMessage);\n }\n return
obs;\n }\n\nfunction mergeErrors(arrayOfErrors: (ValidationErrors|null)[]): ValidationErrors|null {\n let res: {[key:
string]: any} = {};\n // Not using Array.reduce here due to a Chrome 80 bug\n //
https://bugs.chromium.org/p/chromium/issues/detail?id=1049982\n arrayOfErrors.forEach((errors:
ValidationErrors|null) => {\n res = errors != null ? {...res!, ...errors} : res!;\n });\n\n return
Object.keys(res).length === 0 ? null : res;\n }\n\ninterface GenericValidatorFn = (control: AbstractControl) =>
any;\n\nfunction executeValidators<V extends GenericValidatorFn>(\n control: AbstractControl,\n
validators: V[]): Return<V>[] {\n return validators.map(validator => validator(control));\n }\n\nfunction
isValidatorFn<V>(validator: V|Validator|AsyncValidator): validator is V {\n return !(validator as
Validator).validate;\n }\n\n/**\n * Given the list of validators that may contain both functions as well as classes,
return the list\n * of validator functions (convert validator classes into validator functions). This is needed to\n *
have consistent structure in validators list before composing them.\n * @param validators The set of validators
that may contain validators both in plain function form\n * as well as represented as a validator class.\n */\nexport
function normalizeValidators<V>(validators: (V|Validator|AsyncValidator)[]): V[] {\n return
validators.map(validator => {\n return isValidatorFn<V>(validator) ?\n validator :\n ((c: AbstractControl)
=> validator.validate(c)) as unknown as V;\n });\n }\n\n/**\n * Merges synchronous validators into
a single validator function.\n * See `Validators.compose` for additional information.\n */\nfunction
compose(validators: (ValidatorFn|null|undefined)[|null]): ValidatorFn|null {\n if (!validators) return null;\n const
presentValidators: ValidatorFn[] = validators.filter(isPresent) as any;\n if (presentValidators.length == 0) return
null;\n\n return function(control: AbstractControl) {\n return
mergeErrors(executeValidators<ValidatorFn>(control, presentValidators));\n };\n }\n\n/**\n * Accepts a list of

```

validators of different possible shapes (`Validator` and `ValidatorFn`),\n \* normalizes the list (converts everything to `ValidatorFn`) and merges them into a single\n \* validator function.\n \*/\nexport function composeValidators(validators: Array<Validator|ValidatorFn>): ValidatorFn|null {\n return validators != null ? compose(normalizeValidators<ValidatorFn>(validators)) : null;\n}\n\n/\*\*\n \* Merges asynchronous validators into a single validator function.\n \* See `Validators.composeAsync` for additional information.\n \*/\nfunction composeAsync(validators: (AsyncValidatorFn|null)[]): AsyncValidatorFn|null {\n if (!validators) return null;\n const presentValidators: AsyncValidatorFn[] = validators.filter(isPresent) as any;\n if (presentValidators.length === 0) return null;\n\n return function(control: AbstractControl) {\n const observables =\n executeValidators<AsyncValidatorFn>(control, presentValidators).map(toObservable);\n return forkJoin(observables).pipe(map(mergeErrors));\n };}\n}\n\n/\*\*\n \* Accepts a list of async validators of different possible shapes (`AsyncValidator` and\n \* `AsyncValidatorFn`), normalizes the list (converts everything to `AsyncValidatorFn`) and merges\n \* them into a single validator function.\n \*/\nexport function composeAsyncValidators(validators: Array<AsyncValidator|AsyncValidatorFn>):\n AsyncValidatorFn|null {\n return validators != null ? composeAsync(normalizeValidators<AsyncValidatorFn>(validators)) :\n null;\n}\n\n/\*\*\n \* Merges raw control validators with a given directive validator and returns the combined list of\n \* validators as an array.\n \*/\nexport function mergeValidators<V>(controlValidators: V[V[]]|null, dirValidator: V): V[] {\n if (controlValidators === null) return [dirValidator];\n return Array.isArray(controlValidators) ? [...controlValidators, dirValidator] :\n [controlValidators, dirValidator];}\n\n/\*\*\n \* Retrieves the list of raw synchronous validators attached to a given control.\n \*/\nexport function getControlValidators(control: AbstractControl): ValidatorFn|ValidatorFn[]|null {\n return (control as any).\_rawValidators as ValidatorFn | ValidatorFn[] | null;\n}\n\n/\*\*\n \* Retrieves the list of raw asynchronous validators attached to a given control.\n \*/\nexport function getControlAsyncValidators(control: AbstractControl): AsyncValidatorFn|\n AsyncValidatorFn[]|null {\n return (control as any).\_rawAsyncValidators as AsyncValidatorFn | AsyncValidatorFn[] | null;\n}\n\n/\*\*\n \* Accepts a singleton validator, an array, or null, and returns an array type with the provided\n \* validators.\n \* @param validators A validator, validators, or null.\n \* @returns A validators array.\n \*/\nexport function makeValidatorsArray<T extends ValidatorFn|AsyncValidatorFn>(validators: T|T[]|\n null): T[] {\n if (!validators) return [];\n return Array.isArray(validators) ? validators : [validators];}\n\n/\*\*\n \* Determines whether a validator or validators array has a given validator.\n \* @param validators The validator or validators to compare against.\n \* @param validator The validator to check.\n \* @returns Whether the validator is present.\n \*/\nexport function hasValidator<T extends ValidatorFn|AsyncValidatorFn>(validators: T|T[]|null, validator: T): boolean {\n return Array.isArray(validators) ? validators.includes(validator) : validators === validator;\n}\n\n/\*\*\n \* Combines two arrays of validators into one. If duplicates are provided, only one will be added.\n \* @param validators The new validators.\n \* @param currentValidators The base array of current validators.\n \* @returns An array of validators.\n \*/\nexport function addValidators<T extends ValidatorFn|AsyncValidatorFn>(validators: T|T[], currentValidators: T|T[]|null): T[] {\n const current = makeValidatorsArray(currentValidators);\n const validatorsToAdd = makeValidatorsArray(validators);\n validatorsToAdd.forEach((v: T) => {\n // Note: if there are duplicate entries in the new validators array,\n // only the first one would be added to the current list of validators.\n // Duplicate ones would be ignored since `hasValidator` would detect\n // the presence of a validator function and we update the current list in place.\n if (!hasValidator(current, v)) {\n current.push(v);\n }\n });\n return current;\n}\n\nexport function removeValidators<T extends ValidatorFn|AsyncValidatorFn>(validators: T|T[], currentValidators: T|T[]|null): T[] {\n return makeValidatorsArray(currentValidators).filter(v => !hasValidator(validators, v));\n}\n\n", /\*\*\n \* @license\n \* Copyright Google LLC All Rights Reserved.\n \* Use of this source code is governed by an MIT-style license that can be\n \* found in the LICENSE file at\n \* https://angular.io/license\n \*/\nimport {Observable} from 'rxjs';\nimport {AbstractControl} from '../model/abstract\_model';\nimport {composeAsyncValidators, composeValidators} from './validators';\nimport

```

{AsyncValidator, AsyncValidatorFn, ValidationErrors, Validator, ValidatorFn} from './validators';\n\n/**\n *
 * @description\n * Base class for control directives.\n *\n * This class is only used internally in the
`ReactiveFormsModule` and the `FormsModule`.\n *\n * @publicApi\n */\nexport abstract class
AbstractControlDirective {\n /**\n
 * @description\n * A reference to the underlying control.\n *\n * @returns the control that backs this directive.
Most properties fall through to that instance.\n */\n abstract get control(): AbstractControl|null;\n\n /**\n *
 * @description\n * Reports the value of the control if it is present, otherwise null.\n *\n get value(): any {\n
return this.control ? this.control.value : null;\n }\n\n /**\n * @description\n * Reports whether the control is
valid. A control is considered valid if no\n * validation errors exist with the current value.\n * If the control is not
present, null is returned.\n *\n get valid(): boolean|null {\n return this.control ? this.control.valid : null;\n }\n\n
/**\n * @description\n * Reports whether the control is invalid, meaning that an error exists in the input value.\n
* If the control is not present, null is returned.\n *\n get invalid(): boolean|null {\n return this.control ?
this.control.invalid : null;\n
}\n\n /**\n * @description\n * Reports whether a control is pending, meaning that that async validation is
occurring and\n * errors are not yet available for the input value. If the control is not present, null is\n *
returned.\n *\n get pending(): boolean|null {\n return this.control ? this.control.pending : null;\n }\n\n /**\n *
 * @description\n * Reports whether the control is disabled, meaning that the control is disabled\n * in the UI and is
exempt from validation checks and excluded from aggregate\n * values of ancestor controls. If the control is not
present, null is returned.\n *\n get disabled(): boolean|null {\n return this.control ? this.control.disabled : null;\n
}\n\n /**\n * @description\n * Reports whether the control is enabled, meaning that the control is included in
ancestor\n * calculations of validity or value. If the control is not present, null is returned.\n *\n get enabled():
boolean|null {\n return this.control
? this.control.enabled : null;\n }\n\n /**\n * @description\n * Reports the control's validation errors. If the
control is not present, null is returned.\n *\n get errors(): ValidationErrors|null {\n return this.control ?
this.control.errors : null;\n }\n\n /**\n * @description\n * Reports whether the control is pristine, meaning that
the user has not yet changed\n * the value in the UI. If the control is not present, null is returned.\n *\n get
pristine(): boolean|null {\n return this.control ? this.control.pristine : null;\n }\n\n /**\n * @description\n
* Reports whether the control is dirty, meaning that the user has changed\n * the value in the UI. If the control is not
present, null is returned.\n *\n get dirty(): boolean|null {\n return this.control ? this.control.dirty : null;\n }\n\n
/**\n * @description\n * Reports whether the control is touched, meaning that the user has triggered\n * a `blur`
event on it. If the control is
not present, null is returned.\n *\n get touched(): boolean|null {\n return this.control ? this.control.touched :
null;\n }\n\n /**\n * @description\n * Reports the validation status of the control. Possible values include:\n *
`VALID`, `INVALID`, `DISABLED`, and `PENDING`.\n * If the control is not present, null is returned.\n *\n get
status(): string|null {\n return this.control ? this.control.status : null;\n }\n\n /**\n * @description\n * Reports
whether the control is untouched, meaning that the user has not yet triggered\n * a `blur` event on it. If the control
is not present, null is returned.\n *\n get untouched(): boolean|null {\n return this.control ?
this.control.untouched : null;\n }\n\n /**\n * @description\n * Returns a multicasting observable that emits a
validation status whenever it is\n * calculated for the control. If the control is not present, null is returned.\n
*\n get statusChanges(): Observable<any>|null {\n
return this.control ? this.control.statusChanges : null;\n }\n\n /**\n * @description\n * Returns a multicasting
observable of value changes for the control that emits every time the\n * value of the control changes in the UI or
programmatically.\n * If the control is not present, null is returned.\n *\n get valueChanges():
Observable<any>|null {\n return this.control ? this.control.valueChanges : null;\n }\n\n /**\n * @description\n
* Returns an array that represents the path from the top-level form to this control.\n * Each index is the string name
of the control on that level.\n *\n get path(): string[]|null {\n return null;\n }\n\n /**\n * Contains the result of
merging synchronous validators into a single validator function\n * (combined using `Validators.compose`).\n
*\n private _composedValidatorFn: ValidatorFn|null|undefined;\n\n /**\n * Contains the result of merging

```



```

asynchronous validators into a single validator function\n * (combined
using `Validators.composeAsync`).\n *^n private _composedAsyncValidatorFn:
AsyncValidatorFn|null|undefined;\n\n /**\n * Set of synchronous validators as they were provided while calling
`setValidators` function.\n * @internal\n *^n _rawValidators: Array<Validator|ValidatorFn> = [];\n\n /**\n * Set of asynchronous validators as they were provided while calling `setAsyncValidators`\n * function.\n * @internal\n *^n _rawAsyncValidators: Array<AsyncValidator|AsyncValidatorFn> = [];\n\n /**\n * Sets
synchronous validators for this directive.\n * @internal\n *^n _setValidators(validators:
Array<Validator|ValidatorFn>|undefined): void {\n this._rawValidators = validators || [];\n
this._composedValidatorFn = composeValidators(this._rawValidators);\n }\n\n /**\n * Sets asynchronous
validators for this directive.\n * @internal\n *^n _setAsyncValidators(validators:
Array<AsyncValidator|AsyncValidatorFn>|undefined): void {\n this._rawAsyncValidators
= validators || [];\n this._composedAsyncValidatorFn = composeAsyncValidators(this._rawAsyncValidators);\n
}\n\n /**\n * @description\n * Synchronous validator function composed of all the synchronous validators
registered with this\n * directive.\n *^n get validator(): ValidatorFn|null {\n return this._composedValidatorFn
|| null;\n }\n\n /**\n * @description\n * Asynchronous validator function composed of all the asynchronous
validators registered with\n * this directive.\n *^n get asyncValidator(): AsyncValidatorFn|null {\n return
this._composedAsyncValidatorFn || null;\n }\n\n /**\n * The set of callbacks to be invoked when directive instance
is being destroyed.\n *^n private _onDestroyCallbacks: (() => void)[] = [];\n\n /**\n * Internal function to
register callbacks that should be invoked\n * when directive instance is being destroyed.\n * @internal\n *^n
_registerOnDestroy(fn: () => void): void {\n this._onDestroyCallbacks.push(fn);\n
}\n\n /**\n * Internal function to invoke all registered \"on destroy\" callbacks.\n * Note: calling this function
also clears the list of callbacks.\n * @internal\n *^n _invokeOnDestroyCallbacks(): void {\n
this._onDestroyCallbacks.forEach(fn => fn());\n this._onDestroyCallbacks = [];\n }\n\n /**\n * @description\n
* Resets the control with the provided value if the control is present.\n *^n reset(value: any = undefined): void {\n
if (this.control) this.control.reset(value);\n }\n\n /**\n * @description\n * Reports whether the control with the
given path has the error specified.\n *^n * @param errorCode The code of the error to check\n * @param path A
list of control names that designates how to move from the current control\n * to the control that should be queried
for errors.\n *^n * @usageNotes\n * For example, for the following `FormGroup`:\n *^n * ```\n * form = new
FormGroup({\n * address: new FormGroup({
street: new FormControl() })\n * });\n * ```\n *^n * The path to the 'street' control from the root form would be
'address' -> 'street'.\n *^n * It can be provided to this method in one of two formats:\n *^n * 1. An array of string
control names, e.g. `['address', 'street']`\n *^n * 1. A period-delimited list of control names in one string, e.g.
`address.street`\n *^n * If no path is given, this method checks for the error on the current control.\n *^n *
@returns whether the given error is present in the control at the given path.\n *^n * If the control is not present,
false is returned.\n *^n hasError(errorCode: string, path?: Array<string|number>|string): boolean {\n return
this.control ? this.control.hasError(errorCode, path) : false;\n }\n\n /**\n * @description\n * Reports error data
for the control with the given path.\n *^n * @param errorCode The code of the error to check\n * @param path
A list of control names that designates
how to move from the current control\n * to the control that should be queried for errors.\n *^n *^n *
@usageNotes\n * For example, for the following `FormGroup`:\n *^n * ```\n * form = new FormGroup({\n *
address: new FormGroup({ street: new FormControl() })\n * });\n * ```\n *^n * The path to the 'street' control
from the root form would be 'address' -> 'street'.\n *^n * It can be provided to this method in one of two formats:\n
*\n *^n * 1. An array of string control names, e.g. `['address', 'street']`\n *^n * 1. A period-delimited list of control names
in one string, e.g. `address.street`\n *^n * @returns error data for that particular error. If the control or error is not
present,\n *^n null is returned.\n *^n getError(errorCode: string, path?: Array<string|number>|string): any {\n
return this.control ? this.control.getError(errorCode, path) : null;\n }\n\n /**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *^n * Use of this

```

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```

import { AbstractControlDirective } from './abstract_control_directive';
import { ControlContainer } from './control_container';
import { ControlValueAccessor } from './control_value_accessor';

/**
 * A base class that all `FormControl`-based directives extend. It binds a `FormControl` object to a DOM element.
 *
 * @publicApi
 * @export abstract class NgControl extends AbstractControlDirective {
 *   @description
 *   * The parent form for the control.
 *   @internal
 *   @parent: ControlContainer | null = null;
 *   @description
 *   * The name for the control
 *   @name: string | number | null = null;
 *   @description
 *   * The value accessor for the control
 *   @valueAccessor: ControlValueAccessor | null = null;
 *   @description
 *   * The callback method to update the model from the view when requested
 *   @param newValue The new value for the view
 *   @abstract
 *   viewToModelUpdate(newValue: any): void;
 * }
 */
}

/**
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 */
import { AbstractControlDirective } from './abstract_control_directive';
import { Form } from './form_interface';

/**
 * A base class for directives that contain multiple registered instances of `NgControl`. Only used by the forms module.
 *
 * @publicApi
 * @export abstract class ControlContainer extends AbstractControlDirective {
 *   @description
 *   * The name for the control
 *   // TODO(issue/24571): remove '!'.
 *   @name!: string | number | null;
 *   @description
 *   * The top-level form directive for the control.
 *   @get
 *   formDirective(): Form | null {
 *     return null;
 *   }
 *   @description
 *   * The path to this group.
 *   @override
 *   @get
 *   path(): string[] | null {
 *     return null;
 *   }
 * }
 */
}

/**
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 */
import { Directive, Optional, Self } from '@angular/core';
import { AbstractControlDirective } from './abstract_control_directive';
import { ControlContainer } from './control_container';
import { NgControl } from './ng_control';

// DO NOT REFACTOR!
// Each status is represented by a separate function to make sure that advanced Closure Compiler optimizations related to property renaming can work correctly.
export class AbstractControlStatus {
  private _cd: AbstractControlDirective | null;

  constructor(cd: AbstractControlDirective | null) {
    this._cd = cd;
  }

  protected get isTouched() {
    return !!this._cd?.control?.touched;
  }

  protected get isUntouched() {
    return !!this._cd?.control?.untouched;
  }

  protected get isPristine() {
    return !!this._cd?.control?.pristine;
  }

  protected get isDirty() {
    return !!this._cd?.control?.dirty;
  }

  protected get isValid() {
    return !!this._cd?.control?.valid;
  }

  protected get isInvalid() {
    return !!this._cd?.control?.invalid;
  }

  protected get isPending() {
    return !!this._cd?.control?.pending;
  }

  protected get isSubmitted() {
    // We check for the `submitted` field from `NgForm` and `FormGroupDirective` classes, but we avoid instanceof checks to prevent non-tree-shakable references to those types.
    return !!((this._cd as unknown as { submitted: boolean }) | null)?.submitted;
  }
}

export const ngControlStatusHost = {
  [class.ng-untouched]: 'isUntouched',
  [class.ng-touched]: 'isTouched',
  [class.ng-pristine]: 'isPristine',
  [class.ng-dirty]: 'isDirty',
  [class.ng-valid]: 'isValid',
  [class.ng-invalid]: 'isInvalid',
  [class.ng-pending]: 'isPending',
};

export const ngGroupStatusHost = {
  ...ngControlStatusHost,
  [class.ng-submitted]: 'isSubmitted',
};

/**
 * Directive automatically applied to Angular form controls that sets CSS classes based on control status.
 *
 * @usageNotes
 * ### CSS classes applied
 * The following classes are applied as the properties become true:
 * * ng-valid
 * * ng-invalid
 * * ng-pending
 * * ng-pristine
 * * ng-dirty
 * * ng-untouched
 * * ng-touched
 *
 * @ngModule ReactiveFormsModule
 * @ngModule FormsModule
 *
 * @publicApi
 * @Directive({ selector: '[formControlName],[ngModel],[formControl]', host: ngControlStatusHost })
 * @export class NgControlStatus extends AbstractControlStatus {
 *   constructor(@Self() cd: NgControl) {
 *     super(cd);
 *   }
 * }
 */
}

/**
 * Directive automatically applied to Angular form

```

groups that sets CSS classes

```
* based on control status (valid/invalid/dirty/etc). On groups, this includes the additional
* class ng-submitted.
* @see `NgControlStatus`
* @ngModule ReactiveFormsModule
* @ngModule FormsModule
* @publicApi
@Directive({
  selector:
    '[formGroupName],[formArrayName],[ngModelGroup],[formGroup],form:not([ngNoForm]),[ngForm]',
  host:
    'ngGroupStatusHost'
})
export class NgControlStatusGroup extends AbstractControlStatus {
  constructor(@Optional() @Self() cd: ControlContainer) {
    super(cd);
  }
}
/**
 * @license
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 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
export const formControlNameExample = `
<div [formGroup]="myGroup">
  <input formControlName="firstName">
</div>
In your class:
this.myGroup = new FormGroup({
  firstName: new FormControl()
});
export
const formGroupNameExample = `
<div [formGroup]="myGroup">
  <div formGroupName="person">
    <input formControlName="firstName">
  </div>
</div>
In your class:
this.myGroup = new
FormGroup({
  person: new FormGroup({
    firstName: new FormControl()
  })
});
export const
formArrayNameExample = `
<div [formGroup]="myGroup">
  <div formArrayName="cities">
    <div
      *ngFor="let city of cityArray.controls; index as i">
      <input [formControlName]="i">
    </div>
  </div>
</div>
In your class:
this.cityArray = new FormArray([new FormControl('SF')]);
this.myGroup = new FormGroup({
  cities: this.cityArray
});
export const ngModelGroupExample = `
<form>
  <div ngModelGroup="person">
    <input [(ngModel)]="person.name" name="firstName">
  </div>
</form>`;
export const ngModelWithFormGroupExample = `
<div [formGroup]="myGroup">
  <input formControlName="firstName">
  <input [(ngModel)]="showMoreControls" [ngModelOptions]="{standalone: true}">
</div>`;
/**
 * @license
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 * Use of this source code is governed by an MIT-
 * style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import { RuntimeError as
RuntimeError } from '@angular/core';
import { RuntimeErrorCode } from '../errors';
import
{ formArrayNameExample, formControlNameExample, formGroupNameExample, ngModelGroupExample } from
'./error_examples';
export function controlParentException(): Error {
  return new RuntimeError(
    RuntimeErrorCode.FORM_CONTROL_NAME_MISSING_PARENT,
    `formControlName must be used with
a parent formGroup directive. You'll want to add a formGroup
directive and pass it an existing FormGroup
instance (you can create one in your class).
Example:
${formControlNameExample}`);
}
export
function ngModelGroupException():
Error {
  return new RuntimeError(
    RuntimeErrorCode.FORM_CONTROL_NAME_INSIDE_MODEL_GROUP,
    `formControlName cannot be
used with an ngModelGroup parent. It is only compatible with parents
that also have a "form" prefix:
formGroupName, formArrayName, or formGroup.
Option 1: Update the parent to be formGroupName
(reactive form strategy)
${formGroupNameExample}
Option 2: Use ngModel instead of
formControlName (template-driven strategy)
${ngModelGroupExample}`);
}
export function
missingFormException(): Error {
  return new RuntimeError(
    RuntimeErrorCode.FORM_GROUP_MISSING_INSTANCE,
    `formGroup expects a FormGroup instance.
Please pass one in.
Example:
${formControlNameExample}`);
}
export function
groupParentException(): Error {
  return new RuntimeError(
    RuntimeErrorCode.FORM_GROUP_NAME_MISSING_PARENT,
    `formGroupName must be used with a
parent formGroup directive. You'll want
to add a formGroup
directive and pass it an existing FormGroup instance (you can create one in your class).
Example:
${formGroupNameExample}`);
}
export function arrayParentException(): Error {
  return
new RuntimeError(
    RuntimeErrorCode.FORM_ARRAY_NAME_MISSING_PARENT,
    `formArrayName must be used with a parent formGroup directive. You'll want to add a formGroup
directive
and pass it an existing FormGroup instance (you can create one in your class).
Example:
`);
}
```

```

${formArrayNameExample});\n\n\nexport const disabledAttrWarning = `
It looks like you're using the disabled
attribute with a reactive form directive. If you set disabled to true
when you set up this control in your component
class, the disabled attribute will actually be set in the DOM for
you. We recommend using this approach to avoid
'changed after checked' errors.
Example:
// Specify the `disabled` property at control creation time:
form
= new FormGroup({
  first: new FormControl({ value: 'Nancy', disabled: true }, Validators.required),
  last: new
  FormControl('Drew', Validators.required)
});
// Controls can also be enabled/disabled after creation:
form.get('first').enable();
form.get('last').disable();
`;
\n\n\nexport const
asyncValidatorsDroppedWithOptsWarning = `
It looks like you're constructing using a FormControl with both an
options argument and an
async validators argument. Mixing these arguments will cause your async validators to
be dropped. You should either put all your validators in the options object, or in separate validators
arguments.
For example:
// Using validators arguments
fc = new FormControl(42, Validators.required,
myAsyncValidator);
// Using AbstractControlOptions
fc = new FormControl(42, { validators:
Validators.required, asyncValidators: myAV });
// Do NOT mix them: async validators will be dropped!
fc =
new FormControl(42, { validators: Validators.required },
/* Oops! */ myAsyncValidator);
`;
\n\n\nexport function ngModelWarning(directiveName: string): string {\n return
`\n It looks like you're using ngModel on the same form field as ${directiveName}.
Support for using the
ngModel input property and ngModelChange event with
reactive form directives has been deprecated in Angular
v6 and will be removed
in a future version of Angular.
For more information on this, see our API docs
here:
https://angular.io/api/forms/\${
directiveName} === 'formControl' ? 'FormControlDirective' :
'FormControlName'}
#use-with-ngmodel
`;
\n\n\nfunction describeKey(isFormGroup: boolean, key:
string|number): string {\n return isFormGroup ? `with name: '${key}'` : `at index: ${key}`;
}\n\n\nexport function
noControlsError(isFormGroup: boolean): string {\n return `\n There are no form controls registered with this ${
isFormGroup ? 'group' : 'array'} yet. If you're using ngModel,
you may want to check next tick
(e.g. use setTimeout).
`;
}\n\n\nexport function missingControlError(isFormGroup: boolean, key: string|number):
string {\n return `Cannot find form control ${describeKey(isFormGroup, key)}`;
}\n\n\nexport function
missingControlValueError(isFormGroup: boolean, key: string|number): string {\n return `Must supply a value for
form control ${describeKey(isFormGroup, key)}`;
}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be
found in the
LICENSE file at https://angular.io/license
*/\n\nimport {EventEmitter, RuntimeError as RuntimeError} from
'@angular/core';\nimport {Observable} from 'rxjs';\nimport {asyncValidatorsDroppedWithOptsWarning,
missingControlError, missingControlValueError, noControlsError} from '../directives/reactive_errors';\nimport
{AsyncValidatorFn, ValidationErrors, ValidatorFn} from '../directives/validators';\nimport {RuntimeErrorCode}
from '../errors';\nimport
{FormArray, FormGroup} from '../forms';\nimport {addValidators, composeAsyncValidators, composeValidators,
hasValidator, removeValidators, toObservable} from '../validators';\n\nconst NG_DEV_MODE = typeof
ngDevMode === 'undefined' || !!ngDevMode;\n\n/**\n * Reports that a control is valid, meaning that no errors exist
in the input value.\n * @see `status`\n */\nexport const VALID = 'VALID';\n\n/**\n * Reports that a control is
invalid, meaning that an error exists in the input value.\n * @see `status`\n */\nexport const INVALID =
'INVALID';\n\n/**\n * Reports that a control is pending, meaning that that async validation is occurring and
errors are not yet available for the input value.\n * @see `markAsPending`\n * @see `status`\n */\nexport const
PENDING = 'PENDING';\n\n/**\n * Reports that a control is disabled, meaning that the control is exempt from
ancestor
calculations of validity or value.\n * @see `markAsDisabled`\n * @see `status`\n */\nexport const
DISABLED
= 'DISABLED';\n\n/**\n * A form can have several different statuses. Each
possible status is returned as a
string literal.\n * **VALID**: Reports that a control is valid, meaning that no errors exist in the input
value.\n * **INVALID**: Reports that a control is invalid, meaning that an error exists in the input
value.\n * **PENDING**: Reports that a control is pending, meaning that that async validation is
occurring and errors
are not yet available for the input value.\n * **DISABLED**: Reports that a control is
disabled, meaning that

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the control is exempt from ancestor calculations of validity or value.

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    * @publicApi
    * ^\nexport type FormControlStatus = 'VALID'|'INVALID'|'PENDING'|'DISABLED';
    * Gets validators from either an options object or given validators.
    * ^\nexport function pickValidators(validatorOrOpts?:
    ValidatorFn|ValidatorFn[]|AbstractControlOptions|
    null): ValidatorFn|ValidatorFn[]|null
    {
    return (isOptionsObj(validatorOrOpts) ? validatorOrOpts.validators : validatorOrOpts) || null;
    }
    * Creates validator function by combining provided validators.
    * ^\nfunction coerceToValidator(validator:
    ValidatorFn|ValidatorFn[]|null): ValidatorFn|null
    {
    return Array.isArray(validator) ?
    composeValidators(validator) : validator || null;
    }
    * Gets async validators from either an options object or given validators.
    * ^\nexport function pickAsyncValidators(
    asyncValidator?:
    AsyncValidatorFn|AsyncValidatorFn[]|null,
    validatorOrOpts?:
    ValidatorFn|ValidatorFn[]|AbstractControlOptions|
    null): AsyncValidatorFn|
    AsyncValidatorFn[]|null
    {
    if (typeof ngDevMode === 'undefined' || ngDevMode) {
    if (isOptionsObj(validatorOrOpts) && asyncValidator) {
    console.warn(asyncValidatorsDroppedWithOptsWarning);
    }
    }
    return (isOptionsObj(validatorOrOpts) ? validatorOrOpts.asyncValidators : asyncValidator) || null;
    }
    * Creates async validator function by combining provided async validators.
    * ^\nfunction coerceToAsyncValidator(asyncValidator?:
    AsyncValidatorFn|AsyncValidatorFn[]|
    null): AsyncValidatorFn|null
    {
    return Array.isArray(asyncValidator) ? composeAsyncValidators(asyncValidator) :
    asyncValidator || null;
    }
    * Interface for options provided to an `AbstractControl`.
    * @publicApi
    * ^\nexport interface AbstractControlOptions {
    /**
    * The list of validators applied to a control.
    * ^\n validators?: ValidatorFn|ValidatorFn[]|null;
    /**
    * The list of async validators applied to control.
    * ^\n asyncValidators?:
    AsyncValidatorFn|AsyncValidatorFn[]|null;
    /**
    * The event name for control to update upon.
    * ^\n updateOn?: 'change'|'blur'|'submit';
    }
    * ^\nexport function isOptionsObj(validatorOrOpts?:
    ValidatorFn|ValidatorFn[]|AbstractControlOptions|
    null): validatorOrOpts is
    AbstractControlOptions
    {
    return validatorOrOpts != null && !Array.isArray(validatorOrOpts) &&
    typeof validatorOrOpts === 'object';
    }
    * ^\nexport function assertControlPresent(parent: any, isGroup: boolean, key:
    string|number): void
    {
    const controls = parent.controls as {[key: string|number]: unknown};
    const collection = isGroup ? Object.keys(controls) : controls;
    if (!collection.length) {
    throw new RuntimeError(
    RuntimeErrorCode.NO_CONTROLS,
    NG_DEV_MODE ? noControlsError(isGroup) :
    );
    }
    if (!controls[key]) {
    throw new RuntimeError(
    RuntimeErrorCode.MISSING_CONTROL,
    NG_DEV_MODE ?
    missingControlError(isGroup, key) :
    );
    }
    }
    * ^\nexport function assertAllValuesPresent(control: any, isGroup:
    boolean, value: any): void
    {
    control._forEachChild((_: unknown, key: string|number) => {
    if (value[key] === undefined) {
    throw new RuntimeError(
    RuntimeErrorCode.MISSING_CONTROL_VALUE,
    NG_DEV_MODE ? missingControlValueError(isGroup, key) :
    );
    }
    });
    }
    // IsAny checks if T is `any`, by checking a condition that couldn't possibly be true otherwise.
    * ^\nexport type IsAny<T, Y, N> = 0 extends (1 & T) ? Y : N;
    * ^\nexport type `TypedOrUntyped` allows one of two different types to be selected, depending on whether the
    Forms
    * class it's applied to is typed or not.
    * ^\n * This is for internal Angular usage to support typed forms; do not directly use it.
    * ^\nexport type TypedOrUntyped<T, Typed, Untyped> = IsAny<T, Untyped, Typed>;
    * ^\nexport
    * Value gives the value type corresponding to a control type.
    * ^\n * Note that the resulting type will follow the same rules as `value` on your control, group, or
    * array, including `undefined` for each group element which might be disabled.
    * ^\n * If you are trying to extract a value type for a data model, you probably want { @link RawValue },
    * which will not have `undefined` in group keys.
    * @usageNotes
    * ### `FormControl` value type
    * You can extract the value type of a single control:
    * type NameControl = FormControl<string>;
    * type NameValue = Value<NameControl>;
    * The resulting type is `string`.
    * ### `FormGroup` value type
    * Imagine you have an interface defining the controls in your group. You can extract the shape of
  
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* the values as follows:\n *\n * ``\n * interface PartyFormControls {\n *   address: FormControl<string>;\n * }\n *\n * // Value operates on controls; the object must be wrapped in a FormGroup.\n * type PartyFormValues =\n * Value<FormGroup<PartyFormControls>>;\n *\n * The resulting type is `{address: string|undefined}`.\n *\n * ### `FormArray` value type\n *\n * You can extract values from FormArrays as well:\n *\n * ``\n * type\n * GuestNamesControls = FormArray<FormControl<string>>;\n *\n * type NamesValues =\n * Value<GuestNamesControls>;\n *\n * ``\n *\n * The resulting type is `string[]`.\n *\n * ***Internal: not for public use.***\n *\n * `export type Value<T extends AbstractControl|undefined> = T extends AbstractControl<any, any>? T['value'] : never;\n *\n * `RawValue` gives the raw value type corresponding to a control type.\n *\n * Note that the resulting type will follow the same rules as `.getRawValue()` on your control, group, or array. This means that all controls inside a group will be required, not optional, regardless of their disabled state.\n *\n * You may also wish to use `{ @link Value }`, which will have `undefined` in group keys (which can be disabled).\n *\n * @usageNotes\n *\n * ### `FormGroup` raw value type\n *\n * Imagine you have an interface defining the controls in your group. You can extract the shape of the raw values as follows:\n *\n * ``\n * interface PartyFormControls {\n *   address: FormControl<string>;\n * }\n *\n * // RawValue operates on controls; the object must be wrapped in a FormGroup.\n * type PartyFormValues = RawValue<FormGroup<PartyFormControls>>;\n *\n * ``\n *\n * The resulting type is `{address: string}`. (Note the absence of `undefined`.)\n *\n * ***Internal: not for public use.***\n *\n * `export type RawValue<T extends AbstractControl|undefined> = T extends AbstractControl<any, any>?\n * (T['setValue'] extends ((v: infer R) => void) ? R : never) : never;\n *\n * // Disable clang-format to produce clearer formatting for these multiline types.\n *\n * // clang-format off\n *\n * `_tokenize` splits a string literal S by a delimiter D.\n *\n * `export type Tokenize<S extends string, D extends string> =\n * string extends S ? string[] : /* S must be a literal */\n * S extends `${infer T}${D}${infer U}` ? [T, ...Tokenize<U, D>] : [S] ;\n *\n * // Base case\n *\n * ;\n *\n * `CoerceStrArrToNumArr` accepts an array of strings, and converts any numeric string to a number.\n *\n * `export type CoerceStrArrToNumArr<S> =\n * // Extract the head of the array.\n * S extends [infer Head, ...infer Tail] ?\n * // Using a template literal type, coerce the head to `number` if possible.\n * // Then, recurse on the tail.\n * Head extends `${number}` ?\n * [number, ...CoerceStrArrToNumArr<Tail>] :\n * [Head, ...CoerceStrArrToNumArr<Tail>] ;\n *\n * `Navigate` takes a type T and an array K, and returns the type of T[K[0]][K[1]][K[2]]...\n *\n * `export type Navigate<T, K extends (Array<string|number>)> =\n * T extends object ? /* T must be indexable (object or array) */\n * (K extends [infer Head, ...infer Tail] ? /* Split K into head and tail */\n * (Head extends keyof T ? /* head(K) must index T */\n * (Tail extends (string|number)[] ? /* tail(K) must be an array */\n * [] extends Tail ? T[Head] : /* base case: K can be split, but Tail is empty */\n * (Navigate<T[Head], Tail>) /* explore T[head(K)] by tail(K) */\n * any) /* tail(K) was not an array, give up */\n * :never) /* head(K) does not index T, give up */\n * :any) /* K cannot be split, give up */\n * :any /* T is not indexable, give up */\n * ;\n *\n * `Writeable` removes readonly from all keys.\n *\n * `export type Writeable<T> =\n * {\n *   -readonly[P in keyof T]: T[P];\n * }\n *\n * `GetProperty` takes a type T and some property names or indices K.\n *\n * If K is a dot-separated string, it is tokenized into an array before proceeding.\n *\n * Then, the type of the nested property at K is computed: T[K[0]][K[1]][K[2]]...\n *\n * This works with both objects, which are indexed by property name, and arrays, which are indexed numerically.\n *\n * For internal use only.\n *\n * `export type GetProperty<T, K> =\n * // K is a string\n * K extends string ? GetProperty<T, CoerceStrArrToNumArr<Tokenize<K, '.'>>> :\n * // Is is an array\n * Writeable<K> extends Array<string|number> ?\n * Navigate<T, Writeable<K>> :\n * // Fall through permissively if we can't calculate the type of K.\n * any;\n *\n * // clang-format on\n *\n * // ***\n *\n * This is the base class for `FormControl`, `FormGroup`, and `FormArray`.\n *\n * It provides some of the shared behavior that all controls and groups of controls have, like running validators, calculating status, and resetting state. It also defines the properties that are shared between all sub-classes, like `value`, `valid`, and `dirty`. It shouldn't be instantiated directly.\n *\n * The first type parameter T Value represents the value type of the control (control.value).\n *\n * The optional type parameter TRawValue represents the raw value type

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(`control.getRawValue()`).\n *\n * @see [Forms Guide](/guide/forms)\n * @see [Reactive Forms
Guide](/guide/reactive-forms)\n * @see [Dynamic Forms Guide](/guide/dynamic-form)\n *\n * @publicApi\n
*\nexport abstract class AbstractControl<TValue = any, TRawValue extends TValue = TValue> {\n /** @internal
*\n _pendingDirty = false;\n\n /**\n * Indicates that a control has its own pending asynchronous validation in
progress.\n
*\n * @internal\n *\n _hasOwnPendingAsyncValidator = false;\n\n /** @internal *\n _pendingTouched =
false;\n\n /** @internal *\n _onCollectionChange = () => {};\n\n /** @internal *\n _updateOn?:
FormHooks;\n\n private _parent: FormGroup|FormArray|null = null;\n private _asyncValidationSubscription:
any;\n\n /**\n * Contains the result of merging synchronous validators into a single validator function\n *
(combined using `Validators.compose`).\n *\n * @internal\n *\n private _composedValidatorFn:
ValidatorFn|null;\n\n /**\n * Contains the result of merging asynchronous validators into a single validator
function\n * (combined using `Validators.composeAsync`).\n *\n * @internal\n *\n private
_composedAsyncValidatorFn: AsyncValidatorFn|null;\n\n /**\n * Synchronous validators as they were
provided:\n * - in `AbstractControl` constructor\n * - as an argument while calling `setValidators` function\n *
- while calling the setter on the
`validator` field (e.g. `control.validator = validatorFn`)\n *\n * @internal\n *\n private _rawValidators:
ValidatorFn|ValidatorFn[]|null;\n\n /**\n * Asynchronous validators as they were provided:\n * - in
`AbstractControl` constructor\n * - as an argument while calling `setAsyncValidators` function\n * - while
calling the setter on the `asyncValidator` field (e.g. `control.asyncValidator =\n * asyncValidatorFn`)\n *\n *
@internal\n *\n private _rawAsyncValidators: AsyncValidatorFn|AsyncValidatorFn[]|null;\n\n /**\n * The
current value of the control.\n *\n * * For a `FormControl`, the current value.\n * * For an enabled `FormGroup`,
the values of enabled controls as an object\n * with a key-value pair for each member of the group.\n * * For a
disabled `FormGroup`, the values of all controls as an object\n * with a key-value pair for each member of the
group.\n * * For a `FormArray`, the values of enabled controls as an array.\n *\n
*\n\n public readonly value!: TValue;\n\n /**\n * Initialize the AbstractControl instance.\n *\n * @param
validators The function or array of functions that is used to determine the validity of\n * this control
synchronously.\n * @param asyncValidators The function or array of functions that is used to determine validity
of\n * this control asynchronously.\n *\n constructor(\n validators: ValidatorFn|ValidatorFn[]|null,\n
asyncValidators: AsyncValidatorFn|AsyncValidatorFn[]|null) {\n this._rawValidators = validators;\n
this._rawAsyncValidators = asyncValidators;\n this._composedValidatorFn =
coerceToValidator(this._rawValidators);\n this._composedAsyncValidatorFn =
coerceToAsyncValidator(this._rawAsyncValidators);\n }\n\n /**\n * Returns the function that is used to
determine the validity of this control synchronously.\n * If multiple validators have been added, this will be a
single composed function.\n * See `Validators.compose()`
for additional information.\n *\n get validator(): ValidatorFn|null {\n return this._composedValidatorFn;\n }\n
set validator(validatorFn: ValidatorFn|null) {\n this._rawValidators = this._composedValidatorFn = validatorFn;\n
}\n\n /**\n * Returns the function that is used to determine the validity of this control asynchronously.\n * If
multiple validators have been added, this will be a single composed function.\n * See `Validators.compose()` for
additional information.\n *\n get asyncValidator(): AsyncValidatorFn|null {\n return
this._composedAsyncValidatorFn;\n }\n set asyncValidator(asyncValidatorFn: AsyncValidatorFn|null) {\n
this._rawAsyncValidators = this._composedAsyncValidatorFn = asyncValidatorFn;\n }\n\n /**\n * The parent
control.\n *\n get parent(): FormGroup|FormArray|null {\n return this._parent;\n }\n\n /**\n * The validation
status of the control.\n *\n * @see `FormControlStatus`\n *\n * These status values are
mutually exclusive, so a control cannot be\n * both valid AND invalid or invalid AND disabled.\n *\n public
readonly status!: FormControlStatus;\n\n /**\n * A control is `valid` when its `status` is `VALID`.\n *\n * @see
{@link AbstractControl.status}\n *\n * @returns True if the control has passed all of its validation tests,\n *
false otherwise.\n *\n get valid(): boolean {\n return this.status === VALID;\n }\n\n /**\n * A control is
`invalid` when its `status` is `INVALID`.\n *\n * @see {@link AbstractControl.status}\n *\n * @returns True

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if this control has failed one or more of its validation checks,\n * false otherwise.\n */\n get invalid(): boolean {\n
  return this.status === INVALID;\n }\n\n /**\n * A control is `pending` when its `status` is `PENDING`.\n *\n * @see {@link AbstractControl.status}\n *\n * @returns True if this control is in the process of conducting a
validation check,\n * false otherwise.\n */\n get
  pending(): boolean {\n  return this.status === PENDING;\n }\n\n /**\n * A control is `disabled` when its `status`
is `DISABLED`.\n *\n * Disabled controls are exempt from validation checks and\n * are not included in the
aggregate value of their ancestor\n * controls.\n *\n * @see {@link AbstractControl.status}\n *\n * @returns
True if the control is disabled, false otherwise.\n */\n get disabled(): boolean {\n  return this.status ===
DISABLED;\n }\n\n /**\n * A control is `enabled` as long as its `status` is not `DISABLED`.\n *\n * @returns
True if the control has any status other than `DISABLED`,\n * false if the status is `DISABLED`.\n *\n * @see
{@link AbstractControl.status}\n *\n */\n get enabled(): boolean {\n  return this.status !== DISABLED;\n
}\n\n /**\n * An object containing any errors generated by failing validation,\n * or null if there are no errors.\n
*/\n public readonly errors!: ValidationErrors|null;\n\n /**\n
* A control is `pristine` if the user has not yet changed\n * the value in the UI.\n *\n * @returns True if the
user has not yet changed the value in the UI; compare `dirty`.\n * Programmatic changes to a control's value do not
mark it dirty.\n */\n public readonly pristine: boolean = true;\n\n /**\n * A control is `dirty` if the user has
changed the value\n * in the UI.\n *\n * @returns True if the user has changed the value of this control in the UI;
compare `pristine`.\n * Programmatic changes to a control's value do not mark it dirty.\n */\n get dirty(): boolean
{\n  return !this.pristine;\n }\n\n /**\n * True if the control is marked as `touched`.\n *\n * A control is marked
`touched` once the user has triggered\n * a `blur` event on it.\n */\n public readonly touched: boolean = false;\n\n
/**\n * True if the control has not been marked as touched\n *\n * A control is `untouched` if the user has not yet
triggered\n * a `blur` event
on it.\n */\n get untouched(): boolean {\n  return !this.touched;\n }\n\n /**\n * A multicasting observable that
emits an event every time the value of the control changes, in\n * the UI or programmatically. It also emits an event
each time you call enable() or disable()\n * without passing along {emitEvent: false} as a function argument.\n
*/\n public readonly valueChanges!: Observable<TValue>;\n\n /**\n * A multicasting observable that emits an
event every time the validation `status` of the control\n * recalculates.\n *\n * @see `FormControlStatus`\n *
@see {@link AbstractControl.status}\n *\n */\n public readonly statusChanges!:
Observable<FormControlStatus>;\n\n /**\n * Reports the update strategy of the `AbstractControl` (meaning\n *
the event on which the control updates itself).\n * Possible values: `change` | `blur` | `submit`\n * Default
value: `change`\n */\n get updateOn(): FormHooks {\n  return this._updateOn ? this._updateOn
: (this.parent ? this.parent.updateOn : 'change');\n }\n\n /**\n * Sets the synchronous validators that are active on
this control. Calling\n * this overwrites any existing synchronous validators.\n *\n * When you add or remove a
validator at run time, you must call\n * `updateValueAndValidity()` for the new validation to take effect.\n *\n *
If you want to add a new validator without affecting existing ones, consider\n * using `addValidators()` method
instead.\n */\n setValidators(validators: ValidatorFn|ValidatorFn[]|null): void {\n  this._rawValidators =
validators;\n  this._composedValidatorFn = coerceToValidator(validators);\n }\n\n /**\n * Sets the asynchronous
validators that are active on this control. Calling this\n * overwrites any existing asynchronous validators.\n *\n
When you add or remove a validator at run time, you must call\n * `updateValueAndValidity()` for the new
validation to take effect.\n *\n * If you want to
add a new validator without affecting existing ones, consider\n * using `addAsyncValidators()` method instead.\n
*/\n setAsyncValidators(validators: AsyncValidatorFn|AsyncValidatorFn[]|null): void {\n
  this._rawAsyncValidators = validators;\n  this._composedAsyncValidatorFn =
coerceToAsyncValidator(validators);\n }\n\n /**\n * Add a synchronous validator or validators to this control,
without affecting other validators.\n *\n * When you add or remove a validator at run time, you must call\n *
`updateValueAndValidity()` for the new validation to take effect.\n *\n * Adding a validator that already exists
will have no effect. If duplicate validator functions\n * are present in the `validators` array, only the first instance
would be added to a form\n * control.\n *\n * @param validators The new validator function or functions to add

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to this control.\n */\n addValidators(validators: ValidatorFn|ValidatorFn[]): void {\n
this.setValidators(addValidators(validators,\n
  this._rawValidators));\n }\n\n /**\n * Add an asynchronous validator or validators to this control, without\n
affecting other\n * validators.\n *\n * When you add or remove a validator at run time, you must call\n *
`updateValueAndValidity()` for the new validation to take effect.\n *\n * Adding a validator that already exists\n
will have no effect.\n *\n * @param validators The new asynchronous validator function or functions to add to\n
this control.\n */\n addAsyncValidators(validators: AsyncValidatorFn|AsyncValidatorFn[]): void {\n
this.setAsyncValidators(addValidators(validators, this._rawAsyncValidators));\n }\n\n /**\n * Remove a\n
synchronous validator from this control, without affecting other validators.\n * Validators are compared by\n
function reference; you must pass a reference to the exact same\n * validator function as the one that was originally\n
set. If a provided validator is not found,\n * it is ignored.\n *\n * @usageNotes\n
*\n * ### Reference to a ValidatorFn\n *\n * ``\n * // Reference to the RequiredValidator\n * const ctrl =\n
new FormControl<string | null>(" ", Validators.required);\n * ctrl.removeValidators(Validators.required);\n *\n *
// Reference to anonymous function inside MinValidator\n * const minValidator = Validators.min(3);\n * const\n
ctrl = new FormControl<string | null>(" ", minValidator);\n *
expect(ctrl.hasValidator(minValidator)).toEqual(true)\n *\n
expect(ctrl.hasValidator(Validators.min(3)).toEqual(false)\n *\n * ctrl.removeValidators(minValidator);\n *\n
*\n * When you add or remove a validator at run time, you must call\n * `updateValueAndValidity()` for the new\n
validation to take effect.\n *\n * @param validators The validator or validators to remove.\n */\n
removeValidators(validators: ValidatorFn|ValidatorFn[]): void {\n  this.setValidators(removeValidators(validators,\n
this._rawValidators));\n }\n\n /**\n * Remove an asynchronous\n
validator from this control, without affecting other validators.\n * Validators are compared by function reference;\n
you must pass a reference to the exact same\n * validator function as the one that was originally set. If a provided\n
validator is not found, it\n * is ignored.\n *\n * When you add or remove a validator at run time, you must call\n
*\n * `updateValueAndValidity()` for the new validation to take effect.\n *\n * @param validators The asynchronous\n
validator or validators to remove.\n */\n removeAsyncValidators(validators:\n
AsyncValidatorFn|AsyncValidatorFn[]): void {\n  this.setAsyncValidators(removeValidators(validators,\n
this._rawAsyncValidators));\n }\n\n /**\n * Check whether a synchronous validator function is present on this\n
control. The provided\n * validator must be a reference to the exact same function that was provided.\n *\n *
@usageNotes\n
*\n * ### Reference to a ValidatorFn\n *\n * ``\n * // Reference to the RequiredValidator\n
*\n * const ctrl = new FormControl<number | null>(0, Validators.required);\n *\n
expect(ctrl.hasValidator(Validators.required)).toEqual(true)\n *\n * // Reference to anonymous function inside\n
MinValidator\n * const minValidator = Validators.min(3);\n * const ctrl = new FormControl<number | null>(0,\n
minValidator);\n * expect(ctrl.hasValidator(minValidator)).toEqual(true)\n *\n
expect(ctrl.hasValidator(Validators.min(3)).toEqual(false)\n *\n
*\n * @param validator The validator to\n
check for presence. Compared by function reference.\n * @returns Whether the provided validator was found on\n
this control.\n */\n hasValidator(validator: ValidatorFn): boolean {\n  return hasValidator(this._rawValidators,\n
validator);\n }\n\n /**\n * Check whether an asynchronous validator function is present on this control. The\n
provided\n * validator must be a reference to the exact same function that was provided.\n *\n * @param\n
validator The asynchronous validator to\n
check for presence. Compared by function\n * reference.\n * @returns Whether the provided asynchronous\n
validator was found on this control.\n */\n hasAsyncValidator(validator: AsyncValidatorFn): boolean {\n  return\n
hasValidator(this._rawAsyncValidators, validator);\n }\n\n /**\n * Empties out the synchronous validator list.\n
*\n * When you add or remove a validator at run time, you must call\n * `updateValueAndValidity()` for the new\n
validation to take effect.\n *\n */\n clearValidators(): void {\n  this.validator = null;\n }\n\n /**\n * Empties\n
out the async validator list.\n *\n * When you add or remove a validator at run time, you must call\n *\n
*\n * `updateValueAndValidity()` for the new validation to take effect.\n *\n */\n clearAsyncValidators(): void {\n
this.asyncValidator = null;\n }\n\n /**\n * Marks the control as `touched`. A control is touched by focus and\n
*\n

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blur events that do not change the value.\n * \n * @see `markAsUntouched()`\n
* @see `markAsDirty()`\n * @see `markAsPristine()`\n * \n * @param opts Configuration options that
determine how the control propagates changes\n * and emits events after marking is applied.\n * * `onlySelf` :
When true, mark only this control. When false or not supplied,\n * marks all direct ancestors. Default is false.\n
*/\n markAsTouched(opts: {onlySelf?: boolean} = {}): void {\n (this as {touched: boolean}).touched = true;\n\n
if (this._parent && !opts.onlySelf) {\n this._parent.markAsTouched(opts);\n }\n }\n\n /**\n * Marks the
control and all its descendant controls as `touched`.\n * @see `markAsTouched()`\n */\n markAllAsTouched():
void {\n this.markAsTouched({onlySelf: true});\n\n this._forEachChild((control: AbstractControl) =>
control.markAllAsTouched());\n }\n\n /**\n * Marks the control as `untouched`.\n * \n * If the control has any
children, also marks all children as `untouched`.\n * and recalculates the
`untouched` status of all parent controls.\n * \n * @see `markAsTouched()`\n * @see `markAsDirty()`\n * @see
`markAsPristine()`\n * \n * @param opts Configuration options that determine how the control propagates
changes\n * and emits events after the marking is applied.\n * * `onlySelf` : When true, mark only this control.
When false or not supplied,\n * marks all direct ancestors. Default is false.\n */\n markAsUntouched(opts:
{onlySelf?: boolean} = {}): void {\n (this as {touched: boolean}).touched = false;\n this._pendingTouched =
false;\n\n this._forEachChild((control: AbstractControl) => {\n control.markAsUntouched({onlySelf: true});\n
});\n\n if (this._parent && !opts.onlySelf) {\n this._parent._updateTouched(opts);\n }\n }\n\n /**\n *
Marks the control as `dirty`. A control becomes dirty when\n * the control's value is changed through the UI;
compare `markAsTouched`.\n * \n * @see `markAsTouched()`\n * @see `markAsUntouched()`\n
* @see `markAsPristine()`\n * \n * @param opts Configuration options that determine how the control
propagates changes\n * and emits events after marking is applied.\n * * `onlySelf` : When true, mark only this
control. When false or not supplied,\n * marks all direct ancestors. Default is false.\n */\n markAsDirty(opts:
{onlySelf?: boolean} = {}): void {\n (this as {pristine: boolean}).pristine = false;\n\n if (this._parent &&
!opts.onlySelf) {\n this._parent.markAsDirty(opts);\n }\n }\n\n /**\n * Marks the control as `pristine`.\n *
* If the control has any children, marks all children as `pristine`,\n * and recalculates the `pristine` status of all
parent\n * controls.\n * \n * @see `markAsTouched()`\n * @see `markAsUntouched()`\n * @see
`markAsDirty()`\n * \n * @param opts Configuration options that determine how the control emits events after\n
* marking is applied.\n * * `onlySelf` : When true, mark only this control.
When false or not supplied,\n * marks all direct ancestors. Default is false.\n */\n markAsPristine(opts:
{onlySelf?: boolean} = {}): void {\n (this as {pristine: boolean}).pristine = true;\n this._pendingDirty =
false;\n\n this._forEachChild((control: AbstractControl) => {\n control.markAsPristine({onlySelf: true});\n
});\n\n if (this._parent && !opts.onlySelf) {\n this._parent._updatePristine(opts);\n }\n }\n\n /**\n * Marks
the control as `pending`.\n * \n * A control is pending while the control performs async validation.\n * \n * @see
{@link AbstractControl.status}\n * \n * @param opts Configuration options that determine how the control
propagates changes and\n * emits events after marking is applied.\n * * `onlySelf` : When true, mark only this
control. When false or not supplied,\n * marks all direct ancestors. Default is false.\n * * `emitEvent` : When true
or not supplied (the default), the `statusChanges`\n * observable
emits an event with the latest status the control is marked pending.\n * When false, no events are emitted.\n * \n
*/\n markAsPending(opts: {onlySelf?: boolean, emitEvent?: boolean} = {}): void {\n (this as {status:
FormControlStatus}).status = PENDING;\n\n if (opts.emitEvent !== false) {\n (this.statusChanges as
EventEmitter<FormControlStatus>).emit(this.status);\n }\n\n if (this._parent && !opts.onlySelf) {\n
this._parent.markAsPending(opts);\n }\n }\n\n /**\n * Disables the control. This means the control is exempt
from validation checks and\n * excluded from the aggregate value of any parent. Its status is `DISABLED`.\n * \n
* If the control has children, all children are also disabled.\n * \n * @see {@link AbstractControl.status}\n * \n
* @param opts Configuration options that determine how the control propagates\n * changes and emits events after
the control is disabled.\n * * `onlySelf` : When true, mark only this control. When false
or not supplied,\n * marks all direct ancestors. Default is false.\n * * `emitEvent` : When true or not supplied (the
default), both the `statusChanges` and\n * `valueChanges`\n * observables emit events with the latest status and

```

```

value when the control is disabled.\n * When false, no events are emitted.\n */\n disable(opts: {onlySelf?:
boolean, emitEvent?: boolean} = {}): void {\n // If parent has been marked artificially dirty we don't want to re-
calculate the\n // parent's dirtiness based on the children.\n const skipPristineCheck =
this._parentMarkedDirty(opts.onlySelf);\n\n (this as {status: FormControlStatus}).status = DISABLED;\n (this
as {errors: ValidationErrors | null}).errors = null;\n this._forEachChild((control: AbstractControl) => {\n
control.disable({...opts, onlySelf: true});\n });\n this._updateValue();\n\n if (opts.emitEvent !== false) {\n
(this.valueChanges as EventEmitter<TValue>).emit(this.value);\n (this.statusChanges
as EventEmitter<FormControlStatus>).emit(this.status);\n }\n\n this._updateAncestors({...opts,
skipPristineCheck});\n this._onDisabledChange.forEach((changeFn) => changeFn(true));\n }\n\n /**\n *
Enables the control. This means the control is included in validation checks and\n * the aggregate value of its
parent. Its status recalculates based on its value and\n * its validators.\n *\n * By default, if the control has
children, all children are enabled.\n *\n * @see {@link AbstractControl.status}\n *\n * @param opts Configure
options that control how the control propagates changes and\n * emits events when marked as untouched\n * *
`onlySelf`: When true, mark only this control. When false or not supplied,\n * marks all direct ancestors. Default is
false.\n * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n *
`valueChanges`\n * observables emit events with the latest status and value when the control
is enabled.\n * When false, no events are emitted.\n */\n enable(opts: {onlySelf?: boolean, emitEvent?: boolean}
= {}): void {\n // If parent has been marked artificially dirty we don't want to re-calculate the\n // parent's
dirtiness based on the children.\n const skipPristineCheck = this._parentMarkedDirty(opts.onlySelf);\n\n (this as
{status: FormControlStatus}).status = VALID;\n this._forEachChild((control: AbstractControl) => {\n
control.enable({...opts, onlySelf: true});\n });\n this.updateValueAndValidity({onlySelf: true, emitEvent:
opts.emitEvent});\n\n this._updateAncestors({...opts, skipPristineCheck});\n
this._onDisabledChange.forEach((changeFn) => changeFn(false));\n }\n\n private _updateAncestors(\n opts:
{onlySelf?: boolean, emitEvent?: boolean, skipPristineCheck?: boolean}): void {\n if (this._parent &&
!opts.onlySelf) {\n this._parent.updateValueAndValidity(opts);\n if (!opts.skipPristineCheck) {\n
this._parent._updatePristine();\n
}\n this._parent._updateTouched();\n }\n }\n\n /**\n * Sets the parent of the control\n *\n * @param
parent The new parent.\n */\n setParent(parent: FormGroup|FormArray|null): void {\n this._parent = parent;\n
}\n\n /**\n * Sets the value of the control. Abstract method (implemented in sub-classes).\n */\n abstract
setValue(value: TRawValue, options?: Object): void;\n\n /**\n * Patches the value of the control. Abstract method
(implemented in sub-classes).\n */\n abstract patchValue(value: TValue, options?: Object): void;\n\n /**\n *
Resets the control. Abstract method (implemented in sub-classes).\n */\n abstract reset(value?: TValue, options?:
Object): void;\n\n /**\n * The raw value of this control. For most control implementations, the raw value will
include\n * disabled children.\n */\n getRawValue(): any {\n return this.value;\n }\n\n /**\n * Recalculates
the value and validation status of
the control.\n *\n * By default, it also updates the value and validity of its ancestors.\n *\n * @param opts
Configuration options determine how the control propagates changes and emits events\n * after updates and
validity checks are applied.\n * * `onlySelf`: When true, only update this control. When false or not supplied,\n *
update all direct ancestors. Default is false.\n * * `emitEvent`: When true or not supplied (the default), both the
`statusChanges` and\n * `valueChanges`\n * observables emit events with the latest status and value when the
control is updated.\n * When false, no events are emitted.\n */\n updateValueAndValidity(opts: {onlySelf?:
boolean, emitEvent?: boolean} = {}): void {\n this._setInitialStatus();\n this._updateValue();\n\n if
(this.enabled) {\n this._cancelExistingSubscription();\n (this as {errors: ValidationErrors | null}).errors =
this._runValidator();\n (this as {status: FormControlStatus}).status = this._calculateStatus();\n\n
if (this.status === VALID || this.status === PENDING) {\n this._runAsyncValidator(opts.emitEvent);\n
}\n }\n\n if (opts.emitEvent !== false) {\n (this.valueChanges as EventEmitter<TValue>).emit(this.value);\n
(this.statusChanges as EventEmitter<FormControlStatus>).emit(this.status);\n }\n\n if (this._parent &&
!opts.onlySelf) {\n this._parent.updateValueAndValidity(opts);\n }\n }\n\n /** @internal */\n

```

```

_updateTreeValidity(opts: {emitEvent?: boolean} = {emitEvent: true}): void {\n  this._forEachChild((ctrl:
AbstractControl) => ctrl._updateTreeValidity(opts));\n  this.updateValueAndValidity({onlySelf: true, emitEvent:
opts.emitEvent});\n }\n\n private _setInitialStatus() {\n  (this as {status: FormControlStatus}).status =
this._allControlsDisabled() ? DISABLED : VALID;\n }\n\n private _runValidator(): ValidationErrors|null {\n
return this.validator ? this.validator(this) : null;\n }\n\n private _runAsyncValidator(emitEvent?:
boolean): void {\n  if (this.asyncValidator) {\n    (this as {status: FormControlStatus}).status = PENDING;\n
this._hasOwnPendingAsyncValidator = true;\n    const obs = toObservable(this.asyncValidator(this));\n
this._asyncValidationSubscription = obs.subscribe((errors: ValidationErrors|null) => {\n
this._hasOwnPendingAsyncValidator = false;\n    // This will trigger the recalculation of the validation status,
which depends on\n    // the state of the asynchronous validation (whether it is in progress or not). So, it is\n    //
necessary that we have updated the `_hasOwnPendingAsyncValidator` boolean flag first.\n    this.setErrors(errors,
{emitEvent});\n  });\n }\n\n private _cancelExistingSubscription(): void {\n  if
(this._asyncValidationSubscription) {\n    this._asyncValidationSubscription.unsubscribe();\n
this._hasOwnPendingAsyncValidator = false;\n  }\n }\n\n /**\n  * Sets errors on a form
control when running validations manually, rather than automatically.\n  *\n  * Calling `setErrors` also updates the
validity of the parent control.\n  *\n  * @param opts Configuration options that determine how the control
propagates\n  * changes and emits events after the control errors are set.\n  * * `emitEvent`: When true or not
supplied (the default), the `statusChanges`\n  * observable emits an event after the errors are set.\n  * *
`@usageNotes`\n  * * ### Manually set the errors for a control\n  * * ```\n  * const login = new
FormControl('someLogin');\n  * login.setErrors({\n  *   notUnique: true\n  * });\n  * \n  *
expect(login.valid).toEqual(false);\n  * expect(login.errors).toEqual({ notUnique: true });\n  * \n  *
login.setValue('someOtherLogin');\n  * \n  * expect(login.valid).toEqual(true);\n  * ```\n  */\n  setErrors(errors:
ValidationErrors|null, opts: {emitEvent?: boolean} = {}): void {\n    (this as {errors: ValidationErrors | null}).errors
= errors;\n    this._updateControlsErrors(opts.emitEvent !== false);\n  }\n\n /**\n  * Retrieves a child control given
the control's name or path.\n  *\n  * This signature for get supports strings and `const` arrays (`.get(['foo', 'bar'] as
const)`).\n  */\n  get<P extends string|(readonly(string|number)[])>(path: P):\n
AbstractControl<GetProperty<TRawValue, P>>|null;\n\n /**\n  * Retrieves a child control given the control's
name or path.\n  *\n  * This signature for `get` supports non-const (mutable) arrays. Inferred type\n  * information
will not be as robust, so prefer to pass a `readonly` array if possible.\n  */\n  get<P extends
string|Array<string|number>>(path: P):\n  AbstractControl<GetProperty<TRawValue, P>>|null;\n\n /**\n  *
Retrieves a child control given the control's name or path.\n  *\n  * @param path A dot-delimited string or array of
string/number values that define the path to the\n  * control. If a string is provided, passing it as a
string literal will result in improved type\n  * information. Likewise, if an array is provided, passing it `as const`
will cause improved type\n  * information to be available.\n  *\n  * @usageNotes\n  * ### Retrieve a nested
control\n  * * For example, to get a `name` control nested within a `person` sub-group:\n  * *
`\n  * this.form.get('person.name');`\n  * * -OR-\n  * *
`\n  * this.form.get(['person', 'name'] as const);` // `as const`
gives improved typings\n  * * ### Retrieve a control in a FormArray\n  * * When accessing an element
inside a FormArray, you can use an element index.\n  * * For example, to get a `price` control from the first element
in an `items` array you can use:\n  * *
`\n  * this.form.get('items.0.price');`\n  * * -OR-\n  * *
`\n  * this.form.get(['items', 0, 'price']);`\n  */\n  get<P extends string|((string | number)[])>(path: P):\n
AbstractControl<GetProperty<TRawValue, P>>|null {\n    let currPath: Array<string|number>|string
= path;\n    if (currPath === null) return null;\n    if (!Array.isArray(currPath)) currPath = currPath.split('.');\n
if (currPath.length === 0) return null;\n    return currPath.reduce(\n      (control: AbstractControl|null, name) =>
control && control._find(name), this);\n  }\n\n /**\n  * @description\n  * Reports error data for the control with
the given path.\n  *\n  * @param errorCode The code of the error to check\n  * @param path A list of control
names that designates how to move from the current control\n  * to the control that should be queried for errors.\n
*\n  * @usageNotes\n  * For example, for the following `FormGroup`:\n  * * ```\n  * form = new
FormGroup({\n  *   address: new FormGroup({ street: new FormControl() })\n  * });\n  * ```\n  * * The path to

```

the 'street' control from the root form would be 'address' -> 'street'.  
It can be provided to this method in one of two formats:  
1. An array of string control names, e.g. ['address', 'street']  
1. A period-delimited list of control names in one string, e.g. 'address.street'  
@returns error data for that particular error. If the control or error is not present, null is returned.

```
getError(errorCode: string, path?: Array<string|number>|string): any {  
    const control = path ? this.get(path) : this;  
    return control && control.errors ? control.errors[errorCode] : null;  
}  
/**  
 * @description  
 * Reports whether the control with the given path has the error specified.  
 * @param errorCode The code of the error to check  
 * @param path A list of control names that designates how to move from the current control to the control that should be queried for errors.  
 * @usageNotes  
 * For example, for the following  
`FormGroup`:  
` ` form = new FormGroup({  
 ` address: new FormGroup({  
 ` street: new FormControl() })  
 ` });  
` ` The path  
to the 'street' control from the root form would be 'address' -> 'street'.  
It can be provided to this method in one of two formats:  
1. An array of string control names, e.g. ['address', 'street']  
1. A period-delimited list of control names in one string, e.g. 'address.street'  
If no path is given, this method checks for the error on the current control.  
@returns whether the given error is present in the control at the given path.  
If the control is not present, false is returned.
```

```
hasError(errorCode: string, path?: Array<string|number>|string): boolean {  
    return !!this.getError(errorCode, path);  
}  
/**  
 * Retrieves the top-level ancestor of this control.  
 */  
get root(): AbstractControl {  
    let x: AbstractControl = this;  
    while (x._parent) {  
        x = x._parent;  
    }  
    return x;  
}  
/** @internal */  
_updateControlsErrors(emitEvent: boolean): void {  
    (this as {  
        status: FormControlStatus}).status = this._calculateStatus();  
    if (emitEvent) {  
        (this.statusChanges as EventEmitter<FormControlStatus>).emit(this.status);  
    }  
    if (this._parent) {  
        this._parent._updateControlsErrors(emitEvent);  
    }  
}  
/** @internal */  
_initObservables() {  
    (this as {  
        valueChanges: Observable<TValue>}).valueChanges = new EventEmitter();  
    (this as {  
        statusChanges: Observable<FormControlStatus>}).statusChanges = new EventEmitter();  
}  
private _calculateStatus(): FormControlStatus {  
    if (this._allControlsDisabled()) return DISABLED;  
    if (this.errors) return INVALID;  
    if (this._hasOwnPendingAsyncValidator || this._anyControlsHaveStatus(PENDING)) return PENDING;  
    if (this._anyControlsHaveStatus(INVALID)) return INVALID;  
    return VALID;  
}  
/** @internal */  
abstract _updateValue(): void;  
/** @internal */  
abstract _forEachChild(cb: (c: AbstractControl) => void): void;  
/** @internal */  
abstract _anyControls(condition: (c: AbstractControl) => boolean): boolean;  
/** @internal */  
abstract _allControlsDisabled(): boolean;  
/** @internal */  
abstract _syncPendingControls(): boolean;  
/** @internal */  
_anyControlsHaveStatus(status: FormControlStatus): boolean {  
    return this._anyControls((control: AbstractControl) => control.status === status);  
}  
/** @internal */  
_anyControlsDirty(): boolean {  
    return this._anyControls((control: AbstractControl) => control.dirty);  
}  
/** @internal */  
_anyControlsTouched(): boolean {  
    return this._anyControls((control: AbstractControl) => control.touched);  
}  
/** @internal */  
_updatePristine(opts: {onlySelf?: boolean} = {}): void {  
    (this as {  
        pristine: boolean}).pristine = !this._anyControlsDirty();  
    if (this._parent && !opts.onlySelf) {  
        this._parent._updatePristine(opts);  
    }  
}  
/** @internal */  
_updateTouched(opts: {onlySelf?: boolean} = {}): void {  
    (this as {  
        touched: boolean}).touched = this._anyControlsTouched();  
    if (this._parent && !opts.onlySelf) {  
        this._parent._updateTouched(opts);  
    }  
}  
/** @internal */  
_onDisabledChange: Array<(isDisabled: boolean) => void> = [];  
/** @internal */  
_registerOnCollectionChange(fn: () => void): void {  
    this._onCollectionChange = fn;  
}  
/** @internal */  
_setUpdateStrategy(opts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null): void {  
    if (isOptionsObj(opts) && opts.updateOn !== null) {  
        this._updateOn = opts.updateOn!  
    }  
}  
/**  
 * Check to see if parent has been marked artificially dirty.  
 * @internal  
 */  
private _parentMarkedDirty(onlySelf?: boolean): boolean {  
    const parentDirty = this._parent && this._parent.dirty;  
    return !onlySelf && !parentDirty &&
```

```

!this._parent!._anyControlsDirty();\n } \n\n /** @internal *\n _find(name: string|number): AbstractControl|null
{\n return
null;\n } \n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport { AsyncValidatorFn, ValidatorFn } from './directives/validators';\n\nimport { AbstractControl,
AbstractControlOptions, assertAllValuesPresent, assertControlPresent, pickAsyncValidators, pickValidators,
RawValue, TypedOrUntyped, Value } from './abstract_model';\n\n/**\n * FormGroupValue extracts the type of
`.value` from a FormGroup's inner object type. The untyped\n * case falls back to {[key: string]: any}.\n *\n *
Angular uses this type internally to support Typed Forms; do not use it directly.\n *\n * For internal use only.\n
*\n\nexport type FormGroupValue<T> extends {[K in keyof T]?: AbstractControl<any>} > =\n TypedOrUntyped<T,
Partial<{[K in keyof T]: Value<T[K]>}>, {[key: string]: any}>;\n\n/**\n * FormGroupRawValue extracts the type
of `.getRawValue()`
from a FormGroup's inner object type. The\n * untyped case falls back to {[key: string]: any}.\n *\n * Angular uses
this type internally to support Typed Forms; do not use it directly.\n *\n * For internal use only.\n *\n\nexport type
FormGroupRawValue<T> extends {[K in keyof T]?: AbstractControl<any>} > =\n TypedOrUntyped<T, {[K in
keyof T]: RawValue<T[K]>}, {[key: string]: any}>;\n\n/**\n * OptionalKeys returns the union of all optional keys
in the object.\n *\n * Angular uses this type internally to support Typed Forms; do not use it directly.\n *\n\nexport
type OptionalKeys<T> = {\n [K in keyof T] -?: undefined extends T[K] ? K : never\n}[keyof T];\n\n/**\n * Tracks
the value and validity state of a group of `FormControl` instances.\n *\n * A `FormGroup` aggregates the values of
each child `FormControl` into one object,\n * with each control name as the key. It calculates its status by reducing
the status values\n * of its children. For example, if one of the controls
in a group is invalid, the entire\n * group becomes invalid.\n *\n * `FormGroup` is one of the four fundamental
building blocks used to define forms in Angular,\n * along with `FormControl`, `FormArray`, and `FormRecord`.\n
*\n * When instantiating a `FormGroup`, pass in a collection of child controls as the first\n * argument. The key for
each child registers the name for the control.\n *\n * `FormGroup` is intended for use cases where the keys are
known ahead of time.\n * If you need to dynamically add and remove controls, use {@link FormRecord} instead.\n
*\n * `FormGroup` accepts an optional type parameter `TControl`, which is an object type with inner\n * control
types as values.\n *\n * @usageNotes\n *\n * ### Create a form group with 2 controls\n *\n * ```\n * const form =
new FormGroup({\n * first: new FormControl('Nancy', Validators.minLength(2)),\n * last: new
FormControl('Drew'),\n * });\n *\n * console.log(form.value); // {first: 'Nancy', last: 'Drew'}\n *\n *
console.log(form.status);
// 'VALID'\n *\n * ### The type argument, and optional controls\n *\n * `FormGroup` accepts one generic
argument, which is an object containing its inner controls.\n * This type will usually be inferred automatically, but
you can always specify it explicitly if you\n * wish.\n * If you have controls that are optional (i.e. they can be
removed, you can use the `?` in the\n * type):\n *\n * ```\n * const form = new FormGroup<{\n * first:
FormControl<string|null>,\n * middle?: FormControl<string|null>, // Middle name is optional.\n * last:
FormControl<string|null>,\n * }>({\n * first: new FormControl('Nancy'),\n * last: new FormControl('Drew'),\n *
});\n *\n * ```\n *\n * ### Create a form group with a group-level validator\n *\n * You include group-level validators as
the second arg, or group-level async\n * validators as the third arg. These come in handy when you want to perform
validation\n * that considers the value of more than one child control.\n
*\n * ```\n * const form = new FormGroup({\n * password: new FormControl("", Validators.minLength(2)),\n *
passwordConfirm: new FormControl("", Validators.minLength(2)),\n * }, passwordMatchValidator);\n *\n * \n *\n * function passwordMatchValidator(g: FormGroup) {\n * return g.get('password').value ===
g.get('passwordConfirm').value\n * ? null : {'mismatch': true};\n * }\n *\n * ```\n *\n * Like `FormControl`
instances, you choose to pass in\n * validators and async validators as part of an options object.\n *\n * ```\n * const
form = new FormGroup({\n * password: new FormControl(""),\n * passwordConfirm: new FormControl(""),\n * }, {\n
validators: passwordMatchValidator, asyncValidators: otherValidator });\n *\n * ```\n *\n * ### Set the updateOn
property for all controls in a form group\n *\n * The options object is used to set a default value for each child\n *

```

control's `updateOn` property. If you set `updateOn` to `blur` at the group level, all child controls default to `blur`, unless the child has explicitly specified a different `updateOn` value.

```

const c = new FormGroup({
  one: new FormControl(),
  { updateOn: 'blur' }
});

```

Using a FormGroup with optional controls

It is possible to have optional controls in a FormGroup. An optional control can be removed later using `removeControl`, and can be omitted when calling `reset`. Optional controls must be declared optional in the group's type.

```

const c = new FormGroup<{one?: FormControl<string>}>({
  one: new FormControl()
});

```

Notice that `c.value.one` has type `string|null|undefined`. This is because calling `c.reset({})` without providing the optional key `one` will cause it to become `null`.

```

@publicApi
export class FormGroup<TControl> extends {[K in keyof TControl]: AbstractControl<any>} = any> extends AbstractControl<
  TypedOrUntyped<TControl, FormGroupValue<TControl>,
  any>,
  TypedOrUntyped<TControl, FormGroupRawValue<TControl>, any>> {
  /**
   * Creates a new `FormGroup` instance.
   * @param controls A collection of child controls. The key for each child is the name under which it is registered.
   * @param validatorOrOpts A synchronous validator function, or an array of such functions, or an `AbstractControlOptions` object that contains validation functions and a validation trigger.
   * @param asyncValidator A single async validator or array of async validator functions
   */
  constructor(
    controls: TControl, validatorOrOpts?:
    ValidatorFn|ValidatorFn[]|AbstractControlOptions|null, asyncValidator?:
    AsyncValidatorFn|AsyncValidatorFn[]|null) {
    super(pickValidators(validatorOrOpts),
    pickAsyncValidators(asyncValidator, validatorOrOpts));
    this.controls = controls;
    this._initObservables();
    this._setUpdateStrategy(validatorOrOpts);
    this._setUpControls();

    this.updateValueAndValidity({
      onlySelf: true,
      // If `asyncValidator` is present, it will trigger control
      // status change from `PENDING` to `VALID` or `INVALID`. The status should be broadcasted via the
      // `statusChanges` observable, // so we set `emitEvent` to `true` to allow that during the control creation
      // process.
      emitEvent: !!this.asyncValidator
    });
  }

  public controls: TypedOrUntyped<TControl,
  TControl, {[key: string]: AbstractControl<any>}>;

  /**
   * Registers a control with the group's list of controls. In a strongly-typed group, the control must be in the group's type (possibly as an optional key). This method does not update the value or validity of the control. Use {@link FormGroup#addControl addControl} instead.
   * @param name The control name to register in the collection
   * @param control Provides the control for the given name
   */
  registerControl<K extends string&keyof TControl>(name: K, control: TControl[K]): TControl[K];
  registerControl(
    this: FormGroup<{[key: string]: AbstractControl<any>}>, name: string,
    control: AbstractControl<any>): AbstractControl<any>;

  registerControl<K extends string&keyof TControl>(name: K, control: TControl[K]): TControl[K] {
    if (this.controls[name]) return (this.controls as any)[name];
    this.controls[name] = control;
    control.setParent(this as FormGroup);
    control._registerOnCollectionChange(this._onCollectionChange);
    return control;
  }

  /**
   * Add a control to this group. In a strongly-typed group, the control must be in the group's type (possibly as an optional key). If a control with a given name already exists, it would not be replaced with a new one. If you want to replace an existing control, use the {@link FormGroup#setControl setControl} method instead. This method also updates the value and validity of the control.
   * @param name The control name to add to the collection
   * @param control Provides the control for the given name
   * @param options Specifies whether this FormGroup instance should emit events after a new control is added.
   * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and `valueChanges` observables emit events with the latest status and value when the control is added. When false, no events are emitted.
   */
  addControl(
    this: FormGroup<{[key: string]: AbstractControl<any>}>, name:
    string,
    control: AbstractControl, options?: {emitEvent?: boolean}): void;
  addControl<K extends string&keyof TControl>(name: K, control: Required<TControl>[K], options?: {
    emitEvent?: boolean}):
    void;
  addControl<K extends string&keyof TControl>(name: K, control: Required<TControl>[K], options: {
    emitEvent?: boolean}) = {}): void {
    this.registerControl(name, control);
    this.updateValueAndValidity({emitEvent:

```

```

options.emitEvent});\n this._onCollectionChange();\n }\n\n removeControl(this: FormGroup<{[key: string]:
AbstractControl<any>}>, name: string, options?: {\n emitEvent?: boolean;\n }): void;\n removeControl<S
extends string>(name: OptionalKeys<TControl>&S, options?: {\n emitEvent?: boolean;\n }): void;\n\n /**\n *
Remove a control from this group. In a strongly-typed group, required controls cannot be\n * removed.\n *\n *
This method also updates the value and validity of the control.\n *\n * @param name The control name to remove
from the collection\n * @param options Specifies whether this FormGroup instance should emit events after a\n *
control is removed.\n * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n *
`valueChanges` observables emit events with the latest status and value when the control is\n * removed. When
false, no events are emitted.\n */\n removeControl(name: string, options:
{\n emitEvent?: boolean; } = {}): void {\n if ((this.controls as any)[name])\n (this.controls as
any)[name]._registerOnCollectionChange(() => {});\n delete ((this.controls as any)[name]);\n
this.updateValueAndValidity({emitEvent: options.emitEvent});\n this._onCollectionChange();\n }\n\n /**\n *
Replace an existing control. In a strongly-typed group, the control must be in the group's type\n * (possibly as an
optional key).\n *\n * If a control with a given name does not exist in this `FormGroup`, it will be added.\n *\n
* @param name The control name to replace in the collection\n * @param control Provides the control for the
given name\n * @param options Specifies whether this FormGroup instance should emit events after an\n *
existing control is replaced.\n * * `emitEvent`: When true or not supplied (the default), both the `statusChanges`
and\n * `valueChanges` observables emit events with the latest status and value when the control is\n
* replaced with a new one. When false, no events are emitted.\n */\n setControl<K extends string&keyof
TControl>(name: K, control: TControl[K], options?: {\n emitEvent?: boolean\n }): void;\n setControl(\n this:
FormGroup<{[key: string]: AbstractControl<any>}>, name: string,\n control: AbstractControl, options?:
{\n emitEvent?: boolean}): void;\n\n setControl<K extends string&keyof TControl>(name: K, control: TControl[K],
options: {\n emitEvent?: boolean\n } = {}): void {\n if (this.controls[name])
this.controls[name]._registerOnCollectionChange(() => {});\n delete (this.controls[name]);\n if (control)
this.registerControl(name, control);\n this.updateValueAndValidity({emitEvent: options.emitEvent});\n
this._onCollectionChange();\n }\n\n /**\n * Check whether there is an enabled control with the given name in the
group.\n *\n * Reports false for disabled controls. If you'd like to check for existence in the group\n * only, use
{@link AbstractControl#get
get} instead.\n *\n * @param controlName The control name to check for existence in the collection\n *\n *
@returns false for disabled controls, true otherwise.\n */\n contains<K extends string>(controlName: K):
boolean;\n\n contains<K extends string&keyof TControl>(controlName: K): boolean {\n return
this.controls.hasOwnProperty(controlName) && this.controls[controlName].enabled;\n }\n\n /**\n * Sets the
value of the `FormGroup`. It accepts an object that matches\n * the structure of the group, with control names as
keys.\n *\n * @usageNotes\n * ### Set the complete value for the form group\n *\n * ```\n * const form =
new FormGroup({\n * first: new FormControl(),\n * last: new FormControl()\n * });\n *\n * console.log(form.value); // {first: null, last: null}\n *\n * form.setValue({first: 'Nancy', last: 'Drew'});\n
*\n * console.log(form.value); // {first: 'Nancy', last: 'Drew'}\n * ```\n *\n * @throws When strict checks fail, such
as setting the value of a control\n * that doesn't exist or if you exclude a value of a control that does exist.\n *\n
* @param value The new value for the control that matches the structure of the group.\n * @param options
Configuration options that determine how the control propagates changes\n * and emits events after the value
changes.\n * The configuration options are passed to the {@link AbstractControl#updateValueAndValidity\n *
updateValueAndValidity} method.\n *\n * * `onlySelf`: When true, each change only affects this control, and not
its parent. Default is\n * false.\n * * `emitEvent`: When true or not supplied (the default), both the
`statusChanges` and\n * `valueChanges`\n * observables emit events with the latest status and value when the
control value is updated.\n * When false, no events are emitted.\n */\n override
setValue(value: FormGroupRawValue<TControl>, options: {\n onlySelf?: boolean,\n emitEvent?: boolean\n }
= {}): void {\n assertAllValuesPresent(this, true, value);\n (Object.keys(value) as Array<keyof

```



```

TControl>).forEach(name => {\n    assertControlPresent(this, true, name as any);\n    (this.controls as
any)[name].setValue(\n        (value as any)[name], {onlySelf: true, emitEvent: options.emitEvent});\n    });\n
this.updateValueAndValidity(options);\n })\n\n /**\n  * Patches the value of the `FormGroup`. It accepts an object
with control\n  * names as keys, and does its best to match the values to the correct controls\n  * in the group.\n  *\n  * It accepts both super-sets and sub-sets of the group without throwing an error.\n  *\n  * @usageNotes\n  * ### Patch the value for a form group\n  * \n  * ```\n  * const form = new FormGroup({\n  *   first: new
FormControl(),\n  *   last: new FormControl()\n  * });\n  * console.log(form.value); // {first:
null, last: null}\n  * \n  * form.patchValue({first: 'Nancy'});\n  * console.log(form.value); // {first: 'Nancy', last:
null}\n  * ```\n  * @param value The object that matches the structure of the group.\n  * @param options
Configuration options that determine how the control propagates changes and\n  * emits events after the value is
patched.\n  * * `onlySelf`: When true, each change only affects this control and not its parent. Default is\n  * true.\n  * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n  * `valueChanges`
observables emit events with the latest status and value when the control value\n  * is updated. When false, no
events are emitted. The configuration options are passed to\n  * the {@link
AbstractControl#updateValueAndValidity updateValueAndValidity} method.\n  * \n  * @override patchValue(value:
FormGroupValue<TControl>, options: {\n  *   onlySelf?: boolean,\n  *   emitEvent?: boolean\n  * } = {}): void {\n  * //
Even though the `value` argument type doesn't allow `null` and `undefined` values, the\n  * // `patchValue` can be
called recursively and inner data structures might have these values, so\n  * // we just ignore such cases when a field
containing FormGroup instance receives `null` or\n  * // `undefined` as a value.\n  * if (value == null /* both `null`
and `undefined` */) return;\n  * (Object.keys(value) as Array<keyof TControl>).forEach(name => {\n  * // The
compiler cannot see through the uninstantiated conditional type of `this.controls`, so\n  * // `as any` is required.\n  * const control = (this.controls as any)[name];\n  * if (control) {\n  *   control.patchValue(\n  *     /* Guaranteed to
be present, due to the outer forEach. */ value\n  *     [name as keyof FormGroupValue<TControl>]!,\n  *     {\n  *       onlySelf: true, emitEvent: options.emitEvent\n  *     });\n  *   }\n  *   this.updateValueAndValidity(options);\n  * }\n  * }\n  * \n  * Resets the `FormGroup`, marks
all descendants `pristine` and `untouched` and sets\n  * the value of all descendants to their default values, or null if
no defaults were provided.\n  *\n  * You reset to a specific form state by passing in a map of states\n  * that
matches the structure of your form, with control names as keys. The state\n  * is a standalone value or a form state
object with both a value and a disabled\n  * status.\n  *\n  * @param value Resets the control with an initial
value,\n  * or an object that defines the initial value and disabled state.\n  *\n  * @param options Configuration
options that determine how the control propagates changes\n  * and emits events when the group is reset.\n  * *
`onlySelf`: When true, each change only affects this control, and not its parent. Default is\n  * false.\n  * *
`emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n  * `valueChanges`\n  *
observables emit events with the latest status and value when the control
is reset.\n  * When false, no events are emitted.\n  * The configuration options are passed to the {@link
AbstractControl#updateValueAndValidity\n  * updateValueAndValidity} method.\n  * \n  * @usageNotes\n  * \n  *
### Reset the form group values\n  * \n  * ```ts\n  * const form = new FormGroup({\n  *   first: new
FormControl('first name'),\n  *   last: new FormControl('last name')\n  * });\n  * \n  * console.log(form.value); //
{first: 'first name', last: 'last name'}\n  * \n  * form.reset({ first: 'name', last: 'last name' });\n  * \n  *
console.log(form.value); // {first: 'name', last: 'last name'}\n  * ```\n  * \n  * ### Reset the form group values and
disabled status\n  * \n  * ```\n  * const form = new FormGroup({\n  *   first: new FormControl('first name'),\n  *
last: new FormControl('last name')\n  * });\n  * \n  * form.reset({\n  *   first: {value: 'name', disabled: true},\n  *
last: 'last'\n  * });\n  * \n  * console.log(form.value); // {last:
'last'}\n  * console.log(form.get('first').status); // 'DISABLED'\n  * ```\n  * \n  * @override reset(\n  *   value:
TypedOrUntyped<TControl, FormGroupValue<TControl>, any> = {} as unknown as\n  *   FormGroupValue<TControl>,\n  *   options: {onlySelf?: boolean, emitEvent?: boolean} = {}): void {\n  *
this._forEachChild((control, name) => {\n  *   control.reset((value as any)[name], {onlySelf: true, emitEvent:
options.emitEvent});\n  * });\n  * this._updatePristine(options);\n  * this._updateTouched(options);\n  * }\n

```

```

this.updateValueAndValidity(options);\n }\n\n /**\n  * The aggregate value of the `FormGroup`, including any
disabled controls.\n  *\n  * Retrieves all values regardless of disabled status.\n  */\n  override getRawValue():
TypedOrUntyped<TControl, FormGroupRawValue<TControl>, any> {\n  return this._reduceChildren({}, (acc,
control, name) => {\n    (acc as any)[name] = (control as any).getRawValue();\n    return acc;\n  }) as any;\n
}\n\n /** @internal
*\n  override _syncPendingControls(): boolean {\n  let subtreeUpdated = this._reduceChildren(false, (updated:
boolean, child) => {\n    return child._syncPendingControls() ? true : updated;\n  });\n  if (subtreeUpdated)
this.updateValueAndValidity({onlySelf: true});\n  return subtreeUpdated;\n }\n\n /** @internal *\n  override
_forEachChild(cb: (v: any, k: any) => void): void {\n  Object.keys(this.controls).forEach(key => {\n    // The list
of controls can change (for ex. controls might be removed) while the loop\n    // is running (as a result of invoking
Forms API in `valueChanges` subscription), so we\n    // have to null check before invoking the callback.\n    const control = (this.controls as any)[key];\n    control && cb(control, key);\n  });\n }\n\n /** @internal *\n  _setUpControls(): void {\n  this._forEachChild((control) => {\n    control.setParent(this);\n
control._registerOnCollectionChange(this._onCollectionChange);\n  });\n }\n\n /** @internal *\n  override _updateValue(): void {\n  (this as {value: any}).value = this._reduceValue();\n }\n\n /** @internal *\n  override _anyControls(condition: (c: AbstractControl) => boolean): boolean {\n  for (const
[controlName, control] of Object.entries(this.controls)) {\n    if (this.contains(controlName as any) &&
condition(control as any)) {\n      return true;\n    }\n  }\n  return false;\n }\n\n /** @internal *\n  _reduceValue(): Partial<TControl> {\n  let acc: Partial<TControl> = {};\n  return this._reduceChildren(acc, (acc,
control, name) => {\n    if (control.enabled || this.disabled) {\n      acc[name] = control.value;\n    }\n    return
acc;\n  });\n }\n\n /** @internal *\n  _reduceChildren<T, K extends keyof TControl>(\n  initialValue: T, fn: (acc:
T, control: TControl[K], name: K) => T): T {\n  let res = initialValue;\n  this._forEachChild((control: TControl[K],
name: K) => {\n    res = fn(res, control, name);\n  });\n  return res;\n }\n\n /** @internal *\n  override _allControlsDisabled(): boolean {\n  for (const
controlName of (Object.keys(this.controls) as Array<keyof TControl>)) {\n    if ((this.controls as
any)[controlName].enabled) {\n      return false;\n    }\n  }\n  return Object.keys(this.controls).length > 0 ||
this.disabled;\n }\n\n /** @internal *\n  override _find(name: string|number): AbstractControl|null {\n  return
this.controls.hasOwnProperty(name as string) ?\n    (this.controls as any)[name as keyof TControl] :\n    null;\n }\n\n }\n\n interface UntypedFormGroupCtor {\n  new(controls: {[key: string]: AbstractControl},\n  validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n  asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormGroup;\n\n /**\n  * The presence of an explicit
`prototype` property provides backwards-compatibility for apps that\n  * manually inspect the prototype chain.\n  *\n  * prototype:
FormGroup<any>;\n }\n\n /**\n  * UntypedFormGroup is a non-strongly-typed version of @see FormGroup.\n  *\n  * export type UntypedFormGroup = FormGroup<any>;\n  * export const UntypedFormGroup:
UntypedFormGroupCtor = FormGroup;\n  * export const isFormGroup = (control: unknown): control is FormGroup
=> control instanceof FormGroup;\n\n /**\n  * Tracks the value and validity state of a collection of `FormControl`
instances, each of which has\n  * the same value type.\n  *\n  * `FormRecord` is very similar to {@link FormGroup},
except it can be used with a dynamic keys,\n  * with controls added and removed as needed.\n  *\n  * `FormRecord`
accepts one generic argument, which describes the type of the controls it contains.\n  *\n  * @usageNotes\n  *\n  *
```\n  * let numbers = new FormRecord({bill: new FormControl('415-123-456')});\n  * numbers.addControl('bob',
new FormControl('415-234-567'));\n  * numbers.removeControl('bill');\n  * ```\n  *\n  * @publicApi\n  */\n  export class
FormRecord<TControl extends AbstractControl
= AbstractControl> extends\n  FormGroup<{[key: string]: TControl}> {\n\n  export interface
FormRecord<TControl> {\n\n  /**\n  * Registers a control with the records's list of controls.\n  *\n  * See
`FormGroup#registerControl` for additional information.\n  */\n  registerControl(name: string, control: TControl):
TControl;\n\n  /**\n  * Add a control to this group.\n  *\n  * See `FormGroup#addControl` for additional
information.\n  */\n  addControl(name: string, control: TControl, options?: {emitEvent?: boolean}): void;\n\n  /**\n

```

\* Remove a control from this group.  
 \* See `FormGroup#removeControl` for additional information.  
 removeControl(name: string, options?: {emitEvent?: boolean}): void

\* Replace an existing control.  
 \* See `FormGroup#setControl` for additional information.  
 setControl(name: string, control: TControl, options?: {emitEvent?: boolean}): void

\* Check whether there is an enabled control with the given name in the group.  
 \* See `FormGroup#contains` for additional information.  
 contains(controlName: string): boolean

\* Sets the value of the `FormRecord`. It accepts an object that matches the structure of the group, with control names as keys.  
 \* See `FormGroup#setValue` for additional information.  
 setValue(value: {[key: string]: Value<TControl>}, options?: {onlySelf?: boolean, emitEvent?: boolean}): void

\* Patches the value of the `FormRecord`. It accepts an object with control names as keys, and does its best to match the values to the correct controls in the group.  
 \* See `FormGroup#patchValue` for additional information.  
 patchValue(value: {[key: string]: Value<TControl>}, options?: {onlySelf?: boolean, emitEvent?: boolean}): void

\* Resets the `FormRecord`, marks all descendants `pristine` and `untouched` and sets the value of all descendants to null.  
 \* See `FormGroup#reset` for additional information.  
 reset(value?: {[key: string]: Value<TControl>}, options?: {onlySelf?: boolean, emitEvent?: boolean}): void

\* The aggregate value of the `FormRecord`, including any disabled controls.  
 \* See `FormGroup#getRawValue` for additional information.  
 getRawValue(): {[key: string]: RawValue<TControl>};

```

export const isFormRecord = (control: unknown): control is FormRecord =>
  control instanceof FormRecord;

```

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```

import { RuntimeError as RuntimeError } from '@angular/core';
import { RuntimeErrorCode } from '../errors';
import { AbstractControl } from '../model/abstract_model';
import { FormArray } from '../model/form_array';
import { FormControl } from '../model/form_control';
import { FormGroup } from '../model/form_group';
import { getControlAsyncValidators, getControlValidators, mergeValidators } from '../validators';
import { AbstractControlDirective } from './abstract_control_directive';
import { AbstractFormGroupDirective } from './abstract_form_group_directive';
import { ControlContainer } from './control_container';
import { BuiltInControlValueAccessor, ControlValueAccessor } from './control_value_accessor';
import { DefaultValueAccessor } from './default_value_accessor';
import { NgControl } from './ng_control';
import { FormArrayName } from './reactive_directives/form_group_name';
import { ngModelWarning } from './reactive_errors';
import { AsyncValidatorFn, Validator, ValidatorFn } from './validators';

```

export function controlPath(name: string|null, parent: ControlContainer): string[] {  
 return [...parent.path!, name!];  
}

\* Links a Form control and a Form directive by setting up callbacks (such as `onChange`) on both instances. This function is typically invoked when form directive is being initialized.  
 \* @param control Form control instance that should be linked.  
 \* @param dir Directive that should be linked with a given control.  
 export function setUpControl(control: FormControl, dir: NgControl): void {  
 if (typeof ngDevMode === 'undefined' || ngDevMode) {  
 if (!control) \_throwError(dir, 'Cannot find control with');  
 if (!dir.valueAccessor) \_throwError(dir, 'No value accessor for form control with');  
 }  
 setUpValidators(control, dir);  
 dir.valueAccessor!.writeValue(control.value);  
 if (control.disabled) {  
 dir.valueAccessor!.setDisabledState?.(true);  
 }  
 setUpViewChangePipeline(control, dir);  
 setUpModelChangePipeline(control, dir);  
 setUpBlurPipeline(control, dir);  
 setUpDisabledChangeHandler(control, dir);  
}

\* Reverts configuration performed by the `setUpControl` control function.  
 \* Effectively disconnects form control with a given form directive.  
 \* This function is typically invoked when corresponding form directive is being destroyed.  
 \* @param control Form control which should be cleaned up.  
 \* @param dir Directive that should be disconnected from a given control.  
 \* @param validateControlPresenceOnChange Flag that indicates whether onChange handler should contain asserts to verify that it's not called once directive is destroyed. We need this flag to avoid potentially breaking changes caused by better control cleanup introduced in #39235.



```

AbstractControl|null, dir: AbstractControlDirective): boolean {\n let isControlUpdated = false;\n if (control !==
null) {\n if (dir.validator !== null) {\n const validators = getControlValidators(control);\n if
(Array.isArray(validators) && validators.length > 0) {\n // Filter out directive validator function.\n const
updatedValidators = validators.filter((validator) => validator !== dir.validator);\n if (updatedValidators.length
!== validators.length) {\n isControlUpdated = true;\n control.setValidators(updatedValidators);\n }\n
}\n }\n if (dir.asyncValidator !== null) {\n
const asyncValidators = getControlAsyncValidators(control);\n if (Array.isArray(asyncValidators) &&
asyncValidators.length > 0) {\n // Filter out directive async validator function.\n const
updatedAsyncValidators =\n asyncValidators.filter((asyncValidator) => asyncValidator !==
dir.asyncValidator);\n if (updatedAsyncValidators.length !== asyncValidators.length) {\n
isControlUpdated = true;\n control.setAsyncValidators(updatedAsyncValidators);\n }\n }\n }\n }\n }\n
// Clear onValidatorChange callbacks by providing a noop function.\n const noop = () => {};\n
registerOnValidatorChange<ValidatorFn>(dir._rawValidators, noop);\n
registerOnValidatorChange<AsyncValidatorFn>(dir._rawAsyncValidators, noop);\n\n return
isControlUpdated;\n}\n\nfunction setUpViewChangePipeline(control: FormControl, dir: NgControl): void {\n
dir.valueAccessor!.registerOnChange((newValue: any) => {\n control._pendingValue = newValue;\n
control._pendingChange = true;\n control._pendingDirty = true;\n\n if (control.updateOn === 'change')
updateControl(control, dir);\n });\n}\n\nfunction setUpBlurPipeline(control: FormControl, dir: NgControl): void {\n
dir.valueAccessor!.registerOnTouched(() => {\n control._pendingTouched = true;\n\n if (control.updateOn ===
'blur' && control._pendingChange) updateControl(control, dir);\n if (control.updateOn !== 'submit')
control.markAsTouched();\n });\n}\n\nfunction updateControl(control: FormControl, dir: NgControl): void {\n if
(control._pendingDirty) control.markAsDirty();\n control.setValue(control._pendingValue,
{emitModelToViewChange: false});\n dir.viewToModelUpdate(control._pendingValue);\n
control._pendingChange = false;\n}\n\nfunction setUpModelChangePipeline(control: FormControl, dir: NgControl):
void {\n const onChange = (newValue?: any, emitModelEvent?: boolean) => {\n // control -> view\n
dir.valueAccessor!.writeValue(newValue);\n\n //
control -> ngModel\n if (emitModelEvent) dir.viewToModelUpdate(newValue);\n });\n
control.registerOnChange(onChange);\n\n // Register a callback function to cleanup onChange handler\n // from a
control instance when a directive is destroyed.\n dir._registerOnDestroy(() => {\n
control._unregisterOnChange(onChange);\n });\n}\n\n/**\n * Links a FormGroup or FormArray instance and
corresponding Form directive by setting up validators\n * present in the view.\n * @param control FormGroup
or FormArray instance that should be linked.\n * @param dir Directive that provides view validators.\n */\nexport
function setUpFormContainer(\n control: FormGroup|FormArray, dir:
AbstractFormGroupDirective|FormArrayName) {\n if (control == null && (typeof ngDevMode === 'undefined' ||
ngDevMode))\n _throwError(dir, 'Cannot find control with');\n setUpValidators(control, dir);\n}\n\n/**\n *
Reverts the setup performed by the `setUpFormContainer` function.\n * @param control FormGroup
or FormArray instance that should be cleaned up.\n * @param dir Directive that provided view validators.\n *
@returns true if a control was updated as a result of this action.\n */\nexport function cleanUpFormContainer(\n
control: FormGroup|FormArray, dir: AbstractFormGroupDirective|FormArrayName): boolean {\n return
cleanUpValidators(control, dir);\n}\n\nfunction _noControlError(dir: NgControl) {\n return _throwError(dir, 'There
is no FormControl instance attached to form control element with');\n}\n\nfunction _throwError(dir:
AbstractControlDirective, message: string): void {\n const messageEnd = _describeControlLocation(dir);\n throw
new Error(`${message} ${messageEnd}`);\n}\n\nfunction _describeControlLocation(dir: AbstractControlDirective):
string {\n const path = dir.path;\n if (path && path.length > 1) return `path: '${path.join(' -> ')}';`\n
if (path?.[0])\n return `name: '${path}'`; \n return 'unspecified name attribute';\n}\n\nfunction
_throwInvalidValueAccessorError(dir:
AbstractControlDirective) {\n const loc = _describeControlLocation(dir);\n throw new RuntimeError(\n
RuntimeErrorCode.NG_VALUE_ACCESSOR_NOT_PROVIDED, \n `Value accessor was not provided as an

```

```

array for form control with ${loc}. ` +\n      `Check that the `NG_VALUE_ACCESSOR` token is configured
as a `multi: true` provider.`);\n}\n\nexport function isPropertyUpdated(changes: {[key: string]: any}, viewModel:
any): boolean {\n  if (!changes.hasOwnProperty('model')) return false;\n  const change = changes['model'];\n  if
(change.isFirstChange()) return true;\n  return !Object.is(viewModel, change.currentValue);\n}\n\nexport function
isBuiltInAccessor(valueAccessor: ControlValueAccessor): boolean {\n  // Check if a given value accessor is an
instance of a class that directly extends\n  // `BuiltInControlValueAccessor` one.\n  return
Object.getPrototypeOf(valueAccessor.constructor) === BuiltInControlValueAccessor;\n}\n\nexport function
syncPendingControls(form:
  FormGroup, directives: Set<NgControl>|NgControl[]): void {\n  form._syncPendingControls();\n
  directives.forEach((dir: NgControl) => {\n    const control = dir.control as FormControl;\n    if (control.updateOn
=== 'submit' && control._pendingChange) {\n      dir.viewToModelUpdate(control._pendingValue);\n
      control._pendingChange = false;\n    }\n  });\n}\n\n// TODO: vsavkin remove it once
https://github.com/angular/angular/issues/3011 is implemented\nexport function selectValueAccessor(\n  dir:
  NgControl, valueAccessors: ControlValueAccessor[]): ControlValueAccessor|null {\n  if (!valueAccessors) return
null;\n  if (!Array.isArray(valueAccessors) && (typeof ngDevMode === 'undefined' || ngDevMode))\n    _throwInvalidValueAccessorError(dir);\n  let defaultAccessor: ControlValueAccessor|undefined = undefined;\n  let builtinAccessor: ControlValueAccessor|undefined = undefined;\n  let customAccessor:
  ControlValueAccessor|undefined = undefined;\n  valueAccessors.forEach((v: ControlValueAccessor)
=> {\n    if (v.constructor === DefaultValueAccessor) {\n      defaultAccessor = v;\n    } else if
(isBuiltInAccessor(v)) {\n      if (builtinAccessor && (typeof ngDevMode === 'undefined' || ngDevMode))\n        _throwError(dir, 'More than one built-in value accessor matches form control with');\n      builtinAccessor = v;\n    }
else {\n      if (customAccessor && (typeof ngDevMode === 'undefined' || ngDevMode))\n        _throwError(dir,
'More than one custom value accessor matches form control with');\n      customAccessor = v;\n    }\n  });\n  if
(customAccessor) return customAccessor;\n  if (builtinAccessor) return builtinAccessor;\n  if (defaultAccessor)
return defaultAccessor;\n  if (typeof ngDevMode === 'undefined' || ngDevMode) {\n    _throwError(dir, 'No valid
value accessor for form control with');\n  }\n  return null;\n}\n\nexport function removeListItem<T>(list: T[], el: T):
void {\n  const index = list.indexOf(el);\n  if (index > -1) list.splice(index,
  1);\n}\n\n// TODO(kara): remove after deprecation period\nexport function _ngModelWarning(\n  name: string,
  type: { _ngModelWarningSentOnce: boolean },\n  instance: { _ngModelWarningSent: boolean }, warningConfig:
  string|null) {\n  if (warningConfig === 'never') return;\n  if (((warningConfig === null || warningConfig ===
'once') && !type._ngModelWarningSentOnce) ||\n    (warningConfig === 'always' &&
!instance._ngModelWarningSent)) {\n    console.warn(ngModelWarning(name));\n
    type._ngModelWarningSentOnce = true;\n    instance._ngModelWarningSent = true;\n  }\n}\n\n"/**\n * @license\n
 * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport { AfterViewInit, Directive,
  EventEmitter, forwardRef, Inject, Input, Optional, Self } from '@angular/core';\nimport { AbstractControl,
  FormHooks } from '../model/abstract_model';\nimport { FormControl }
  from '../model/form_control';\nimport { FormGroup } from '../model/form_group';\nimport
  { composeAsyncValidators, composeValidators, NG_ASYNC_VALIDATORS, NG_VALIDATORS } from
  '../validators';\nimport { ControlContainer } from './control_container';\nimport { Form } from
  './form_interface';\nimport { NgControl } from './ng_control';\nimport { NgModel } from './ng_model';\nimport
  { NgModelGroup } from './ng_model_group';\nimport { setUpControl, setUpFormContainer, syncPendingControls }
  from './shared';\nimport { AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn } from './validators';\n\nexport
  const formDirectiveProvider: any = {\n  provide: ControlContainer,\n  useExisting: forwardRef(() =>
  NgForm)\n};\n\nconst resolvedPromise = ((() => Promise.resolve())());\n\n/**\n * @description\n * Creates a top-
  level `FormGroup` instance and binds it to a form\n * to track aggregate form value and validation status.\n * As
  soon as you import the `FormsModule`, this directive becomes active by default on\n

```

\* all `<form>` tags. You don't need to add a special selector. You optionally export the directive into a local template variable using `ngForm` as the key (ex: `#myForm="ngForm"`). This is optional, but useful. Many properties from the underlying `FormGroup` instance are duplicated on the directive itself, so a reference to it gives you access to the aggregate value and validity status of the form, as well as user interaction properties like `dirty` and `touched`. To register child controls with the form, use `NgModel` with a `name` attribute. You may use `NgModelGroup` to create sub-groups within the form. If necessary, listen to the directive's `ngSubmit` event to be notified when the user has triggered a form submission. The `ngSubmit` event emits the original form submission event. In template driven forms, all `<form>` tags are automatically tagged as `NgForm`. To import the `FormsModule` but skip its usage in some forms, for example, to use native HTML5 validation, add the `ngNoForm` and the `<form>` tags won't create an `NgForm` directive. In reactive forms, using `ngNoForm` is unnecessary because the `<form>` tags are inert. In that case, you would refrain from using the `formGroup` directive. @usageNotes

### Listening for form submission

The following example shows how to capture the form values from the `ngSubmit` event.

```
{@example forms/ts/simpleForm/simple_form_example.ts region='Component'}
```

### Setting the update options

The following example shows you how to change the `updateOn` option from its default using `ngFormOptions`.

```
html
<form [ngFormOptions]="{updateOn: 'blur'}">
<input name="one" ngModel> <!-- this ngModel will update on blur -->
</form>
```

### Native DOM validation UI

In order to prevent the native DOM form validation UI from interfering with Angular's form validation, Angular automatically adds the `novalidate` attribute on any `<form>` whenever `FormsModule` or `ReactiveFormsModule` are imported into the application. If you want to explicitly enable native DOM validation UI with Angular forms, you can add the `ngNativeValidate` attribute to the `<form>` element.

```
html
<form ngNativeValidate> ... </form>
```

@ngModule

```
FormsModule
@publicApi
^@Directive({
  selector: 'form:not([ngNoForm]):not([formGroup]),ng-
  form,[ngForm]',
  providers: [formDirectiveProvider],
  host: {'(submit)': 'onSubmit($event)', '(reset)':
  'onReset()'},
  outputs: ['ngSubmit'],
  exportAs: 'ngForm'})
export class NgForm extends FormControl
implements Form, AfterViewInit {
  /**
   * @description
   * Returns whether the form submission has been
   * triggered.
   */
  public readonly submitted: boolean = false;
  private _directives = new Set<NgModel>();
  /**
   * @description
   * The FormGroup instance created for this form.
   */
  form: FormGroup;
  /**
   * @description
   * Event emitter for the ngSubmit event
   */
  ngSubmit = new EventEmitter();
  /**
   * @description
   * Tracks options for the NgForm instance.
   * **updateOn**: Sets the default updateOn value for all child
   * NgModels below it unless explicitly set by a child NgModel using
   * ngModelOptions. Defaults to 'change'.
   * Possible values: 'change' | 'blur' | 'submit'.
   */
  // TODO(issue/24571): remove '!'.
  @Input('ngFormOptions') options!: {updateOn?: FormHooks};
  constructor(@Optional() @Self()
  @Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],
  @Optional() @Self()
  @Inject(NG_ASYNC_VALIDATORS) asyncValidators:
  (AsyncValidator|AsyncValidatorFn[]) {
    super();
    this.form = new FormGroup({}, composeValidators(validators),
    composeAsyncValidators(asyncValidators));
  }
  /**
   * @nodoc
   */
  ngAfterViewInit() {
    this._setUpdateStrategy();
  }
  /**
   * @description
   * The directive instance.
   */
  override get formDirective(): Form {
    return this;
  }
  /**
   * @description
   * The internal FormGroup instance.
   */
  override get control(): FormGroup {
    return this.form;
  }
  /**
   * @description
   * Returns an array representing the path to this group. Because this directive
   * always lives at the top level of a form, it is always an empty array.
   */
  override get path(): string[] {
    return [];
  }
  /**
   * @description
   * Returns a map of the controls in this group.
   */
  get controls(): {[key: string]:
  AbstractControl} {
    return this.form.controls;
  }
  /**
   * @description
   * Method that sets up the
   * control directive in this group, re-calculates its value and validity, and adds the instance to the internal list of
   * directives.
   */
  @param dir The NgModel
```

```

directive instance.\n */\n addControl(dir: NgModel): void {\n  resolvedPromise.then(() => {\n    const container
= this._findContainer(dir.path);\n    (dir as {control: FormControl}).control =\n
<FormControl>container.registerControl(dir.name, dir.control);\n    setUpControl(dir.control, dir);\n
dir.control.updateValueAndValidity({emitEvent: false});\n    this._directives.add(dir);\n  });\n}\n\n/**\n *
 @description\n * Retrieves the `FormControl` instance from the provided `NgModel` directive.\n * \n * @param
dir The `NgModel` directive instance.\n */\n getControl(dir: NgModel): FormControl {\n  return
<FormControl>this.form.get(dir.path);\n }\n\n/**\n * @description\n * Removes the `NgModel` instance from
the internal list of directives\n * \n * @param dir The `NgModel` directive instance.\n */\n removeControl(dir:
NgModel): void {\n  resolvedPromise.then(() => {\n    const container = this._findContainer(dir.path);\n
    if (container) {\n      container.removeControl(dir.name);\n    }\n    this._directives.delete(dir);\n  });\n}\n\n
/**\n * @description\n * Adds a new `NgModelGroup` directive instance to the form.\n * \n * @param dir The
`NgModelGroup` directive instance.\n */\n addFormGroup(dir: NgModelGroup): void {\n
resolvedPromise.then(() => {\n  const container = this._findContainer(dir.path);\n  const group = new
FormGroup({});\n  setUpFormContainer(group, dir);\n  container.registerControl(dir.name, group);\n
group.updateValueAndValidity({emitEvent: false});\n });\n }\n\n/**\n * @description\n * Removes the
`NgModelGroup` directive instance from the form.\n * \n * @param dir The `NgModelGroup` directive
instance.\n */\n removeFormGroup(dir: NgModelGroup): void {\n  resolvedPromise.then(() => {\n  const
container = this._findContainer(dir.path);\n  if (container) {\n    container.removeControl(dir.name);\n  }\n
});\n }\n\n/**\n * @description\n * Retrieves the `FormGroup` for a provided `NgModelGroup` directive
instance\n * \n * @param dir The `NgModelGroup` directive instance.\n */\n getFormGroup(dir:
NgModelGroup): FormGroup {\n  return <FormGroup>this.form.get(dir.path);\n }\n\n/**\n * Sets the new
value for the provided `NgControl` directive.\n * \n * @param dir The `NgControl` directive instance.\n *
 @param value The new value for the directive's control.\n */\n updateModel(dir: NgControl, value: any): void {\n
resolvedPromise.then(() => {\n  const ctrl = <FormControl>this.form.get(dir.path!);\n  ctrl.setValue(value);\n
});\n }\n\n/**\n * @description\n * Sets the value for this `FormGroup`.\n * \n * @param value The new
value\n */\n setValue(value: {[key: string]: any}): void {\n  this.control.setValue(value);\n }\n\n/**\n *
 @description\n * Method called when the "submit" event is triggered on the form.\n * Triggers the
`ngSubmit` emitter to emit the "submit" event as its payload.\n * \n * @param $event The "submit" event
object\n */\n onSubmit($event: Event): boolean {\n  (this as {submitted: boolean}).submitted = true;\n
syncPendingControls(this.form, this._directives);\n  this.ngSubmit.emit($event);\n  // Forms with
`method="dialog"` have some special behavior\n  // that won't reload the page and that shouldn't be prevented.\n
return ($event?.target as HTMLFormElement | null)?.method === 'dialog';\n }\n\n/**\n * @description\n *
Method called when the "reset" event is triggered on the form.\n */\n onReset(): void {\n  this.resetForm();\n
}\n\n/**\n * @description\n * Resets the form to an initial value and resets its submitted status.\n * \n *
 @param value The new value for the form.\n */\n resetForm(value: any = undefined): void {\n
this.form.reset(value);\n  (this as {submitted: boolean}).submitted = false;\n }\n\n private _setUpdateStrategy()
{\n  if (this.options && this.options.updateOn != null) {\n    this.form._updateOn = this.options.updateOn;\n
}\n }\n\n private _findContainer(path: string[]): FormGroup {\n  path.pop();\n  return path.length ?
<FormGroup>this.form.get(path) : this.form;\n }\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nexport function removeListItem<T>(list: T[], el: T): void {\n
const index = list.indexOf(el);\n  if (index > -1) list.splice(index, 1);\n }\n\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n */\n\nimport { AsyncValidatorFn, ValidatorFn } from
'./directives/validators';\nimport { removeListItem } from './util';\nimport { AbstractControl,
AbstractControlOptions,
isOptionsObj, pickAsyncValidators, pickValidators } from './abstract_model';\n\n/**\n * FormControlState is a
boxed form value. It is an object with a `value` key and a `disabled` key.\n * \n * @publicApi\n */\nexport interface

```



FormControlState<T> {\n value: T;\n disabled: boolean;\n}\n\n/\*\*\n \* Interface for options provided to a `FormControl`.\n \*\n \* This interface extends all options from { @link AbstractControlOptions }, plus some options\n \* unique to `FormControl`.\n \*\n \* @publicApi\n \*/\nexport interface FormControlOptions extends AbstractControlOptions {\n /\*\*\n \* @description\n \* Whether to use the initial value used to construct the `FormControl` as its default value\n \* as well. If this option is false or not provided, the default value of a FormControl is `null`.\n \* When a FormControl is reset without an explicit value, its value reverts to\n \* its default value.\n \*/\n nonNullable?: boolean;\n\n /\*\*\n \* @deprecated Use `nonNullable` instead.\n \*/\n initialValueIsDefault?: boolean;\n}\n\n/\*\*\n \* Tracks the value and validation status of an individual form control.\n \*\n \* This is one of the four fundamental building blocks of Angular forms, along with\n \* `FormGroup`, `FormArray` and `FormRecord`. It extends the `AbstractControl` class that\n \* implements most of the base functionality for accessing the value, validation status,\n \* user interactions and events.\n \*\n \* `FormControl` takes a single generic argument, which describes the type of its value. This\n \* argument always implicitly includes `null` because the control can be reset. To change this\n \* behavior, set `nonNullable` or see the usage notes below.\n \*\n \* See [usage examples below](#usage-notes).\n \*\n \* @see `AbstractControl`\n \* @see [Reactive Forms Guide](guide/reactive-forms)\n \* @see [Usage Notes](#usage-notes)\n \*\n \* @publicApi\n \*/\n\n @overrideImplementation FormControlCtor\n \*\n \* @usageNotes\n \*\n \* ### Initializing Form Controls\n \*\n \* Instantiate a `FormControl`, with an initial value.\n \*\n \* ```ts\n \* const control = new FormControl('some value');\n \* console.log(control.value); // 'some value'\n \* ```\n \*\n \* The following example initializes the control with a form state object. The `value` and `disabled` keys are required in this case.\n \*\n \* ```ts\n \* const control = new FormControl({ value: 'n/a', disabled: true });\n \* console.log(control.value); // 'n/a'\n \* console.log(control.status); // 'DISABLED'\n \* ```\n \*\n \* The following example initializes the control with a synchronous validator.\n \*\n \* ```ts\n \* const control = new FormControl("", Validators.required);\n \* console.log(control.value); // ""\n \* console.log(control.status); // 'INVALID'\n \* ```\n \*\n \* The following example initializes the control using an options object.\n \*\n \* ```ts\n \* const control = new FormControl("", {\n \* validators: Validators.required,\n \* asyncValidators: myAsyncValidator\n \* });\n \* ```\n \*\n \* ### The single type argument\n \*\n \* `FormControl` accepts a generic argument, which describes the type of its value. In most cases, this argument will be inferred. If you are initializing the control to `null`, or you otherwise wish to provide a\n \* wider type, you may specify the argument explicitly:\n \*\n \* ```\n \* let fc = new FormControl<string|null>(null);\n \* fc.setValue('foo');\n \* ```\n \*\n \* You might notice that `null` is always added to the type of the control. This is because the control will become `null` if you call `reset`. You can change\n \* this behavior by setting `{ nonNullable: true }`.\n \*\n \* ### Configure the control to update on a blur event\n \*\n \* Set the `updateOn` option to `blur` to update on the blur `event`.\n \*\n \* ```ts\n \* const control = new FormControl("", { updateOn: 'blur' });\n \* ```\n \*\n \* ### Configure the control to update on a submit event\n \*\n \* Set the `updateOn` option to `submit` to update on a submit `event`.\n \*\n \* ```ts\n \* const control = new FormControl("", { updateOn: 'submit' });\n \* ```\n \*\n \* ### Reset the control back to a specific value\n \*\n \* You reset to a specific form state by passing through a standalone\n \* value or a form state object that contains both a value and a disabled state\n \* (these are the only two properties that cannot be calculated).\n \*\n \* ```ts\n \* const control = new FormControl('Nancy');\n \* console.log(control.value); // 'Nancy'\n \* control.reset('Drew');\n \* console.log(control.value); // 'Drew'\n \* ```\n \*\n \* ### Reset the control to its initial value\n \*\n \* If you wish to always reset the control to its initial value (instead of null),\n \* you can pass the `nonNullable` option:\n \*\n \* ```ts\n \* const control = new FormControl('Nancy', { nonNullable: true });\n \* console.log(control.value); // 'Nancy'\n \* control.reset();\n \* console.log(control.value); // 'Nancy'\n \* ```\n \*\n \* ### Reset the control back to an initial value and disabled\n \*\n \* ```ts\n \* const control = new FormControl('Nancy');\n \* console.log(control.value); // 'Nancy'\n \* console.log(control.status); // 'VALID'\n \* control.reset({ value: 'Drew', disabled: true });\n \* console.log(control.value); // 'Drew'\n \* console.log(control.status); // 'DISABLED'\n \* ```\n\nexport interface FormControl<TValue = any> extends AbstractControl<TValue> {\n /\*\*\n \* The default value of this FormControl, used whenever the control is reset without an explicit\n \* value. See { @link

```

FormControlOptions#nonNullable} for more information on configuring
 * a default value.
 * ^\n readonly
defaultValue: TValue;
/** @internal */
_onChange: Function[];
/**
 * This field holds a pending
value that has not yet been applied to the form's value.
 * @internal
 * ^\n _pendingValue: TValue;
/**
 * @internal
 * ^\n _pendingChange: boolean;
/**
 * Sets a new value for the form control.
 * ^\n * @param
value The
new value for the control.
 * @param options Configuration options that determine how the control propagates
changes
 * and emits events when the value changes.
 * The configuration options are passed to the { @link
AbstractControl#updateValueAndValidity
 * updateValueAndValidity } method.
 * ^\n * * `onlySelf`: When
true, each change only affects this control, and not its parent. Default is
 * false.
 * * `emitEvent`: When true or
not supplied (the default), both the `statusChanges` and
 * `valueChanges`
 * observables emit events with the
latest status and value when the control value is updated.
 * When false, no events are emitted.
 * *
`emitModelToViewChange`: When true or not supplied (the default), each change triggers an
 * `onChange`
event to
 * update the view.
 * * `emitViewToModelChange`: When true or not supplied (the default), each
change triggers an
 * `ngModelChange`
 * event to update the model.
 * ^\n * ^\n setValue(value:
TValue, options?: {
 * onlySelf?: boolean,
 * emitEvent?: boolean,
 * emitModelToViewChange?: boolean,
 * emitViewToModelChange?: boolean
 * }): void;
/**
 * Patches the value of a control.
 * ^\n * This
function is functionally the same as { @link FormControl#setValue setValue } at this level.
 * It exists for
symmetry with { @link FormGroup#patchValue patchValue } on `FormGroups` and
 * `FormArrays`, where it
does behave differently.
 * ^\n * @see `setValue` for options
 * ^\n patchValue(value: TValue, options?: {
 * onlySelf?: boolean,
 * emitEvent?: boolean,
 * emitModelToViewChange?: boolean,
 * emitViewToModelChange?: boolean
 * }): void;
/**
 * Resets the form control, marking it `pristine` and
`untouched`, and resetting
 * the value. The new value will be the provided value (if passed), `null`, or the initial
value
 * if `nonNullable` was set in the constructor via { @link FormControlOptions }.
 * ^\n * ``ts
 * // By
default, the control will reset to null.
 * const dog = new FormControl('spot');
 * dog.reset(); // dog.value is
null
 * // If this flag is set, the control will instead reset to the initial value.
 * const cat = new
FormControl('tabby', { nonNullable: true });
 * cat.reset(); // cat.value is `tabby`
 * // A value passed to
reset always takes precedence.
 * const fish = new FormControl('finn', { nonNullable: true });
 *
fish.reset('bubble'); // fish.value is `bubble`
 * ``
 * ^\n * @param formState Resets the control with an initial
value,
 * or an object that defines the initial value and disabled state.
 * ^\n * @param options Configuration
options that determine how the control propagates changes
 * and emits events after the value changes.
 * ^\n *
 * `onlySelf`: When true, each change only affects this control, and not its parent. Default is
 * false.
 * *
`emitEvent`: When true or not supplied (the default), both the `statusChanges`
and
 * `valueChanges`
 * observables emit events with the latest status and value when the control is reset.
 * When false, no events are emitted.
 * ^\n * ^\n reset(formState?: TValue|FormControlState<TValue>, options?:
{
 * onlySelf?: boolean,
 * emitEvent?: boolean
 * }): void;
/**
 * For a simple FormControl, the raw value
is equivalent to the value.
 * ^\n getRawValue(): TValue;
/**
 * @internal
 * ^\n _updateValue():
void;
/**
 * @internal
 * ^\n _anyControls(condition: (c: AbstractControl) => boolean): boolean;
/**
 * @internal
 * ^\n _allControlsDisabled(): boolean;
/**
 * Register a listener for change events.
 * ^\n *
 * @param fn The method that is called when the value changes
 * ^\n registerOnChange(fn: Function): void;
/**
 * Internal function to unregister a change events listener.
 * @internal
 * ^\n _unregisterOnChange(fn:
(value?: any, emitModelEvent?: boolean) => void):
void;
/**
 * Register a listener for disabled events.
 * ^\n * @param fn The method that is called when the
disabled status changes.
 * ^\n registerOnDisabledChange(fn: (isDisabled: boolean) => void): void;
/**
 * Internal function to unregister a disabled event listener.
 * @internal
 * ^\n _unregisterOnDisabledChange(fn:
(isDisabled: boolean) => void): void;
/**
 * @internal
 * ^\n _forEachChild(cb: (c: AbstractControl) =>
void): void;
/**
 * @internal
 * ^\n _syncPendingControls(): boolean;
}
// This internal interface is present to
avoid a naming clash, resulting in the wrong `FormControl` symbol being used.
type
FormControlInterface<TValue = any> = FormControl<TValue>;
/**
 * Various available constructors for

```

```

`FormControl`.n * Do not use this interface directly. Instead, use `FormControl`:n * ``n * const fc = new
FormControl('foo');n * ``n * This symbol is prefixed with ` to make plain that it is an internal symbol.n
*/nexport interface FormControlCtor {n /**n * Construct a FormControl with no initial value or validators.n
*/n new(): FormControl<any>;n/n /**n * Creates a new `FormControl` instance.n *n * @param formState
Initializes the control with an initial value,n * or an object that defines the initial value and disabled state.n *n
* @param validatorOrOpts A synchronous validator function, or an array ofn * such functions, or a
`FormControlOptions` object that contains validation functionsn * and a validation trigger.n *n * @param
asyncValidator A single async validator or array of async validator functionsn */n new<T = any>(value:
FormControlState<T>|T, opts: FormControlOptions&{nonNullable: true}):n FormControl<T>;n/n /**n *
@deprecated Use `nonNullable` instead.n */n new<T = any>(value: FormControlState<T>|T, opts:
FormControlOptions&{n initialValueIsDefault: true\n }): FormControl<T>;n/n /**n * @deprecated When
passing
an `options` argument, the `asyncValidator` argument has no effect.n */n new<T = any>(n value:
FormControlState<T>|T, opts: FormControlOptions,n asyncValidator: AsyncValidatorFn|AsyncValidatorFn[]):
FormControl<T|null>;n/n new<T = any>(n value: FormControlState<T>|T,n validatorOrOpts?:
ValidatorFn|ValidatorFn[]|FormControlOptions|null,n asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null): FormControl<T|null>;n/n /**n * The presence of an explicit
`prototype` property provides backwards-compatibility for apps thatn * manually inspect the prototype chain.n
*/n prototype: FormControl<any>;n}n/nfunction isFormControlState(formState: unknown): formState is
FormControlState<unknown> {n return typeof formState === 'object' && formState !== null &&n
Object.keys(formState).length === 2 && 'value' in formState && 'disabled' in formState;n}n/nexport const
FormControl: FormControlCtor =n (class FormControl<TValue = any>
extends AbstractControl<n TValue> implements FormControlInterface<TValue> {n /** @publicApi */n
public readonly defaultValue: TValue = null as unknown as TValue;n/n /** @internal */n _onChange:
Array<Function> = [];n/n /** @internal */n _pendingValue!: TValue;n/n /** @internal */n
_pendingChange: boolean = false;n/n constructor(n // formState and defaultValue will only be null if T is
nullable\n formState: FormControlState<TValue>|TValue = null as unknown as TValue,n
validatorOrOpts?: ValidatorFn|ValidatorFn[]|FormControlOptions|null,n asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null) {n super(n pickValidators(validatorOrOpts),
pickAsyncValidators(asyncValidator, validatorOrOpts));n this._applyFormState(formState);n
this._setUpdateStrategy(validatorOrOpts);n this._initObservables();n this.updateValueAndValidity({n
onlySelf: true,n // If `asyncValidator` is present, it will trigger control status change from `PENDING` to\n
// `VALID` or `INVALID`.n // The status should be broadcasted via the `statusChanges` observable, so we
set\n // `emitEvent` to `true` to allow that during the control creation process.n emitEvent:
!!this.asyncValidator\n });n if (isOptionsObj(validatorOrOpts) &&n (validatorOrOpts.nonNullable
|| validatorOrOpts.initialValueIsDefault)) {n if (isFormControlState(formState)) {n this.defaultValue =
formState.value;n } else {n this.defaultValue = formState;n }n }n }n/n override
setValue(value: TValue, options: {n onlySelf?: boolean,n emitEvent?: boolean,n
emitModelToViewChange?: boolean,n emitViewToModelChange?: boolean\n } = {}): void {n (this as
{value: TValue}).value = this._pendingValue
= value;n if (this._onChange.length && options.emitModelToViewChange !== false) {n
this._onChange.forEach(n (changeFn) => changeFn(this.value, options.emitViewToModelChange !==
false));n }n this.updateValueAndValidity(options);n }n/n override patchValue(value: TValue,
options: {n onlySelf?: boolean,n emitEvent?: boolean,n emitModelToViewChange?: boolean,n
emitViewToModelChange?: boolean\n } = {}): void {n this.setValue(value, options);n }n/n override
reset(n formState: TValue|FormControlState<TValue> = this.defaultValue,n options: {onlySelf?:
boolean, emitEvent?: boolean} = {}): void {n this._applyFormState(formState);n

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this.markAsPristine(options);\n    this.markAsUntouched(options);\n    this.setValue(this.value, options);\nthis._pendingChange = false;\n  }\n  /** @internal */\n  override _updateValue():\n  void {\n\n    /** @internal */\n    override _anyControls(condition: (c: AbstractControl) => boolean): boolean\n  {\n    return false;\n  }\n  /** @internal */\n  override _allControlsDisabled(): boolean {\n    return\nthis.disabled;\n  }\n  registerOnChange(fn: Function): void {\n    this._onChange.push(fn);\n  }\n  /** @internal */\n  _unregisterOnChange(fn: (value?: any, emitModelEvent?: boolean) => void): void {\n\nremoveListItem(this._onChange, fn);\n  }\n  registerOnDisabledChange(fn: (isDisabled: boolean) => void):\nvoid {\n    this._onDisabledChange.push(fn);\n  }\n  /** @internal */\n  _unregisterOnDisabledChange(fn: (isDisabled: boolean) => void): void {\n\nremoveListItem(this._onDisabledChange, fn);\n  }\n  /** @internal */\n  override _forEachChild(cb: (c:\nAbstractControl) => void): void {\n\n  /** @internal */\n  override _syncPendingControls(): boolean {\n\n    if (this.updateOn === 'submit') {\n      if (this._pendingDirty) this.markAsDirty();\n      if\n(this._pendingTouched) this.markAsTouched();\n      if (this._pendingChange) {\n\nthis.setValue(this._pendingValue, {onlySelf: true, emitModelToViewChange: false});\n      return true;\n\n}\n    }\n    return false;\n  }\n  private _applyFormState(formState: FormControlState<TValue>|TValue)\n{\n  if (isFormControlState(formState)) {\n    (this as {value: TValue}).value = this._pendingValue =\nformState.value;\n    formState.disabled ? this.disable({onlySelf: true, emitEvent: false}) : \nthis.enable({onlySelf: true, emitEvent: false});\n  } else {\n    (this as {value: TValue}).value =\nthis._pendingValue = formState;\n  }\n}\n};\n\ninterface UntypedFormControlCtor {\n  new():\nUntypedFormControl;\n  new(formState?: any, validatorOrOpts?:\nValidatorFn|ValidatorFn[]|FormControlOptions|null,\n  asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormControl;\n}\n\n/**\n * The presence\nof an explicit `prototype` property provides backwards-compatibility for apps that\n * manually inspect the\nprototype chain.\n */\n\nprototype: FormControl<any>;\n\n/**\n * UntypedFormControl is a non-strongly-typed\nversion of @see FormControl.\n */\n\nexport type UntypedFormControl = FormControl<any>;\n\nexport const\nUntypedFormControl: UntypedFormControlCtor = FormControl;\n\nexport const isFormControl = (control:\nunknown): control is FormControl =>\n  control instanceof FormControl;\n\n"/**\n * @license\n * Copyright\nGoogle LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Directive, OnDestroy, OnInit} from\n '@angular/core';\nimport {FormGroup} from '../model/form_group';\nimport {ControlContainer} from\n '../control_container';\nimport {Form} from '../form_interface';\nimport {controlPath} from '../shared';\n\n\n/**\n * @description\n * A base class for code shared between the `NgModelGroup` and `FormGroupName` directives.\n */\n * @publicApi\n */\n\n@Directive()\nexport class AbstractFormGroupDirective extends ControlContainer\nimplements OnInit, OnDestroy {\n  /**\n * @description\n * The parent control for the group\n */\n * @internal\n */\n // TODO(issue/24571): remove '!'.\n  _parent!: ControlContainer;\n  /** @nodoc */\n  ngOnInit(): void {\n    this._checkParentType();\n    // Register the group with its parent group.\n    this.formDirective!.addFormGroup(this);\n  }\n  /** @nodoc */\n  ngOnDestroy(): void {\n    if\n(this.formDirective) {\n      // Remove the group from its parent group.\n      this.formDirective.removeFormGroup(this);\n    }\n  }\n  /**\n * @description\n * The `FormGroup` bound to\nthis directive.\n */\n  override get control(): FormGroup {\n\n    return this.formDirective!.getFormGroup(this);\n  }\n  /**\n * @description\n * The path to this group from\nthe top-level directive.\n */\n  override get path(): string[] {\n    return controlPath(this.name == null ? this.name :\nthis.name.toString(), this._parent);\n  }\n  /**\n * @description\n * The top-level directive for this group if\npresent, otherwise null.\n */\n  override get formDirective(): Form|null {\n    return this._parent ?\nthis._parent.formDirective : null;\n  }\n  /** @internal */\n  _checkParentType(): void {\n\n"/**\n * @license\n * Copyright\nGoogle LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-\nstyle license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {RuntimeError as\nRuntimeError} from '@angular/core';\nimport {RuntimeErrorCode} from '../errors';\n\nimport

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    {formControlNameExample, formGroupNameExample, ngModelGroupExample,
    ngModelWithFormGroupExample} from './error_examples';\n\nexport
    function modelParentException(): Error {\n return new
    RuntimeError(RuntimeErrorCode.NGMODEL_IN_FORM_GROUP,`\n ngModel cannot be used to register form
    controls with a parent FormGroup directive. Try using\n FormGroup's partner directive `"formControlName"`
    instead. Example:\n\n ${formControlNameExample}\n\n Or, if you'd like to avoid registering this form control,
    indicate that it's standalone in ngModelOptions:\n\n Example:\n\n
    ${ngModelWithFormGroupExample}`);\n\nexport function FormGroupNameException(): Error {\n return new
    RuntimeError(RuntimeErrorCode.NGMODEL_IN_FORM_GROUP_NAME,`\n ngModel cannot be used to
    register form controls with a parent FormGroupName or FormGroupName directive.\n\n Option 1: Use
    formControlName instead of ngModel (reactive strategy):\n\n ${formGroupNameExample}\n\n Option 2:
    Update ngModel's parent be ngModelGroup (template-driven strategy):\n\n
    ${ngModelGroupExample}`);\n\nexport function
    missingNameException(): Error {\n return new RuntimeError(\n
    RuntimeErrorCode.NGMODEL_WITHOUT_NAME,\n `If ngModel is used within a form tag, either the name
    attribute must be set or the form\n control must be defined as 'standalone' in ngModelOptions.\n\n Example 1:
    <input [(ngModel)]="person.firstName" name="first">\n Example 2: <input [(ngModel)]="person.firstName"
    [ngModelOptions]="{standalone: true}">`);\n\nexport function modelGroupParentException(): Error {\n return
    new RuntimeError(RuntimeErrorCode.NGMODELGROUP_IN_FORM_GROUP,`\n ngModelGroup cannot be
    used with a parent FormGroup directive.\n\n Option 1: Use FormGroupName instead of ngModelGroup (reactive
    strategy):\n\n ${formGroupNameExample}\n\n Option 2: Use a regular form tag instead of the FormGroup
    directive (template-driven strategy):\n\n ${ngModelGroupExample}`);\n\n"/>**\n * @license\n * Copyright
    Google LLC All Rights Reserved.\n *\n * Use of this source code is governed
    by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport
    {Directive, forwardRef, Host, Inject, Input, OnDestroy, OnInit, Optional, Self, SkipSelf} from
    '@angular/core';\nimport {NG_ASYNC_VALIDATORS, NG_VALIDATORS} from './validators';\nimport
    {AbstractFormGroupDirective} from './abstract_form_group_directive';\nimport {ControlContainer} from
    './control_container';\nimport {NgForm} from './ng_form';\nimport {modelGroupParentException} from
    './template_driven_errors';\nimport {AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn} from
    './validators';\nexport const modelGroupProvider: any = {\n provide: ControlContainer,\n useExisting:
    forwardRef(() => NgModelGroup)\n};\n/**\n * @description\n * Creates and binds a `FormGroup` instance to a
    DOM element.\n *\n * This directive can only be used as a child of `NgForm` (within `` tags).\n *\n * Use
    this directive to validate a sub-group of your form separately from
    the\n * rest of your form, or if some values in your domain model make more sense\n * to consume together in a
    nested object.\n *\n * Provide a name for the sub-group and it will become the key\n * for the sub-group in the
    form's full value. If you need direct access, export the directive into\n * a local template variable using
    `ngModelGroup` (ex: `#myGroup="ngModelGroup"`).\n *\n * @usageNotes\n *\n * ### Consuming controls in a
    grouping\n *\n * The following example shows you how to combine controls together in a sub-group\n * of the
    form.\n *\n * {@example forms/ts/ngModelGroup/ng_model_group_example.ts region='Component'}\n *\n *
    @NgModule FormsModule\n * @publicApi\n */\n@Directive({selector: '[ngModelGroup]', providers:
    [modelGroupProvider], exportAs: 'ngModelGroup'})\nexport class NgModelGroup extends
    AbstractFormGroupDirective implements OnInit, OnDestroy {\n /**\n * @description\n * Tracks the name of
    the `NgModelGroup` bound to the directive. The name corresponds\n
    * to a key in the parent `NgForm`.\n */\n // TODO(issue/24571): remove '!'.\n @Input('ngModelGroup')
    override name!: string;\n\n constructor(\n @Host() @SkipSelf() parent: ControlContainer,\n @Optional()
    @Self() @Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],\n @Optional() @Self()
    @Inject(NG_ASYNC_VALIDATORS) asyncValidators: (AsyncValidator|AsyncValidatorFn[]) {\n
    super();\n this._parent = parent;\n this._setValidators(validators);\n

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this._setAsyncValidators(asyncValidators);\n }\n\n /** @internal *\n override _checkParentType(): void {\n if\n (!!(this._parent instanceof NgModelGroup) && !(this._parent instanceof NgForm) &&\n (typeof ngDevMode\n === 'undefined' || ngDevMode)) {\n throw modelGroupParentException();\n }\n }\n\n"/>**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license\n that can be\n * found in the LICENSE file at https://angular.io/license\n\n */\n\nimport { ChangeDetectorRef, Directive, EventEmitter, forwardRef, Host, Inject, Input, OnChanges,\n OnDestroy, Optional, Output, Self, SimpleChanges, coerceToBoolean as coerceToBoolean } from\n '@angular/core';\nimport { FormHooks } from '../model/abstract_model';\nimport { FormControl } from\n '../model/form_control';\nimport { NG_ASYNC_VALIDATORS, NG_VALIDATORS } from\n '../validators';\nimport { AbstractFormGroupDirective } from './abstract_form_group_directive';\nimport\n { ControlContainer } from './control_container';\nimport { ControlValueAccessor, NG_VALUE_ACCESSOR } from\n './control_value_accessor';\nimport { NgControl } from './ng_control';\nimport { NgForm } from './ng_form';\nimport\n { NgModelGroup } from './ng_model_group';\nimport { controlPath, isPropertyUpdated, selectValueAccessor,\n setUpControl } from './shared';\nimport { FormGroupNameException, missingNameException,\n modelParentException } from './template_driven_errors';\nimport { AsyncValidator, AsyncValidatorFn, Validator,\n ValidatorFn } from './validators';\n\nexport const formControlBinding: any = {\n provide: NgControl,\n useExisting: forwardRef(() => NgModel)\n};\n\n/**\n * `ngModel` forces an additional change detection run when\n its inputs change.\n * E.g.:\n * ``\n * <div>{ myModel.valid }</div>\n * <input [(ngModel)]="myValue"\n #myModel="ngModel">\n * ``\n * I.e. `ngModel` can export itself on the element and then be used in the\n template.\n * Normally, this would result in expressions before the `input` that use the exported directive\n * to have\n an old value as they have been\n * dirty checked before. As this is a very common case for `ngModel`, we added\n this second change\n * detection run.\n *\n * Notes:\n * - this is just one extra run no matter how many `ngModel`s\n have been changed.\n * - this is a general problem when using `exportAs` for directives!\n\n */\nconst\n resolvedPromise = (() => Promise.resolve());\n\n/**\n * @description\n * Creates a `FormControl` instance from a\n domain\n model and binds it\n * to a form control element.\n *\n * The `FormControl` instance tracks the value, user\n interaction, and\n * validation status of the control and keeps the view synced with the model. If used\n * within a\n parent form, the directive also registers itself with the form as a child\n * control.\n *\n * This directive is used by\n itself or as part of a larger form. Use the\n * `ngModel` selector to activate it.\n *\n * It accepts a domain model as\n an optional `Input`. If you have a one-way binding\n * to `ngModel` with `[]` syntax, changing the domain model's\n value in the component\n * class sets the value in the view. If you have a two-way binding with `[]` syntax\n * (also known as 'banana-in-a-box syntax'), the value in the UI always syncs back to\n * the domain model in your\n class.\n *\n * To inspect the properties of the associated `FormControl` (like the validity state),\n * export the\n directive into a local template variable using `ngModel` as the key (ex:\n *\n * `#myVar="ngModel"`). You can then access the control using the directive's `control` property.\n * However, the\n most commonly used properties (like `valid` and `dirty`) also exist on the control\n * for direct access. See a full list\n of properties directly available in\n * `AbstractControlDirective`. \n *\n * @see `RadioControlValueAccessor`\n *\n * @see `SelectControlValueAccessor`\n *\n * @usageNotes\n *\n * ### Using ngModel on a standalone control\n *\n * The following examples show a simple standalone control using `ngModel`:\n *\n * { @example\n forms/ts/simpleNgModel/simple_ng_model_example.ts region='Component'}\n *\n * When using the `ngModel`\n within `<form>` tags, you'll also need to supply a `name` attribute\n * so that the control can be registered with the\n parent form under that name.\n *\n * In the context of a parent form, it's often unnecessary to include one-way or\n two-way binding,\n * as the parent form syncs the value for you. You access its properties by exporting it into\n a\n * local template variable using `ngForm` such as (`#f="ngForm"`). Use the variable where\n * needed on form\n submission.\n *\n * If you do need to populate initial values into your form, using a one-way binding for\n * `ngModel`\n tends to be sufficient as long as you use the exported form's value rather\n * than the domain model's\n value on submit.\n *\n * ### Using ngModel within a form\n *\n * The following example shows controls using\n `ngModel` within a form:\n *\n * { @example forms/ts/simpleForm/simple_form_example.ts

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region='Component'}\n *\n * ### Using a standalone ngModel within a group\n *\n * The following example shows
you how to use a standalone ngModel control\n * within a form. This controls the display of the form, but doesn't
contain form data.\n *\n * ```html\n * <form>\n * <input name="login" ngModel placeholder="Login">\n *
<input type="checkbox" ngModel [ngModelOptions]="{standalone: true}"> Show more options?\n * </form>\n
* <!-- form value: {login:
"} -->\n *\n * ### Setting the ngModel `name` attribute through options\n *\n * The following example
shows you an alternate way to set the name attribute. Here,\n * an attribute identified as name is used within a
custom form control component. To still be able\n * to specify the NgModel's name, you must specify it using the
`ngModelOptions` input instead.\n *\n * ```html\n * <my-custom-form-control name="Nancy"
ngModel [ngModelOptions]="{name: 'user'}">\n * </my-custom-form-control>\n * </form>\n * <!-- form value:
{user: " } -->\n *\n * @ngModule FormsModule\n * @publicApi\n * ^\n @Directive({\n selector:
'[ngModel]:not([formControlName]):not([formControl])',\n providers: [formControlBinding],\n exportAs:
'ngModel'\n})\nexport class NgModel extends NgControl implements OnChanges, OnDestroy {\n public override
readonly control: FormControl = new FormControl();\n\n // At runtime we coerce arbitrary values assigned to the
"disabled" input to a
\n"boolean".\n // This is not reflected in the type of the property because outside of templates, consumers\n //
should only deal with booleans. In templates, a string is allowed for convenience and to\n // match the native
"disabled attribute" semantics which can be observed on input elements.\n // This static member tells the compiler
that values of type "string" can also be assigned\n // to the input in a template.\n /** @nodoc */\n static
ngAcceptInputType_isDisabled: boolean|string;\n\n /** @internal */\n _registered = false;\n\n /**\n * Internal
reference to the view model value.\n * @nodoc\n */\n viewModel: any;\n\n /**\n * @description\n * Tracks
the name bound to the directive. If a parent form exists, it\n * uses this name as a key to retrieve this control's
value.\n * ^\n // TODO(issue/24571): remove '!.\n @Input() override name!: string;\n\n /**\n * @description\n
* Tracks whether the control is disabled.\n * ^\n // TODO(issue/24571):
remove '!.\n @Input('disabled') isDisabled!: boolean;\n\n /**\n * @description\n * Tracks the value bound to
this directive.\n * ^\n @Input('ngModel') model: any;\n\n /**\n * @description\n * Tracks the configuration
options for this `ngModel` instance.\n * ^\n * ***name***: An alternative to setting the name attribute on the form
control element. See\n * the [example](api/forms/NgModel#using-ngmodel-on-a-standalone-control) for using
`NgModel`\n * as a standalone control.\n * ^\n * ***standalone***: When set to true, the `ngModel` will not register
itself with its parent form,\n * and acts as if it's not in the form. Defaults to false. If no parent form exists, this
option\n * has no effect.\n * ^\n * ***updateOn***: Defines the event upon which the form control value and
validity update.\n * Defaults to 'change'. Possible values: `change` | `blur` | `submit`.\n * ^\n * ^\n //
TODO(issue/24571): remove '!.\n @Input('ngModelOptions') options!: {name?:
string, standalone?: boolean, updateOn?: FormHooks};\n\n /**\n * @description\n * Event emitter for producing
the `ngModelChange` event after\n * the view model updates.\n * ^\n @Output('ngModelChange') update = new
EventEmitter();\n\n constructor(\n @Optional() @Host() parent: ControlContainer,\n @Optional() @Self()
@Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],\n @Optional() @Self()
@Inject(NG_ASYNC_VALIDATORS) asyncValidators: (AsyncValidator|AsyncValidatorFn)[],\n
@Optional() @Self() @Inject(NG_VALUE_ACCESSOR) valueAccessors: ControlValueAccessor[],\n
@Optional() @Inject(ChangeDetectorRef) private _changeDetectorRef?: ChangeDetectorRef|null) {\n super();\n
this._parent = parent;\n this._setValidators(validators);\n this._setAsyncValidators(asyncValidators);\n
this.valueAccessor = selectValueAccessor(this, valueAccessors);\n }\n\n /** @nodoc */\n ngOnChanges(changes:
SimpleChanges) {\n this._checkForErrors();\n
if (!this._registered || 'name' in changes) {\n if (this._registered) {\n this._checkName();\n if
(this.formDirective) {\n // We can't call `formDirective.removeControl(this)`, because the `name` has already
been\n // changed. We also can't reset the name temporarily since the logic in `removeControl`\n // is
inside a promise and it won't run immediately. We work around it by giving it an\n // object with the same
shape instead.\n const oldName = changes['name'].previousValue;\n

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this.formDirective.removeControl({name: oldName, path: this._getPath(oldName)});
    }
    }
    this._setUpControl();
    }
    if ('isDisabled' in changes) {
        this._updateDisabled(changes);
    }
    if (isPropertyUpdated(changes, this.viewModel)) {
        this._updateValue(this.model);
        this.viewModel =
        this.model;
    }
}

/** @nodoc */
ngOnDestroy(): void {
    this.formDirective &&
    this.formDirective.removeControl(this);
}

/**
 * @description
 * Returns an array that represents the
    path from the top-level form to this control.
 * Each index is the string name of the control on that level.
 */
override getPath(): string[] {
    return this._getPath(this.name);
}

/**
 * @description
 * The top-level
    directive for this control if present, otherwise null.
 */
get formDirective(): any {
    return this._parent ?
    this._parent.formDirective : null;
}

/**
 * @description
 * Sets the new value for the view model and
    emits an `ngModelChange` event.
 * @param newValue The new value emitted by `ngModelChange`.
 */
override viewToModelUpdate(newValue: any): void {
    this.viewModel = newValue;
    this.update.emit(newValue);
}

private _setUpControl(): void {
    this._setUpUpdateStrategy();
    this._isStandalone() ? this._setUpStandalone() : this.formDirective.addControl(this);
    this._registered
    = true;
}

private _setUpUpdateStrategy(): void {
    if (this.options && this.options.updateOn != null) {
        this.control.updateOn = this.options.updateOn;
    }
}

private _isStandalone(): boolean {
    return
    !this._parent || !(this.options && this.options.standalone);
}

private _setUpStandalone(): void {
    setUpControl(this.control, this);
    this.control.updateValueAndValidity({emitEvent: false});
}

private
_checkForErrors(): void {
    if (!this._isStandalone()) {
        this._checkParentType();
    }
    this._checkName();
}

private _checkParentType(): void {
    if (typeof ngDevMode === 'undefined' ||
    ngDevMode) {
        if (!(this._parent instanceof NgModelGroup) &&
            this._parent instanceof
            AbstractFormGroupDirective) {
            throw formGroupNameException();
        } else if (!(this._parent instanceof
            NgModelGroup) && !(this._parent instanceof NgForm)) {
            throw modelParentException();
        }
    }
}

private _checkName(): void {
    if (this.options && this.options.name) {
        this.name =
        this.options.name;
        if (!this._isStandalone() && !this.name && (typeof ngDevMode === 'undefined' ||
            ngDevMode)) {
            throw missingNameException();
        }
    }
}

private _updateValue(value: any): void {
    resolvedPromise.then(() => {
        this.control.setValue(value, {emitViewToModelChange: false});
        this._changeDetectorRef?.markForCheck();
    });
}

private _updateDisabled(changes: SimpleChanges) {
    const disabledValue = changes['isDisabled'].currentValue;
    // checking for 0 to avoid breaking change
    const isDisabled = disabledValue !== 0 && coerceToBoolean(disabledValue);
    resolvedPromise.then(() => {
        if (isDisabled && !this.control.disabled) {
            this.control.disable();
        } else if (!isDisabled &&
            this.control.disabled) {
            this.control.enable();
        }
        this._changeDetectorRef?.markForCheck();
    });
}

private _getPath(controlName: string): string[] {
    return this._parent ? controlPath(controlName,
    this._parent) : [controlName];
}
}

}

"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n */\n\nimport {Directive} from '@angular/core';\n\n/**\n * @description\n *\n * Adds\n `novalidate` attribute to all forms by default.\n *\n * `novalidate` is used to disable browser's native form\n validation.\n *\n * If you want to use native validation with Angular forms, just add `ngNativeValidate` attribute:\n *\n * <form ngNativeValidate></form>\n *\n * @publicApi\n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n */\n@Directive({\n selector: 'form:not([ngNoForm]):not([ngNativeValidate])',\n host: {'novalidate': ''}\n})\nexport class NgNoValidate {\n}\n\nexport {NgNoValidate as NgNoValidate};\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an\n MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Directive,\n ElementRef, forwardRef, Renderer2} from '@angular/core';\nimport {BuiltInControlValueAccessor,\n ControlValueAccessor, NG_VALUE_ACCESSOR} from './control_value_accessor';\n\nexport const\n NUMBER_VALUE_ACCESSOR: any = {\n provide: NG_VALUE_ACCESSOR,\n useExisting: forwardRef(()\n => NumberValueAccessor),\n multi: true\n};\n\n/**\n * @description\n * The `ControlValueAccessor` for writing\n a number value and listening to number input changes.\n * The value accessor is used by the\n `FormControlDirective`, `FormControlName`, and `NgModel`\n * directives.\n *\n * @usageNotes\n *\n * ###

```



Using a number input with a reactive form.

```

const totalCountControl = new FormControl();

<input type="number" [formControl]=totalCountControl>

@NgModule
ReactiveFormsModule
@NgModule FormsModule
@publicApi
@Directive({
  selector: 'input[type=number][formControl],input[type=number][ngModel]',
  host: {
    '(input)': 'onChange($event.target.value)',
    '(blur)': 'onTouched()',
  },
  providers: [
    NUMBER_VALUE_ACCESSOR
  ]
})
export class NumberValueAccessor extends BuiltInControlValueAccessor
implements ControlValueAccessor {
  /**
   * Sets the "value" property on the input element.
   */
  writeValue(value: number): void {
    // The value needs to be normalized for IE9, otherwise it is set to 'null'
    when null
    const normalizedValue = value == null ? '' : value;
    this.setProperty('value', normalizedValue);
  }
  /**
   * Registers a function called when the control value changes.
   */
  @nodoc
  override
  registerOnChange(fn:
    (_: number|null) => void): void {
    this.onChange = (value) => {
      fn(value == '' ? null : parseFloat(value));
    };
  }
}

```

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```

import { Directive, ElementRef, forwardRef, Injectable, Injector, Input, NgModule, OnDestroy, OnInit,
  Renderer2, RuntimeError as RuntimeError } from '@angular/core';
import { RuntimeErrorCode } from './errors';
import { BuiltInControlValueAccessor, ControlValueAccessor, NG_VALUE_ACCESSOR } from './control_value_accessor';
import { NgControl } from './ng_control';
export const
RADIO_VALUE_ACCESSOR: any = {
  provide: NG_VALUE_ACCESSOR,
  useExisting: forwardRef(() =>
    RadioControlValueAccessor),
  multi: true
};
function throwError() {
  throw new
  RuntimeError(RuntimeErrorCode.NAME_AND_FORM_CONTROL_NAME_MUST_MATCH, `
  If you
  define both a name and a formControlName attribute on your radio button, their values
  must match. Ex: <input
  type="radio" formControlName="food" name="food">
  `);
}
/**
 * Internal-only NgModule that works
 * as a host for the `RadioControlRegistry` tree-shakable provider. Note: the `InternalFormsSharedModule` can not
 * be used here directly, since it's declared after the `RadioControlRegistry` class and the `providedIn` doesn't
 * support forwardRef logic.
 */
@NgModule()
export class RadioControlRegistryModule {}
/**
 * @description
 * Class used by Angular to track radio buttons. For internal use only.
 */
@Injectable({ providedIn: RadioControlRegistryModule })
export class RadioControlRegistry {
  private
  _accessors: any[] = [];
  /**
   * @description
   * Adds a control to the internal registry. For internal use
   * only.
   */
  add(control: NgControl, accessor: RadioControlValueAccessor) {
    this._accessors.push([control,
      accessor]);
  }
  /**
   * @description
   * Removes a control from the internal registry. For internal use only.
   */
  remove(accessor: RadioControlValueAccessor) {
    for (let i = this._accessors.length - 1; i >= 0; --i) {
      if
      (this._accessors[i][1] === accessor) {
        this._accessors.splice(i, 1);
        return;
      }
    }
  }
  /**
   * @description
   * Selects a radio button. For internal use only.
   */
  select(accessor:
    RadioControlValueAccessor) {
    this._accessors.forEach((c) => {
      if (this._isSameGroup(c, accessor) &&
        c[1] !== accessor) {
        c[1].fireUncheck(accessor.value);
      }
    });
    private _isSameGroup(
      controlPair: [NgControl, RadioControlValueAccessor],
      accessor: RadioControlValueAccessor): boolean {
      if (!controlPair[0].control) return false;
      return controlPair[0]._parent === accessor._control._parent &&
        controlPair[1].name === accessor.name;
    }
  }
}
/**
 * @description
 * The `ControlValueAccessor` for writing radio control values and listening to radio control changes. The value
 * accessor is used by the `FormControlDirective`, `FormControlName`, and `NgModel` directives.
 */

```

##### Using radio buttons with reactive form directives

The follow example shows how to use radio buttons in a reactive form. When using radio buttons in a reactive form, radio buttons in the same group should have the same `formControlName`. Providing a `name` attribute is optional.

```

@example
forms/ts/reactiveRadioButtons/reactive_radio_button_example.ts
region='Reactive'
@NgModule
ReactiveFormsModule
@NgModule FormsModule
@publicApi
@Directive({
  selector:

```

```



```

```

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 * found in the LICENSE file at https://angular.io/license
 *
 * \n \n import { Directive, EventEmitter, forwardRef, Inject, InjectionToken, Input, OnChanges, OnDestroy,
 * Optional, Output, Self, SimpleChanges } from '@angular/core';
 * \n \n import { FormControl } from
 * './././model/form_control';
 * \n \n import { NG_ASYNC_VALIDATORS, NG_VALIDATORS } from
 * './././validators';
 * \n \n import { ControlValueAccessor, NG_VALUE_ACCESSOR } from
 * '././control_value_accessor';
 * \n \n import { NgControl } from '././ng_control';
 * \n \n import { disabledAttrWarning } from
 * '././reactive_errors';
 * \n \n import { _ngModelWarning, cleanUpControl, isPropertyUpdated, selectValueAccessor,
 * setUpControl } from '././shared';
 * \n \n import { AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn } from
 * '././validators';
 * \n \n \n /**
 * \n * Token to provide to turn off the ngModel warning on formControl and
 * formControlName.
 * \n * ^\n
 * \n export const NG_MODEL_WITH_FORM_CONTROL_WARNING =
 * \n new
 * \n InjectionToken('NgModelWithFormControlWarning');
 * \n \n export const formControlBinding: any = {
 * \n provide:
 * \n NgControl,
 * \n useExisting: forwardRef(() => FormControlDirective)
 * \n };
 * \n \n /**
 * \n * @description
 * \n * Synchronizes
 * \n a standalone `FormControl` instance to a form
 * \n control element.
 * \n * \n * Note that support for using the `ngModel` input property and `ngModelChange` event with
 * \n reactive
 * \n * form directives was deprecated in Angular v6 and is scheduled for removal in
 * \n * a future version of
 * \n Angular.
 * \n * For details, see [Deprecated features](guide/deprecations#ngmodel-with-reactive-forms).
 * \n * \n * @see
 * \n [Reactive Forms Guide](guide/reactive-forms)
 * \n * @see `FormControl`
 * \n * @see `AbstractControl`
 * \n * \n *
 * \n @usageNotes
 * \n * \n * The following example shows how to register a standalone control and set its value.
 * \n * \n *
 * \n {
 * \n @example forms/ts/simpleFormControl/simple_form_control_example.ts region='Component'
 * \n }
 * \n *
 * \n @NgModule(ReactiveFormsModule)
 * \n * @publicApi
 * \n * ^\n
 * \n @Directive({ selector: '[formControl]', providers:
 * \n [formControlBinding], exportAs: 'ngForm' })
 * \n export class FormControlDirective extends NgControl implements
 * \n OnChanges, OnDestroy {
 * \n /**
 * \n * Internal reference to the view model value.
 * \n * @nodoc
 * \n * ^\n
 * \n viewModel:
 * \n any;
 * \n /**
 * \n * @description
 * \n
 * \n * Tracks the `FormControl` instance bound to the directive.
 * \n * ^\n // TODO(issue/24571): remove '!'.
 * \n
 * \n @Input('formControl') form!: FormControl;
 * \n \n /**
 * \n * @description
 * \n * Triggers a warning in dev mode that
 * \n this input should not be used with reactive forms.
 * \n * ^\n
 * \n @Input('disabled')
 * \n set isDisabled(isDisabled: boolean)
 * \n {
 * \n if (typeof ngDevMode === 'undefined' || ngDevMode) {
 * \n console.warn(disabledAttrWarning);
 * \n }
 * \n }
 * \n \n // TODO(kara): remove next 4 properties once deprecation period is over
 * \n \n /**
 * \n * @deprecated as of v6
 * \n * ^\n
 * \n @Input('ngModel') model: any;
 * \n \n /**
 * \n * @deprecated as of v6
 * \n * ^\n
 * \n @Output('ngModelChange') update = new
 * \n EventEmitter();
 * \n \n /**
 * \n * @description
 * \n * Static property used to track whether any ngModel warnings have
 * \n been sent across
 * \n * all instances of FormControlDirective. Used to support warning config of "once".
 * \n * \n *
 * \n @internal
 * \n * ^\n
 * \n static _ngModelWarningSentOnce = false;
 * \n \n /**
 * \n * @description
 * \n
 * \n * Instance property used to track whether an ngModel warning has been sent out for this
 * \n * particular
 * \n `FormControlDirective` instance. Used to support warning config of "always".
 * \n * \n *
 * \n @internal
 * \n * ^\n
 * \n _ngModelWarningSent = false;
 * \n \n constructor(
 * \n @Optional() @Self() @Inject(NG_VALIDATORS)
 * \n validators: (Validator|ValidatorFn)[],
 * \n @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS)
 * \n asyncValidators:
 * \n (AsyncValidator|AsyncValidatorFn)[],
 * \n @Optional() @Self()
 * \n @Inject(NG_VALUE_ACCESSOR) valueAccessors: ControlValueAccessor[],
 * \n @Optional()
 * \n @Inject(NG_MODEL_WITH_FORM_CONTROL_WARNING) private _ngModelWarningConfig: string|
 * \n null) {
 * \n super();
 * \n this._setValidators(validators);
 * \n this._setAsyncValidators(asyncValidators);
 * \n
 * \n this.valueAccessor = selectValueAccessor(this, valueAccessors);
 * \n }
 * \n \n /**
 * \n * @nodoc
 * \n * ^\n
 * \n ngOnChanges(changes:
 * \n SimpleChanges): void {
 * \n if (this._isControlChanged(changes)) {
 * \n const previousForm
 * \n = changes['form'].previousValue;
 * \n if (previousForm) {
 * \n cleanUpControl(previousForm, this, /*
 * \n validateControlPresenceOnChange */ false);
 * \n }
 * \n setUpControl(this.form, this);
 * \n
 * \n this.form.updateValueAndValidity({ emitEvent: false });
 * \n }
 * \n if (isPropertyUpdated(changes, this.viewModel))
 * \n {
 * \n if (typeof ngDevMode === 'undefined' || ngDevMode) {
 * \n _ngModelWarning('formControl',
 * \n FormControlDirective, this, this._ngModelWarningConfig);
 * \n }
 * \n this.form.setValue(this.model);
 * \n
 * \n this.viewModel = this.model;
 * \n }
 * \n }
 * \n \n /**
 * \n * @nodoc
 * \n * ^\n
 * \n ngOnDestroy() {
 * \n if (this.form) {

```

```

cleanUpControl(this.form, this, /* validateControlPresenceOnChange */ false);\n  }\n }\n\n /**\n *
 @description\n * Returns an array that represents the path from the top-level form to this control.\n * Each index
 is the string name of the control on that level.\n */\n override get path(): string[] {\n  return [];\n }\n\n /**\n *
 @description\n
 * The `FormControl` bound to this directive.\n */\n override get control(): FormControl {\n  return this.form;\n
 }\n\n /**\n * @description\n * Sets the new value for the view model and emits an `ngModelChange` event.\n
 *\n * @param newValue The new value for the view model.\n */\n override viewToModelUpdate(newValue:
 any): void {\n  this.viewModel = newValue;\n  this.update.emit(newValue);\n }\n\n private
 _isControlChanged(changes: {[key: string]: any}): boolean {\n  return changes.hasOwnProperty('form');\n
 }\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
 governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
 */\n\nimport {Directive, EventEmitter, forwardRef, Inject, Input, OnChanges, OnDestroy, Optional, Output, Self,
 SimpleChanges} from '@angular/core';\nimport {FormArray} from '../model/form_array';\nimport
 {FormControl, isFormControl}
 from '../model/form_control';\nimport {FormGroup} from '../model/form_group';\nimport
 {NG_ASYNC_VALIDATORS, NG_VALIDATORS} from '../validators';\nimport {ControlContainer} from
 '../control_container';\nimport {Form} from '../form_interface';\nimport {missingFormException} from
 '../reactive_errors';\nimport {cleanUpControl, cleanUpFormContainer, cleanUpValidators, removeListItem,
 setUpControl, setUpFormContainer, setUpValidators, syncPendingControls} from '../shared';\nimport
 {AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn} from './validators';\nimport {FormControlName}
 from './form_control_name';\nimport {FormArrayName, FormGroupName} from './form_group_name';\n\nexport
 const formDirectiveProvider: any = {\n  provide: ControlContainer,\n  useExisting: forwardRef(() =>
 FormGroupDirective)\n};\n\n/**\n * @description\n *\n * Binds an existing `FormGroup` or `FormRecord` to a
 DOM element.\n *\n * This directive accepts an existing `FormGroup` instance. It will then
 use this\n * `FormGroup` instance to match any child `FormControl`, `FormGroup`/`FormRecord`,\n * and
 `FormArray` instances to child `FormControlName`, `FormGroupName`,\n * and `FormArrayName` directives.\n
 *\n * @see [Reactive Forms Guide](guide/reactive-forms)\n * @see `AbstractControl`\n *\n * @usageNotes\n
 *### Register Form Group\n *\n * The following example registers a `FormGroup` with first name and last name
 controls,\n * and listens for the *ngSubmit* event when the button is clicked.\n *\n * @example
 forms/ts/simpleFormGroup/simple_form_group_example.ts region='Component')\n *\n * @ngModule
 ReactiveFormsModule\n * @publicApi\n */\n@Directive({\n  selector: '[formGroup]',\n  providers:
 [formDirectiveProvider],\n  host: {'(submit)': 'onSubmit($event)', '(reset)': 'onReset()'},\n  exportAs:
 'ngForm'\n})\nexport class FormGroupDirective extends ControlContainer implements Form, OnChanges,
 OnDestroy {\n  /**\n * @description\n * Reports whether the form submission has been
 triggered.\n */\n  public readonly submitted: boolean = false;\n\n  /**\n * Reference to an old form group input
 value, which is needed to cleanup old instance in case it\n * was replaced with a new one.\n */\n  private
 _oldForm: FormGroup|undefined;\n\n  /**\n * Callback that should be invoked when controls in FormGroup or
 FormArray collection change\n * (added or removed). This callback triggers corresponding DOM updates.\n */\n
 private readonly _onCollectionChange = () => this._updateDomValue();\n\n  /**\n * @description\n * Tracks the
 list of added `FormControlName` instances\n */\n  directives: FormControlName[] = [];\n\n  /**\n *
 @description\n * Tracks the `FormGroup` bound to this directive.\n */\n  @Input('formGroup') form: FormGroup
 = null!;\n\n  /**\n * @description\n * Emits an event when the form submission has been triggered.\n */\n
  @Output() ngSubmit = new EventEmitter();\n\n  constructor(\n    @Optional() @Self()
 @Inject(NG_VALIDATORS)\n    validators: (Validator|ValidatorFn)[],\n    @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS)\n    asyncValidators: (\n      AsyncValidator|AsyncValidatorFn[]\n    ) {\n    super();\n    this._setValidators(validators);\n
    this._setAsyncValidators(asyncValidators);\n  }\n\n  /**\n * @nodoc\n */\n  ngOnChanges(changes: SimpleChanges):
 void {\n    this._checkFormPresent();\n    if (changes.hasOwnProperty('form')) {\n      this._updateValidators();\n

```

```

this._updateDomValue();\n  this._updateRegistrations();\n  this._oldForm = this.form;\n  }\n }\n\n /**
@nodoc *\n ngOnDestroy() {\n  if (this.form) {\n    cleanUpValidators(this.form, this);\n    // Currently the
`onCollectionChange` callback is rewritten each time the\n    // `_registerOnCollectionChange` function is invoked.
The implication is that cleanup should\n    // happen *only* when the `onCollectionChange` callback was set by
this directive instance.\n    // Otherwise it might cause overriding a callback
of some other directive instances. We should\n    // consider updating this logic later to make it similar to how
`onChange` callbacks are\n    // handled, see https://github.com/angular/angular/issues/39732 for additional info.\n
if (this.form._onCollectionChange === this._onCollectionChange) {\n
this.form._registerOnCollectionChange(=> {});\n  }\n }\n\n /**\n * @description\n * Returns this
directive's instance.\n * *\n override get formDirective(): Form {\n  return this;\n }\n\n /**\n * @description\n * Returns the `FormGroup` bound to this directive.\n * *\n override get control(): FormGroup {\n  return
this.form;\n }\n\n /**\n * @description\n * Returns an array representing the path to this group. Because this
directive\n * always lives at the top level of a form, it always an empty array.\n * *\n override get path(): string[]
{\n  return [];\n }\n\n /**\n * @description\n * Method that sets up the control directive
in this group, re-calculates its value\n * and validity, and adds the instance to the internal list of directives.\n * *\n
* @param dir The `FormControlName` directive instance.\n * *\n addControl(dir: FormControlName):
FormControl {\n  const ctrl: any = this.form.get(dir.path);\n  setUpControl(ctrl, dir);\n
ctrl.updateValueAndValidity({emitEvent: false});\n  this.directives.push(dir);\n  return ctrl;\n }\n\n /**\n *
@description\n * Retrieves the `FormControl` instance from the provided `FormControlName` directive\n * *\n
* @param dir The `FormControlName` directive instance.\n * *\n getControl(dir: FormControlName): FormControl
{\n  return <FormControl>this.form.get(dir.path);\n }\n\n /**\n * @description\n * Removes the
`FormControlName` instance from the internal list of directives\n * *\n * @param dir The `FormControlName`
directive instance.\n * *\n removeControl(dir: FormControlName): void {\n  cleanUpControl(dir.control || null,
dir,
/* validateControlPresenceOnChange */ false);\n  removeListItem(this.directives, dir);\n }\n\n /**\n * Adds a
new `FormGroupName` directive instance to the form.\n * *\n * @param dir The `FormGroupName` directive
instance.\n * *\n addFormGroup(dir: FormGroupName): void {\n  this._setUpFormContainer(dir);\n }\n\n /**\n *
Performs the necessary cleanup when a `FormGroupName` directive instance is removed from the\n * view.\n
*\n * @param dir The `FormGroupName` directive instance.\n * *\n removeFormGroup(dir: FormGroupName):
void {\n  this._cleanUpFormContainer(dir);\n }\n\n /**\n * @description\n * Retrieves the `FormGroup` for a
provided `FormGroupName` directive instance\n * *\n * @param dir The `FormGroupName` directive instance.\n
*\n getFormGroup(dir: FormGroupName): FormGroup {\n  return <FormGroup>this.form.get(dir.path);\n }\n\n
/**\n * Performs the necessary setup when a `FormArrayName` directive instance is added to the view.\n * *\n
* @param dir The `FormArrayName` directive instance.\n * *\n addFormArray(dir: FormArrayName): void {\n
this._setUpFormContainer(dir);\n }\n\n /**\n * Performs the necessary cleanup when a `FormArrayName`
directive instance is removed from the\n * view.\n
*\n * @param dir The `FormArrayName` directive
instance.\n * *\n removeFormArray(dir: FormArrayName): void {\n  this._cleanUpFormContainer(dir);\n }\n\n
/**\n * @description\n * Retrieves the `FormArray` for a provided `FormArrayName` directive instance.\n * *\n
* @param dir The `FormArrayName` directive instance.\n * *\n getFormArray(dir: FormArrayName): FormArray
{\n  return <FormArray>this.form.get(dir.path);\n }\n\n /**\n * Sets the new value for the provided
`FormControlName` directive.\n * *\n * @param dir The `FormControlName` directive instance.\n * *\n
* @param value The new value for the directive's control.\n * *\n updateModel(dir: FormControlName, value: any): void {\n
const ctrl =
<FormControl>this.form.get(dir.path);\n  ctrl.setValue(value);\n }\n\n /**\n * @description\n * Method called
with the `submit` event is triggered on the form.\n * *\n * Triggers the `ngSubmit` emitter to emit the `submit` event
as its payload.\n * *\n * @param $event The `submit` event object\n * *\n onSubmit($event: Event): boolean {\n
(this as {submitted: boolean}).submitted = true;\n  syncPendingControls(this.form, this.directives);\n
this.ngSubmit.emit($event);\n  // Forms with `method="dialog"` have some special behavior that won't reload the

```

```

page and that\n // shouldn't be prevented. Note that we need to null check the `event` and the `target`, because\n
// some internal apps call this method directly with the wrong arguments.\n return ($event?.target as
HTMLFormElement | null)?.method === 'dialog';\n }\n\n /**\n * @description\n * Method called when the
"reset" event is triggered on the form.\n *\n onReset(): void {\n this.resetForm();\n
}\n\n /**\n * @description\n * Resets the form to an initial value and resets its submitted status.\n *\n *
@param value The new value for the form.\n */\n resetForm(value: any = undefined): void {\n
this.form.reset(value);\n (this as {submitted: boolean}).submitted = false;\n }\n\n /** @internal */\n
_updateDomValue() {\n this.directives.forEach(dir => {\n const oldCtrl = dir.control;\n const newCtrl =
this.form.get(dir.path);\n if (oldCtrl !== newCtrl) {\n // Note: the value of the `dir.control` may not be
defined, for example when it's a first\n // `FormControl` that is added to a `FormGroup` instance (via
`addControl` call).\n cleanUpControl(oldCtrl || null, dir);\n // Check whether new control at the same
location inside the corresponding `FormGroup` is an\n // instance of `FormControl` and perform control setup
only if that's the case.\n // Note: we don't need to clear the list of directives
(this.directives) here, it would be\n // taken care of in the `removeControl` method invoked when
corresponding `formControlName`\n // directive instance is being removed (invoked from
`FormControlName.ngOnDestroy`).\n if (isFormControl(newCtrl)) {\n setUpControl(newCtrl, dir);\n
(dir as {control: FormControl}).control = newCtrl;\n }\n }\n });\n\n
this.form._updateTreeValidity({emitEvent: false});\n }\n\n private _setUpFormContainer(dir:
FormArrayName|FormGroupName): void {\n const ctrl: any = this.form.get(dir.path);\n
setUpFormContainer(ctrl, dir);\n // NOTE: this operation looks unnecessary in case no new validators were added
in\n // `setUpFormContainer` call. Consider updating this code to match the logic in\n //
`_cleanUpFormContainer` function.\n ctrl.updateValueAndValidity({emitEvent: false});\n }\n\n private
_cleanUpFormContainer(dir: FormArrayName|FormGroupName): void {\n if (this.form)
{\n const ctrl: any = this.form.get(dir.path);\n if (ctrl) {\n const isControlUpdated =
cleanUpFormContainer(ctrl, dir);\n if (isControlUpdated) {\n // Run validity check only in case a control
was updated (i.e. view validators were\n // removed) as removing view validators might cause validity to
change.\n ctrl.updateValueAndValidity({emitEvent: false});\n }\n }\n }\n }\n\n private
_updateRegistrations() {\n this.form._registerOnCollectionChange(this._onCollectionChange);\n if
(this._oldForm) {\n this._oldForm._registerOnCollectionChange(() => {});\n }\n }\n\n private
_updateValidators() {\n setUpValidators(this.form, this);\n if (this._oldForm) {\n
cleanUpValidators(this._oldForm, this);\n }\n }\n\n private _checkFormPresent() {\n if (!this.form && (typeof
ngDevMode === 'undefined' || ngDevMode)) {\n throw missingFormException();\n }\n }\n }\n\n", /**\n *
@license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {Directive, forwardRef, Host, Inject, Input,
OnDestroy, OnInit, Optional, Self, SkipSelf} from '@angular/core';\n\nimport {FormArray} from
'../model/form_array';\n\nimport {NG_ASYNC_VALIDATORS, NG_VALIDATORS} from
'../validators';\n\nimport {AbstractFormGroupDirective} from '../abstract_form_group_directive';\n\nimport
{ControlContainer} from '../control_container';\n\nimport {arrayParentException, groupParentException} from
'../reactive_errors';\n\nimport {controlPath} from '../shared';\n\nimport {AsyncValidator, AsyncValidatorFn, Validator,
ValidatorFn} from '../validators';\n\nimport {FormGroupDirective} from './form_group_directive';\n\nexport const
formGroupNameProvider: any = {\n provide: ControlContainer,\n useExisting: forwardRef(() =>
FormGroupName);\n};\n\n/**\n * @description\n *\n * Syncs a nested
`FormGroup` or `FormRecord` to a DOM element.\n *\n * This directive can only be used with a parent
`FormGroupDirective`.\n *\n * It accepts the string name of the nested `FormGroup` or `FormRecord` to link, and\n
* looks for a `FormGroup` or `FormRecord` registered with that name in the parent\n * `FormGroup` instance you
passed into `FormGroupDirective`.\n *\n * Use nested form groups to validate a sub-group of a\n * form separately
from the rest or to group the values of certain\n * controls into their own nested object.\n *\n * @see [Reactive

```

```

Forms Guide](guide/reactive-forms)\n *\n * @usageNotes\n *\n * ### Access the group by name\n *\n * The following example uses the `AbstractControl.get` method to access the\n * associated `FormGroup`\n *\n * ``\n *\n * this.form.get('name');\n *\n * ``\n *\n * ### Access individual controls in the group\n *\n * The following example uses the `AbstractControl.get` method to access\n * individual controls within the group using dot syntax.\n *\n * ``\n *\n * this.form.get('name.first');\n *\n * ``\n *\n * ### Register a nested `FormGroup`\n *\n * The following example registers a nested `FormGroup` within an existing `FormGroup`,\n * and provides methods to retrieve the nested `FormGroup` and individual controls.\n *\n * @example
forms/ts/nestedFormGroup/nested_form_group_example.ts region='Component'\n *\n * @ngModule
ReactiveFormsModule\n * @publicApi\n *\n * @Directive({selector: '[formGroupName]', providers:
[formGroupNameProvider]})\n * export class FormGroupName extends AbstractFormGroupDirective implements
OnInit, OnDestroy {\n * /**\n * @description\n * Tracks the name of the `FormGroup` bound to the directive. The name corresponds\n * to a key in the parent `FormGroup` or `FormArray`.\n * Accepts a name as a string or a number.\n * The name in the form of a string is useful for individual forms,\n * while the numerical form allows for form groups to be bound\n * to indices when iterating over groups in a `FormArray`.\n * \n * // TODO(issue/24571): remove '!'\n * @Input('formGroupName') override name!: string|number|null;\n *\n * constructor(\n * @Optional() @Host() @SkipSelf() parent: ControlContainer,\n * @Optional() @Self() @Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],\n * @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS) asyncValidators: (AsyncValidator|AsyncValidatorFn)[\n * ]\n * )\n * super();\n * this._parent = parent;\n * this._setValidators(validators);\n * this._setAsyncValidators(asyncValidators);\n * }\n *\n * /** @internal *\n * override _checkParentType(): void {\n * if (_hasInvalidParent(this._parent) && (typeof ngDevMode === 'undefined' || ngDevMode)) {\n * throw groupParentException();\n * }\n * }\n *\n * }
}\n * export const formArrayNameProvider: any = {\n * provide: ControlContainer,\n * useExisting: forwardRef(() => FormArrayName);\n *};\n *\n * @description\n *\n * Syncs a nested `FormArray` to a DOM element.\n *\n * This directive is designed to be used with a parent `FormGroupDirective` (selector:\n * `[formGroup]`).\n *\n * It accepts the string name of the nested `FormArray` you want to link, and\n * will look for a `FormArray` registered with that name in the parent\n * `FormGroup` instance you passed into `FormGroupDirective`.\n *\n * @see [Reactive Forms Guide](guide/reactive-forms)\n *\n * @see `AbstractControl`\n *\n * @usageNotes\n *\n * ### Example\n *\n * @example forms/ts/nestedFormArray/nested_form_array_example.ts region='Component'\n *\n * @ngModule
ReactiveFormsModule\n * @publicApi\n *\n * @Directive({selector: '[formArrayName]', providers:
[formArrayNameProvider]})\n * export class FormArrayName extends ControlContainer implements OnInit,
OnDestroy {\n * /** @internal *\n * _parent: ControlContainer;\n *\n * /**\n * @description\n * Tracks the name of the `FormArray` bound to the directive. The name corresponds\n * to a key in the parent `FormGroup` or `FormArray`.\n * \n * Accepts a name as a string or a number.\n * \n * The name in the form of a string is useful for individual forms,\n * while the numerical form allows for form arrays to be bound\n * to indices when iterating over arrays in a `FormArray`.\n * \n * // TODO(issue/24571): remove '!'\n * @Input('formArrayName') override name!: string|number|null;\n *\n * constructor(\n * @Optional() @Host() @SkipSelf() parent: ControlContainer,\n * @Optional() @Self() @Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],\n * @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS) asyncValidators: (AsyncValidator|AsyncValidatorFn)[\n * ]\n * )\n * super();\n * this._parent = parent;\n * this._setValidators(validators);\n * this._setAsyncValidators(asyncValidators);\n * }\n *\n * /**\n * @description\n * A lifecycle method called when the directive's inputs are initialized. For internal use only.\n * \n * @throws If the directive does not have a valid parent.\n * \n * @nodoc\n * @ngOnInit(): void {\n * this._checkParentType();\n * this.formDirective!.addFormArray(this);\n * }\n *\n * /**\n * @description\n * A lifecycle method called before the directive's instance is destroyed. For internal use only.\n * \n * @nodoc\n * @ngOnDestroy(): void {\n * if (this.formDirective) {\n * this.formDirective.removeFormArray(this);\n * }\n * }\n *\n * /**\n * @description\n * The `FormArray` bound to this directive.\n * \n * override get control(): FormArray {\n * return this.formDirective!.getFormArray(this);\n * }

```

```

}\n\n /**\n * @description\n * The top-level directive for this group if present, otherwise null.\n */\n override
get formDirective(): FormGroupDirective|null {\n return this._parent ?
<FormGroupDirective>this._parent.formDirective : null;\n }\n\n /**\n * @description\n * Returns an array that
represents the path from the top-level form to this control.\n * Each index is the string name of the control on that
level.\n */\n override get path(): string[] {\n return controlPath(this.name == null ? this.name :
this.name.toString(),
this._parent);\n }\n\n private _checkParentType(): void {\n if (_hasInvalidParent(this._parent) && (typeof
ngDevMode === 'undefined' || ngDevMode)) {\n throw arrayParentException();\n }\n }\n\n\nfunction
_hasInvalidParent(parent: ControlContainer): boolean {\n return !(parent instanceof FormGroupName) && !(parent
instanceof FormGroupDirective) &&\n !(parent instanceof FormGroupName);\n }\n\n"/**\n * @license\n *
Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Directive, EventEmitter,
forwardRef, Host, Inject, Input, OnChanges, OnDestroy, Optional, Output, Self, SimpleChanges, SkipSelf} from
'@angular/core';\n\nimport {FormControl} from '../model/form_control';\n\nimport {NG_ASYNC_VALIDATORS,
NG_VALIDATORS} from '../validators';\n\nimport {AbstractFormGroupDirective} from
'../abstract_form_group_directive';\n\nimport
{ControlContainer} from './control_container';\n\nimport {ControlValueAccessor, NG_VALUE_ACCESSOR} from
'./control_value_accessor';\n\nimport {NgControl} from './ng_control';\n\nimport {controlParentException,
disabledAttrWarning, ngModelGroupException} from './reactive_errors';\n\nimport {_ngModelWarning, controlPath,
isPropertyUpdated, selectValueAccessor} from './shared';\n\nimport {AsyncValidator, AsyncValidatorFn, Validator,
ValidatorFn} from './validators';\n\nimport {NG_MODEL_WITH_FORM_CONTROL_WARNING} from
'./form_control_directive';\n\nimport {FormGroupDirective} from './form_group_directive';\n\nimport
{FormArrayName, FormGroupName} from './form_group_name';\n\nexport const controlNameBinding: any = {\n
provide: NgControl,\n useExisting: forwardRef(() => FormControlName)\n};\n\n/**\n * @description\n * Syncs a
`FormControl` in an existing `FormGroup` to a form control\n * element by name.\n *\n * @see [Reactive Forms
Guide](guide/reactive-forms)\n *\n * @see `FormControl`\n
*\n * @see `AbstractControl`\n *\n * @usageNotes\n *\n * ### Register `FormControl` within a group\n *\n * The
following example shows how to register multiple form controls within a form group\n * and set their value.\n *\n *
{@example forms/ts/simpleFormGroup/simple_form_group_example.ts region='Component'}\n *\n * To see
`formControlName` examples with different form control types, see:\n *\n * * Radio buttons:
`RadioControlValueAccessor`\n *\n * * Selects: `SelectControlValueAccessor`\n *\n * * ### Use with ngModel is
deprecated\n *\n * Support for using the `ngModel` input property and `ngModelChange` event with reactive\n *
form directives has been deprecated in Angular v6 and is scheduled for removal in\n * a future version of Angular.\n
*\n * For details, see [Deprecated features](guide/deprecations#ngmodel-with-reactive-forms).\n *\n * @ngModule
ReactiveFormsModule\n *\n * @publicApi\n */\n\n@Directive({selector: '[formControlName]', providers:
[controlNameBinding]})\n\nexport class FormControlName
extends NgControl implements OnChanges, OnDestroy {\n private _added = false;\n /**\n * Internal reference to
the view model value.\n *\n * @internal\n */\n viewModel: any;\n\n /**\n * @description\n * Tracks the
`FormControl` instance bound to the directive.\n *\n * // TODO(issue/24571): remove '!.\n */\n override readonly
control!: FormControl;\n\n /**\n * @description\n * Tracks the name of the `FormControl` bound to the
directive. The name corresponds\n * to a key in the parent `FormGroup` or `FormArray`.\n *\n * Accepts a name as a
string or a number.\n *\n * The name in the form of a string is useful for individual forms,\n * while the numerical
form allows for form controls to be bound\n * to indices when iterating over controls in a `FormArray`.\n *\n * //
TODO(issue/24571): remove '!.\n */\n @Input('formControlName') override name!: string|number|null;\n\n /**\n *
@description\n * Triggers a warning in dev mode that this input should not be used with reactive
forms.\n *\n * @Input('disabled')\n */\n set isDisabled(isDisabled: boolean) {\n if (typeof ngDevMode ===
'undefined' || ngDevMode) {\n console.warn(disabledAttrWarning);\n }\n }\n\n // TODO(kara): remove next 4
properties once deprecation period is over\n\n /**\n * @deprecated as of v6\n */\n @Input('ngModel') model: any;\n\n

```



```

/** @deprecated as of v6 */
@Output('ngModelChange') update = new EventEmitter();
/**
 * @description
 * Static property used to track whether any ngModel warnings have been sent across
 * all instances of FormControlName. Used to support warning config of "once".
 * @internal
 */
static _ngModelWarningSentOnce = false;
/**
 * @description
 * Instance property used to track whether an ngModel warning has been sent out for this
 * particular FormControlName instance. Used to support warning config of "always".
 * @internal
 */
_ngModelWarningSent = false;
constructor(
  @Optional()
  @Host() @SkipSelf() parent: ControlContainer,
  @Optional() @Self() @Inject(NG_VALIDATORS)
  validators: (Validator|ValidatorFn)[],
  @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS)
  asyncValidators: (AsyncValidator|AsyncValidatorFn)[],
  @Optional() @Self()
  @Inject(NG_VALUE_ACCESSOR) valueAccessors: ControlValueAccessor[],
  @Optional()
  @Inject(NG_MODEL_WITH_FORM_CONTROL_WARNING) private _ngModelWarningConfig: string|
  null) {
  super();
  this._parent = parent;
  this._setValidators(validators);
  this._setAsyncValidators(asyncValidators);
  this.valueAccessor = selectValueAccessor(this, valueAccessors);
}
/** @nodoc */
ngOnChanges(changes: SimpleChanges) {
  if (!this._added) this._setUpControl();
  if (isPropertyUpdated(changes, this.viewModel)) {
    if (typeof ngDevMode === 'undefined' || ngDevMode) {
      _ngModelWarning('formControlName', FormControlName, this, this._ngModelWarningConfig);
    }
    this.viewModel = this.model;
    this.formDirective.updateModel(this, this.model);
  }
}
/** @nodoc */
ngOnDestroy(): void {
  if (this.formDirective) {
    this.formDirective.removeControl(this);
  }
}
/**
 * @description
 * Sets the new value for the view model and emits an `ngModelChange`
 * event.
 * @param newValue The new value for the view model.
 */
override
viewToModelUpdate(newValue: any): void {
  this.viewModel = newValue;
  this.update.emit(newValue);
}
/**
 * @description
 * Returns an array that represents the path from the top-level form to this control.
 * Each index is the string name of the control on that level.
 */
override get path(): string[] {
  return
  controlPath(this.name == null ? this.name : this.name.toString(), this._parent!);
}
/**
 * @description
 * The top-level directive for this group if present, otherwise null.
 */
get formDirective(): any {
  return this._parent ? this._parent.formDirective : null;
}
private _checkParentType(): void {
  if (typeof ngDevMode === 'undefined' || ngDevMode) {
    if (!(this._parent instanceof FormGroupName) &&
      this._parent instanceof AbstractFormGroupDirective) {
      throw ngModelGroupException();
    } else if (
      !(this._parent instanceof FormGroupName) &&
      !(this._parent instanceof FormGroupDirective) &&
      !(this._parent instanceof FormArrayName)) {
      throw controlParentException();
    }
  }
}
private
_setUpControl() {
  this._checkParentType();
  (this as {control: FormControl}).control =
  this.formDirective.addControl(this);
  this._added = true;
}
}
",
/**
 * @license
 * Copyright Google LLC
 * All Rights Reserved.
 * Use of this source code is governed by an MIT-style license that can be
 * found in the LICENSE file at https://angular.io/license
 */
import {Directive, ElementRef,
  forwardRef, Host, Input, OnDestroy, Optional, Renderer2, StaticProvider, RuntimeError as RuntimeError} from
 '@angular/core';
import {RuntimeErrorCode} from './errors';
import {BuiltInControlValueAccessor,
  ControlValueAccessor, NG_VALUE_ACCESSOR} from './control_value_accessor';
export const
SELECT_VALUE_ACCESSOR: StaticProvider = {
  provide: NG_VALUE_ACCESSOR,
  useExisting:
  forwardRef(() => SelectControlValueAccessor),
  multi: true
};
function _buildValueString(id: string|null,
  value: any): string {
  if (id == null) return `${value}`;
  if (value && typeof value === 'object') value = 'Object';
  return `${id}: ${value}`.slice(0, 50);
}
function _extractId(valueString: string): string {
  return
  valueString.split(':')[0];
}
/**
 * @description
 * The `ControlValueAccessor` for writing select control
 * values and listening to select control
 * changes. The value accessor is used by the `FormControlDirective`,
 * `FormControlName`, and
 * `NgModel` directives.
 */
/**
 * @usageNotes
 * ### Using select controls in a reactive form
 * The following examples show how
 * to use a select control in a reactive form.
 * @example
 * forms/ts/reactiveSelectControl/reactive_select_control_example.ts
 * region='Component'
 */
/**
 * ### Using select

```

controls in a template-driven form

To use a select in a template-driven form, simply add an `ngModel` and a `name` attribute to the main `<select>` tag.

```
{ @example forms/ts/selectControl/select_control_example.ts
region='Component'}
```

### Customizing option selection

Angular uses object identity to select option. It's possible for the identities of items to change while the data does not. This can happen, for example, if the items are produced from an RPC to the server, and that RPC is re-run. Even if the data hasn't changed, the second response will produce objects with different identities.

To customize the default option comparison algorithm,

```
<select>` supports `compareWith` input. `compareWith` takes a **function** which has two arguments:
`option1` and `option2`. If `compareWith` is given, Angular selects option by the return value of the function.
`ts`
const selectedCountriesControl = new FormControl();
<select
[compareWith]="compareFn" [formControl]="selectedCountriesControl">
  <option *ngFor="let country
of countries" [ngValue]="country">
    {{country.name}}
  </option>
</select>
compareFn(c1: Country, c2: Country): boolean {
  return c1 && c2 ? c1.id === c2.id : c1 === c2;
}
**Note:** We listen to the 'change' event because 'input' events aren't fired for selects in IE, see:
https://developer.mozilla.org/en-US/docs/Web/API/HTMLElement/input_event#browser_compatibility
@NgModule(ReactiveFormsModule)
@NgModule(FormsModule)
@publicApi
@Directive({
  selector:
'select:not([multiple])[formControlName],select:not([multiple])[formControl],select:not([multiple])[ngModel]',
  host: { '(change)': 'onChange($event.target.value)', '(blur)': 'onTouched()' },
  providers:
[SELECT_VALUE_ACCESSOR]
})
export class SelectControlValueAccessor extends
BuiltInControlValueAccessor implements ControlValueAccessor {
  /** @nodoc */
  value: any;
  /** @internal */
  _optionMap: Map<string, any> = new Map<string, any>();
  /** @internal */
  _idCounter: number = 0;
  /** @description */
  Tracks the option comparison algorithm for tracking identities when
  * checking for changes.
  @Input()
  set compareWith(fn: (o1: any, o2: any) => boolean) {
    if (typeof fn !== 'function' && (typeof ngDevMode === 'undefined' || ngDevMode)) {
      throw new RuntimeError(
        RuntimeErrorCode.COMPAREWITH_NOT_A_FN,
        `compareWith must be a function, but received
        ${JSON.stringify(fn)}
      );
    }
    this._compareWith = fn;
  }
  private _compareWith: (o1: any, o2: any) => boolean = Object.is;
  /** Sets the "value" property on the
  select element.
  @nodoc */
  writeValue(value: any): void {
    this.value = value;
    const id: string | null = this._getOptionId(value);
    const valueString = _buildValueString(id, value);
    this.setProperty('value', valueString);
  }
  /** Registers a function called when the control value changes.
  @nodoc */
  override registerOnChange(fn: (value: any) => any): void {
    this.onChange = (valueString: string) => {
      this.value = this._getOptionValue(valueString);
      fn(this.value);
    };
  }
  /** @internal */
  _registerOption(): string {
    return (this._idCounter++).toString();
  }
  /** @internal */
  _getOptionId(value: any): string | null {
    for (const id of Array.from(this._optionMap.keys())) {
      if (this._compareWith(this._optionMap.get(id), value)) {
        return id;
      }
    }
    return null;
  }
  /** @internal */
  _getOptionValue(valueString: string): any {
    const id: string = _extractId(valueString);
    return this._optionMap.has(id) ? this._optionMap.get(id) : valueString;
  }
  /** @description */
  Marks
  <option>` as dynamic, so Angular can be notified when options change.
  @see
  `SelectControlValueAccessor`
  @NgModule(ReactiveFormsModule)
  @NgModule(FormsModule)
  @publicApi
  @Directive({ selector: 'option' })
  export class NgSelectOption implements OnDestroy {
    /** @description */
    ID of the option element
    /* TODO(issue/24571): remove '!'. */
    id!: string;
    constructor(
      private _element: ElementRef,
      private _renderer: Renderer2,
      @Optional() @Host() private
      _select: SelectControlValueAccessor
    ) {
      if (this._select) {
        this.id = this._select._registerOption();
      }
    }
    /** @description */
    Tracks the value bound to the option element. Unlike the value binding,
    * ngValue supports
    binding
    to objects.
    @Input('ngValue')
    set ngValue(value: any) {
      if (this._select === null) {
        return;
      }
      this._select._optionMap.set(this.id, value);
      this._setElementValue(_buildValueString(this.id, value));
    }
  }
}
```

```

this._select.writeValue(this._select.value);\n }\n\n /**\n * @description\n * Tracks simple string values bound to
the option element.\n * For objects, use the `ngValue` input binding.\n */\n @Input('value')\n set value(value:
any) {\n this._setElementValue(value);\n if (this._select) this._select.writeValue(this._select.value);\n }\n\n /**
@internal *\n _setElementValue(value: string): void {\n this._renderer.setProperty(this._element.nativeElement,
'value', value);\n }\n\n /** @nodoc *\n ngOnDestroy(): void {\n if (this._select) {\n
this._select._optionMap.delete(this.id);\n this._select.writeValue(this._select.value);\n }\n }\n\n",/**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Directive, ElementRef, forwardRef, Host, Input, OnDestroy, Optional,
Renderer2, StaticProvider, RuntimeError as RuntimeError} from '@angular/core';\n\nimport {RuntimeErrorCode}
from './errors';\n\nimport {BuiltInControlValueAccessor, ControlValueAccessor, NG_VALUE_ACCESSOR} from
'./control_value_accessor';\n\nexport const SELECT_MULTIPLE_VALUE_ACCESSOR: StaticProvider = {\n
provide: NG_VALUE_ACCESSOR,\n useExisting: forwardRef(() => SelectMultipleControlValueAccessor),\n
multi: true\n};\n\nfunction _buildValueString(id: string, value: any): string {\n if (id == null) return `${value}`;\n if
(typeof value === 'string') value = `${value}`;\n if (value && typeof value === 'object') value = 'Object';\n return
`${id}: ${value}`.slice(0, 50);\n}\n\nfunction _extractId(valueString: string): string {\n return
valueString.split(':')[0];\n}\n\n/**
Mock interface for HTML Options *\ninterface HTMLOption {\n value: string;\n selected: boolean;\n}\n\n/**
Mock interface for HTMLCollection *\nabstract class HTMLCollection {\n // TODO(issue/24571): remove '!'.\n
length!: number;\n abstract item(_: number): HTMLOption;\n}\n\n/**\n * @description\n * The
`ControlValueAccessor` for writing multi-select control values and listening to multi-select\n * control changes. The
value accessor is used by the `FormControlDirective`, `FormControlName`, and\n * `NgModel` directives.\n *\n *
@see `SelectControlValueAccessor`\n *\n * @usageNotes\n *\n * ### Using a multi-select control\n *\n * The
follow example shows you how to use a multi-select control with a reactive form.\n *\n * ``\n ts\n * const
countryControl = new FormControl();\n * ``\n *\n * ``\n * <select multiple name="countries"\n
[formControl]="countryControl">\n * <option *ngFor="let country of countries" [ngValue]="country">\n *
{{ country.name }}\n * </option>\n * </select>\n * ``\n *\n * ### Customizing option selection\n *\n * To customize the default option comparison
algorithm, `<select>` supports `compareWith` input.\n * See the `SelectControlValueAccessor` for usage.\n *\n *
@ngModule ReactiveFormsModule\n * @ngModule FormsModule\n * @publicApi\n */\n @Directive({\n
selector: `select[multiple][formControlName],select[multiple][formControl],select[multiple][ngModel]`,\n
host: {'(change)': 'onChange($event.target)', '(blur)': 'onTouched()' },\n providers:
[SELECT_MULTIPLE_VALUE_ACCESSOR]\n})\nexport class SelectMultipleControlValueAccessor extends
BuiltInControlValueAccessor implements\n ControlValueAccessor {\n /**\n * The current value.\n *
@nodoc\n */\n value: any;\n\n /** @internal *\n _optionMap: Map<string, NgSelectMultipleOption> = new
Map<string, NgSelectMultipleOption>();\n\n /** @internal *\n _idCounter: number = 0;\n\n /**\n *
@description\n * Tracks the option comparison algorithm for tracking
identities when\n * checking for changes.\n */\n @Input()\n set compareWith(fn: (o1: any, o2: any) => boolean)
{\n if (typeof fn !== 'function' && (typeof ngDevMode === 'undefined' || ngDevMode)) {\n throw new
RuntimeError(\n RuntimeErrorCode.COMPAREWITH_NOT_A_FN,\n `compareWith must be a
function, but received ${JSON.stringify(fn)}`);\n }\n this._compareWith = fn;\n }\n\n private _compareWith:
(o1: any, o2: any) => boolean = Object.is;\n\n /**\n * Sets the "value" property on one or of more of the select's
options.\n * @nodoc\n */\n writeValue(value: any): void {\n this.value = value;\n let
optionSelectedStateSetter: (opt: NgSelectMultipleOption, o: any) => void;\n if (Array.isArray(value)) {\n //
convert values to ids\n const ids = value.map((v) => this._getOptionId(v));\n optionSelectedStateSetter = (opt,
o) => {\n opt._setSelected(ids.indexOf(o.toString()) > -1);\n }; \n } else {\n optionSelectedStateSetter
= (opt, o) => {\n opt._setSelected(false);\n }; \n }\n\n this._optionMap.forEach(optionSelectedStateSetter);\n }\n\n /**\n * Registers a function called when the control

```

```

value changes\n * and writes an array of the selected options.\n * @nodoc\n */\n override registerOnChange(fn:
(value: any) => any): void {\n this.onChange = (element: HTMLSelectElement) => {\n const selected:
Array<any> = [];\n const selectedOptions = element.selectedOptions;\n if (selectedOptions !== undefined) {\n
const options = selectedOptions;\n for (let i = 0; i < options.length; i++) {\n const opt = options[i];\n
const val = this._getOptionValue(opt.value);\n selected.push(val);\n }\n }\n // Degrade to use
`options` when `selectedOptions` property is not available.\n // Note: the `selectedOptions` is available in all
supported browsers, but the Domino lib\n // doesn't have it currently,
see https://github.com/fgnass/domino/issues/177.\n else {\n const options = element.options;\n for (let i
= 0; i < options.length; i++) {\n const opt = options[i];\n if (opt.selected) {\n const val =
this._getOptionValue(opt.value);\n selected.push(val);\n }\n }\n }\n this.value = selected;\n
fn(selected);\n };\n }\n\n /** @internal */\n _registerOption(value: NgSelectMultipleOption): string {\n const
id: string = (this._idCounter++).toString();\n this._optionMap.set(id, value);\n return id;\n }\n\n /** @internal
*/\n _getOptionId(value: any): string|null {\n for (const id of Array.from(this._optionMap.keys())) {\n if
(this._compareWith(this._optionMap.get(id)!._value, value)) return id;\n }\n return null;\n }\n\n /** @internal
*/\n _getOptionValue(valueString: string): any {\n const id: string = _extractId(valueString);\n return
this._optionMap.has(id)
? this._optionMap.get(id)!._value : valueString;\n }\n}\n\n/**\n * @description\n * Marks `` as dynamic,
so Angular can be notified when options change.\n */\n * @see `SelectMultipleControlValueAccessor`\n */\n *
@NgModule ReactiveFormsModule\n * @NgModule FormsModule\n * @publicApi\n */\n @Directive({selector:
'option'})\nexport class NgSelectMultipleOption implements OnDestroy {\n // TODO(issue/24571): remove '!'.\n
id!: string;\n /** @internal */\n _value: any;\n\n constructor(\n private _element: ElementRef, private
_renderer: Renderer2,\n @Optional() @Host() private _select: SelectMultipleControlValueAccessor) {\n if
(this._select) {\n this.id = this._select._registerOption(this);\n }\n }\n\n /**\n * @description\n * Tracks the
value bound to the option element. Unlike the value binding,\n * ngValue supports binding to objects.\n */\n
@Input('ngValue')\n set ngValue(value: any) {\n if (this._select == null) return;\n this._value
= value;\n this._setElementValue(_buildValueString(this.id, value));\n
this._select.writeValue(this._select.value);\n }\n\n /**\n * @description\n * Tracks simple string values bound to
the option element.\n * For objects, use the `ngValue` input binding.\n */\n @Input('value')\n set value(value:
any) {\n if (this._select) {\n this._value = value;\n this._setElementValue(_buildValueString(this.id,
value));\n this._select.writeValue(this._select.value);\n } else {\n this._setElementValue(value);\n }\n
}\n\n /** @internal */\n _setElementValue(value: string): void {\n
this._renderer.setProperty(this._element.nativeElement, 'value', value);\n }\n\n /** @internal */\n
_setSelected(selected: boolean) {\n this._renderer.setProperty(this._element.nativeElement, 'selected', selected);\n
}\n\n /** @nodoc */\n ngOnDestroy(): void {\n if (this._select) {\n this._select._optionMap.delete(this.id);\n
this._select.writeValue(this._select.value);\n
}\n }\n }\n\nexport {NgSelectMultipleOption as NgSelectMultipleOption};\n", "/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n */\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n */\n\nimport {Directive, forwardRef, Input, OnChanges,
SimpleChanges, StaticProvider, coerceToBoolean as coerceToBoolean} from '@angular/core';\nimport
{Observable} from 'rxjs';\nimport {AbstractControl} from '../model/abstract_model';\nimport {emailValidator,
maxLengthValidator, maxValidator, minLengthValidator, minValidator, NG_VALIDATORS, nullValidator,
patternValidator, requiredTrueValidator, requiredValidator} from '../validators';\n\n/**\n * Method that updates
string to integer if not already a number\n */\n * @param value The value to convert to integer.\n * @returns value
of parameter converted to number or integer.\n */\n function toInteger(value: string|number): number
{\n return typeof value === 'number' ? value : parseInt(value, 10);\n }\n\n /**\n * Method that ensures that provided
value is a float (and converts it to float if needed).\n */\n * @param value The value to convert to float.\n * @returns
value of parameter converted to number or float.\n */\n function toFloat(value: string|number): number {\n return
typeof value === 'number' ? value : parseFloat(value);\n }\n\n /**\n * @description\n * Defines the map of errors

```

```

returned from failed validation checks.\n *\n * @publicApi\n */\nexport type ValidationErrors = {\n  [key: string]:\n  any\n};\n\n/**\n * @description\n * An interface implemented by classes that perform synchronous validation.\n *\n * @usageNotes\n *\n * ### Provide a custom validator\n *\n * The following example implements the `Validator`\n interface to create a\n * validator directive with a custom error key.\n *\n * ```typescript\n * @Directive({\n * selector: '[customValidator]',\n * providers: [{provide: NG_VALIDATORS, useExisting:\n * CustomValidatorDirective, multi: true}]\n * })\n * class CustomValidatorDirective implements Validator {\n * validate(control: AbstractControl): ValidationErrors|null {\n *   return {'custom': true};\n * }\n * }\n * ```\n *\n * @publicApi\n */\nexport interface Validator {\n  /**\n * @description\n * Method that performs synchronous\n validation against the provided control.\n *\n * @param control The control to validate against.\n *\n * @returns A map of validation errors if validation fails,\n * otherwise null.\n */\n validate(control:\n AbstractControl): ValidationErrors|null;\n\n  /**\n * @description\n * Registers a callback function to call when\n the validator inputs change.\n *\n * @param fn The callback function\n */\n registerOnChange?(fn: ()\n => void): void;\n}\n\n/**\n * A base class for Validator-based Directives. The class contains common logic shared\n across such\n * Directives.\n *\n * For internal use only, this class is not intended\n for use outside of the Forms package.\n */\n@Directive()\nabstract class AbstractValidatorDirective implements\n Validator, OnChanges {\n  private _validator: ValidatorFn = nullValidator;\n  private _onChange!: () => void;\n\n  /**\n * A flag that tracks whether this validator is enabled.\n *\n * Marking it `internal` (vs `protected`), so that\n this flag can be used in host bindings of\n * directive classes that extend this base class.\n */\n  @internal\n  _enabled?: boolean;\n\n  /**\n * Name of an input that matches directive selector attribute (e.g. `minlength` for\n * `MinLengthDirective`). An input with a given name might contain configuration information (like\n * `minlength=10`) or a flag that indicates whether validator should be enabled (like\n * `[required]=false`).\n */\n  @internal\n  abstract inputName: string;\n\n  /**\n * Creates an instance of a validator (specific to a\n directive that extends this base class).\n */\n  @internal\n  abstract createValidator(input: unknown): ValidatorFn;\n\n  /**\n * Performs the necessary input\n normalization based on a specific logic of a Directive.\n * For example, the function might be used to convert\n string-based representation of the\n * `minlength` input to an integer value that can later be used in the\n `Validators.minLength`\n * validator.\n */\n  @internal\n  abstract normalizeInput(input: unknown):\n unknown;\n\n  /** @nodoc */\n  ngOnChanges(changes: SimpleChanges): void {\n    if (this.inputName in changes)\n      {\n        const input = this.normalizeInput(changes[this.inputName].currentValue);\n        this._enabled =\n this.enabled(input);\n        this._validator = this._enabled ? this.createValidator(input) : nullValidator;\n        if\n (this._onChange) {\n          this._onChange();\n        }\n      }\n  }\n\n  /** @nodoc */\n  validate(control:\n AbstractControl): ValidationErrors|null {\n    return this._validator(control);\n  }\n\n  /** @nodoc */\n  registerOnChange(fn:\n () => void): void {\n    this._onChange = fn;\n  }\n}\n\n/**\n * @description\n * Determines whether this validator\n should be active or not based on an input.\n * Base class implementation checks whether an input is defined (if the\n value is different from\n * `null` and `undefined`). Validator classes that extend this base class can override this\n * function with the logic specific to a particular validator directive.\n */\n  enabled(input: unknown): boolean {\n    return input != null /* both `null` and `undefined` */;\n  }\n}\n\n/**\n * @description\n * Provider which adds\n `MaxValidator` to the `NG_VALIDATORS` multi-provider list.\n */\nexport const MAX_VALIDATOR:\n StaticProvider = {\n  provide: NG_VALIDATORS,\n  useExisting: forwardRef(() => MaxValidator),\n  multi:\n true\n};\n\n/**\n * A directive which installs the {@link MaxValidator} for any `formControlName`,\n * `formControl`, or control with `ngModel` that also has a `max` attribute.\n */\n\n  @see [Form Validation](guide/form-validation)\n *\n * @usageNotes\n *\n * ### Adding a max validator\n *\n * The following example shows how to add a max validator to an input attached to an\n * ngModel binding.\n *\n * ```html\n * <input type="number" ngModel max="4">\n * ```\n *\n * @ngModule ReactiveFormsModule\n *\n * @ngModule FormsModule\n */\n @publicApi\n */\n @Directive({\n  selector: '\n input[type=number][max][formControlName],input[type=number][max][formControl],input[type=number][max][\n ngModel]',\n  providers: [MAX_VALIDATOR],\n  host: {'[attr.max]': '_enabled ? max : null'}\n })\nexport class

```

```

MaxValidator extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the max bound
to this directive.\n *\n * @Input() max!: string|number|null;\n /** @internal *\n override inputName = 'max';\n /** @internal *\n override normalizeInput = (input: string|number): number => toFloat(input);\n /** @internal
*\n override createValidator = (max: number):
ValidatorFn => maxValidator(max);\n}\n\n/**\n * @description\n * Provider which adds `MinValidator` to the
`NG_VALIDATORS` multi-provider list.\n *\nexport const MIN_VALIDATOR: StaticProvider = {\n provide:
NG_VALIDATORS,\n useExisting: forwardRef(() => MinValidator),\n multi: true\n};\n\n/**\n * A directive
which installs the {@link MinValidator} for any `formControlName`,\n * `formControl`, or control with `ngModel`
that also has a `min` attribute.\n *\n * @see [Form Validation](guide/form-validation)\n *\n * @usageNotes\n *\n *
### Adding a min validator\n *\n * The following example shows how to add a min validator to an input attached to
an\n * ngModel binding.\n *\n * ```html\n * <input type="number" ngModel min="4">\n * ```\n *\n *
@ngModule ReactiveFormsModule\n * @ngModule FormsModule\n * @publicApi\n *\n @Directive({\n
selector:\n
'input[type=number][min][formControlName],input[type=number][min][formControl],input[type=number][min][ng
Model]'\n
providers:
[MIN_VALIDATOR],\n
host: {'[attr.min]': '_enabled ? min : null'}\n
})\n
export class MinValidator extends
AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the min bound to this directive.\n
*\n * @Input() min!: string|number|null;\n /** @internal *\n override inputName = 'min';\n /** @internal *\n
override normalizeInput = (input: string|number): number => toFloat(input);\n /** @internal *\n override
createValidator = (min: number): ValidatorFn => minValidator(min);\n}\n\n/**\n * @description\n * An interface
implemented by classes that perform asynchronous validation.\n *\n * @usageNotes\n *\n * ### Provide a custom
async validator directive\n *\n * The following example implements the `AsyncValidator` interface to create an\n
* async validator directive with a custom error key.\n *\n * ```typescript\n * import { of } from 'rxjs';\n *\n *
@Directive({\n * selector: '[customAsyncValidator]',\n * providers: [{provide: NG_ASYNC_VALIDATORS,
useExisting:
CustomAsyncValidatorDirective, multi:\n * true}]\n * })\n * class CustomAsyncValidatorDirective implements
AsyncValidator {\n * validate(control: AbstractControl): Observable<ValidationErrors|null> {\n * return
of({'custom': true});\n * }\n * }\n * ```\n *\n * @publicApi\n *\nexport interface AsyncValidator extends
Validator {\n /**\n * @description\n * Method that performs async validation against the provided control.\n
*\n * @param control The control to validate against.\n *\n * @returns A promise or observable that resolves a
map of validation errors\n * if validation fails, otherwise null.\n *\n * validate(control: AbstractControl):\n
Promise<ValidationErrors|null>|Observable<ValidationErrors|null>;\n}\n\n/**\n * @description\n * Provider which
adds `RequiredValidator` to the `NG_VALIDATORS` multi-provider list.\n *\nexport const
REQUIRED_VALIDATOR: StaticProvider = {\n provide: NG_VALIDATORS,\n useExisting: forwardRef(() =>
RequiredValidator),\n
multi: true\n};\n\n/**\n * @description\n * Provider which adds `CheckboxRequiredValidator` to the
`NG_VALIDATORS` multi-provider list.\n *\nexport const CHECKBOX_REQUIRED_VALIDATOR:
StaticProvider = {\n provide: NG_VALIDATORS,\n useExisting: forwardRef(() =>
CheckboxRequiredValidator),\n multi: true\n};\n\n/**\n * @description\n * A directive that adds the `required`
validator to any controls marked with the\n * `required` attribute. The directive is provided with the
`NG_VALIDATORS` multi-provider list.\n *\n * @see [Form Validation](guide/form-validation)\n *\n *
@usageNotes\n *\n * ### Adding a required validator using template-driven forms\n *\n * ```\n * <input
name="fullName" ngModel required>\n * ```\n *\n * @ngModule FormsModule\n * @ngModule
ReactiveFormsModule\n * @publicApi\n *\n @Directive({\n selector:\n
':not([type=checkbox])[required][formControlName],:not([type=checkbox])[required][formControl],:not([type=chec
kbox])[required][ngModel]'\n
providers:
[REQUIRED_VALIDATOR],\n
host: {'[attr.required]': '_enabled ? \'\" : null'}\n
})\n
export class
RequiredValidator extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the

```

required attribute bound to this directive.  
`@Input() required!: boolean|string;`  
`/** @internal */`  
`override inputName = 'required';`  
`/** @internal */`  
`override normalizeInput = coerceToBoolean;`  
`/** @internal */`  
`override createValidator = (input: boolean): ValidatorFn => requiredValidator;`  
`/** @nodoc */`  
`override enabled(input: boolean): boolean {`  
`return input;`  
`}`  
 A Directive that adds the `required` validator to checkbox controls marked with the `required` attribute. The directive is provided with the `NG\_VALIDATORS` multi-provider list.  
 @see [Form Validation](guide/form-validation)  
 @usageNotes  
 ### Adding a required checkbox validator using template-driven forms  
 The following example

shows how to add a checkbox required validator to an input attached to an `ngModel` binding.

```

<input type="checkbox" name="active" ngModel required>

```

```

@publicApi
@NgModule
FormsModule
@NgModule
ReactiveFormsModule
@Directive({
  selector:
'input[type=checkbox][required][formControlName],input[type=checkbox][required][formControl],input[type=checkbox][required][ngModel]',
  providers: [CHECKBOX_REQUIRED_VALIDATOR],
  host: {'[attr.required]':
'_enabled ? \'\' : null'}
})
export class CheckboxRequiredValidator extends RequiredValidator {
  /** @internal */
  override createValidator = (input: unknown): ValidatorFn => requiredTrueValidator;
}

```

Provider which adds `EmailValidator` to the `NG\_VALIDATORS` multi-provider list.  
 @next const EMAIL\_VALIDATOR: any = {  
 provide: NG\_VALIDATORS,  
 useExisting: forwardRef(() => EmailValidator),  
 multi: true};  
 A directive that adds the `email`

validator to controls marked with the `email` attribute. The directive is provided with the `NG\_VALIDATORS` multi-provider list.  
 The email validation is based on the WHATWG HTML specification with some enhancements to incorporate more RFC rules. More information can be found on the [Validators.email page](api/forms/Validators#email).  
 @see [Form Validation](guide/form-validation)  
 @usageNotes  
 ### Adding an email validator  
 The following example shows how to add an email validator to an input attached to an `ngModel` binding.

```

<input type="email" name="email" ngModel email="true">
<input type="email" name="email" ngModel [email]="true">

```

```

@publicApi
@NgModule
FormsModule
@NgModule
ReactiveFormsModule
@Directive({
  selector:
'[email][formControlName],[email][formControl],[email][ngModel]',
  providers:
[EMAIL_VALIDATOR]
})

```

```

export
class EmailValidator extends AbstractValidatorDirective {
  /** @description */
  Tracks changes to the email attribute bound to this directive.
  /** @internal */
  @Input() email!: boolean|string;
  /** @internal */
  override inputName = 'email';
  /** @internal */
  override normalizeInput = coerceToBoolean;
  /** @internal */
  override createValidator = (input: number): ValidatorFn => emailValidator;
  /** @nodoc */
  override enabled(input: boolean): boolean {
    return input;
  }
}

```

A function that receives a control and synchronously returns a map of validation errors if present, otherwise null.  
 @publicApi  
 @next interface ValidatorFn {  
 (control: AbstractControl): ValidationErrors|null;  
}

A function that receives a control and returns a Promise or observable that emits validation errors if present, otherwise null.  
 @publicApi  
 @next interface AsyncValidatorFn {  
 (control: AbstractControl): Promise<ValidationErrors|null>|Observable<ValidationErrors|null>;  
}

Provider which adds `MinLengthValidator` to the `NG\_VALIDATORS` multi-provider list.  
 @next const MIN\_LENGTH\_VALIDATOR: any = {  
 provide: NG\_VALIDATORS,  
 useExisting: forwardRef(() => MinLengthValidator),  
 multi: true};  
 A directive that adds minimum length validation to controls marked with the `minlength` attribute. The directive is provided with the `NG\_VALIDATORS` multi-provider list.  
 @see [Form Validation](guide/form-validation)  
 @usageNotes  
 ### Adding a minimum length validator  
 The following example shows how to add a minimum length validator to an input attached to an `ngModel` binding.

```

<input name="firstName" ngModel minlength="4">

```

```

@ngModule ReactiveFormsModule
@ngModule FormsModule
@publicApi
@Directive({
  selector:

```

```

'[minlength][formControlName],[minlength][formControl],[minlength][ngModel]',\n
  providers: [MIN_LENGTH_VALIDATOR],\n host: {'[attr.minlength]': '_enabled ? minlength : null'}\n))\nexport
class MinLengthValidator extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to
the minimum length bound to this directive.\n */\n @Input() minlength!: string|number|null;\n /** @internal
*/\n override inputName = 'minlength';\n /** @internal */\n override normalizeInput = (input: string|number):
number => toInteger(input);\n /** @internal */\n override createValidator = (minlength: number): ValidatorFn
=> minLengthValidator(minlength);\n}\n\n/**\n * @description\n * Provider which adds `MaxLengthValidator` to
the `NG_VALIDATORS` multi-provider list.\n */\nexport const MAX_LENGTH_VALIDATOR: any = {\n
provide: NG_VALIDATORS,\n useExisting: forwardRef(() => MaxLengthValidator),\n multi: true\n};\n\n/**\n *
A directive that adds max length validation to controls
marked with the\n * `maxlength` attribute. The directive is provided with the `NG_VALIDATORS` multi-provider
list.\n * @see [Form Validation](guide/form-validation)\n * @usageNotes\n * ### Adding a maximum
length validator\n * The following example shows how to add a maximum length validator to an input attached
to an\n * ngModel binding.\n * ```html\n * <input name="\`firstName\`" ngModel maxlength="\`25\`">\n * ```\n *
*/\n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n * @publicApi\n */\n @Directive({\n
selector: '[maxlength][formControlName],[maxlength][formControl],[maxlength][ngModel]',\n providers:
[MAX_LENGTH_VALIDATOR],\n host: {'[attr.maxlength]': '_enabled ? maxlength : null'}\n))\nexport class
MaxLengthValidator extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the
minimum length bound to this directive.\n */\n @Input() maxlength!: string|number|null;\n /** @internal */\n
override inputName = 'maxlength';\n\n /** @internal */\n override normalizeInput = (input: string|number):
number => toInteger(input);\n /**\n * @internal */\n override createValidator = (maxlength: number): ValidatorFn
=>
maxLengthValidator(maxlength);\n}\n\n/**\n * @description\n * Provider which adds `PatternValidator` to the
`NG_VALIDATORS` multi-provider list.\n */\nexport const PATTERN_VALIDATOR: any = {\n provide:
NG_VALIDATORS,\n useExisting: forwardRef(() => PatternValidator),\n multi: true\n};\n\n/**\n *
A directive that adds regex pattern validation to controls marked with the\n * `pattern` attribute.
The regex must match the entire control value.\n * The directive is provided with the `NG_VALIDATORS` multi-
provider list.\n * @see [Form Validation](guide/form-validation)\n * @usageNotes\n * ### Adding a
pattern validator\n * The following example shows how to add a pattern validator to an input attached to an\n *
ngModel binding.\n * ```html\n * <input name="\`firstName\`"\n * ngModel pattern="\`[a-zA-Z ]*\`">\n * ```\n *
*/\n * @ngModule ReactiveFormsModule\n * @ngModule
FormsModule\n * @publicApi\n */\n @Directive({\n selector:
'[pattern][formControlName],[pattern][formControl],[pattern][ngModel]',\n providers:
[PATTERN_VALIDATOR],\n host: {'[attr.pattern]': '_enabled ? pattern : null'}\n))\nexport class PatternValidator
extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the pattern bound to this
directive.\n */\n @Input()\n pattern!: string|RegExp; // This input is always defined, since the name matches
selector.\n\n /** @internal */\n override inputName = 'pattern';\n /** @internal */\n override normalizeInput =
(input: string|RegExp): string|RegExp => input;\n /** @internal */\n override createValidator = (input:
string|RegExp): ValidatorFn => patternValidator(input);\n}\n\n"/>\n\n/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n * Use of this source code is governed by an MIT-style
license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport {NgModule, Type}
from '@angular/core';\nimport {CheckboxControlValueAccessor} from
'/directives/checkbox_value_accessor';\nimport {DefaultValueAccessor} from
'/directives/default_value_accessor';\nimport {NgControlStatus, NgControlStatusGroup} from
'/directives/ng_control_status';\nimport {NgForm} from './directives/ng_form';\nimport {NgModel} from
'/directives/ng_model';\nimport {NgModelGroup} from './directives/ng_model_group';\nimport {NgNoValidate}
from './directives/ng_no_validate_directive';\nimport {NumberValueAccessor} from
'/directives/number_value_accessor';\nimport {RadioControlRegistryModule, RadioControlValueAccessor} from

```



```

./directives/radio_control_value_accessor';\nimport {RangeValueAccessor} from
./directives/range_value_accessor';\nimport {FormControlDirective} from
./directives/reactive_directives/form_control_directive';\nimport {FormControlName} from
./directives/reactive_directives/form_control_name';\nimport
{FormGroupDirective} from './directives/reactive_directives/form_group_directive';\nimport {FormArrayName,
FormGroupName} from './directives/reactive_directives/form_group_name';\nimport {NgSelectOption,
SelectControlValueAccessor} from './directives/select_control_value_accessor';\nimport {NgSelectMultipleOption,
SelectMultipleControlValueAccessor} from './directives/select_multiple_control_value_accessor';\nimport
{CheckboxRequiredValidator, EmailValidator, MaxLengthValidator, MaxValidator, MinLengthValidator,
MinValidator, PatternValidator, RequiredValidator} from './directives/validators';\n\nexport
{CheckboxControlValueAccessor} from './directives/checkbox_value_accessor';\nexport {ControlValueAccessor}
from './directives/control_value_accessor';\nexport {DefaultValueAccessor} from
./directives/default_value_accessor';\nexport {NgControl} from './directives/ng_control';\nexport {NgControlStatus,
NgControlStatusGroup} from './directives/ng_control_status';\nexport
{NgForm} from './directives/ng_form';\nexport {NgModel} from './directives/ng_model';\nexport
{NgModelGroup} from './directives/ng_model_group';\nexport {NumberValueAccessor} from
./directives/number_value_accessor';\nexport {RadioControlValueAccessor} from
./directives/radio_control_value_accessor';\nexport {RangeValueAccessor} from
./directives/range_value_accessor';\nexport {FormControlDirective,
NG_MODEL_WITH_FORM_CONTROL_WARNING} from
./directives/reactive_directives/form_control_directive';\nexport {FormControlName} from
./directives/reactive_directives/form_control_name';\nexport {FormGroupDirective} from
./directives/reactive_directives/form_group_directive';\nexport {FormArrayName, FormGroupName} from
./directives/reactive_directives/form_group_name';\nexport {NgSelectOption, SelectControlValueAccessor} from
./directives/select_control_value_accessor';\nexport {NgSelectMultipleOption,
SelectMultipleControlValueAccessor} from './directives/select_multiple_control_value_accessor';\n\nexport
const SHARED_FORM_DIRECTIVES: Type<any>[] = [\n NgNoValidate,\n NgSelectOption,\n
NgSelectMultipleOption,\n DefaultValueAccessor,\n NumberValueAccessor,\n RangeValueAccessor,\n
CheckboxControlValueAccessor,\n SelectControlValueAccessor,\n SelectMultipleControlValueAccessor,\n
RadioControlValueAccessor,\n NgControlStatus,\n NgControlStatusGroup,\n RequiredValidator,\n
MinLengthValidator,\n MaxLengthValidator,\n PatternValidator,\n CheckboxRequiredValidator,\n
EmailValidator,\n MinValidator,\n MaxValidator,\n];\n\nexport const TEMPLATE_DRIVEN_DIRECTIVES:
Type<any>[] = [NgModel, NgModelGroup, NgForm];\n\nexport const REACTIVE_DRIVEN_DIRECTIVES:
Type<any>[] =[\n [FormControlDirective, FormGroupDirective, FormControlName, FormGroupName,
FormArrayName];\n\n/**\n * Internal module used for sharing directives between FormsModule and
ReactiveFormsModule\n */\n@NgModule({\n declarations: SHARED_FORM_DIRECTIVES,\n imports:
[RadioControlRegistryModule],\n exports: SHARED_FORM_DIRECTIVES,\n})\nexport class
InternalFormsSharedModule {\n}\n\nexport {InternalFormsSharedModule as
InternalFormsSharedModule};\n","/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {ModuleWithProviders, NgModule} from '@angular/core';\n\nimport
{InternalFormsSharedModule, NG_MODEL_WITH_FORM_CONTROL_WARNING,
REACTIVE_DRIVEN_DIRECTIVES, TEMPLATE_DRIVEN_DIRECTIVES} from './directives';\n\n/**\n *
Exports the required providers and directives for template-driven forms,\n * making them available for import by
NgModules that import this module.\n *\n * Providers associated with this module:\n * * `RadioControlRegistry`\n
*\n * @see [Forms Overview](/guide/forms-overview)\n * @see [Template-driven Forms Guide](/guide/forms)\n
*\n * @publicApi\n */\n@NgModule({\n declarations:

```

```

TEMPLATE_DRIVEN_DIRECTIVES,\n exports: [InternalFormsSharedModule,
TEMPLATE_DRIVEN_DIRECTIVES])\n})\nexport class FormsModule {\n\n/**\n * Exports the required
infrastructure and directives for reactive forms,\n * making them available for import by NgModules that import this
module.\n *\n * Providers associated with this module:\n * * `FormBuilder`\n * * `RadioControlRegistry`\n *\n *
@see [Forms Overview](guide/forms-overview)\n * @see [Reactive Forms Guide](guide/reactive-forms)\n *\n *
@publicApi\n *\n * @NgModule({\n declarations: [REACTIVE_DRIVEN_DIRECTIVES],\n exports:
[InternalFormsSharedModule, REACTIVE_DRIVEN_DIRECTIVES])\n})\nexport class ReactiveFormsModule {\n\n/**\n *
@description\n * Provides options for configuring the reactive forms module.\n *\n * @param opts An
object of configuration options\n * * `warnOnNgModelWithFormControl` Configures when to emit a warning
when an `ngModel`\n * binding is used with reactive form directives.\n *\n *
static withConfig(opts: {\n /** @deprecated as of v6 */ warnOnNgModelWithFormControl:
'never'|'once'|'always'\n }): ModuleWithProviders<ReactiveFormsModule> {\n return {\n ngModule:
ReactiveFormsModule,\n providers: [\n {provide: NG_MODEL_WITH_FORM_CONTROL_WARNING,
useValue: opts.warnOnNgModelWithFormControl}\n ]\n };\n }\n\n"/**\n * @license\n * Copyright Google
LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n *\n *
import {AsyncValidatorFn, ValidatorFn} from
'./directives/validators';\n *
import {AbstractControl, AbstractControlOptions, assertAllValuesPresent,
assertControlPresent, pickAsyncValidators, pickValidators, RawValue, TypedOrUntyped, Value} from
'./abstract_model';\n *\n /**\n * FormArrayValue extracts the type of `.value` from a FormArray's element type, and
wraps it in an\n * array.\n *\n * Angular uses this type internally
to support Typed Forms; do not use it directly. The untyped\n * case falls back to any[].\n *\n *
export type FormArrayValue<T extends AbstractControl<any>> =\n TypedOrUntyped<T, Array<Value<T>>,
any[]>;\n *\n /**\n * FormArrayRawValue extracts the type of `.getRawValue()` from a FormArray's element type,
and\n * wraps it in an array. The untyped case falls back to any[].\n *\n * Angular uses this type internally to support
Typed Forms; do not use it directly.\n *\n *
export type FormArrayRawValue<T extends AbstractControl<any>> =\n TypedOrUntyped<T, Array<RawValue<T>>, any[]>;\n *\n /**\n * Tracks the value and validity state of an array of
`FormControl`,\n * `FormGroup` or `FormArray` instances.\n *\n * A `FormArray` aggregates the values of each
child `FormControl` into an array.\n * It calculates its status by reducing the status values of its children. For
example, if one of\n * the controls in a `FormArray` is invalid, the entire array becomes invalid.\n *\n *
`FormArray` accepts
one generic argument, which is the type of the controls inside.\n * If you need a heterogenous array, use { @link
UntypedFormArray }.\n *\n * `FormArray` is one of the four fundamental building blocks used to define forms in
Angular,\n * along with `FormControl`, `FormGroup`, and `FormRecord`.\n *\n * @usageNotes\n *\n * ### Create
an array of form controls\n *\n * ```\n * const arr = new FormArray([\n * new FormControl('Nancy',
Validators.minLength(2)),\n * new FormControl('Drew'),\n * ]);\n *\n * console.log(arr.value); // ['Nancy',
'Drew']\n * console.log(arr.status); // 'VALID'\n * ```\n *\n * ### Create a form array with array-level validators\n
*\n * You include array-level validators and async validators. These come in handy\n * when you want to perform
validation that considers the value of more than one child\n * control.\n *\n * The two types of validators are passed
in separately as the second and third arg\n * respectively, or together as part of an options object.\n
*\n * ```\n * const arr = new FormArray([\n * new FormControl('Nancy'),\n * new FormControl('Drew')\n * ],
{validators: myValidator, asyncValidators: myAsyncValidator});\n * ```\n *\n * ### Set the updateOn property for
all controls in a form array\n *\n * The options object is used to set a default value for each child\n * control's
`updateOn` property. If you set `updateOn` to `blur` at the\n * array level, all child controls default to `blur`, unless
the child\n * has explicitly specified a different `updateOn` value.\n *\n * ```ts\n * const arr = new FormArray([\n *
new FormControl(),\n * ], {updateOn: 'blur'});\n * ```\n *\n * ### Adding or removing controls from a form array\n
*\n * To change the controls in the array, use the `push`, `insert`, `removeAt` or `clear` methods\n * in `FormArray`
itself. These methods ensure the controls are properly tracked in the\n * form's hierarchy. Do not modify the array of
`AbstractControl`s used to instantiate\n * the `FormArray`

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directly, as that result in strange and unexpected behavior such
 * as broken change detection.
 *
 * @publicApi
 * \nexport class FormArray<TControl extends AbstractControl<any> = any> extends
AbstractControl<\n  TypedOrUntyped<TControl, FormArrayValue<TControl>, any>, \n
TypedOrUntyped<TControl, FormArrayRawValue<TControl>, any>> {\n /**\n * Creates a new `FormArray`
instance.\n * \n * @param controls An array of child controls. Each child control is given an index
 * where it is
registered.\n * \n * @param validatorOrOpts A synchronous validator function, or an array of
 * such functions,
or an `AbstractControlOptions` object that contains validation functions
 * and a validation trigger.\n * \n *
@param asyncValidator A single async validator or array of async validator functions
 * \n * \n constructor(\n
controls: Array<TControl>, \n  validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null, \n
asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null)
{\n  super(pickValidators(validatorOrOpts), pickAsyncValidators(asyncValidator, validatorOrOpts));\n
this.controls = controls;\n  this._initObservables();\n  this._setUpdateStrategy(validatorOrOpts);\n
this._setUpControls();\n  this.updateValueAndValidity({\n    onlySelf: true, \n    // If `asyncValidator` is present,
it will trigger control status change from `PENDING` to \n    // `VALID` or `INVALID`. \n    // The status should
be broadcasted via the `statusChanges` observable, so we set `emitEvent` \n    // to `true` to allow that during the
control creation process.\n    emitEvent: !!this.asyncValidator \n  });\n }\n\n public controls:
TypedOrUntyped<TControl, Array<TControl>, Array<AbstractControl<any>>>;\n\n /**\n * Get the
`AbstractControl` at the given `index` in the array.\n * \n * @param index Index in the array to retrieve the
control. If `index` is negative, it will wrap
 * around from the back, and
if index is greatly negative (less than `-length`), the result is
 * undefined. This behavior is the same as
`Array.at(index)`.\n * \n at(index: number): TypedOrUntyped<TControl, TControl, AbstractControl<any>> {\n
return (this.controls as any)[this._adjustIndex(index)];\n }\n\n /**\n * Insert a new `AbstractControl` at the end of
the array.\n * \n * @param control Form control to be inserted\n * @param options Specifies whether this
FormArray instance should emit events after a new
 * control is added.\n * * * `emitEvent`: When true or not
supplied (the default), both the `statusChanges` and
 * `valueChanges` observables emit events with the latest
status and value when the control is
 * inserted. When false, no events are emitted.\n * \n push(control:
TControl, options: {emitEvent?: boolean} = {}): void {\n  this.controls.push(control);\n
this._registerControl(control);\n  this.updateValueAndValidity({emitEvent: options.emitEvent});\n
this._onCollectionChange();\n
}\n\n /**\n * Insert a new `AbstractControl` at the given `index` in the array.\n * \n * @param index Index in
the array to insert the control. If `index` is negative, wraps around
 * from the back. If `index` is greatly
negative (less than `-length`), prepends to the array.\n * \n This behavior is the same as `Array.splice(index, 0,
control)`.\n * \n * @param control Form control to be inserted\n * @param options Specifies whether this FormArray
instance should emit events after a new
 * control is inserted.\n * * * `emitEvent`: When true or not supplied
(the default), both the `statusChanges` and
 * `valueChanges` observables emit events with the latest status and
value when the control is
 * inserted. When false, no events are emitted.\n * \n insert(index: number, control:
TControl, options: {emitEvent?: boolean} = {}): void {\n  this.controls.splice(index, 0, control);\n\n
this._registerControl(control);\n  this.updateValueAndValidity({emitEvent:
options.emitEvent});\n }\n\n /**\n * Remove the control at the given `index` in the array.\n * \n * @param
index Index in the array to remove the control. If `index` is negative, wraps around
 * from the back. If `index`
is greatly negative (less than `-length`), removes the first
 * element. This behavior is the same as
`Array.splice(index, 1)`.\n * \n * @param options Specifies whether this FormArray instance should emit events after
a
 * control is removed.\n * * * `emitEvent`: When true or not supplied (the default), both the `statusChanges`
and
 * `valueChanges` observables emit events with the latest status and value when the control is
 * removed. When false, no events are emitted.\n * \n removeAt(index: number, options: {emitEvent?: boolean} = {}): void
{\n  // Adjust the index, then clamp it at no less than 0 to prevent undesired underflows.\n  let adjustedIndex =
this._adjustIndex(index);\n  if (adjustedIndex

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< 0) adjustedIndex = 0;\n\n  if (this.controls[adjustedIndex])\n  this.controls[adjustedIndex]._registerOnCollectionChange(() => {});\n  this.controls.splice(adjustedIndex, 1);\n  this.updateValueAndValidity({ emitEvent: options.emitEvent });\n  }\n\n  /**\n   * Replace an existing control.\n   *\n   * @param index Index in the array to replace the control. If `index` is negative, wraps around\n   *   from the back. If `index` is greatly negative (less than `-length`), replaces the first\n   *   element. This behavior is the same as `Array.splice(index, 1, control)`.\n   * @param control The `AbstractControl` control to replace the existing\n   *   control\n   * @param options Specifies whether this FormArray instance should emit events after an\n   *   existing control is replaced with a new one.\n   * * `emitEvent`: When true or not supplied (the default), both the\n   * `statusChanges` and\n   * `valueChanges` observables emit events with the latest status and value when the control\n   * is\n   * replaced with a new one. When false, no events are emitted.\n   */\n  setControl(index: number, control: TControl, options: { emitEvent?: boolean } = {}): void {\n    // Adjust the index, then clamp it at no less than 0 to\n    prevent undesired underflows.\n    let adjustedIndex = this._adjustIndex(index);\n    if (adjustedIndex < 0)\n      adjustedIndex = 0;\n\n    if (this.controls[adjustedIndex])\n      this.controls[adjustedIndex]._registerOnCollectionChange(() => {});\n    this.controls.splice(adjustedIndex, 1);\n\n    if (control) {\n      this.controls.splice(adjustedIndex, 0, control);\n      this._registerControl(control);\n    }\n\n    this.updateValueAndValidity({ emitEvent: options.emitEvent });\n    this._onCollectionChange();\n  }\n\n  /**\n   * Length of the control array.\n   */\n  get length(): number {\n    return this.controls.length;\n  }\n\n  /**\n   * Sets the value of the `FormArray`. It accepts an array that matches\n   * the structure of the control.\n   *\n   * This method performs strict checks, and throws an error if you try\n   * to set the value of a control that doesn't exist or if you exclude the\n   * value of a control.\n   * @usageNotes\n   * ### Set the values for the controls in the form array\n   *\n   * ```\n   * const arr = new FormArray([\n   *   new FormControl(),\n   *   new FormControl()\n   * ]);\n   * console.log(arr.value); // [null, null]\n   *\n   * arr.setValue(['Nancy', 'Drew']);\n   *\n   * console.log(arr.value); // ['Nancy', 'Drew']\n   * ```\n   * @param value Array of values for the controls\n   * @param options Configure options that determine how the control propagates changes and\n   *   emits events after the value changes\n   * * * `onlySelf`: When true, each change only affects this control, and not its parent.\n   * Default\n   * is false.\n   * * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n   * `valueChanges`\n   * observables emit events with the latest status and value when the control value is updated.\n   * When false, no events are emitted.\n   * The configuration options are passed to the {@link AbstractControl#updateValueAndValidity\n   *   updateValueAndValidity} method.\n   */\n  override setValue(value: FormArrayRawValue<TControl>, options: {\n    onlySelf?: boolean,\n    emitEvent?: boolean\n  } = {}): void {\n    assertAllValuesPresent(this, false, value);\n    value.forEach((newValue: any, index: number) => {\n      assertControlPresent(this, false, index);\n      this.at(index).setValue(newValue, { onlySelf: true, emitEvent: options.emitEvent });\n    });\n    this.updateValueAndValidity(options);\n  }\n\n  /**\n   * Patches the value of the `FormArray`. It accepts an array that matches the\n   * structure of the control, and does its best to match the values to the correct\n   * controls in the group.\n   *\n   * It accepts both super-sets and sub-sets of the array without throwing an error.\n   * @usageNotes\n   * ### Patch the values for controls in a form array\n   *\n   * ```\n   * const arr = new FormArray([\n   *   new FormControl(),\n   *   new FormControl()\n   * ]);\n   * console.log(arr.value); // [null, null]\n   *\n   * arr.patchValue(['Nancy']);\n   *\n   * console.log(arr.value); // ['Nancy', null]\n   * ```\n   * @param value Array of latest values for the controls\n   * @param options Configure options that determine how the control propagates changes and\n   *   emits events after the value changes\n   * * * `onlySelf`: When true, each change only affects this control, and not its parent.\n   * Default\n   * is false.\n   * * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n   * `valueChanges`\n   * observables emit events with the latest status and value when the control\n   * value is updated. When false, no events are emitted. The configuration options are passed to\n   * the {@link AbstractControl#updateValueAndValidity updateValueAndValidity} method.\n   */\n  override patchValue(value: FormArrayValue<TControl>, options: {\n    onlySelf?: boolean,\n    emitEvent?: boolean\n  } = {}): void {\n    // Even though the `value` argument type doesn't allow `null` and `undefined` values,\n    the\n    // `patchValue` can be called recursively and inner data structures might have these values,\n    // so we just

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ignore such cases when a field containing FormArray instance receives `null` or `undefined` as a value. if (value == null /\* both `null` and `undefined` \*/) return; value.forEach((newValue, index) => { if (this.at(index)) { this.at(index).patchValue(newValue, {onlySelf: true, emitEvent: options.emitEvent}); } }); this.updateValueAndValidity(options); } } /\*\* Resets the `FormArray` and all descendants are marked `pristine` and `untouched`, and the value of all descendants to null or null maps. You reset to a specific form state by passing in an array of states

\* that matches the structure of the control. The state is a standalone value or a form state object with both a value and a disabled status. @usageNotes ### Reset the values in a form array ```ts const arr = new FormArray([ new FormControl(), new FormControl() ]); arr.reset(['name', 'last name']); console.log(arr.value); // ['name', 'last name'] ``` ### Reset the values in a form array and the disabled status for the first control ```ts arr.reset([ {value: 'name', disabled: true}, 'last' ]); console.log(arr.value); // ['last'] console.log(arr.at(0).status); // 'DISABLED' ``` @param value Array of values for the controls @param options Configure options that determine how the control propagates changes and emits events after the value changes \*onlySelf: When true, each change

only affects this control, and not its parent. Default is false. \*emitEvent: When true or not supplied (the default), both the `statusChanges` and `valueChanges` observables emit events with the latest status and value when the control is reset. When false, no events are emitted. The configuration options are passed to the {@link AbstractControl#updateValueAndValidity} updateValueAndValidity method. ^/n override reset(value: TypedOrUntyped<TControl, FormArrayValue<TControl>, any> = [], options: {onlySelf?: boolean, emitEvent?: boolean} = {}): void { this.\_forEachChild((control: AbstractControl, index: number) => { control.reset(value[index], {onlySelf: true, emitEvent: options.emitEvent}); }); this.\_updatePristine(options); this.\_updateTouched(options); this.updateValueAndValidity(options); } } /\*\* The aggregate value of the array, including any disabled controls. Reports all values regardless of disabled status. ^/n override getRawValue():

FormArrayRawValue<TControl> { return this.controls.map((control: AbstractControl) => control.getRawValue()); } } /\*\* Remove all controls in the `FormArray`. @param options Specifies whether this FormArray instance should emit events after all controls are removed. \*emitEvent: When true or not supplied (the default), both the `statusChanges` and `valueChanges` observables emit events with the latest status and value when all controls in this FormArray instance are removed. When false, no events are emitted. @usageNotes ### Remove all elements from a FormArray ```ts const arr = new FormArray([ new FormControl(), new FormControl() ]); console.log(arr.length); // 2 arr.clear(); console.log(arr.length); // 0 ``` It's a simpler and more efficient

alternative to removing all elements one by one: ```ts const arr = new FormArray([ new FormControl(), new FormControl() ]); while (arr.length) { arr.removeAt(0); } ^/n clear(options: {emitEvent?: boolean} = {}): void { if (this.controls.length < 1) return; this.\_forEachChild((control) => control.\_registerOnCollectionChange(() => {})); this.controls.splice(0); this.updateValueAndValidity({emitEvent: options.emitEvent}); } } /\*\* Adjusts a negative index by summing it with the length of the array. For very negative indices, the result may remain negative. @internal ^/n private \_adjustIndex(index: number): number { return index < 0 ? index + this.length : index; } } /\*\* @internal ^/n override \_syncPendingControls(): boolean { let subtreeUpdated = (this.controls as any).reduce((updated: any, child: any) => { return child.\_syncPendingControls() ? true : updated; }, false); if (subtreeUpdated) this.updateValueAndValidity({onlySelf: true}); return subtreeUpdated; } } /\*\* @internal ^/n override \_forEachChild(cb: (c: AbstractControl, index: number) => void): void { this.controls.forEach((control: AbstractControl, index: number) => { cb(control, index); }); } } /\*\* @internal ^/n override \_updateValue(): void { (this as {value: any}).value = this.controls.filter((control) => control.enabled || this.disabled).map((control) => control.value); } }

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/** @internal */\n override _anyControls(condition: (c: AbstractControl) => boolean): boolean {\n  return
this.controls.some((control) => control.enabled && condition(control));\n }\n\n /** @internal */\n
_setUpControls(): void {\n  this._forEachChild((control) => this._registerControl(control));\n }\n\n /** @internal
*/\n override _allControlsDisabled(): boolean {\n  for (const control
of this.controls) {\n    if (control.enabled) return false;\n  }\n  return this.controls.length > 0 || this.disabled;\n
}\n\n private _registerControl(control: AbstractControl) {\n  control.setParent(this);\n
control._registerOnCollectionChange(this._onCollectionChange);\n }\n\n /** @internal */\n override _find(name:
string|number): AbstractControl|null {\n  return this.at(name as number) ?? null;\n }\n}\n\ninterface
UntypedFormArrayCtor {\n  new(controls: AbstractControl[],\n    validatorOrOpts?:
ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n    asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormArray;\n\n  /**\n   * The presence of an explicit
`prototype` property provides backwards-compatibility for apps that\n   * manually inspect the prototype chain.\n
*/\n  prototype: FormArray<any>;\n}\n\n/**\n * UntypedFormArray is a non-strongly-typed version of @see
FormArray, which\n * permits heterogenous controls.\n */\nexport type
UntypedFormArray = FormArray<any>;\n\nexport const UntypedFormArray: UntypedFormArrayCtor =
FormArray;\n\nexport const isFormArray = (control: unknown): control is FormArray => control instanceof
FormArray;\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*/\n\nimport {inject, Injectable} from '@angular/core';\n\nimport {AsyncValidatorFn, ValidatorFn} from
'/directives/validators';\n\nimport {ReactiveFormsModule} from './form_providers';\n\nimport {AbstractControl,
AbstractControlOptions, FormHooks} from './model/abstract_model';\n\nimport {FormArray, UntypedFormArray}
from './model/form_array';\n\nimport {FormControl, FormControlOptions, FormControlState, UntypedFormControl}
from './model/form_control';\n\nimport {FormGroup, FormRecord, UntypedFormGroup} from
'/model/form_group';\n\nfunction isAbstractControlOptions(options: AbstractControlOptions|{[key:
string]: any}|null|\n    undefined): options is AbstractControlOptions {\n  return !!options &&\n
((options as AbstractControlOptions).asyncValidators !== undefined ||\n    (options as
AbstractControlOptions).validators !== undefined ||\n    (options as AbstractControlOptions).updateOn !==
undefined);\n}\n\n/**\n * The union of all validator types that can be accepted by a ControlConfig.\n */\n
type ValidatorConfig = ValidatorFn|AsyncValidatorFn|ValidatorFn[]|AsyncValidatorFn[];\n\n/**\n * The compiler may
not always be able to prove that the elements of the control config are a tuple\n * (i.e. occur in a fixed order). This
slightly looser type is used for inference, to catch cases\n * where the compiler cannot prove order and position.\n
*/\n * For example, consider the simple case `fb.group({foo: ['bar', Validators.required]})`. The\n * compiler will
infer this as an array, not as a tuple.\n */\n
type PermissiveControlConfig<T>
= Array<T>|FormControlState<T>|ValidatorConfig;\n\n/**\n * ControlConfig<T> is a tuple containing a value of
type T, plus optional validators and async\n * validators.\n */\n * @publicApi\n */\n
export type ControlConfig<T> =
[T]|FormControlState<T>, (ValidatorFn|(ValidatorFn[])?, (AsyncValidatorFn|AsyncValidatorFn[])?);\n\n// Disable
clang-format to produce clearer formatting for this multiline type.\n// clang-format off\n\n/**\n * FormBuilder
accepts values in various container shapes, as well as raw values.\n * Element returns the appropriate corresponding
model class, given the container T.\n * The flag N, if not never, makes the resulting `FormControl` have N in its
type.\n */\n
export type Element<T, N extends null> =\n // The `extends` checks are wrapped in arrays in order to
prevent TypeScript from applying type unions\n // through the distributive conditional type. This is the officially
recommended solution.\n // https://www.typescriptlang.org/docs/handbook/2/conditional-types.html#distributive-conditional-types\n
\n // Identify FormControl container types.\n [T] extends [FormControl<infer U>] ? FormControl<U> :\n // Or
FormControl containers that are optional in their parent group.\n [T] extends [FormControl<infer U>|undefined] ?
FormControl<U> :\n // FormGroup containers.\n [T] extends [FormGroup<infer U>] ? FormGroup<U> :\n //
Optional FormGroup containers.\n [T] extends [FormGroup<infer U>|undefined] ? FormGroup<U> :\n //
FormRecord containers.\n [T] extends [FormRecord<infer U>] ? FormRecord<U> :\n // Optional FormRecord

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containers.  
[T] extends [FormRecord<infer U>|undefined] ? FormRecord<U> :  
// FormArray containers.  
[T] extends [FormArray<infer U>] ? FormArray<U> :  
// Optional FormArray containers.  
[T] extends [FormArray<infer U>|undefined] ? FormArray<U> :  
// Otherwise unknown AbstractControl containers.  
[T] extends [AbstractControl<infer U>] ? AbstractControl<U> :  
// Optional AbstractControl containers.  
[T] extends [AbstractControl<infer U>|undefined] ? AbstractControl<U> :  
// FormControlState object container, which produces a nullable control.  
[T] extends [FormControlState<infer U>] ? FormControl<U|N> :  
// A ControlConfig tuple, which produces a nullable control.  
[T] extends [PermissiveControlConfig<infer U>] ? FormControl<Exclude<U, ValidatorConfig>|N> :  
// clang-format on  
/\*\*  
 \* @description  
 \* Creates an `AbstractControl` from a user-specified configuration.  
 \* The `FormBuilder` provides syntactic sugar that shortens creating instances of a  
`FormControl`, `FormGroup`, or `FormArray`. It reduces the amount of boilerplate needed to  
build complex forms.  
@see [Reactive Forms Guide](guide/reactive-forms)  
@publicApi  
@injectable({providedIn: ReactiveFormsModule})  
export class FormBuilder {  
private useNonNullable: boolean = false;  
/\*\*  
 \* @description  
 \* Returns a FormBuilder in which automatically constructed  
@see FormControl} elements  
 \* have `{nonNullable: true}` and are non-nullable.  
 \*  
 \* Constructing non-nullable controls  
 \*  
 \* When constructing a control, it will be non-nullable, and will reset to its initial value.  
 \*  
 \*  
 \*  
 \* let nnfb = new FormBuilder().nonNullable;  
 \* let name = nnfb.control('Alex'); // FormControl<string>  
 \* name.reset(); console.log(name); // 'Alex'  
 \*  
 \* Constructing non-nullable groups or arrays  
 \*  
 \* When constructing a group or array, all automatically created inner controls will be  
 \* non-nullable, and will reset to their initial values.  
 \*  
 \*  
 \*  
 \* let nnfb = new FormBuilder().nonNullable;  
 \* let name = nnfb.group({who: 'Alex'}); // FormGroup<{who: FormControl<string>}>  
 \* name.reset(); console.log(name); // {who: 'Alex'}  
 \*  
 \* Constructing nullable fields on groups or arrays  
 \*  
 \* It is still possible to have a nullable field.  
 \*  
 \* In particular, any `FormControl` which is  
 \* already constructed will not be altered. For example:  
 \*  
 \*  
 \* let nnfb = new FormBuilder().nonNullable;  
 \* // FormGroup<{who: FormControl<string|null>}>  
 \* let name = nnfb.group({who: new FormControl('Alex')});  
 \* name.reset(); console.log(name); // {who: null}  
 \*  
 \* Because the inner control is constructed explicitly by the caller, the builder has  
 \* no control over how it is created, and cannot exclude the `null`.  
 \*  
 \*  
 \* get nonNullable(): NonNullableFormBuilder {  
const nnfb = new FormBuilder();  
nnfb.useNonNullable = true;  
return nnfb as NonNullableFormBuilder;  
}  
/\*\*  
 \* @description  
 \* Constructs a new `FormGroup` instance. Accepts a single generic argument, which is an  
object  
 \* containing all the keys and corresponding inner control types.  
 \* @param controls A collection of child controls. The key for each child is the name  
 \* under which it is registered.  
 \* @param options Configuration options object for the `FormGroup`. The object should have  
the  
 \* `AbstractControlOptions` type and might contain the following fields:  
 \* \* `validators`: A synchronous validator function, or an array of validator functions.  
 \* \* `asyncValidators`: A single async validator or array of async validator functions.  
 \* \* `updateOn`: The event upon which the control should be updated (options: 'change' | 'blur' | 'submit').  
 \*  
 \*  
 \* group<T extends {}>(controls: T, options?: AbstractControlOptions|null,  
 \* ): FormGroup<{[K in keyof T]: Element<T[K], null>}>;  
 \*  
 \*  
 \* @description  
 \* Constructs a new `FormGroup` instance.  
 \* @deprecated This API is not typesafe and can result in issues with Closure Compiler renaming.  
 \* Use the `FormBuilder#group` overload with `AbstractControlOptions` instead.  
 \* Note that `AbstractControlOptions` expects `validators` and `asyncValidators` to be valid  
 \* validators. If you have custom validators, make sure their validation function parameter is  
 \* `AbstractControl` and not a sub-class, such as `FormGroup`. These functions will be called  
 \* with an object of type `AbstractControl` and that cannot be automatically downcast to a  
 \* subclass, so TypeScript sees this as an error. For example, change the  
 \* `(group: FormGroup) => ValidationErrors|null` signature to be  
 \* `(group: AbstractControl) => ValidationErrors|null`.  
 \*  
 \* @param controls A record of child controls. The key for each child is the name  
 \* under which the control is registered.  
 \* @param options Configuration options object for the `FormGroup`. The legacy configuration  
 \* object consists of:  
 \* \* `validator`: A synchronous validator

function, or an array of validator functions.

`asyncValidator`: A single async validator or array of async validator functions

Note: the legacy format is deprecated and might be removed in one of the next major versions of Angular.

```

group(controls: {[key: string]: any}, options: {[key: string]: any}): FormGroup;
group(controls: {[key: string]: any}, options: AbstractControlOptions|{[key: string]: any}|null = null): FormGroup {
  const reducedControls = this._reduceControls(controls);
  let newOptions: FormControlOptions = {};
  if (isAbstractControlOptions(options)) {
    // `options` are `AbstractControlOptions`
    newOptions = options;
  } else if (options !== null) {
    // `options` are legacy form group options
    newOptions.validators = (options as any).validator;
    newOptions.asyncValidators = (options as any).asyncValidator;
  }
  return new FormGroup(reducedControls, newOptions);
}

```

`@description` Constructs a new `FormRecord` instance. Accepts a single generic argument, which is an object containing all the keys and corresponding inner control types.

`@param controls` A collection of child controls. The key for each child is the name under which it is registered.

`@param options` Configuration options object for the `FormRecord`. The object should have the `AbstractControlOptions` type and might contain the following fields:

- `validators`: A synchronous validator function, or an array of validator functions.
- `asyncValidators`: A single async validator or array of async validator functions.
- `updateOn`: The event upon which the control should be updated (options: 'change' | 'blur' | 'submit').

```

record<T>(controls: {[key: string]: T}, options: AbstractControlOptions|null = null): FormRecord<Element<T, null>> {
  const reducedControls = this._reduceControls(controls);
  // Cast to `any` because the inferred types are not as specific as Element.
  return new FormRecord(reducedControls, options) as any;
}

```

`@deprecated` Use `nonNullable` instead.

```

control<T>(formState: T|FormControlState<T>, opts: FormControlOptions&{initialValueIsDefault: true}): FormControl<T>;
control<T>(formState: T|FormControlState<T>, opts: FormControlOptions&{nonNullable: true}): FormControl<T>;

```

`@deprecated` When passing an `options` argument, the `asyncValidator` argument has no effect.

```

control<T>(formState: T|FormControlState<T>, opts: FormControlOptions, asyncValidator: AsyncValidatorFn|AsyncValidatorFn[]): FormControl<T|nullable>;
control<T>(formState: T|FormControlState<T>, validatorOrOpts?: ValidatorFn|ValidatorFn[]|FormControlOptions|null, asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): FormControl<T|nullable>;

```

`@description` Constructs a new `FormControl` with the given state, validators and options. Sets `{nonNullable: true}` in the options to get a non-nullable control. Otherwise, the control will be nullable. Accepts a single generic argument, which is the type of the control's value.

`@param formState` Initializes the control with an initial state value, or with an object that contains both a value and a disabled status.

`@param validatorOrOpts` A synchronous validator function, or an array of such functions, or a `FormControlOptions` object that contains validation functions and a validation trigger.

`@param asyncValidator` A single async validator or array of async validator functions.

`@usageNotes` Initialize a control as disabled

The following example returns a control with an initial value in a disabled state.

```

<code-example path="forms/ts/formBuilder/form_builder_example.ts" region="disabled-control">
control<T>(formState: T|FormControlState<T>, validatorOrOpts?: ValidatorFn|ValidatorFn[]|FormControlOptions|null, asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): FormControl {
  let newOptions: FormControlOptions = {};
  if (!this.useNonNullable) {
    return new FormControl(formState, validatorOrOpts, asyncValidator);
  }
  if (isAbstractControlOptions(validatorOrOpts)) {
    // If the second argument is options, then they are copied.
    newOptions = validatorOrOpts;
  } else {
    // If the other arguments are validators, they are copied into an options object.
    newOptions.validators = validatorOrOpts;
    newOptions.asyncValidators = asyncValidator;
  }
  return new FormControl<T>(formState, {...newOptions, nonNullable: true});
}

```

`@description` Constructs a new `FormArray` from the given array of configurations, validators and options. Accepts a single generic argument, which is the type of each control inside the array.

`@param controls`



```

An array of child controls or control configs. Each child control is given an
 * index when it is registered.
 * @param validatorOrOpts A synchronous validator function, or an array of such functions, or an
`AbstractControlOptions` object that contains
 * validation functions and a validation trigger.
 * @param asyncValidator A single async validator or array of async validator functions.
 */
array<T>(\n controls:
Array<T>, validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n
asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): FormArray<Element<T, never>> {\n
const createdControls =
controls.map(c => this._createControl(c));\n
// Cast to `any` because the inferred types are not as specific as
Element.\n
return new FormArray(createdControls, validatorOrOpts, asyncValidator) as any;\n
}\n
/**
@internal
 */
_reduceControls<T>(controls:\n
[k: string]:
T|ControlConfig<T>|FormControlState<T>|AbstractControl<T>)}:\n
{[key: string]: AbstractControl} {\n
const createdControls: {[key: string]: AbstractControl} = {};\n
Object.keys(controls).forEach(controlName => {\n
createdControls[controlName] =
this._createControl(controls[controlName]);\n
});\n
return createdControls;\n
}\n
/**
@internal
 */
_createControl<T>(controls: T|FormControlState<T>|ControlConfig<T>|FormControl<T>|\n
AbstractControl<T>): FormControl<T>|FormControl<T>|null|AbstractControl<T> {\n
if (controls instanceof
FormControl) {\n
return controls as FormControl<T>;\n
} else if (controls instanceof AbstractControl) { // A
control; just return it\n
return controls;\n
} else if (Array.isArray(controls)) { // ControlConfig Tuple\n
const value: T|FormControlState<T> = controls[0];\n
const validator: ValidatorFn|ValidatorFn[]|null =
controls.length > 1 ? controls[1]! : null;\n
const asyncValidator: AsyncValidatorFn|AsyncValidatorFn[]|null
= \n
controls.length > 2 ? controls[2]! : null;\n
return this.control<T>(value, validator, asyncValidator);\n
} else { // T or FormControlState<T>\n
return this.control<T>(controls);\n
}\n
}\n
}\n
/**
 * @description\n
 * `NonnullableFormBuilder` is similar to `@link FormBuilder`, but automatically constructed\n
 * { @link
FormControl} elements have `{ nullable: true}` and are non-nullable.\n
 * @publicApi\n
 */
@injectable({\n
providedIn: ReactiveFormsModule,\n
useFactory: () => inject(FormBuilder).nullable,\n
})\n
export abstract class
NonnullableFormBuilder {\n
/**
 * Similar to `FormBuilder#group`, except any implicitly constructed
`FormControl`\n
 * will be non-nullable (i.e. it will have `nullable` set to true). Note\n
 * that already-
constructed controls will not be altered.\n
 */
abstract group<T extends {}>(\n
controls: T,\n
options?:
AbstractControlOptions|null,\n
): FormGroup<{[K in keyof
T]: Element<T[K], never>}>;\n
/**
 * Similar to `FormBuilder#record`, except any implicitly constructed
`FormControl`\n
 * will be non-nullable (i.e. it will have `nullable` set to true). Note\n
 * that already-
constructed controls will not be altered.\n
 */
abstract record<T>(\n
controls: {[key: string]: T},\n
options?:
AbstractControlOptions|null,\n
): FormRecord<Element<T, never>>;\n
/**
 * Similar to
`FormBuilder#array`, except any implicitly constructed `FormControl`\n
 * will be non-nullable (i.e. it will have
`nullable` set to true). Note\n
 * that already-constructed controls will not be altered.\n
 */
abstract
array<T>(\n
controls: Array<T>, validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n
asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): FormArray<Element<T, never>>;\n
/**
 * Similar to `FormBuilder#control`, except this overridden version of `control` forces\n
 * `nullable`
to be `true`, resulting in the control always being non-nullable.\n
 */
abstract control<T>(\n
formState:
T|FormControlState<T>,\n
validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n
asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): FormControl<T>;\n
}\n
/**
 * UntypedFormBuilder is the same as @see FormBuilder, but it provides untyped controls.
 */
@injectable({\n
providedIn: ReactiveFormsModule})\n
export class UntypedFormBuilder extends FormBuilder {\n
/**
 * Like `FormBuilder#group`, except the resulting group is untyped.\n
 */
override group(\n
controlsConfig: {[key: string]: any},\n
options?: AbstractControlOptions|null,\n
): UntypedFormGroup;\n
/**
 * @deprecated This API is not typesafe and can result in issues with Closure Compiler renaming.
 * Use
the `FormBuilder#group` overload with `AbstractControlOptions` instead.\n
 */
override group(\n
controlsConfig: {[key: string]: any},\n

```

```

options: {[key: string]: any},\n    ): UntypedFormGroup;\n\n  override group(\n    controlsConfig: {[key: string]: any},\n    options: AbstractControlOptions|{[key: string]: any}|null = null): UntypedFormGroup {\n    return super.group(controlsConfig, options);\n  }\n\n  /**\n   * Like `FormBuilder#control`, except the resulting control is untyped.\n   */\n  override control(\n    formState: any, validatorOrOpts?: ValidatorFn|ValidatorFn[]|FormControlOptions|null,\n    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormControl {\n    return super.control(formState, validatorOrOpts, asyncValidator);\n  }\n\n  /**\n   * Like `FormBuilder#array`, except the resulting array is untyped.\n   */\n  override array(\n    controlsConfig: any[],\n    validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormArray {\n    return super.array(controlsConfig, validatorOrOpts, asyncValidator);\n  }\n}\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\n * @module\n * @description\n * Entry point for all public APIs of the forms package.\n */\nimport {Version} from '@angular/core';\n\n/**\n * @publicApi\n */\nexport const VERSION = new Version('14.3.0');\n\n",/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n */\n\n * @module\n * @description\n * This module is used for handling user input, by defining and building a `FormGroup` that\n * consists of `FormControl` objects, and mapping them onto the DOM. `FormControl`\n * objects can then be used to read information from the form DOM elements.\n *\n * Forms providers are not included in\n *\n * default providers; you must import these providers\n * explicitly.\n */\nexport {InternalFormsSharedModule} from './directives';\nexport {AbstractControlDirective} from './directives/abstract_control_directive';\nexport {AbstractFormGroupDirective} from './directives/abstract_form_group_directive';\nexport {CheckboxControlValueAccessor} from './directives/checkbox_value_accessor';\nexport {ControlContainer} from './directives/control_container';\nexport {ControlValueAccessor, NG_VALUE_ACCESSOR} from './directives/control_value_accessor';\nexport {COMPOSITION_BUFFER_MODE, DefaultValueAccessor} from './directives/default_value_accessor';\nexport {Form} from './directives/form_interface';\nexport {NgControl} from './directives/ng_control';\nexport {NgControlStatus, NgControlStatusGroup} from './directives/ng_control_status';\nexport {NgForm} from './directives/ng_form';\nexport {NgModel} from './directives/ng_model';\nexport {NgModelGroup} from './directives/ng_model_group';\nexport {NgNoValidate} from './directives/ng_no_validate_directive';\nexport {NumberValueAccessor} from './directives/number_value_accessor';\nexport {RadioControlValueAccessor} from './directives/radio_control_value_accessor';\nexport {RangeValueAccessor} from './directives/range_value_accessor';\nexport {FormControlDirective} from './directives/reactive_directives/form_control_directive';\nexport {FormControlName} from './directives/reactive_directives/form_control_name';\nexport {FormGroupDirective} from './directives/reactive_directives/form_group_directive';\nexport {FormArrayName, FormGroupName} from './directives/reactive_directives/form_group_name';\nexport {NgSelectOption, SelectControlValueAccessor} from './directives/select_control_value_accessor';\nexport {SelectMultipleControlValueAccessor, NgSelectMultipleOption} from './directives/select_multiple_control_value_accessor';\nexport {AsyncValidator, AsyncValidatorFn, CheckboxRequiredValidator, EmailValidator, MaxLengthValidator, MaxValidator, MinLengthValidator, MinValidator, PatternValidator, RequiredValidator, ValidationErrors, Validator, ValidatorFn} from './directives/validators';\nexport {ControlConfig, FormBuilder, NonNullableFormBuilder, UntypedFormBuilder, Element} from './form_builder';\nexport {AbstractControl, AbstractControlOptions, FormControlStatus, CoerceStrArrToNumArr, GetProperty, Navigate, RawValue, Tokenize, TypedOrUntyped, Value, Writable} from './model/abstract_model';\nexport {FormArray, UntypedFormArray, FormArrayRawValue, FormArrayValue} from './model/form_array';\nexport {FormControl, FormControlOptions, FormControlState,

```

```
UntypedFormControl, FormControlCtor} from './model/form_control';\nexport {FormGroup, FormRecord,  
UntypedFormGroup, FormGroupRawValue, FormGroupValue, OptionalKeys} from './model/form_group';\nexport  
{NG_ASYNC_VALIDATORS, NG_VALIDATORS, Validators} from './validators';\nexport {VERSION} from  
 './version';\n\nexport * from './form_providers';\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license  
that can be\n * found in the LICENSE file at https://angular.io/license\n * \n\n\n * @module\n * @description\n * Entry point for all public APIs of this package.\n * \n\nexport * from './src/forms';\n\n// This file only reexports  
content of the `src` folder. Keep it that way.\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n * \n\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at  
https://angular.io/license\n * \n\n// This file is not used to build this module. It is only used during editing\n// by the  
TypeScript language service and during build for verification. `ngc`\n// replaces this file with production index.ts  
when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n\n", "/*\n * Generated bundle index. Do  
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AAc,CAAC,CAAC;KACrE;;0HAzCU,kBAAkB,EAAA,IAAA,EAAA,IAAA,EAAA,MAAA,EAAA,EAAA,CAAA  
,eAAA,CAAA,UAAA,EAAA,CAAA,CAAA;AAAIb,kBAAA,CAAA,KAAA,GAAA,EAAA,CAAA,qBAAA,CAA  
A,EAAA,UAAA,EAAA,QAAA,EAAA,OAAA,EAAA,mBAAA,EAAA,QAAA,EAAA,EAAA,EAAA,IAAA,EAA  
A,kBAAkB,cADN,mBAAmB,EAAA,CAAA,CAAA;sGAC/B,kBAAkB,EAAA,UAAA,EAAA,CAAA;kBAD9B,U  
AAU;mBAAC,EAAC,UAAU,EAAE,mBAAmB,EAAC,CAAA;;AC1Z7C;;;;;AAMG;AAUH;;AAEG;MACU,OA  
AO,GAAG,IAAI,OAAO,CAAC,mBAAmB;;ACnBtD;;;;;AAMG;;ACNH;;;;;AAMG;AASH;;ACfA;;;;;AAMG;;A  
CNH;;AAEG;;;"}  
}

Found

in path(s):

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/fesm2015/forms.mjs.map  
No license file was found, but licenses were detected in source scan.

Angular

=====

The sources for this package are in the main [Angular](https://github.com/angular/angular) repo. Please file issues and pull requests against that repo.

Usage information and reference details can be found in [Angular documentation](https://angular.io/docs).

License: MIT

Found in path(s):

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/README.md  
No license file was found, but licenses were detected in source scan.

/\*\*

\* @license Angular v14.3.0

\* (c) 2010-2022 Google LLC. https://angular.io/

\* License: MIT

\*/

/\*\*

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\*/

Found in path(s):

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/fesm2015/forms.mjs

\* /opt/cola/permits/1784583527\_1693546591.9448414/0/forms-14-3-0-1-tgz/package/fesm2020/forms.mjs

No license file was found, but licenses were detected in source scan.

```
{"version":3,"file":"forms.mjs","sources":["../../../../packages/forms/src/directives/control_value_accessor.ts","../../../../packages/forms/src/directives/checkbox_value_accessor.ts","../../../../packages/forms/src/directives/default_value_accessor.ts","../../../../packages/forms/src/validators.ts","../../../../packages/forms/src/directives/abstract_control_directive.ts","../../../../packages/forms/src/directives/control_container.ts","../../../../packages/forms/src/directives/ng_control.ts","../../../../packages/forms/src/directives/ng_control_status.ts","../../../../packages/forms/src/directives/error_examples.ts","../../../../packages/forms/src/directives/reactive_errors.ts","../../../../packages/forms/src/model/abstract_model.ts","../../../../packages/forms/src/model/form_group.ts","../../../../packages/forms/src/directives/shared.ts","../../../../packages/forms/src/directives/ng_form.ts","../../../../packages/forms/src/util.ts","../../../../packages/forms/src/model/form_control.ts","../../../../packages/forms/src/directives/abstract_form_group_directive.ts","../../../../packages/forms/src/directives/template_driven_errors.ts","../../../../
```

```
../packages/forms/src/directives/ng_model_group.ts", "../packages/forms/src/directives/ng_model.ts", ..  
../packages/forms/src/directives/ng_no_validate_directive.ts", "../packages/forms/src/directives/num  
ber_value_accessor.ts", "../packages/forms/src/directives/radio_control_value_accessor.ts", "../pac  
kages/forms/src/directives/range_value_accessor.ts", "../packages/forms/src/directives/reactive_directives/f  
orm_control_directive.ts", "../packages/forms/src/directives/reactive_directives/form_group_directive.ts", "  
../packages/forms/src/directives/reactive_directives/form_group_name.ts", "../packages/forms/src/  
directives/reactive_directives/form_control_name.ts", "../packages/forms/src/directives/select_control_valu  
e_accessor.ts", "../packages/forms/src/directives/select_multiple_control_value_accessor.ts", "../pa  
ckages/forms/src/directives/validators.ts", "../packages/forms/src/directives.ts", "../packages/forms  
/src/form_providers.ts", "../packages/forms/src/model/form_array.ts", "../packages/forms/src/form  
_builder.ts", "../packages/forms/src/version.ts", "../packages/forms/src/forms.ts", "../pack  
ages/forms/public_api.ts", "../packages/forms/index.ts", "../packages/forms/forms.ts"], "sourcesCo  
ntent":["/**\n
```

```
* @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an  
MIT-style license that can be\n  
* found in the LICENSE file at https://angular.io/license\n *\n\nimport {Directive, ElementRef, InjectionToken,  
Renderer2} from '@angular/core';\n\n/**\n * @description\n * Defines an interface that acts as a bridge between the  
Angular forms API and a\n * native element in the DOM.\n *\n * Implement this interface to create a custom form  
control directive\n * that integrates with Angular forms.\n *\n * @see DefaultValueAccessor\n *\n * @publicApi\n *\n\nexport interface ControlValueAccessor {\n  /**\n   * @description\n   * Writes a new value to the element.\n   *\n   * This method is called by the forms API to write to the view when programmatic\n   * changes from model to  
view are requested.\n   *\n   * @usageNotes\n   * ### Write a value to the element\n   *\n   * The following example  
writes a value to the native DOM element.\n   *\n   * ```ts\n   * writeValue(value: any): void {\n   *   this._renderer.setProperty(this._elementRef.nativeElement, 'value', value);\n   * }\n   * ```\n   *\n   * @param obj The new value for the element\n   *\n   * writeValue(obj: any): void;\n   */\n  writeValue(value: any): void;\n\n  /**\n   * @description\n   * Registers a callback function that is called when the control's value\n   * changes in the UI.\n   *\n   * This method is called by the forms API on initialization to update the form\n   * model when values  
propagate from the view to the model.\n   *\n   * When implementing the `registerOnChange` method in your own  
value accessor,\n   * save the given function so your class calls it at the appropriate time.\n   *\n   * @usageNotes\n   * ### Store the change function\n   *\n   * The following example stores the provided function as an internal  
method.\n   *\n   * ```ts\n   * registerOnChange(fn: (_: any) => void): void {\n   *   this._onChange = fn;\n   * }\n   * ```\n   *\n   * When the value changes in the UI, call the registered\n   * function to allow the forms API to update  
itself:\n   *\n   * ```ts\n   * host: {\n   *   '(change)': '_onChange($event.target.value)'\n   * }\n   * ```\n   *\n   * @param fn The callback function to register\n   *\n   * registerOnChange(fn: any): void;\n   */\n  registerOnChange(fn: any): void;\n\n  /**\n   * @description\n   * Registers a callback function that is called by the forms API on initialization\n   * to  
update the form model on blur.\n   *\n   * When implementing `registerOnTouched` in your own value accessor,  
save the given\n   * function so your class calls it when the control should be considered\n   * blurred or  
\"touched\".\n   *\n   * @usageNotes\n   * ### Store the callback function\n   *\n   * The following example stores  
the provided function as an internal method.\n   *\n   * ```ts\n   * registerOnTouched(fn: any): void {\n   *   this._onTouched = fn;\n   * }\n   * ```\n   *\n   * On blur (or equivalent), your class should call the registered  
function to allow\n   * the forms API to update itself:\n   *\n   * ```ts\n   * host: {\n   *   '(blur)': '_onTouched()'\n   * }\n   * ```\n   *\n   * @param fn The callback function to register\n   *\n   * registerOnTouched(fn: any): void;\n   */\n  registerOnTouched(fn: any): void;\n\n  /**\n   * @description\n   * Function that is called by the forms API  
when the control status changes to\n   * or from 'DISABLED'. Depending on the status, it enables or disables the\n   * appropriate DOM element.\n   *\n   * @usageNotes\n   * The following is an example of writing the disabled  
property to a native DOM element:\n   *\n   * ```ts\n   * setDisabledState(isDisabled: boolean): void {\n   *   this._renderer.setProperty(this._elementRef.nativeElement, 'disabled', isDisabled);\n   * }\n   * ```\n   *\n   * @param isDisabled The disabled status to set on the element\n   *\n   * setDisabledState?(isDisabled: boolean):
```

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void; \n } \n \n /** \n * Base class for all ControlValueAccessor classes defined in Forms package. \n * Contains
common logic and utility functions. \n * \n * Note: this is an *internal-only* class and should not be extended or used
directly in \n * applications code. \n * \n @Directive() \n export class BaseControlValueAccessor
{ \n /** \n * The registered callback function called when a change or input event occurs on the input \n *
element. \n * @nodoc \n */ \n onChange = (_: any) => {} \n \n /** \n * The registered callback function called
when a blur event occurs on the input element. \n * @nodoc \n */ \n onTouched = () => {} \n \n constructor(private
_renderer: Renderer2, private _elementRef: ElementRef) { \n } \n \n /** \n * Helper method that sets a property on a
target element using the current Renderer \n * implementation. \n * @nodoc \n */ \n protected setProperty(key:
string, value: any): void { \n this._renderer.setProperty(this._elementRef.nativeElement, key, value); \n } \n \n /** \n
* Registers a function called when the control is touched. \n * @nodoc \n */ \n registerOnTouched(fn: () => void):
void { \n this.onTouched = fn; \n } \n \n /** \n * Registers a function called when the control value changes. \n *
@nodoc \n */ \n registerOnChange(fn: (_: any) => {}): void { \n this.onChange
= fn; \n } \n \n /** \n * Sets the \"disabled\" property on the range input element. \n * @nodoc \n */ \n
setDisabledState(isDisabled: boolean): void { \n this.setProperty('disabled', isDisabled); \n } \n } \n \n \n /** \n * Base
class for all built-in ControlValueAccessor classes (except DefaultValueAccessor, which is \n * used in case no other
CVAs can be found). We use this class to distinguish between default CVA, \n * built-in CVAs and custom CVAs,
so that Forms logic can recognize built-in CVAs and treat custom \n * ones with higher priority (when both built-in
and custom CVAs are present). \n * \n * Note: this is an *internal-only* class and should not be extended or used
directly in \n * applications code. \n * \n @Directive() \n export class BuiltInControlValueAccessor extends
BaseControlValueAccessor { \n } \n \n \n /** \n * Used to provide a `ControlValueAccessor` for form controls. \n * \n *
See `DefaultValueAccessor` for how to implement one. \n * \n * @publicApi \n */ \n export const
NG_VALUE_ACCESSOR
= \n new InjectionToken<ReadonlyArray<ControlValueAccessor>>('NgValueAccessor'); \n } \n \n /** \n * @license
 \n * Copyright Google LLC All Rights Reserved. \n * \n * Use of this source code is governed by an MIT-style license
that can be \n * found in the LICENSE file at https://angular.io/license \n * \n \n \n import { Directive, ElementRef,
forwardRef, Renderer2 } from '@angular/core'; \n \n import { BuiltInControlValueAccessor, ControlValueAccessor,
NG_VALUE_ACCESSOR } from './control_value_accessor'; \n \n export const CHECKBOX_VALUE_ACCESSOR:
any = { \n provide: NG_VALUE_ACCESSOR, \n useExisting: forwardRef(() =>
CheckboxControlValueAccessor), \n multi: true, \n }; \n \n \n /** \n * @description \n * A `ControlValueAccessor` for
writing a value and listening to changes on a checkbox input \n * element. \n * \n * @usageNotes \n * \n * ### Using a
checkbox with a reactive form. \n * \n * The following example shows how to use a checkbox with a reactive form. \n *
 \n * ```ts \n * const rememberLoginControl = new FormControl(); \n *
 \n * ``` \n * \n * <input type=\"checkbox\" [formControl]=\"rememberLoginControl\"> \n * ``` \n * \n *
 \n * @ngModule ReactiveFormsModule \n * @ngModule FormsModule \n * @publicApi \n */ \n @Directive({ \n
selector: \n
'input[type=checkbox][formControlName], input[type=checkbox][formControl], input[type=checkbox][ngModel]', \n
host: {'(change)': 'onChange($event.target.checked)', '(blur)': 'onTouched()' }, \n providers:
[CHECKBOX_VALUE_ACCESSOR] \n }) \n export class CheckboxControlValueAccessor extends
BuiltInControlValueAccessor implements \n ControlValueAccessor { \n /** \n * Sets the \"checked\" property on
the input element. \n * @nodoc \n */ \n writeValue(value: any): void { \n this.setProperty('checked', value); \n
} \n } \n \n \n /** \n * @license \n * Copyright Google LLC All Rights Reserved. \n * \n * Use of this source code is
governed by an MIT-style license that can be \n * found in the LICENSE file at https://angular.io/license \n
 \n * \n \n import { getDOM as getDOM } from '@angular/common'; \n \n import
{ Directive, ElementRef, forwardRef, Inject, InjectionToken, Optional, Renderer2 } from '@angular/core'; \n \n import
{ BaseControlValueAccessor, ControlValueAccessor, NG_VALUE_ACCESSOR } from
'./control_value_accessor'; \n \n export const DEFAULT_VALUE_ACCESSOR: any = { \n provide:
NG_VALUE_ACCESSOR, \n useExisting: forwardRef(() => DefaultValueAccessor), \n multi: true \n }; \n \n \n \n /** \n *
We must check whether the agent is Android because composition events \n * behave differently between iOS and

```

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Android.\n *\nfunction _isAndroid(): boolean {\n  const userAgent = getDOM() ? getDOM().getUserAgent() : "";
  return /android (\\d+)/.test(userAgent.toLowerCase());\n}\n\n/**\n * @description\n * Provide this token to control
if form directives buffer IME input until\n * the "compositionend" event occurs.\n * @publicApi\n *\nexport
const COMPOSITION_BUFFER_MODE = new InjectionToken<boolean>('CompositionEventMode');\n\n/**\n *
The default `ControlValueAccessor` for writing a value and
listening to changes on input\n * elements. The accessor is used by the `FormControlDirective`,
`FormControlName`, and\n * `NgModel` directives.\n *\n * {@searchKeywords ngDefaultControl}\n *\n *
@usageNotes\n *\n * ### Using the default value accessor\n *\n * The following example shows how to use an
input element that activates the default value accessor\n * (in this case, a text field).\n *\n * ```ts\n * const
firstNameControl = new FormControl();\n * ```\n *\n * ```\n * <input type="text"\n *
[formControl]=\n * "firstNameControl">\n * ```\n *\n * This value accessor is used by default for `<input
type="text">` and `<textarea>` elements, but\n * you could also use it for custom components that have similar
behavior and do not require special\n * processing. In order to attach the default value accessor to a custom element,
add the\n * `ngDefaultControl` attribute as shown below.\n *\n * ```\n * <custom-input-component
ngDefaultControl [(ngModel)]=\n * "value"></custom-input-component>\n *
```.\n *\n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n * @publicApi\n
*\n *\n * @Directive({\n  selector:\n
'input:not([type=checkbox])[formControlName],textarea[formControlName],input:not([type=checkbox])[formContr
ol],textarea[formControl],input:not([type=checkbox])[ngModel],textarea[ngModel],[ngDefaultControl]',\n
//
TODO: vsavkin replace the above selector with the one below it once\n //
https://github.com/angular/angular/issues/3011 is implemented\n // selector:
'[ngModel],[formControl],[formControlName]',\n  host: {\n    '(input)':
'$any(this)._handleInput($event.target.value)',\n    '(blur)': 'onTouched()',\n    '(compositionstart)':
'$any(this)._compositionStart()',\n    '(compositionend)': '$any(this)._compositionEnd($event.target.value)'\n  },\n
providers: [DEFAULT_VALUE_ACCESSOR]\n})\nexport class DefaultValueAccessor extends
BaseControlValueAccessor implements ControlValueAccessor {\n  /** Whether the user is creating a composition
string (IME events). *\n
private _composing = false;\n\n  constructor(\n    renderer: Renderer2, elementRef: ElementRef,\n
@Optional() @Inject(COMPOSITION_BUFFER_MODE) private _compositionMode: boolean) {\n
super(renderer, elementRef);\n    if (this._compositionMode == null) {\n      this._compositionMode =
!_isAndroid();\n    }\n  }\n\n  /**\n * Sets the "value" property on the input element.\n * @nodoc\n *\n
writeValue(value: any): void {\n    const normalizedValue = value == null ? '' : value;\n    this.setProperty('value',
normalizedValue);\n  }\n\n  /** @internal *\n  _handleInput(value: any): void {\n    if (!this._compositionMode ||
(this._compositionMode && !this._composing)) {\n      this.onChange(value);\n    }\n  }\n\n  /** @internal *\n
_compositionStart(): void {\n    this._composing = true;\n  }\n\n  /** @internal *\n  _compositionEnd(value: any):
void {\n    this._composing = false;\n    this._compositionMode && this.onChange(value);\n  }\n}\n\n",/**\n *
@license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n\nimport {InjectionToken, isObservable as
isObservable, isPromise as isPromise, RuntimeError as RuntimeError} from '@angular/core';\nimport {forkJoin,
from, Observable} from 'rxjs';\nimport {map} from 'rxjs/operators';\n\nimport {AsyncValidator, AsyncValidatorFn,
ValidationErrors, Validator, ValidatorFn} from './directives/validators';\nimport {RuntimeErrorCode} from
'./errors';\nimport {AbstractControl} from './model/abstract_model';\n\nconst NG_DEV_MODE = typeof
ngDevMode === 'undefined' || !!ngDevMode;\n\nfunction isEmptyInputValue(value: any): boolean {\n  /**\n *
Check if the object is a string or array before evaluating the length attribute.\n * This avoids falsely rejecting
objects that contain a custom length attribute.\n * For example, the object {id: 1, length: 0, width: 0} should not
be returned as empty.\n *\n * return value == null ||\n * ((typeof value === 'string' || Array.isArray(value)) &&
value.length === 0);\n}\n\nfunction hasValidLength(value: any): boolean {\n  // non-strict comparison is intentional,

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to check for both `null` and `undefined` values\n return value != null && typeof value.length ===  
`number`;\n}\n\n/\*\*\n \* @description\n \* An `InjectionToken` for registering additional synchronous validators used  
with\n \* `AbstractControl`s.\n \* @see `NG\_ASYNC\_VALIDATORS`\n \* @usageNotes\n \* ###  
Providing a custom validator\n \* The following example registers a custom validator directive. Adding the  
validator to the\n \* existing collection of validators requires the `multi: true` option.\n \* \n \* ``typescript\n \*  
@Directive({\n \* selector: '[customValidator]',\n \* providers: [{provide: NG\_VALIDATORS, useExisting:  
CustomValidatorDirective, multi: true}]\n \* })\n \* class CustomValidatorDirective implements Validator {\n \*  
validate(control:  
AbstractControl): ValidationErrors | null {\n \* return { 'custom': true };}\n \* }\n \* }\n \* @publicApi\n \*  
\nexport const NG\_VALIDATORS = new InjectionToken<Array<Validator|Function>>('NgValidators');\n\n/\*\*\n \*  
@description\n \* An `InjectionToken` for registering additional asynchronous validators used with\n \*  
`AbstractControl`s.\n \* @see `NG\_ASYNC\_VALIDATORS`\n \* @usageNotes\n \* ### Provide a custom async  
validator directive\n \* The following example implements the `AsyncValidator` interface to create an\n \* async  
validator directive with a custom error key.\n \* \n \* ``typescript\n \* @Directive({\n \* selector:  
'[customAsyncValidator]',\n \* providers: [{provide: NG\_ASYNC\_VALIDATORS, useExisting:  
CustomAsyncValidatorDirective, multi:\n \* true}]\n \* })\n \* class CustomAsyncValidatorDirective implements  
AsyncValidator {\n \* validate(control: AbstractControl): Promise<ValidationErrors|null> {\n \* return  
Promise.resolve({'custom': true});\n \*  
}\n \* }\n \* @publicApi\n \*  
\nexport const NG\_ASYNC\_VALIDATORS =\n \* new  
InjectionToken<Array<Validator|Function>>('NgAsyncValidators');\n\n/\*\*\n \* A regular expression that matches  
valid e-mail addresses.\n \* At a high level, this regexp matches e-mail addresses of the format `local-part@tld`,  
where:\n \* - `local-part` consists of one or more of the allowed characters (alphanumeric and some\n \* punctuation  
symbols).\n \* - `local-part` cannot begin or end with a period (`.`).\n \* - `local-part` cannot be longer than 64  
characters.\n \* - `tld` consists of one or more `labels` separated by periods (`.`). For example `localhost` or\n \*  
`foo.com`.\n \* - A `label` consists of one or more of the allowed characters (alphanumeric, dashes (`-`) and\n \*  
periods (`.`)).\n \* - A `label` cannot begin or end with a dash (`-`) or a period (`.`).\n \* - A `label` cannot be longer  
than 63 characters.\n \* - The whole address cannot be longer than 254 characters.\n \* \n \* ## Implementation  
background\n \* This regexp was ported over from AngularJS (see there for git history):\n \*  
<https://github.com/angular/angular.js/blob/c133ef836/src/ng/directive/input.js#L27>\n \* It is based on the\n \*  
[WHATWG version](<https://html.spec.whatwg.org/multipage/input.html#valid-e-mail-address>) with\n \* some  
enhancements to incorporate more RFC rules (such as rules related to domain names and the\n \* lengths of different  
parts of the address). The main differences from the WHATWG version are:\n \* - Disallow `local-part` to begin or  
end with a period (`.`).\n \* - Disallow `local-part` length to exceed 64 characters.\n \* - Disallow total address  
length to exceed 254 characters.\n \* \n \* See [this commit](<https://github.com/angular/angular.js/commit/f3f5cf72e>)  
for more details.\n \* \n \* const EMAIL\_REGEXP =\n \* /^(?=[1,254]\$)(?=[1,64]@)[a-zA-Z0-  
9!#\$%&'\*/+/?^\_`{}~~]+(?:\\.([a-zA-Z0-9!#\$%&'\*/+/?^\_`{}~~]+)\*@[a-zA-Z0-9](?:[a-zA-Z0-9-]{0,61}[a-zA-Z0-  
9])?(?:\\.([a-zA-Z0-9](?:[a-zA-Z0-9-]{0,61}[a-zA-Z0-9])?)\*\$);\n\n/\*\*\n \*  
@description\n \* Provides a set of built-in validators that can be used by form controls.\n \* \n \* A validator is a  
function that processes a `FormControl` or collection of\n \* controls and returns an error map or null. A null map  
means that validation has passed.\n \* \n \* @see [Form Validation](/guide/form-validation)\n \* \n \* @publicApi\n \*  
\nexport class Validators {\n \* /\*\*\n \* @description\n \* Validator that requires the control's value to be greater  
than or equal to the provided number.\n \* \n \* @usageNotes\n \* ### Validate against a minimum of 3\n \*  
\n \* ``typescript\n \* const control = new FormControl(2, Validators.min(3));\n \* \n \*  
console.log(control.errors); // {min: {min: 3, actual: 2}}\n \* \n \* \n \* @returns A validator function that  
returns an error map with the\n \* `min` property if the validation check fails, otherwise `null`.\n \* \n \* @see  
`updateValueAndValidity()`\n \* \n \* \n \* static min(min:  
number): ValidatorFn {\n \* return minValidator(min);\n \* }\n \* }\n \* /\*\*\n \* @description\n \* Validator that requires  
the control's value to be less than or equal to the provided number.\n \* \n \* @usageNotes\n \* \n \* ### Validate



```

against a maximum of 15\n * \n * ``typescript\n * const control = new FormControl(16, Validators.max(15));\n
*\n * console.log(control.errors); // {max: {max: 15, actual: 16}}\n * ``\n *\n * @returns A validator function
that returns an error map with the\n * `max` property if the validation check fails, otherwise `null`.\n *\n * @see
`updateValueAndValidity()`\n *\n */\n static max(max: number): ValidatorFn {\n return maxValidator(max);\n
}\n\n /**\n * @description\n * Validator that requires the control have a non-empty value.\n *\n *
@usageNotes\n *\n * ### Validate that the field is non-empty\n *\n * ``typescript\n * const control = new
FormControl("", Validators.required);\n *\n * console.log(control.errors);\n
// {required: true}\n * ``\n *\n * @returns An error map with the `required` property\n * if the validation
check fails, otherwise `null`.\n *\n * @see `updateValueAndValidity()`\n *\n */\n static required(control:
AbstractControl): ValidationErrors|null {\n return requiredValidator(control);\n }\n\n /**\n * @description\n *
Validator that requires the control's value be true. This validator is commonly\n * used for required checkboxes.\n
*\n * @usageNotes\n *\n * ### Validate that the field value is true\n *\n * ``typescript\n * const control =
new FormControl('some value', Validators.requiredTrue);\n *\n * console.log(control.errors); // {required: true}\n
* ``\n *\n * @returns An error map that contains the `required` property\n * set to `true` if the validation check
fails, otherwise `null`.\n *\n * @see `updateValueAndValidity()`\n *\n */\n static requiredTrue(control:
AbstractControl): ValidationErrors|null
{\n return requiredTrueValidator(control);\n }\n\n /**\n * @description\n * Validator that requires the
control's value pass an email validation test.\n *\n * Tests the value using a [regular\n *
expression](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Regular_Expressions)\n * pattern
suitable for common use cases. The pattern is based on the definition of a valid email\n * address in the
[WHATWG HTML\n * specification](https://html.spec.whatwg.org/multipage/input.html#valid-e-mail-address)
with\n * some enhancements to incorporate more RFC rules (such as rules related to domain names and the\n *
lengths of different parts of the address).\n *\n * The differences from the WHATWG version include:\n * -
Disallow `local-part` (the part before the `@` symbol) to begin or end with a period (`.`).\n * - Disallow `local-part`
to be longer than 64 characters.\n * - Disallow the whole address to be longer than 254 characters.\n *\n
* If this pattern does not satisfy your business needs, you can use `Validators.pattern()` to\n * validate the value
against a different pattern.\n *\n * @usageNotes\n *\n * ### Validate that the field matches a valid email
pattern\n *\n * ``typescript\n * const control = new FormControl('bad@', Validators.email);\n *\n *
console.log(control.errors); // {email: true}\n * ``\n *\n * @returns An error map with the `email` property\n *
if the validation check fails, otherwise `null`.\n *\n * @see `updateValueAndValidity()`\n *\n */\n static
email(control: AbstractControl): ValidationErrors|null {\n return emailValidator(control);\n }\n\n /**\n *
@description\n * Validator that requires the length of the control's value to be greater than or equal\n * to the
provided minimum length. This validator is also provided by default if you use the\n * the HTML5 `minlength`
attribute. Note that the `minLength` validator is intended to be used\n
*\n * only for types that have a numeric `length` property, such as strings or arrays. The\n * `minLength` validator
logic is also not invoked for values when their `length` property is 0\n * (for example in case of an empty string or
an empty array), to support optional controls. You\n * can use the standard `required` validator if empty values
should not be considered valid.\n *\n * @usageNotes\n *\n * ### Validate that the field has a minimum of 3
characters\n *\n * ``typescript\n * const control = new FormControl('ng', Validators.minLength(3));\n *\n *
console.log(control.errors); // {minlength: {requiredLength: 3, actualLength: 2}}\n * ``\n *\n * ``html\n *
<input minlength="5">\n * ``\n *\n * @returns A validator function that returns an error map with the\n *
`minlength` property if the validation check fails, otherwise `null`.\n *\n * @see `updateValueAndValidity()`\n
*\n */\n static minLength(minLength: number): ValidatorFn
{\n return minLengthValidator(minLength);\n }\n\n /**\n * @description\n * Validator that requires the
length of the control's value to be less than or equal\n * to the provided maximum length. This validator is also
provided by default if you use the\n * the HTML5 `maxlength` attribute. Note that the `maxLength` validator is
intended to be used\n * only for types that have a numeric `length` property, such as strings or arrays.\n *\n *
@usageNotes\n *\n * ### Validate that the field has maximum of 5 characters\n *\n * ``typescript\n * const

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control = new FormControl('Angular', Validators.maxLength(5));\n * console.log(control.errors); //
{maxlength: {requiredLength: 5, actualLength: 7}}\n * \`\`\`\n * \`\`\`html\n * <input maxlength="5">\n *
\`\`\`\n * \n * @returns A validator function that returns an error map with the\n * `maxlength` property if the
validation check fails, otherwise `null`.\n * \n * @see `updateValueAndValidity()`\n
*\n * \n static maxLength(maxLength: number): ValidatorFn {\n return maxLengthValidator(maxLength);\n
}\n\n /**\n * @description\n * Validator that requires the control's value to match a regex pattern. This validator
is also\n * provided by default if you use the HTML5 `pattern` attribute.\n * \n * @usageNotes\n * \n * ###
Validate that the field only contains letters or spaces\n * \n * \`\`\`typescript\n * const control = new
FormControl('1', Validators.pattern('[a-zA-Z ]*'));\n * console.log(control.errors); // {pattern:
{requiredPattern: '^[a-zA-Z ]*$', actualValue: '1'}}\n * \`\`\`\n * \n * \`\`\`html\n * <input pattern="[a-zA-Z ]*">\n
*\n * \n * ### Pattern matching with the global or sticky flag\n * \n * `RegExp` objects created with the `g` or
`y` flags that are passed into `Validators.pattern`\n * can produce different results on the same input when
validations are run consecutively. This is\n * due to how the behavior of
`RegExp.prototype.test` is\n * specified in [ECMA-262](https://tc39.es/ecma262/#sec-regexpbuiltinexec)\n *
(`RegExp` preserves the index of the last match when the global or sticky flag is used).\n * Due to this behavior, it
is recommended that when using\n * `Validators.pattern` you **do not** pass in a `RegExp` object with either the
global or sticky\n * flag enabled.\n * \n * \`\`\`typescript\n * // Not recommended (since the `g` flag is used)\n *
const controlOne = new FormControl('1', Validators.pattern(/foo/g));\n * \n * // Good\n * const controlTwo =
new FormControl('1', Validators.pattern(/foo/));\n * \n * \n * @param pattern A regular expression to be used
as is to test the values, or a string.\n * If a string is passed, the `^` character is prepended and the `$` character is\n
* appended to the provided string (if not already present), and the resulting regular\n * expression is used to test the
values.\n * \n * @returns A validator function
that returns an error map with the\n * `pattern` property if the validation check fails, otherwise `null`.\n * \n *
@see `updateValueAndValidity()`\n * \n * \n static pattern(pattern: string|RegExp): ValidatorFn {\n return
patternValidator(pattern);\n }\n\n /**\n * @description\n * Validator that performs no operation.\n * \n * @see
`updateValueAndValidity()`\n * \n * \n static nullValidator(control: AbstractControl): ValidationErrors|null {\n
return nullValidator(control);\n }\n\n /**\n * @description\n * Compose multiple validators into a single
function that returns the union\n * of the individual error maps for the provided control.\n * \n * @returns A
validator function that returns an error map with the\n * merged error maps of the validators if the validation check
fails, otherwise `null`.\n * \n * @see `updateValueAndValidity()`\n * \n * \n static compose(validators: null):
null;\n static compose(validators: (ValidatorFn|null|undefined)[]):
ValidatorFn|null;\n static compose(validators: (ValidatorFn|null|undefined)[]|null): ValidatorFn|null {\n return
compose(validators);\n }\n\n /**\n * @description\n * Compose multiple async validators into a single function
that returns the union\n * of the individual error objects for the provided control.\n * \n * @returns A validator
function that returns an error map with the\n * merged error objects of the async validators if the validation check
fails, otherwise `null`.\n * \n * @see `updateValueAndValidity()`\n * \n * \n static composeAsync(validators:
(AsyncValidatorFn|null)[]): AsyncValidatorFn|null {\n return composeAsync(validators);\n }\n}\n\n /**\n *
Validator that requires the control's value to be greater than or equal to the provided number.\n * See
`Validators.min` for additional information.\n * \n * \n export function minValidator(min: number): ValidatorFn {\n
return (control: AbstractControl): ValidationErrors|null => {\n if (isEmptyInputValue(control.value)
|| isEmptyInputValue(min)) {\n return null; // don't validate empty values to allow optional controls\n }\n
const value = parseFloat(control.value);\n // Controls with NaN values after parsing should be treated as not
having a\n // minimum, per the HTML forms spec: https://www.w3.org/TR/html5/forms.html#attr-input-min\n
return !isNaN(value) && value < min ? {'min': {'min': min, 'actual': control.value}} : null;\n };}\n\n /**\n *
Validator that requires the control's value to be less than or equal to the provided number.\n * See `Validators.max`
for additional information.\n * \n * \n export function maxValidator(max: number): ValidatorFn {\n return (control:
AbstractControl): ValidationErrors|null => {\n if (isEmptyInputValue(control.value) || isEmptyInputValue(max))
{\n return null; // don't validate empty values to allow optional controls\n }\n const value =

```

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parseFloat(control.value);\n // Controls with NaN values after
parsing should be treated as not having a\n // maximum, per the HTML forms spec:
https://www.w3.org/TR/html5/forms.html#attr-input-max\n return !isNaN(value) && value > max ? {'max':
{'max': max, 'actual': control.value}} : null;\n };}\n\n/**\n * Validator that requires the control have a non-empty
value.\n * See `Validators.required` for additional information.\n */\nexport function requiredValidator(control:
AbstractControl): ValidationErrors|null {\n return isEmptyInputValue(control.value) ? {'required': true} :
null;\n}\n\n/**\n * Validator that requires the control's value be true. This validator is commonly\n * used for
required checkboxes.\n * See `Validators.requiredTrue` for additional information.\n */\nexport function
requiredTrueValidator(control: AbstractControl): ValidationErrors|null {\n return control.value === true ? null :
{'required': true};\n}\n\n/**\n * Validator that requires the control's value pass an email validation test.\n * See
`Validators.email`
for additional information.\n */\nexport function emailValidator(control: AbstractControl): ValidationErrors|null
{\n if (isEmptyInputValue(control.value)) {\n return null; // don't validate empty values to allow optional
controls\n }\n return EMAIL_REGEXP.test(control.value) ? null : {'email': true};\n}\n\n/**\n * Validator that
requires the length of the control's value to be greater than or equal\n * to the provided minimum length. See
`Validators.minLength` for additional information.\n */\nexport function minLengthValidator(minLength: number):
ValidatorFn {\n return (control: AbstractControl): ValidationErrors|null => {\n if
(isEmptyInputValue(control.value) || !hasValidLength(control.value)) {\n // don't validate empty values to allow
optional controls\n // don't validate values without `length` property\n return null;\n }\n\n return
control.value.length < minLength ?\n {'minlength': {'requiredLength': minLength, 'actualLength':
control.value.length}}\n :\n null;\n};\n}\n\n/**\n * Validator that requires the length of the control's value to be less than or equal\n *
to the provided maximum length. See `Validators.maxLength` for additional information.\n */\nexport function
maxLengthValidator(maxLength: number): ValidatorFn {\n return (control: AbstractControl): ValidationErrors|null
=> {\n return hasValidLength(control.value) && control.value.length > maxLength ?\n {'maxlength':
{'requiredLength': maxLength, 'actualLength': control.value.length}} :\n null;\n};\n}\n\n/**\n * Validator that
requires the control's value to match a regex pattern.\n * See `Validators.pattern` for additional information.\n
*/\nexport function patternValidator(pattern: string|RegExp): ValidatorFn {\n if (!pattern) return nullValidator;\n
let regex: RegExp;\n let regexStr: string;\n if (typeof pattern === 'string') {\n regexStr = ";\n\n if
(pattern.charAt(0) !== '^') regexStr += '^';\n\n regexStr += pattern;\n\n
if (pattern.charAt(pattern.length - 1) !== '$') regexStr += '$';\n\n regex = new RegExp(regexStr);\n } else {\n
regexStr = pattern.toString();\n regex = pattern;\n }\n return (control: AbstractControl): ValidationErrors|null
=> {\n if (isEmptyInputValue(control.value)) {\n return null; // don't validate empty values to allow optional
controls\n }\n\n const value: string = control.value;\n return regex.test(value) ? null :\n
{'pattern': {'requiredPattern': regexStr, 'actualValue': value}};\n};\n}\n\n/**\n * Function that has `ValidatorFn`
shape, but performs no operation.\n */\nexport function nullValidator(control: AbstractControl):
ValidationErrors|null {\n return null;\n}\n\nfunction isPresent(o: any): boolean {\n return o != null;\n}\n\nexport
function toObservable(value: any): Observable<any> {\n const obs = isPromise(value) ? from(value) : value;\n if
(NG_DEV_MODE && !(isObservable(obs))) {\n let errorMessage
= `Expected async validator to return Promise or Observable.`;\n // A synchronous validator will return object or
null.\n if (typeof value === 'object') {\n errorMessage +=\n ' Are you using a synchronous validator where
an async validator is expected?';\n }\n\n throw new
RuntimeError(RuntimeErrorCode.WRONG_VALIDATOR_RETURN_TYPE, errorMessage);\n }\n\n return
obs;\n}\n\nfunction mergeErrors(arrayOfErrors: (ValidationErrors|null)[]): ValidationErrors|null {\n let res: {[key:
string]: any} = {};\n\n // Not using Array.reduce here due to a Chrome 80 bug\n //
https://bugs.chromium.org/p/chromium/issues/detail?id=1049982\n arrayOfErrors.forEach((errors:
ValidationErrors|null) => {\n res = errors != null ? {...res!, ...errors} : res!;\n });\n\n return
Object.keys(res).length === 0 ? null : res;\n}\n\nexport type GenericValidatorFn = (control: AbstractControl) =>

```

```

any;
function executeValidators<V extends GenericValidatorFn>(
  control: AbstractControl,
  validators: V[]): Return<V>[] {
  return validators.map(validator => validator(control));
}
function isValidatorFn<V>(validator: V|Validator|AsyncValidator): validator is V {
  return !(validator as Validator).validate;
}
/**
 * Given the list of validators that may contain both functions as well as classes,
 * return the list of validator functions (convert validator classes into validator functions).
 * This is needed to have consistent structure in validators list before composing them.
 * @param validators The set of validators that may contain validators both in plain function form
 * as well as represented as a validator class.
 */
export function normalizeValidators<V>(validators: (V|Validator|AsyncValidator)[]): V[] {
  return validators.map(validator => {
    return isValidatorFn<V>(validator) ?
      validator :
      ((c: AbstractControl) => validator.validate(c)) as unknown as V;
  });
}
/**
 * Merges synchronous validators into a single validator function.
 * See `Validators.compose` for additional information.
 */
function compose(validators: (ValidatorFn|null|undefined)[]): ValidatorFn|null {
  if (!validators) return null;
  const presentValidators: ValidatorFn[] = validators.filter(isPresent) as any;
  if (presentValidators.length === 0) return null;
  return function(control: AbstractControl) {
    return mergeErrors(executeValidators<ValidatorFn>(control, presentValidators));
  };
}
/**
 * Accepts a list of validators of different possible shapes (`Validator` and `ValidatorFn`),
 * normalizes the list (converts everything to `ValidatorFn`) and merges them into a single
 * validator function.
 */
export function composeValidators(validators: Array<Validator|ValidatorFn>): ValidatorFn|null {
  return validators != null ?
    compose(normalizeValidators<ValidatorFn>(validators)) :
    null;
}
/**
 * Merges asynchronous validators into a single validator function.
 * See `Validators.composeAsync` for additional information.
 */
function composeAsync(validators: (AsyncValidatorFn|null)[]): AsyncValidatorFn|null {
  if (!validators) return null;
  const presentValidators: AsyncValidatorFn[] = validators.filter(isPresent) as any;
  if (presentValidators.length === 0) return null;
  return function(control: AbstractControl) {
    const observables =
      executeValidators<AsyncValidatorFn>(control, presentValidators).map(toObservable);
    return forkJoin(observables).pipe(map(mergeErrors));
  };
}
/**
 * Accepts a list of async validators of different possible shapes (`AsyncValidator` and
 * `AsyncValidatorFn`), normalizes the list (converts everything to `AsyncValidatorFn`) and
 * merges them into a single validator function.
 */
export function composeAsyncValidators(validators: Array<AsyncValidator|AsyncValidatorFn>): AsyncValidatorFn|null {
  return validators != null ?
    composeAsync(normalizeValidators<AsyncValidatorFn>(validators)) :
    null;
}
/**
 * Merges raw control validators with a given directive validator and returns the combined
 * list of validators as an array.
 */
export function mergeValidators<V>(controlValidators: V|V[]|null, dirValidator: V): V[] {
  if (controlValidators === null) return [dirValidator];
  return Array.isArray(controlValidators) ? [...controlValidators, dirValidator] :
    [controlValidators, dirValidator];
}
/**
 * Retrieves the list of raw synchronous validators attached to a given control.
 */
export function getControlValidators(control: AbstractControl): ValidatorFn|ValidatorFn[]|null {
  return (control as any)._rawValidators as ValidatorFn | ValidatorFn[] | null;
}
/**
 * Retrieves the list of raw asynchronous validators attached to a given control.
 */
export function getControlAsyncValidators(control: AbstractControl): AsyncValidatorFn|AsyncValidatorFn[]|null {
  return (control as any)._rawAsyncValidators as AsyncValidatorFn | AsyncValidatorFn[] | null;
}
/**
 * Accepts a singleton validator, an array, or null, and returns an array type with the provided
 * validators.
 * @param validators A validator, validators, or null.
 * @returns A validators array.
 */
export function makeValidatorsArray<T extends ValidatorFn|AsyncValidatorFn>(validators: T|T[]|null): T[] {
  if (!validators) return [];
  return Array.isArray(validators) ? validators : [validators];
}
/**
 * Determines whether a validator or validators array has a given validator.
 * @param validators The validator or validators to compare against.
 * @param validator The validator to check.
 * @returns Whether the validator is present.
 */
export function hasValidator<T extends ValidatorFn|AsyncValidatorFn>(
  validators: T|T[]|null,
  validator: T): boolean {
  return Array.isArray(validators)

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? validators.includes(validator) : validators === validator;\n\n/**\n * Combines two arrays of validators into
one. If duplicates are provided, only one will be added.\n *\n * @param validators The new validators.\n *\n * @param
currentValidators The base array of current validators.\n *\n * @returns An array of validators.\n */\nexport function
addValidators<T extends ValidatorFn|AsyncValidatorFn>(\n  validators: T|T[], currentValidators: T|T[]|null): T[]
{\n  const current = makeValidatorsArray(currentValidators);\n  const validatorsToAdd =
makeValidatorsArray(validators);\n  validatorsToAdd.forEach((v: T) => {\n    // Note: if there are duplicate entries
in the new validators array,\n    // only the first one would be added to the current list of validators.\n    // Duplicate
ones would be ignored since `hasValidator` would detect\n    // the presence of a validator function and we update
the current list in place.\n    if (!hasValidator(current, v)) {\n      current.push(v);\n    }\n  });\n  return current;\n}\n\nexport function removeValidators<T extends ValidatorFn|AsyncValidatorFn>(\n
validators: T|T[], currentValidators: T|T[]|null): T[] {\n  return makeValidatorsArray(currentValidators).filter(v =>
!hasValidator(validators, v));\n}\n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {Observable} from 'rxjs';\n\nimport {AbstractControl} from
'./model/abstract_model';\n\nimport {composeAsyncValidators, composeValidators} from './validators';\n\nimport
{AsyncValidator, AsyncValidatorFn, ValidationErrors, Validator, ValidatorFn} from './validators';\n\n\n/**\n *
 * @description\n * Base class for control directives.\n *\n * This class is only used internally in the
`ReactiveFormsModule` and the `FormsModule`.\n *\n * @publicApi\n */\nexport abstract class
AbstractControlDirective {\n  /**\n   * @description\n   * A reference to the underlying control.\n   *\n   * @returns the control that backs this directive.
Most properties fall through to that instance.\n   */\n  abstract get control(): AbstractControl|null;\n\n  /**\n   *
 * @description\n   * Reports the value of the control if it is present, otherwise null.\n   */\n  get value(): any {\n
return this.control ? this.control.value : null;\n }\n\n  /**\n   * @description\n   * Reports whether the control is
valid. A control is considered valid if no\n   * validation errors exist with the current value.\n   * If the control is not
present, null is returned.\n   */\n  get valid(): boolean|null {\n  return this.control ? this.control.valid : null;\n }\n\n
  /**\n   * @description\n   * Reports whether the control is invalid, meaning that an error exists in the input value.\n
   * If the control is not present, null is returned.\n   */\n  get invalid(): boolean|null {\n  return this.control ?
this.control.invalid : null;\n }\n\n  /**\n   * @description\n   * Reports whether a control is pending, meaning that that async validation is
occurring and\n   * errors are not yet available for the input value. If the control is not present, null is\n   *
returned.\n   */\n  get pending(): boolean|null {\n  return this.control ? this.control.pending : null;\n }\n\n  /**\n   *
 * @description\n   * Reports whether the control is disabled, meaning that the control is disabled\n   * in the UI and is
exempt from validation checks and excluded from aggregate\n   * values of ancestor controls. If the control is not
present, null is returned.\n   */\n  get disabled(): boolean|null {\n  return this.control ? this.control.disabled : null;\n
}\n\n  /**\n   * @description\n   * Reports whether the control is enabled, meaning that the control is included in
ancestor\n   * calculations of validity or value. If the control is not present, null is returned.\n   */\n  get enabled():
boolean|null {\n  return this.control\n    ? this.control.enabled : null;\n }\n\n  /**\n   * @description\n   * Reports the control's validation errors. If the
control is not present, null is returned.\n   */\n  get errors(): ValidationErrors|null {\n  return this.control ?
this.control.errors : null;\n }\n\n  /**\n   * @description\n   * Reports whether the control is pristine, meaning that
the user has not yet changed\n   * the value in the UI. If the control is not present, null is returned.\n   */\n  get
pristine(): boolean|null {\n  return this.control ? this.control.pristine : null;\n }\n\n  /**\n   * @description\n   *
Reports whether the control is dirty, meaning that the user has changed\n   * the value in the UI. If the control is not
present, null is returned.\n   */\n  get dirty(): boolean|null {\n  return this.control ? this.control.dirty : null;\n }\n\n
  /**\n   * @description\n   * Reports whether the control is touched, meaning that the user has triggered\n   * a `blur`
event on it. If the control is
not present, null is returned.\n   */\n  get touched(): boolean|null {\n  return this.control ? this.control.touched :
null;\n }\n\n  /**\n   * @description\n   * Reports the validation status of the control. Possible values include:\n   *

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'VALID', 'INVALID', 'DISABLED', and 'PENDING'.\n * If the control is not present, null is returned.\n */\n get
status(): string|null {\n return this.control ? this.control.status : null;\n }\n\n /**\n * @description\n * Reports
whether the control is untouched, meaning that the user has not yet triggered\n * a `blur` event on it. If the control
is not present, null is returned.\n */\n get untouched(): boolean|null {\n return this.control ?
this.control.untouched : null;\n }\n\n /**\n * @description\n * Returns a multicasting observable that emits a
validation status whenever it is\n * calculated for the control. If the control is not present, null is returned.\n */\n
get statusChanges(): Observable<any>|null {\n
return this.control ? this.control.statusChanges : null;\n }\n\n /**\n * @description\n * Returns a multicasting
observable of value changes for the control that emits every time the\n * value of the control changes in the UI or
programmatically.\n * If the control is not present, null is returned.\n */\n get valueChanges():
Observable<any>|null {\n return this.control ? this.control.valueChanges : null;\n }\n\n /**\n * @description\n
* Returns an array that represents the path from the top-level form to this control.\n * Each index is the string name
of the control on that level.\n */\n get path(): string[]|null {\n return null;\n }\n\n /**\n * Contains the result of
merging synchronous validators into a single validator function\n * (combined using `Validators.compose`).\n
*/\n private _composedValidatorFn: ValidatorFn|null|undefined;\n\n /**\n * Contains the result of merging
asynchronous validators into a single validator function\n * (combined
using `Validators.composeAsync`).\n */\n private _composedAsyncValidatorFn:
AsyncValidatorFn|null|undefined;\n\n /**\n * Set of synchronous validators as they were provided while calling
`setValidators` function.\n * @internal\n */\n private _rawValidators: Array<Validator|ValidatorFn> = [];\n\n /**\n *
Set of asynchronous validators as they were provided while calling `setAsyncValidators`\n * function.\n *
@internal\n */\n private _rawAsyncValidators: Array<AsyncValidator|AsyncValidatorFn> = [];\n\n /**\n * Sets
synchronous validators for this directive.\n * @internal\n */\n private _setValidators(validators:
Array<Validator|ValidatorFn>|undefined): void {\n this._rawValidators = validators || [];\n
this._composedValidatorFn = composeValidators(this._rawValidators);\n }\n\n /**\n * Sets asynchronous
validators for this directive.\n * @internal\n */\n private _setAsyncValidators(validators:
Array<AsyncValidator|AsyncValidatorFn>|undefined): void {\n this._rawAsyncValidators
= validators || [];\n this._composedAsyncValidatorFn = composeAsyncValidators(this._rawAsyncValidators);\n
}\n\n /**\n * @description\n * Synchronous validator function composed of all the synchronous validators
registered with this\n * directive.\n */\n get validator(): ValidatorFn|null {\n return this._composedValidatorFn
|| null;\n }\n\n /**\n * @description\n * Asynchronous validator function composed of all the asynchronous
validators registered with\n * this directive.\n */\n get asyncValidator(): AsyncValidatorFn|null {\n return
this._composedAsyncValidatorFn || null;\n }\n\n /**\n * The set of callbacks to be invoked when directive instance
is being destroyed.\n */\n private _onDestroyCallbacks: (() => void)[] = [];\n\n /**\n * Internal function to
register callbacks that should be invoked\n * when directive instance is being destroyed.\n * @internal\n */\n
private _registerOnDestroy(fn: () => void): void {\n this._onDestroyCallbacks.push(fn);\n
}\n\n /**\n * Internal function to invoke all registered "on destroy" callbacks.\n * Note: calling this function
also clears the list of callbacks.\n * @internal\n */\n private _invokeOnDestroyCallbacks(): void {\n
this._onDestroyCallbacks.forEach(fn => fn());\n this._onDestroyCallbacks = [];\n }\n\n /**\n * @description\n
* Resets the control with the provided value if the control is present.\n */\n reset(value: any = undefined): void {\n
if (this.control) this.control.reset(value);\n }\n\n /**\n * @description\n * Reports whether the control with the
given path has the error specified.\n * @param errorCode The code of the error to check\n * @param path A
list of control names that designates how to move from the current control\n * to the control that should be queried
for errors.\n * @usageNotes\n * For example, for the following `FormGroup`:\n * ```\n * form = new
FormGroup({\n * address: new FormGroup({\n * street: new FormControl() })\n * });\n * ```\n * The path to the 'street' control from the root form would be
'address' -> 'street'.\n * It can be provided to this method in one of two formats:\n * 1. An array of string
control names, e.g. `[address', 'street']`\n * 2. A period-delimited list of control names in one string, e.g.
`address.street`\n * If no path is given, this method checks for the error on the current control.\n */

```

@returns whether the given error is present in the control at the given path.  
 \* If the control is not present, false is returned.  
 \* hasError(errorCode: string, path?: Array<string|number>|string): boolean  
 { return this.control ? this.control.hasError(errorCode, path) : false; }  
 /\*\*  
 \* @description  
 \* Reports error data for the control with the given path.  
 \* @param errorCode The code of the error to check  
 \* @param path A list of control names that designates how to move from the current control  
 \* to the control that should be queried for errors.  
 \* @usageNotes  
 \* For example, for the following `FormGroup`:  
 `form = new FormGroup({  
 address: new FormGroup({ street: new FormControl() })  
 });`  
 \* The path to the 'street' control from the root form would be 'address' -> 'street'.  
 \* It can be provided to this method in one of two formats:  
 \* 1. An array of string control names, e.g. ['address', 'street']  
 \* 1. A period-delimited list of control names in one string, e.g. 'address.street'  
 \* @returns error data for that particular error. If the control or error is not present,  
 \* null is returned.  
 \* @param errorCode: string, path?: Array<string|number>|string): any  
 { return this.control ? this.control.getError(errorCode, path) : null; }  
 }  
 /\*\*  
 \* @license  
 \* Copyright Google LLC All Rights Reserved.  
 \* Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at  
 https://angular.io/license`  
 import { AbstractControlDirective } from './abstract\_control\_directive';  
 import { Form } from './form\_interface';  
 /\*\*  
 \* @description  
 \* A base class for directives that contain multiple registered instances of `NgControl`.  
 \* Only used by the forms module.  
 \* @publicApi  
 export abstract class ControlContainer extends AbstractControlDirective {  
 /\*\*  
 \* @description  
 \* The name for the control  
 \* // TODO(issue/24571): remove '!'.  
 name!: string|number|null;  
 /\*\*  
 \* @description  
 \* The top-level form directive for the control.  
 get formDirective(): Form|null {  
 return null; }  
 /\*\*  
 \* @description  
 \* The path to this group.  
 override get path(): string[]|null {  
 return null; }  
 }  
 }  
 /\*\*  
 \* @license  
 \* Copyright Google LLC All Rights Reserved.  
 \* Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at  
 https://angular.io/license`  
 import { AbstractControlDirective } from './abstract\_control\_directive';  
 import { ControlContainer } from './control\_container';  
 import { ControlValueAccessor } from './control\_value\_accessor';  
 /\*\*  
 \* @description  
 \* A base class that all `FormControl`-based directives extend. It binds a `FormControl`  
 \* object to a DOM element.  
 \* @publicApi  
 export abstract class NgControl extends AbstractControlDirective {  
 /\*\*  
 \* @description  
 \* The parent form for the control.  
 \* @internal  
 \_parent: ControlContainer|null = null;  
 /\*\*  
 \* @description  
 \* The name for the control  
 \* // name: string|number|null = null;  
 /\*\*  
 \* @description  
 \* The value accessor for the control  
 \* // valueAccessor: ControlValueAccessor|null = null;  
 /\*\*  
 \* @description  
 \* The callback method to update the model from the view when requested  
 \* @param newValue The new value for the view  
 \* // abstract viewToModelUpdate(newValue: any): void;  
 }  
 }  
 /\*\*  
 \* @license  
 \* Copyright Google LLC All Rights Reserved.  
 \* Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at  
 https://angular.io/license`  
 import { Directive, Optional, Self } from '@angular/core';  
 import { AbstractControlDirective } from './abstract\_control\_directive';  
 import { ControlContainer } from './control\_container';  
 import { NgControl } from './ng\_control';  
 // DO NOT REFACTOR!  
 // Each status is represented by a separate function to make sure that advanced Closure Compiler  
 // optimizations related to property renaming can work correctly.  
 export class AbstractControlStatus {  
 private \_cd: AbstractControlDirective|null;  
 constructor(cd: AbstractControlDirective|null) {  
 this.\_cd = cd; }  
 protected get isTouched() {  
 return !!this.\_cd?.control?.touched; }  
 protected get isUntouched() {  
 return !!this.\_cd?.control?.untouched; }  
 protected get isPristine() {  
 return !!this.\_cd?.control?.pristine; }  
 protected get isDirty() {  
 return !!this.\_cd?.control?.dirty; }  
 protected get isValid() {  
 return !!this.\_cd?.control?.valid; }  
 protected get isInvalid() {  
 return !!this.\_cd?.control?.invalid; }  
 protected get isPending() {  
 return !!this.\_cd?.control?.pending; }  
 protected get isSubmitted() {  
 // We check for the `submitted` field from `NgForm` and `FormGroupDirective`  
 // classes, but we avoid instanceof checks to prevent non-tree-shakable references to those types.  
 return

```

!!(this._cd as unknown as {submitted: boolean} | null)?.submitted;\n } }\n\nexport const ngControlStatusHost =
{\n  'class.ng-untouched': 'isUntouched',\n  'class.ng-touched': 'isTouched',\n  'class.ng-pristine': 'isPristine',\n  'class.ng-dirty': 'isDirty',\n  'class.ng-valid':
  'isValid',\n  'class.ng-invalid': 'isInvalid',\n  'class.ng-pending': 'isPending',\n};\n\nexport const
ngGroupStatusHost = {\n  ...ngControlStatusHost,\n  'class.ng-submitted': 'isSubmitted',\n};\n\n/**\n *
 * @description\n * Directive automatically applied to Angular form controls that sets CSS classes\n * based on
 * control status.\n * @usageNotes\n * ### CSS classes applied\n * The following classes are applied as the
 * properties become true:\n * * ng-valid\n * * ng-invalid\n * * ng-pending\n * * ng-pristine\n * * ng-dirty\n * *
 * ng-untouched\n * * ng-touched\n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n *
 * @publicApi\n * @Directive({selector: '[formControlName],[ngModel],[formControl]', host:
ngControlStatusHost})\n\nexport class NgControlStatus extends AbstractControlStatus {\n  constructor(@Self() cd:
NgControl) {\n    super(cd);\n  }\n}\n\n/**\n * @description\n * Directive automatically applied to Angular form
 * groups that sets CSS classes\n
 * * based on control status (valid/invalid/dirty/etc). On groups, this includes the additional\n * class ng-submitted.\n
 * @see `NgControlStatus`\n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n *
 * @publicApi\n * @Directive({\n  selector:\n
'[formGroupName],[formArrayName],[ngModelGroup],[formGroup],form:not([ngNoForm]),[ngForm]',\n  host:\n
ngGroupStatusHost\n})\n\nexport class NgControlStatusGroup extends AbstractControlStatus {\n
  constructor(@Optional() @Self() cd: ControlContainer) {\n    super(cd);\n  }\n}\n\n",/**\n * @license\n * Copyright
 * Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n
 * found in the LICENSE file at https://angular.io/license\n *\n\nexport const formControlNameExample = `\n <div
[formGroup]="myGroup">\n   <input formControlName="firstName">\n </div>\n\n In your class:\n\n
this.myGroup = new FormGroup({\n  firstName: new FormControl()\n });`; \n\nexport
const formGroupNameExample = `\n <div [formGroup]="myGroup">\n   <div formGroupName="person">\n
   <input formControlName="firstName">\n   </div>\n </div>\n\n In your class:\n\n
this.myGroup = new
FormGroup({\n  person: new FormGroup({\n    firstName: new FormControl()\n  })\n });`; \n\nexport const
formArrayNameExample = `\n <div [formGroup]="myGroup">\n   <div formArrayName="cities">\n   <div
 *ngFor="let city of cityArray.controls; index as i">\n     <input [formControlName]="i">\n   </div>\n
</div>\n </div>\n\n In your class:\n\n
this.cityArray = new FormArray([new FormControl('SF')]);\n
this.myGroup = new FormGroup({\n  cities: this.cityArray\n });`; \n\nexport const ngModelGroupExample = `\n
<form>\n   <div ngModelGroup="person">\n     <input [(ngModel)]="person.name" name="firstName">\n
   </div>\n </form>`; \n\nexport const ngModelWithFormGroupExample = `\n <div [formGroup]="myGroup">\n
  <input formControlName="firstName">\n
  <input [(ngModel)]="showMoreControls" [ngModelOptions]="{standalone: true}">\n </div>\n`; \n\n",/**\n *
 * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-
 * style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport {RuntimeError as
 * RuntimeError} from '@angular/core';\n\nimport {RuntimeErrorCode} from '../errors';\n\nimport
{formArrayNameExample, formControlNameExample, formGroupNameExample, ngModelGroupExample} from
'./error_examples';\n\nexport function controlParentException(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.FORM_CONTROL_NAME_MISSING_PARENT,\n    `formControlName must be used with
 * a parent formGroup directive. You'll want to add a formGroup\n    directive and pass it an existing FormGroup
 * instance (you can create one in your class).\n    Example:\n    ${formControlNameExample}`);\n}\n\nexport
function ngModelGroupException():
 * Error {\n  return new RuntimeError(\n
RuntimeErrorCode.FORM_CONTROL_NAME_INSIDE_MODEL_GROUP,\n    `formControlName cannot be
 * used with an ngModelGroup parent. It is only compatible with parents\n    that also have a `form` prefix:
 * formGroupName, formArrayName, or formGroup.\n    Option 1: Update the parent to be formGroupName
 * (reactive form strategy)\n    ${formGroupNameExample}\n    Option 2: Use ngModel instead of

```



```

formControlName (template-driven strategy)\n    ${ngModelGroupExample}`);\n\nexport function
missingFormException(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.FORM_GROUP_MISSING_INSTANCE,\n    `formGroup expects a FormGroup instance.
Please pass one in.\n\n  Example:\n    ${formControlNameExample}`);\n\nexport function
groupParentException(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.FORM_GROUP_NAME_MISSING_PARENT,\n    `formGroupName must be used with a
parent FormGroup directive. You'll want
to add a FormGroup\n  directive and pass it an existing FormGroup instance (you can create one in your class).\n\n
Example:\n\n  ${formGroupNameExample}`);\n\nexport function arrayParentException(): Error {\n  return
new RuntimeError(\n    RuntimeErrorCode.FORM_ARRAY_NAME_MISSING_PARENT,\n
`formArrayName must be used with a parent FormGroup directive. You'll want to add a FormGroup\n
directive
and pass it an existing FormGroup instance (you can create one in your class).\n\n  Example:\n\n
${formArrayNameExample}`);\n\nexport const disabledAttrWarning = `It looks like you're using the disabled
attribute with a reactive form directive. If you set disabled to true\n  when you set up this control in your component
class, the disabled attribute will actually be set in the DOM for\n  you. We recommend using this approach to avoid
'changed after checked' errors.\n\n  Example:\n  // Specify the `disabled` property at control creation time:\n  form
= new FormGroup({\n    first: new FormControl({ value: 'Nancy', disabled: true }, Validators.required),\n    last: new
FormControl('Drew', Validators.required)\n  });\n\n  // Controls can also be enabled/disabled after creation:\n
form.get('first')?.enable();\n  form.get('last')?.disable();\n`;\n\nexport const
asyncValidatorsDroppedWithOptsWarning = `It looks like you're constructing using a FormControl with both an
options argument and an\n  async validators argument. Mixing these arguments will cause your async validators to
be dropped.\n  You should either put all your validators in the options object, or in separate validators\n  arguments.
For example:\n\n  // Using validators arguments\n  fc = new FormControl(42, Validators.required,
myAsyncValidator);\n\n  // Using AbstractControlOptions\n  fc = new FormControl(42, { validators:
Validators.required, asyncValidators: myAV });\n\n  // Do NOT mix them: async validators will be dropped!\n  fc =
new FormControl(42, { validators: Validators.required },
/* Oops! */ myAsyncValidator);\n`;\n\nexport function ngModelWarning(directiveName: string): string {\n  return
`\n  It looks like you're using ngModel on the same form field as ${directiveName}.\n  Support for using the
ngModel input property and ngModelChange event with\n  reactive form directives has been deprecated in Angular
v6 and will be removed\n  in a future version of Angular.\n  For more information on this, see our API docs
here:\n  https://angular.io/api/forms/${\n    directiveName === 'formControl' ? 'FormControlDirective' :
'FormControlName'}#use-with-ngmodel\n  `;\n\nfunction describeKey(isFormGroup: boolean, key:
string|number): string {\n  return isFormGroup ? `with name: '${key}'` : `at index: ${key}`;\n}\n\nexport function
noControlsError(isFormGroup: boolean): string {\n  return `\n  There are no form controls registered with this ${\n
isFormGroup ? 'group' : 'array'} yet. If you're using ngModel,\n  you may want to check next tick
(e.g. use setTimeout).\n  `;\n\nexport function missingControlError(isFormGroup: boolean, key: string|number):
string {\n  return `Cannot find form control ${describeKey(isFormGroup, key)}`;\n}\n\nexport function
missingControlValueError(isFormGroup: boolean, key: string|number): string {\n  return `Must supply a value for
form control ${describeKey(isFormGroup, key)}`;\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights
Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the
LICENSE file at https://angular.io/license\n */\n\nimport { EventEmitter, RuntimeError as RuntimeError } from
'@angular/core';\nimport { Observable } from 'rxjs';\nimport { AsyncValidatorsDroppedWithOptsWarning,
missingControlError, missingControlValueError, noControlsError } from '../directives/reactive_errors';\nimport
{ AsyncValidatorFn, ValidationErrors, ValidatorFn } from '../directives/validators';\nimport { RuntimeErrorCode }
from '../errors';\nimport
{ FormArray, FormGroup } from '../forms';\nimport { addValidators, composeAsyncValidators, composeValidators,
hasValidator, removeValidators, toObservable } from '../validators';\n\nconst NG_DEV_MODE = typeof
ngDevMode === 'undefined' || !!ngDevMode;\n\n/**\n * Reports that a control is valid, meaning that no errors exist

```

in the input value.

```

    @see `status`
    ^nextport const VALID = 'VALID';
    Reports that a control is invalid, meaning that an error exists in the input value.
    @see `status`
    ^nextport const INVALID = 'INVALID';
    Reports that a control is pending, meaning that that async validation is occurring and errors are not yet available for the input value.
    @see `markAsPending`
    @see `status`
    ^nextport const PENDING = 'PENDING';
    Reports that a control is disabled, meaning that the control is exempt from ancestor calculations of validity or value.
    @see `markAsDisabled`
    @see `status`
    ^nextport const DISABLED = 'DISABLED';
    A form can have several different statuses. Each possible status is returned as a string literal.
    ***VALID***: Reports that a control is valid, meaning that no errors exist in the input value.
    ***INVALID***: Reports that a control is invalid, meaning that an error exists in the input value.
    ***PENDING***: Reports that a control is pending, meaning that that async validation is occurring and errors are not yet available for the input value.
    ***DISABLED***: Reports that a control is disabled, meaning that the control is exempt from ancestor calculations of validity or value.
    @publicApi
    ^nextport type FormControlStatus = 'VALID'|'INVALID'|'PENDING'|'DISABLED';
    Gets validators from either an options object or given validators.
    ^nextport function pickValidators(validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null): ValidatorFn|ValidatorFn[]|null {
    return (isOptionsObj(validatorOrOpts) ? validatorOrOpts.validators : validatorOrOpts) || null;
    }
    Creates validator function by combining provided validators.
    ^nextport function coerceToValidator(validator: ValidatorFn|ValidatorFn[]|null): ValidatorFn|null {
    return Array.isArray(validator) ?
    composeValidators(validator) : validator || null;
    }
    Gets async validators from either an options object or given validators.
    ^nextport function pickAsyncValidators(
    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null,
    validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null): AsyncValidatorFn|
    AsyncValidatorFn[]|null {
    if (typeof ngDevMode === 'undefined' || ngDevMode) {
    if (isOptionsObj(validatorOrOpts) && asyncValidator) {
    console.warn(asyncValidatorsDroppedWithOptsWarning);
    }
    }
    return (isOptionsObj(validatorOrOpts) ? validatorOrOpts.asyncValidators : asyncValidator) || null;
    }
    Creates async validator function by combining provided async validators.
    ^nextport function coerceToAsyncValidator(asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|
    null): AsyncValidatorFn|null {
    return Array.isArray(asyncValidator) ? composeAsyncValidators(asyncValidator) :
    asyncValidator || null;
    }
    ^nextport type FormHooks = 'change'|'blur'|'submit';
    Interface for options provided to an `AbstractControl`.
    @publicApi
    ^nextport interface AbstractControlOptions {
    /**
    * @description
    * The list of validators applied to a control.
    ^nextport validators?: ValidatorFn|ValidatorFn[]|null;
    /**
    * @description
    * The list of async validators applied to control.
    ^nextport asyncValidators?: AsyncValidatorFn|AsyncValidatorFn[]|null;
    /**
    * @description
    * The event name for control to update upon.
    ^nextport updateOn?: 'change'|'blur'|'submit';
    }
    ^nextport function isOptionsObj(validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|
    null): validatorOrOpts is AbstractControlOptions {
    return validatorOrOpts != null && !Array.isArray(validatorOrOpts) &&
    typeof validatorOrOpts === 'object';
    }
    ^nextport function assertControlPresent(parent: any, isGroup: boolean, key: string|number): void {
    const controls = parent.controls as {[key: string|number]: unknown};
    const collection = isGroup ? Object.keys(controls) : controls;
    if (!collection.length) {
    throw new RuntimeError(
    RuntimeErrorCode.NO_CONTROLS, NG_DEV_MODE ? noControlsError(isGroup) : "");
    }
    if (!controls[key]) {
    throw new RuntimeError(
    RuntimeErrorCode.MISSING_CONTROL, NG_DEV_MODE ? missingControlError(isGroup, key) : "");
    }
    }
    ^nextport function assertAllValuesPresent(control: any, isGroup: boolean, value: any): void {
    control._forEachChild((_: unknown, key: string|number) => {
    if (value[key] === undefined) {
    throw new RuntimeError(
    RuntimeErrorCode.MISSING_CONTROL_VALUE,
    NG_DEV_MODE ? missingControlValueError(isGroup, key) : "");
    }
    });
    }
    // IsAny checks if T is `any`, by

```

```

checking a condition that couldn't possibly be true otherwise.\nexport type IsAny<T, Y, N> = 0 extends(1&T) ? Y :
N;\n\n/**\n * `TypedOrUntyped` allows one of two different types to be selected, depending on whether the
Forms\n * class it's applied to is typed or not.\n *\n * This is for internal Angular usage to support typed forms; do
not directly use it.\n *\nexport type TypedOrUntyped<T, Typed, Untyped> = IsAny<T, Untyped, Typed>;\n\n/**\n * Value gives the value type corresponding to a control type.\n *\n * Note that the resulting type will follow the
same rules as `.value` on your control, group, or\n * array, including `undefined` for each group element which
might be disabled.\n *\n * If you are trying to extract a value type for a data model, you probably want { @link
RawValue },\n
 * which will not have `undefined` in group keys.\n *\n * @usageNotes\n *\n * ### `FormControl` value type\n *\n
 * You can extract the value type of a single control:\n *\n * ```\n * type NameControl = FormControl<string>;\n *
type NameValue = Value<NameControl>;\n * ```\n *\n * The resulting type is `string`.\n *\n * ### `FormGroup`
value type\n *\n * Imagine you have an interface defining the controls in your group. You can extract the shape of\n
 * the values as follows:\n *\n * ```\n * interface PartyFormControls {\n *   address: FormControl<string>;\n * }\n
*\n * // Value operates on controls; the object must be wrapped in a FormGroup.\n * type PartyFormValues =
Value<FormGroup<PartyFormControls>>;\n * ```\n *\n * The resulting type is `{address: string|undefined}`.\n *\n
 * ### `FormArray` value type\n *\n * You can extract values from FormArrays as well:\n *\n * ```\n * type
GuestNamesControls = FormArray<FormControl<string>>;\n * type NamesValues =
Value<GuestNamesControls>;\n
 * ```\n *\n * The resulting type is `string[]`.\n *\n * **Internal: not for public use.**\n *\nexport type Value<T
extends AbstractControl|undefined> =\n   T extends AbstractControl<any, any>? T['value'] : never;\n\n/**\n *
RawValue gives the raw value type corresponding to a control type.\n *\n * Note that the resulting type will follow
the same rules as `.getRawValue()` on your control,\n * group, or array. This means that all controls inside a group
will be required, not optional,\n * regardless of their disabled state.\n *\n * You may also wish to use { @link
Value }, which will have `undefined` in group keys (which can be\n * disabled).\n *\n * @usageNotes\n *\n * ###
`FormGroup` raw value type\n *\n * Imagine you have an interface defining the controls in your group. You can
extract the shape of\n * the raw values as follows:\n *\n * ```\n * interface PartyFormControls {\n *   address:
FormControl<string>;\n * }\n *\n * // RawValue operates on controls; the
object must be wrapped in a FormGroup.\n * type PartyFormValues =
RawValue<FormGroup<PartyFormControls>>;\n * ```\n *\n * The resulting type is `{address: string}`. (Note the
absence of `undefined`.)\n *\n * **Internal: not for public use.**\n *\nexport type RawValue<T extends
AbstractControl|undefined> = T extends AbstractControl<any, any>?\n   (T['setValue'] extends ((v: infer R) =>
void) ? R : never) : never;\n\n// Disable clang-format to produce clearer formatting for these multiline types.\n\n//
clang-format off\n\n/**\n * Tokenize splits a string literal S by a delimiter D.\n *\nexport type Tokenize<S extends
string, D extends string> =\n   string extends S ? string[] : /* S must be a literal */\n   S extends `${infer
T}${D}${infer U}` ? [T, ...Tokenize<U, D>] :\n   [S] /* Base case */;\n\n/**\n * CoerceStrArrToNumArr
accepts an array of strings, and converts any numeric string to a number.\n *\nexport type
CoerceStrArrToNumArr<S> =\n   // Extract the head of the array.\n
   S extends [infer Head, ...infer Tail] ?\n     // Using a template literal type, coerce the head to `number` if possible.\n
     // Then, recurse on the tail.\n     Head extends `${number}` ?\n       [number, ...CoerceStrArrToNumArr<Tail>] :\n
     [Head, ...CoerceStrArrToNumArr<Tail>] :\n     [];\n\n/**\n * Navigate takes a type T and an array K, and returns the
type of T[K[0]][K[1]][K[2]]...\n *\nexport type Navigate<T, K extends (Array<string|number>)> =\n   T extends
object ? /* T must be indexable (object or array) */\n     (K extends [infer Head, ...infer Tail] ? /* Split K into head
and tail */\n       (Head extends keyof T ? /* head(K) must index T */\n         (Tail extends (string|number)[] ? /* tail(K)
must be an array */\n           [] extends Tail ? T[Head] : /* base case: K can be split, but Tail is empty */\n
           (Navigate<T[Head], Tail>) /* explore T[head(K)] by tail(K) */ :\n             any) /* tail(K) was not an array, give up */
:\n         never) /* head(K) does
not index T, give up */ :\n       any) /* K cannot be split, give up */ :\n     any /* T is not indexable, give up */\n
);\n\n/**\n * Writeable removes readonly from all keys.\n *\nexport type Writeable<T> = {\n   -readonly[P in keyof

```

```

T]: T[P]\n};\n\n/**\n * GetProperty takes a type T and some property names or indices K.\n * If K is a dot-separated
string, it is tokenized into an array before proceeding.\n * Then, the type of the nested property at K is computed:
T[K[0]][K[1]][K[2]]...\n * This works with both objects, which are indexed by property name, and arrays, which are
indexed\n * numerically.\n *\n * For internal use only.\n */\nexport type GetProperty<T, K> =\n // K is a string\n K extends string ? GetProperty<T, CoerceStrArrToNumArr<Tokenize<K, '.'>>> :\n // Is is an array\n Writeable<K> extends Array<string|number> ? Navigate<T, Writeable<K>> :\n // Fall through permissively if we
can't calculate the type of K.\n any;\n\n// clang-format on\n\n/**\n * This is the base class for `FormControl`, `FormGroup`, and `FormArray`.\n *\n * It provides some of the shared
behavior that all controls and groups of controls have, like\n * running validators, calculating status, and resetting
state. It also defines the properties\n * that are shared between all sub-classes, like `value`, `valid`, and `dirty`. It
shouldn't be\n * instantiated directly.\n *\n * The first type parameter TValue represents the value type of the control
(`control.value`).\n * The optional type parameter TRawValue represents the raw value type
(`control.getRawValue()`).\n *\n * @see [Forms Guide](/guide/forms)\n * @see [Reactive Forms
Guide](/guide/reactive-forms)\n * @see [Dynamic Forms Guide](/guide/dynamic-form)\n *\n * @publicApi\n */\nexport abstract class AbstractControl<TValue = any, TRawValue extends TValue = TValue> {\n /** @internal
*/\n _pendingDirty = false;\n\n /**\n * Indicates that a control has its own pending asynchronous validation in
progress.\n *\n * @internal\n */\n _hasOwnPendingAsyncValidator = false;\n\n /** @internal\n */\n _pendingTouched =
false;\n\n /** @internal\n */\n _onCollectionChange = () => {};\n\n /** @internal\n */\n _updateOn?:
FormHooks;\n\n private _parent: FormGroup|FormArray|null = null;\n private _asyncValidationSubscription:
any;\n\n /**\n * Contains the result of merging synchronous validators into a single validator function\n *
(combined using `Validators.compose`).\n *\n * @internal\n */\n private _composedValidatorFn:
ValidatorFn|null;\n\n /**\n * Contains the result of merging asynchronous validators into a single validator
function\n * (combined using `Validators.composeAsync`).\n *\n * @internal\n */\n private
_composedAsyncValidatorFn: AsyncValidatorFn|null;\n\n /**\n * Synchronous validators as they were
provided:\n * - in `AbstractControl` constructor\n * - as an argument while calling `setValidators` function\n *
- while calling the setter on the
`validator` field (e.g. `control.validator = validatorFn`)\n *\n * @internal\n */\n private _rawValidators:
ValidatorFn|ValidatorFn[]|null;\n\n /**\n * Asynchronous validators as they were provided:\n * - in
`AbstractControl` constructor\n * - as an argument while calling `setAsyncValidators` function\n * - while
calling the setter on the `asyncValidator` field (e.g. `control.asyncValidator =\n * asyncValidatorFn`)\n *\n *
@internal\n */\n private _rawAsyncValidators: AsyncValidatorFn|AsyncValidatorFn[]|null;\n\n /**\n * The
current value of the control.\n *\n * ** For a `FormControl`, the current value.\n * ** For an enabled `FormGroup`,
the values of enabled controls as an object\n * ** with a key-value pair for each member of the group.\n * ** For a
disabled `FormGroup`, the values of all controls as an object\n * ** with a key-value pair for each member of the
group.\n * ** For a `FormArray`, the values of enabled controls as an array.\n *\n */\n\n public readonly value!: TValue;\n\n /**\n * Initialize the AbstractControl instance.\n *\n * @param
validators The function or array of functions that is used to determine the validity of\n * this control
synchronously.\n * @param asyncValidators The function or array of functions that is used to determine validity
of\n * this control asynchronously.\n */\n constructor(\n validators: ValidatorFn|ValidatorFn[]|null,\n
asyncValidators: AsyncValidatorFn|AsyncValidatorFn[]|null) {\n this._rawValidators = validators;\n
this._rawAsyncValidators = asyncValidators;\n this._composedValidatorFn =
coerceToValidator(this._rawValidators);\n this._composedAsyncValidatorFn =
coerceToAsyncValidator(this._rawAsyncValidators);\n }\n\n /**\n * Returns the function that is used to
determine the validity of this control synchronously.\n * If multiple validators have been added, this will be a
single composed function.\n * See `Validators.compose`
for additional information.\n */\n get validator(): ValidatorFn|null {\n return this._composedValidatorFn;\n }\n
set validator(validatorFn: ValidatorFn|null) {\n this._rawValidators = this._composedValidatorFn = validatorFn;\n
}

```

```

}\n\n /**\n * Returns the function that is used to determine the validity of this control asynchronously.\n * If
multiple validators have been added, this will be a single composed function.\n * See `Validators.compose()` for
additional information.\n *\n get asyncValidator(): AsyncValidatorFn|null {\n return
this._composedAsyncValidatorFn;\n }\n set asyncValidator(asyncValidatorFn: AsyncValidatorFn|null) {\n
this._rawAsyncValidators = this._composedAsyncValidatorFn = asyncValidatorFn;\n }\n\n /**\n * The parent
control.\n *\n get parent(): FormGroup|FormArray|null {\n return this._parent;\n }\n\n /**\n * The validation
status of the control.\n *\n * @see `FormControlStatus`\n *\n * These status values are
mutually exclusive, so a control cannot be\n * both valid AND invalid or invalid AND disabled.\n */\n public
readonly status!: FormControlStatus;\n\n /**\n * A control is `valid` when its `status` is `VALID`.\n *\n * @see
{@link AbstractControl.status}\n *\n * @returns True if the control has passed all of its validation tests,\n *
false otherwise.\n *\n get valid(): boolean {\n return this.status === VALID;\n }\n\n /**\n * A control is
`invalid` when its `status` is `INVALID`.\n *\n * @see {@link AbstractControl.status}\n *\n * @returns True
if this control has failed one or more of its validation checks,\n * false otherwise.\n *\n get invalid(): boolean {\n
return this.status === INVALID;\n }\n\n /**\n * A control is `pending` when its `status` is `PENDING`.\n *\n
* @see {@link AbstractControl.status}\n *\n * @returns True if this control is in the process of conducting a
validation check,\n * false otherwise.\n *\n get
pending(): boolean {\n return this.status === PENDING;\n }\n\n /**\n * A control is `disabled` when its `status`
is `DISABLED`.\n *\n * Disabled controls are exempt from validation checks and\n * are not included in the
aggregate value of their ancestor\n * controls.\n *\n * @see {@link AbstractControl.status}\n *\n * @returns
True if the control is disabled, false otherwise.\n *\n get disabled(): boolean {\n return this.status ===
DISABLED;\n }\n\n /**\n * A control is `enabled` as long as its `status` is not `DISABLED`.\n *\n * @returns
True if the control has any status other than `DISABLED`,\n * false if the status is `DISABLED`.\n *\n * @see
{@link AbstractControl.status}\n *\n *\n get enabled(): boolean {\n return this.status !== DISABLED;\n
}\n\n /**\n * An object containing any errors generated by failing validation,\n * or null if there are no errors.\n
*\n *\n public readonly errors!: ValidationErrors|null;\n\n /**\n
* A control is `pristine` if the user has not yet changed\n * the value in the UI.\n *\n * @returns True if the
user has not yet changed the value in the UI; compare `dirty`.\n * Programmatic changes to a control's value do not
mark it dirty.\n *\n public readonly pristine: boolean = true;\n\n /**\n * A control is `dirty` if the user has
changed the value\n * in the UI.\n *\n * @returns True if the user has changed the value of this control in the UI;
compare `pristine`.\n * Programmatic changes to a control's value do not mark it dirty.\n *\n get dirty(): boolean
{\n return !this.pristine;\n }\n\n /**\n * True if the control is marked as `touched`.\n *\n * A control is marked
`touched` once the user has triggered\n * a `blur` event on it.\n *\n public readonly touched: boolean = false;\n\n
/**\n * True if the control has not been marked as touched\n *\n * A control is `untouched` if the user has not yet
triggered\n * a `blur` event
on it.\n *\n get untouched(): boolean {\n return !this.touched;\n }\n\n /**\n * A multicasting observable that
emits an event every time the value of the control changes, in\n * the UI or programmatically. It also emits an event
each time you call enable() or disable()\n * without passing along {emitEvent: false} as a function argument.\n
*\n public readonly valueChanges!: Observable<TValue>;\n\n /**\n * A multicasting observable that emits an
event every time the validation `status` of the control\n * recalculates.\n *\n * @see `FormControlStatus`\n *
*\n * @see {@link AbstractControl.status}\n *\n *\n public readonly statusChanges!:
Observable<FormControlStatus>;\n\n /**\n * Reports the update strategy of the `AbstractControl` (meaning\n *
the event on which the control updates itself).\n * Possible values: `change` | `blur` | `submit`\n * Default
value: `change`\n *\n get updateOn(): FormHooks {\n return this._updateOn ? this._updateOn
: (this.parent ? this.parent.updateOn : 'change');\n }\n\n /**\n * Sets the synchronous validators that are active on
this control. Calling\n * this overwrites any existing synchronous validators.\n *\n * When you add or remove a
validator at run time, you must call\n * `updateValueAndValidity()` for the new validation to take effect.\n *\n *
If you want to add a new validator without affecting existing ones, consider\n * using `addValidators()` method
instead.\n *\n setValidators(validators: ValidatorFn|ValidatorFn[]|null): void {\n this._rawValidators =

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validators;\n  this._composedValidatorFn = coerceToValidator(validators);\n }\n\n /**\n  * Sets the asynchronous
validators that are active on this control. Calling this\n  * overwrites any existing asynchronous validators.\n  *\n  * When you add or remove a validator at run time, you must call\n  * `updateValueAndValidity()` for the new
validation to take effect.\n  *\n  * If you want to
add a new validator without affecting existing ones, consider\n  * using `addAsyncValidators()` method instead.\n
*/\n setAsyncValidators(validators: AsyncValidatorFn|AsyncValidatorFn[]|null): void {\n
this._rawAsyncValidators = validators;\n  this._composedAsyncValidatorFn =
coerceToAsyncValidator(validators);\n }\n\n /**\n  * Add a synchronous validator or validators to this control,
without affecting other validators.\n  *\n  * When you add or remove a validator at run time, you must call\n  *
`updateValueAndValidity()` for the new validation to take effect.\n  *\n  * Adding a validator that already exists
will have no effect. If duplicate validator functions\n  * are present in the `validators` array, only the first instance
would be added to a form\n  * control.\n  *\n  * @param validators The new validator function or functions to add
to this control.\n  */\n addValidators(validators: ValidatorFn|ValidatorFn[]): void {\n
this.setValidators(addValidators(validators,
this._rawValidators));\n }\n\n /**\n  * Add an asynchronous validator or validators to this control, without
affecting other\n  * validators.\n  *\n  * When you add or remove a validator at run time, you must call\n  *
`updateValueAndValidity()` for the new validation to take effect.\n  *\n  * Adding a validator that already exists
will have no effect.\n  *\n  * @param validators The new asynchronous validator function or functions to add to
this control.\n  */\n addAsyncValidators(validators: AsyncValidatorFn|AsyncValidatorFn[]): void {\n
this.setAsyncValidators(addValidators(validators, this._rawAsyncValidators));\n }\n\n /**\n  * Remove a
synchronous validator from this control, without affecting other validators.\n  * Validators are compared by
function reference; you must pass a reference to the exact same\n  * validator function as the one that was originally
set. If a provided validator is not found,\n  * it is ignored.\n  *\n  * @usageNotes\n
*\n  * ### Reference to a ValidatorFn\n  *\n  * ```\n  * // Reference to the RequiredValidator\n  * const ctrl =
new FormControl<string | null>(" ", Validators.required);\n  * ctrl.removeValidators(Validators.required);\n  *\n  *
// Reference to anonymous function inside MinValidator\n  * const minValidator = Validators.min(3);\n  * const
ctrl = new FormControl<string | null>(" ", minValidator);\n  *
expect(ctrl.hasValidator(minValidator)).toEqual(true)\n  *
expect(ctrl.hasValidator(Validators.min(3)).toEqual(false)\n  *\n  * ctrl.removeValidators(minValidator);\n  * ```\n
*\n  * When you add or remove a validator at run time, you must call\n  * `updateValueAndValidity()` for the new
validation to take effect.\n  *\n  * @param validators The validator or validators to remove.\n  */\n
removeValidators(validators: ValidatorFn|ValidatorFn[]): void {\n  this.setValidators(removeValidators(validators,
this._rawValidators));\n }\n\n /**\n  * Remove an asynchronous
validator from this control, without affecting other validators.\n  * Validators are compared by function reference;
you must pass a reference to the exact same\n  * validator function as the one that was originally set. If a provided
validator is not found, it\n  * is ignored.\n  *\n  * When you add or remove a validator at run time, you must call\n
*\n  * `updateValueAndValidity()` for the new validation to take effect.\n  *\n  * @param validators The asynchronous
validator or validators to remove.\n  */\n removeAsyncValidators(validators:
AsyncValidatorFn|AsyncValidatorFn[]): void {\n  this.setAsyncValidators(removeValidators(validators,
this._rawAsyncValidators));\n }\n\n /**\n  * Check whether a synchronous validator function is present on this
control. The provided\n  * validator must be a reference to the exact same function that was provided.\n  *\n  *
@usageNotes\n  *\n  * ### Reference to a ValidatorFn\n  *\n  * ```\n  * // Reference to the RequiredValidator\n
*\n  * const ctrl = new FormControl<number | null>(0, Validators.required);\n  *\n  *
expect(ctrl.hasValidator(Validators.required)).toEqual(true)\n  *\n  * // Reference to anonymous function inside
MinValidator\n  * const minValidator = Validators.min(3);\n  * const ctrl = new FormControl<number | null>(0,
minValidator);\n  *
expect(ctrl.hasValidator(minValidator)).toEqual(true)\n  *\n  *
expect(ctrl.hasValidator(Validators.min(3)).toEqual(false)\n  * ```\n  *\n  * @param validator The validator to
check for presence. Compared by function reference.\n  * @returns Whether the provided validator was found on

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this control.\n *^n hasValidator(validator: ValidatorFn): boolean {\n  return hasValidator(this._rawValidators,
validator);\n }\n\n /**\n  * Check whether an asynchronous validator function is present on this control. The
provided\n  * validator must be a reference to the exact same function that was provided.\n  *\n  * @param
validator The asynchronous validator to
check for presence. Compared by function\n  * reference.\n  * @returns Whether the provided asynchronous
validator was found on this control.\n  *\n  *^n hasAsyncValidator(validator: AsyncValidatorFn): boolean {\n  return
hasValidator(this._rawAsyncValidators, validator);\n }\n\n /**\n  * Empties out the synchronous validator list.\n
*\n  * When you add or remove a validator at run time, you must call\n  * `updateValueAndValidity()` for the new
validation to take effect.\n  *\n  *^n clearValidators(): void {\n  this.validator = null;\n }\n\n /**\n  * Empties
out the async validator list.\n  *\n  * When you add or remove a validator at run time, you must call\n  *
`updateValueAndValidity()` for the new validation to take effect.\n  *\n  *^n clearAsyncValidators(): void {\n
this.asyncValidator = null;\n }\n\n /**\n  * Marks the control as `touched`. A control is touched by focus and\n
* blur events that do not change the value.\n  *\n  * @see `markAsUntouched()`\n
* @see `markAsDirty()`\n  * @see `markAsPristine()`\n  *\n  * @param opts Configuration options that
determine how the control propagates changes\n  * and emits events after marking is applied.\n  * * `onlySelf` :
When true, mark only this control. When false or not supplied,\n  * marks all direct ancestors. Default is false.\n
*\n  *^n markAsTouched(opts: {onlySelf?: boolean} = {}): void {\n  (this as {touched: boolean}).touched = true;\n
if (this._parent && !opts.onlySelf) {\n  this._parent.markAsTouched(opts);\n }\n }\n\n /**\n  * Marks the
control and all its descendant controls as `touched`.\n  * @see `markAsTouched()`\n  *^n markAllAsTouched():
void {\n  this.markAsTouched({onlySelf: true});\n  this._forEachChild((control: AbstractControl) =>
control.markAllAsTouched());\n }\n\n /**\n  * Marks the control as `untouched`.\n  *\n  * If the control has any
children, also marks all children as `untouched`\n  * and recalculates the
`untouched` status of all parent controls.\n  *\n  * @see `markAsTouched()`\n  * @see `markAsDirty()`\n  * @see
`markAsPristine()`\n  *\n  * @param opts Configuration options that determine how the control propagates
changes\n  * and emits events after the marking is applied.\n  * * `onlySelf` : When true, mark only this control.
When false or not supplied,\n  * marks all direct ancestors. Default is false.\n  *\n  *^n markAsUntouched(opts:
{onlySelf?: boolean} = {}): void {\n  (this as {touched: boolean}).touched = false;\n  this._pendingTouched =
false;\n  this._forEachChild((control: AbstractControl) => {\n  control.markAsUntouched({onlySelf: true});\n
});\n  if (this._parent && !opts.onlySelf) {\n  this._parent._updateTouched(opts);\n }\n }\n\n /**\n  *
Marks the control as `dirty`. A control becomes dirty when\n  * the control's value is changed through the UI;
compare `markAsTouched`.\n  *\n  * @see `markAsTouched()`\n  * @see `markAsUntouched()`\n
* @see `markAsPristine()`\n  *\n  * @param opts Configuration options that determine how the control
propagates changes\n  * and emits events after marking is applied.\n  * * `onlySelf` : When true, mark only this
control. When false or not supplied,\n  * marks all direct ancestors. Default is false.\n  *\n  *^n markAsDirty(opts:
{onlySelf?: boolean} = {}): void {\n  (this as {pristine: boolean}).pristine = false;\n  if (this._parent &&
!opts.onlySelf) {\n  this._parent.markAsDirty(opts);\n }\n }\n\n /**\n  * Marks the control as `pristine`.\n
*\n  * If the control has any children, marks all children as `pristine`,\n  * and recalculates the `pristine` status of all
parent\n  * controls.\n  *\n  * @see `markAsTouched()`\n  * @see `markAsUntouched()`\n  * @see
`markAsDirty()`\n  *\n  * @param opts Configuration options that determine how the control emits events after\n
* marking is applied.\n  * * `onlySelf` : When true, mark only this control.
When false or not supplied,\n  * marks all direct ancestors. Default is false.\n  * * `emitEvent` : When true

```

```

or not supplied (the default), the `statusChanges` observable
emits an event with the latest status the control is marked pending.
When false, no events are emitted.
markAsPending(opts: {onlySelf?: boolean, emitEvent?: boolean} = {}): void
(this as {status: FormControlStatus}).status = PENDING;
if (opts.emitEvent !== false) {
  (this.statusChanges as EventEmitter<FormControlStatus>).emit(this.status);
}
if (this._parent && !opts.onlySelf) {
  this._parent.markAsPending(opts);
}
}
/**
 * Disables the control. This means the control is exempt
from validation checks and
 * excluded from the aggregate value of any parent. Its status is `DISABLED`.
 * If the control has children, all children are also disabled.
 * @see {@link AbstractControl.status}
 * @param opts Configuration options that determine how the control propagates
 * changes and emits events after
the control is disabled.
 * * `onlySelf`: When true, mark only this control. When false
or not supplied,
 * marks all direct ancestors. Default is false.
 * * `emitEvent`: When true or not supplied (the
default), both the `statusChanges` and
 * `valueChanges` observables emit events with the latest status and
value when the control is disabled.
When false, no events are emitted.
disable(opts: {onlySelf?:
boolean, emitEvent?: boolean} = {}): void
// If parent has been marked artificially dirty we don't want to re-
calculate the
// parent's dirtiness based on the children.
const skipPristineCheck =
this._parentMarkedDirty(opts.onlySelf);
(this as {status: FormControlStatus}).status = DISABLED;
(this
as {errors: ValidationErrors | null}).errors = null;
this._forEachChild((control: AbstractControl) => {
  control.disable({...opts, onlySelf: true});
});
this._updateValue();
if (opts.emitEvent !== false) {
  (this.valueChanges as EventEmitter<TValue>).emit(this.value);
  (this.statusChanges
as EventEmitter<FormControlStatus>).emit(this.status);
}
this._updateAncestors({...opts,
skipPristineCheck});
this._onDisabledChange.forEach((changeFn) => changeFn(true));
}
/**
 * Enables the control. This means the control is included in validation checks and
 * the aggregate value of its
parent. Its status recalculates based on its value and
 * its validators.
 * By default, if the control has
children, all children are enabled.
 * @see {@link AbstractControl.status}
 * @param opts Configure
options that control how the control propagates changes and
 * emits events when marked as untouched
 * *
`onlySelf`: When true, mark only this control. When false or not supplied,
 * marks all direct ancestors. Default is
false.
 * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and
 *
`valueChanges` observables emit events with the latest status and value when the control
is enabled.
When false, no events are emitted.
enable(opts: {onlySelf?: boolean, emitEvent?: boolean}
= {}): void
// If parent has been marked artificially dirty we don't want to re-calculate the
// parent's
dirtiness based on the children.
const skipPristineCheck = this._parentMarkedDirty(opts.onlySelf);
(this as
{status: FormControlStatus}).status = VALID;
this._forEachChild((control: AbstractControl) => {
  control.enable({...opts, onlySelf: true});
});
this.updateValueAndValidity({onlySelf: true, emitEvent:
opts.emitEvent});
this._updateAncestors({...opts, skipPristineCheck});
this._onDisabledChange.forEach((changeFn) => changeFn(false));
}
private _updateAncestors(\n  opts:
{onlySelf?: boolean, emitEvent?: boolean, skipPristineCheck?: boolean}): void
if (this._parent &&
!opts.onlySelf) {
  this._parent.updateValueAndValidity(opts);
  if (!opts.skipPristineCheck) {
    this._parent._updatePristine();
  }
}
this._parent._updateTouched();
}
}
/**
 * Sets the parent of the control
 * @param
parent The new parent.
setParent(parent: FormGroup|FormArray|null): void
this._parent = parent;
}
/**
 * Sets the value of the control. Abstract method (implemented in sub-classes).
abstract
setValue(value: TRawValue, options?: Object): void;
/**
 * Patches the value of the control. Abstract method
(implemented in sub-classes).
abstract patchValue(value: TValue, options?: Object): void;
/**
 * Resets the control. Abstract method (implemented in sub-classes).
abstract reset(value?: TValue, options?:
Object): void;
/**
 * The raw value of this control. For most control implementations, the raw value will
include
 * disabled children.
getRawValue(): any
return this.value;
}
}
/**
 * Recalculates
the value and validation status of

```



the control.

- \* By default, it also updates the value and validity of its ancestors.
- \* @param opts Configuration options determine how the control propagates changes and emits events after updates and validity checks are applied.
- \* `onlySelf`: When true, only update this control. When false or not supplied, update all direct ancestors. Default is false.
- \* `emitEvent`: When true or not supplied (the default), both the `statusChanges` and `valueChanges` observables emit events with the latest status and value when the control is updated. When false, no events are emitted.

```

updateValueAndValidity(opts: {onlySelf?:
boolean, emitEvent?: boolean} = {}): void {
  this._setInitialStatus();
  this._updateValue();

  if (this.enabled) {
    this._cancelExistingSubscription();
    (this as {errors: ValidationErrors | null}).errors =
    this._runValidator();
    (this as {status: FormControlStatus}).status = this._calculateStatus();

    if (this.status === VALID || this.status === PENDING) {
      this._runAsyncValidator(opts.emitEvent);
    }

    if (opts.emitEvent !== false) {
      (this.valueChanges as EventEmitter<TValue>).emit(this.value);
      (this.statusChanges as EventEmitter<FormControlStatus>).emit(this.status);
    }

    if (this._parent && !opts.onlySelf) {
      this._parent.updateValueAndValidity(opts);
    }
  }
}

/** @internal */
_updateTreeValidity(opts: {emitEvent?: boolean} = {emitEvent: true}): void {
  this._forEachChild((ctrl:
AbstractControl) => ctrl._updateTreeValidity(opts));
  this.updateValueAndValidity({onlySelf: true, emitEvent:
opts.emitEvent});
}

private _setInitialStatus() {
  (this as {status: FormControlStatus}).status =
  this._allControlsDisabled() ? DISABLED : VALID;
}

private _runValidator(): ValidationErrors|null {
  return this.validator ? this.validator(this) : null;
}

private _runAsyncValidator(emitEvent?:
boolean): void {
  if (this.asyncValidator) {
    (this as {status: FormControlStatus}).status = PENDING;
    this._hasOwnPendingAsyncValidator = true;
    const obs = toObservable(this.asyncValidator(this));
    this._asyncValidationSubscription = obs.subscribe((errors: ValidationErrors|null) => {
      this._hasOwnPendingAsyncValidator = false;
      // This will trigger the recalculation of the validation status,
      which depends on
      // the state of the asynchronous validation (whether it is in progress or not). So, it is
      // necessary that we have updated the `_hasOwnPendingAsyncValidator` boolean flag first.
      this.setErrors(errors,
{emitEvent});
    });
  }

  private _cancelExistingSubscription(): void {
    if (
this._asyncValidationSubscription) {
      this._asyncValidationSubscription.unsubscribe();
      this._hasOwnPendingAsyncValidator = false;
    }
  }

  /**
   * Sets errors on a form
   * control when running validations manually, rather than automatically.
   *
   * Calling `setErrors` also updates the
   * validity of the parent control.
   *
   * @param opts Configuration options that determine how the control
   * propagates
   * changes and emits events after the control errors are set.
   *
   * emitEvent: When true or not
   * supplied (the default), the statusChanges
   * observable emits an event after the errors are set.
   *
   * @usageNotes
   *
   * ### Manually set the errors for a control
   *
   * ```
   * const login = new
   * FormControl('someLogin');
   * login.setErrors({
   * notUnique: true
   * });
   *
   * expect(login.valid).toEqual(false);
   * expect(login.errors).toEqual({ notUnique: true });
   *
   * login.setValue('someOtherLogin');
   *
   * expect(login.valid).toEqual(true);
   * ```
   */
  setErrors(errors:
ValidationErrors|null, opts: {emitEvent?: boolean} = {}): void {
    (this as {errors: ValidationErrors | null}).errors
    = errors;
    this._updateControlsErrors(opts.emitEvent !== false);
  }

  /**
   * Retrieves a child control given
   * the control's name or path.
   *
   * This signature for get supports strings and `const` arrays (`.get(['foo', 'bar'] as
const)`).
   */
  get<P extends string|(readonly(string|number)[])>(path: P):
AbstractControl<GetProperty<TRawValue, P>>|null;

  /**
   * Retrieves a child control given the control's
   * name or path.
   *
   * This signature for `get` supports non-const (mutable) arrays. Inferred type
   * information
   * will not be as robust, so prefer to pass a `readonly` array if possible.
   */
  get<P extends
string|Array<string|number>>(path: P):
AbstractControl<GetProperty<TRawValue, P>>|null;

  /**
   * Retrieves a child control given the control's name or path.
   *
   * @param path A dot-delimited string or array of
string/number values that define the path to the
   * control. If a string is provided, passing it as a
   * string literal will result in improved type
   * information. Likewise, if an array is provided, passing it `as const`
   * will cause improved type
   * information to be available.
   *
   * @usageNotes
   *
   * ### Retrieve a nested
   * control
   *
   * For example, to get a `name` control nested within a `person` sub-group:
   *
   *

```

```

`this.form.get('person.name');`
 * -OR-
 * `this.form.get(['person', 'name'] as const);` // `as const`
gives improved typings
 * ### Retrieve a control in a FormArray
 * When accessing an element
inside a FormArray, you can use an element index.
 * For example, to get a `price` control from the first element
in an `items` array you can use:
 * `this.form.get('items.0.price');`
 * -OR-
 * `this.form.get(['items', 0, 'price']);`
 * `get<P extends string|((string | number)[])>(path: P):`
AbstractControl<GetProperty<TRawValue, P>>|null {
 * let currPath: Array<string|number>|string
 * = path;
 * if (currPath === null) return null;
 * if (!Array.isArray(currPath)) currPath = currPath.split('.');
 * if (currPath.length === 0) return null;
 * return currPath.reduce(
 *   (control: AbstractControl|null, name) =>
 *   control && control._find(name), this);
}
 * @description
 * Reports error data for the control with
the given path.
 * @param errorCode The code of the error to check
 * @param path A list of control
names that designates how to move from the current control
 * to the control that should be queried for errors.
 * @usageNotes
 * For example, for the following `FormGroup`:
 * form = new
FormGroup({
 *   address: new FormGroup({ street: new FormControl() })
});
 * The path to
the `street` control from the root form would be `address` -> `street`.
 * It can be provided to this method in one
of two formats:
 * 1. An array of string control
names, e.g. `['address', 'street']`
 * 1. A period-delimited list of control names in one string, e.g. `address.street`
 * @returns error data for that particular error. If the control or error is not present,
 * null is returned.
 * @example
 * getError(errorCode: string, path?: Array<string|number>|string): any {
 *   const control = path ? this.get(path) :
 *   this;
 *   return control && control.errors ? control.errors[errorCode] : null;
}
 * @description
 * Reports whether the control with the given path has the error specified.
 * @param errorCode The code of
the error to check
 * @param path A list of control names that designates how to move from the current control
 * to the control that should be queried for errors.
 * @usageNotes
 * For example, for the following
`FormGroup`:
 * form = new FormGroup({
 *   address: new FormGroup({ street: new
 *   FormControl() })
});
 * The path
to the `street` control from the root form would be `address` -> `street`.
 * It can be provided to this method in
one of two formats:
 * 1. An array of string control names, e.g. `['address', 'street']`
 * 1. A period-
delimited list of control names in one string, e.g. `address.street`
 * If no path is given, this method checks
for the error on the current control.
 * @returns whether the given error is present in the control at the given
path.
 * If the control is not present, false is returned.
 * @example
 * hasError(errorCode: string, path?:
 * Array<string|number>|string): boolean {
 *   return !!this.getError(errorCode, path);
}
 * @description
 * Retrieves the
top-level ancestor of this control.
 * @example
 * get root(): AbstractControl {
 *   let x: AbstractControl = this;
 *   while (x._parent) {
 *     x = x._parent;
 *   }
 *   return x;
}
 * @internal
 * @example
 * _updateControlsErrors(emitEvent:
 * boolean): void {
 *   (this as
 *   {status: FormControlStatus}).status = this._calculateStatus();
 *   if (emitEvent) {
 *     (this.statusChanges as
 *     EventEmitter<FormControlStatus>).emit(this.status);
 *   }
 *   if (this._parent) {
 *     this._parent._updateControlsErrors(emitEvent);
 *   }
}
 * @internal
 * @example
 * _initObservables() {
 *   (this as
 *   {valueChanges: Observable<TValue>}).valueChanges = new EventEmitter();
 *   (this as {statusChanges:
 *   Observable<FormControlStatus>}).statusChanges = new EventEmitter();
}
 * @example
 * _calculateStatus():
 * FormControlStatus {
 *   if (this._allControlsDisabled()) return DISABLED;
 *   if (this.errors) return INVALID;
 *   if (this._hasOwnPendingAsyncValidator || this._anyControlsHaveStatus(PENDING))
 *   return PENDING;
 *   if (this._anyControlsHaveStatus(INVALID)) return INVALID;
 *   return VALID;
}
 * @internal
 * @example
 * _updateValue(): void;
 * @internal
 * @example
 * _forEachChild(cb: (c: AbstractControl) => void):
 * void;
 * @internal
 * @example
 * _anyControls(condition: (c: AbstractControl) => boolean): boolean;
 * @internal
 * @example
 * _allControlsDisabled(): boolean;
 * @internal
 * @example
 * _syncPendingControls(): boolean;
 * @internal
 * @example
 * _anyControlsHaveStatus(status: FormControlStatus): boolean {
 *   return
 *   this._anyControls((control: AbstractControl) => control.status === status);
}
 * @internal
 * @example
 * _anyControlsDirty(): boolean {
 *   return this._anyControls((control: AbstractControl) => control.dirty);
}
}

```

```

/** @internal *\n _anyControlsTouched(): boolean {\n  return this._anyControls((control: AbstractControl) =>
control.touched);\n }\n\n /** @internal *\n _updatePristine(opts: {onlySelf?: boolean} = {}): void {\n  (this as
{pristine: boolean}).pristine = !this._anyControlsDirty();\n  if (this._parent && !opts.onlySelf) {\n
this._parent._updatePristine(opts);\n  }\n }\n\n /** @internal *\n _updateTouched(opts: {onlySelf?: boolean} =
{}):
void {\n  (this as {touched: boolean}).touched = this._anyControlsTouched();\n\n  if (this._parent &&
!opts.onlySelf) {\n    this._parent._updateTouched(opts);\n  }\n }\n\n /** @internal *\n _onDisabledChange:
Array<(isDisabled: boolean) => void> = [];\n\n /** @internal *\n _registerOnCollectionChange(fn: () => void):
void {\n  this._onCollectionChange = fn;\n }\n\n /** @internal *\n _setUpdateStrategy(opts?:
ValidatorFn|ValidatorFn[]|AbstractControlOptions|null): void {\n  if (isOptionsObj(opts) && opts.updateOn !=
null) {\n    this._updateOn = opts.updateOn!;\n  }\n }\n\n /**\n  * Check to see if parent has been marked
artificially dirty.\n  *\n  * @internal\n  *\n  * private _parentMarkedDirty(onlySelf?: boolean): boolean {\n  const
parentDirty = this._parent && this._parent.dirty;\n  return !onlySelf && !!parentDirty &&
!this._parent!._anyControlsDirty();\n }\n\n /** @internal *\n _find(name: string|number): AbstractControl|null
{\n  return
null;\n }\n}\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code
is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport { AsyncValidatorFn, ValidatorFn } from './directives/validators';\n\nimport { AbstractControl,
AbstractControlOptions, assertAllValuesPresent, assertControlPresent, pickAsyncValidators, pickValidators,
RawValue, TypedOrUntyped, Value } from './abstract_model';\n\n/**\n * FormGroupValue extracts the type of
`.value` from a FormGroup's inner object type. The untyped\n * case falls back to {[key: string]: any}.\n *\n *
Angular uses this type internally to support Typed Forms; do not use it directly.\n *\n * For internal use only.\n
*\n * export type FormGroupValue<T> extends {[K in keyof T]?: AbstractControl<any>} > =\n  TypedOrUntyped<T,
Partial<{[K in keyof T]: Value<T[K]>}>, {[key: string]: any}>;\n\n/**\n * FormGroupRawValue extracts the type
of `.getRawValue()`
from a FormGroup's inner object type. The\n * untyped case falls back to {[key: string]: any}.\n *\n * Angular uses
this type internally to support Typed Forms; do not use it directly.\n *\n * For internal use only.\n *\n * export type
FormGroupRawValue<T> extends {[K in keyof T]?: AbstractControl<any>} > =\n  TypedOrUntyped<T, {[K in
keyof T]: RawValue<T[K]>}, {[key: string]: any}>;\n\n/**\n * OptionalKeys returns the union of all optional keys
in the object.\n *\n * Angular uses this type internally to support Typed Forms; do not use it directly.\n *\n * export
type OptionalKeys<T> = {\n  [K in keyof T] -?: undefined extends T[K] ? K : never\n}[keyof T];\n\n/**\n * Tracks
the value and validity state of a group of `FormControl` instances.\n *\n * A `FormGroup` aggregates the values of
each child `FormControl` into one object,\n * with each control name as the key. It calculates its status by reducing
the status values\n * of its children. For example, if one of the controls
in a group is invalid, the entire\n * group becomes invalid.\n *\n * `FormGroup` is one of the four fundamental
building blocks used to define forms in Angular,\n * along with `FormControl`, `FormArray`, and `FormRecord`.\n
*\n * When instantiating a `FormGroup`, pass in a collection of child controls as the first\n * argument. The key for
each child registers the name for the control.\n *\n * `FormGroup` is intended for use cases where the keys are
known ahead of time.\n *\n * If you need to dynamically add and remove controls, use { @link FormRecord } instead.\n
*\n * `FormGroup` accepts an optional type parameter `TControl`, which is an object type with inner\n * control
types as values.\n *\n * @usageNotes\n *\n * ### Create a form group with 2 controls\n *\n * ```\n * const form =
new FormGroup({\n *   first: new FormControl('Nancy', Validators.minLength(2)),\n *   last: new
FormControl('Drew'),\n * });\n *\n * console.log(form.value); // {first: 'Nancy', last: 'Drew'}\n *\n *
console.log(form.status);
\n *\n * // 'VALID'\n *\n * ```\n *\n * ### The type argument, and optional controls\n *\n * `FormGroup` accepts one generic
argument, which is an object containing its inner controls.\n *\n * This type will usually be inferred automatically, but
you can always specify it explicitly if you\n * wish.\n *\n * If you have controls that are optional (i.e. they can be
removed, you can use the `?` in the\n * type):\n *\n * ```\n * const form = new FormGroup<{\n *   first:

```

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FormControl<string|null>,\n * middle?: FormControl<string|null>, // Middle name is optional.\n * last:
FormControl<string|null>,\n * }>({\n * first: new FormControl('Nancy'),\n * last: new FormControl('Drew'),\n *
});\n * ```\n *\n * ### Create a form group with a group-level validator\n *\n * You include group-level validators as
the second arg, or group-level async\n * validators as the third arg. These come in handy when you want to perform
validation\n * that considers the value of more than one child control.\n
*\n * ```\n *\n * const form = new FormGroup({\n * password: new FormControl("", Validators.minLength(2)),\n *
passwordConfirm: new FormControl("", Validators.minLength(2)),\n * }, passwordMatchValidator);\n *\n *\n *
function passwordMatchValidator(g: FormGroup) {\n * return g.get('password').value ===
g.get('passwordConfirm').value\n * ? null : {'mismatch': true};\n * }\n * ```\n *\n * Like `FormControl`
instances, you choose to pass in\n * validators and async validators as part of an options object.\n *\n * ```\n *\n * const
form = new FormGroup({\n * password: new FormControl("")\n * passwordConfirm: new FormControl("")\n * }, {
validators: passwordMatchValidator, asyncValidators: otherValidator });\n *\n * ```\n *\n * ### Set the updateOn
property for all controls in a form group\n *\n * The options object is used to set a default value for each child\n *
control's `updateOn` property. If you set `updateOn` to `blur` at the\n * group level, all child controls default
to `blur`, unless the child\n * has explicitly specified a different `updateOn` value.\n *\n * ```\n *\n * const c = new
FormGroup({\n * one: new FormControl()\n * }, { updateOn: 'blur' });\n *\n * ```\n *\n * ### Using a FormGroup with
optional controls\n *\n * It is possible to have optional controls in a FormGroup. An optional control can be
removed later\n * using `removeControl`, and can be omitted when calling `reset`. Optional controls must be\n *
declared optional in the group's type.\n *\n * ```\n *\n * const c = new FormGroup<{one?: FormControl<string>}>({\n
* one: new FormControl("")\n * });\n *\n * ```\n *\n * Notice that `c.value.one` has type `string|null|undefined`. This is
because calling `c.reset({})`\n * without providing the optional key `one` will cause it to become `null`.\n *\n *
@publicApi\n *\n * export class FormGroup<TControl extends {[K in keyof TControl]: AbstractControl<any>} =
any> extends\n * AbstractControl<\n * TypedOrUntyped<TControl, FormGroupValue<TControl>,\n
any>,\n * TypedOrUntyped<TControl, FormGroupRawValue<TControl>, any>> {\n * /**\n * Creates a new
`FormGroup` instance.\n * \n * @param controls A collection of child controls. The key for each child is the
name\n * under which it is registered.\n * \n * @param validatorOrOpts A synchronous validator function, or an
array of\n * such functions, or an `AbstractControlOptions` object that contains validation functions\n * and a
validation trigger.\n * \n * @param asyncValidator A single async validator or array of async validator functions\n
*\n * \n * constructor(\n * controls: TControl, validatorOrOpts?:
ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n * asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null) {\n * super(pickValidators(validatorOrOpts),
pickAsyncValidators(asyncValidator, validatorOrOpts));\n * this.controls = controls;\n * this._initObservables();\n
this._setUpdateStrategy(validatorOrOpts);\n * this._setUpControls();\n
this.updateValueAndValidity({\n * onlySelf: true,\n * // If `asyncValidator` is present, it will trigger control
status change from `PENDING` to\n * `VALID` or `INVALID`. The status should be broadcasted via the
`statusChanges` observable,\n * // so we set `emitEvent` to `true` to allow that during the control creation
process.\n * emitEvent: !!this.asyncValidator\n * });\n * }\n * \n * public controls: TypedOrUntyped<TControl,
TControl, {[key: string]: AbstractControl<any>}>;\n * /**\n * Registers a control with the group's list of controls.
In a strongly-typed group, the control\n * must be in the group's type (possibly as an optional key).\n *\n * This
method does not update the value or validity of the control.\n * Use {@link FormGroup#addControl addControl}
instead.\n *\n * @param name The control name to register in the collection\n * @param control Provides the
control for the given name\n * \n * registerControl<K extends string&keyof
TControl>(name: K, control: TControl[K]): TControl[K];\n * registerControl(\n * this: FormGroup<{[key: string]:
AbstractControl<any>}>, name: string,\n * control: AbstractControl<any>): AbstractControl<any>;\n
registerControl<K extends string&keyof TControl>(name: K, control: TControl[K]): TControl[K] {\n * if
(this.controls[name]) return (this.controls as any)[name];\n * this.controls[name] = control;\n * control.setParent(this
as FormGroup);\n * control._registerOnCollectionChange(this._onCollectionChange);\n * return control;\n * }\n * \n
/**\n * Add a control to this group. In a strongly-typed group, the control must be in the group's type\n *

```

(possibly as an optional key).\n \* If a control with a given name already exists, it would \*not\* be replaced with a new one.\n \* If you want to replace an existing control, use the { @link FormGroup#setControl setControl }\n \* method instead. This method also updates the value and validity of the control.\n \*\n \* @param name The control name to add to the collection\n \* @param control Provides the control for the given name\n \* @param options Specifies whether this FormGroup instance should emit events after a new\n \* control is added.\n \* \* `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n \* `valueChanges` observables emit events with the latest status and value when the control is\n \* added. When false, no events are emitted.\n \*/\n addControl(\n this: FormGroup<{[key: string]: AbstractControl<any>>}, name: string,\n control: AbstractControl, options?: {emitEvent?: boolean}): void;\n addControl<K extends string & keyof TControl>(name: K, control: Required<TControl>[K], options?: {\n emitEvent?: boolean\n }): void;\n\n addControl<K extends string & keyof TControl>(name: K, control: Required<TControl>[K], options: {\n emitEvent?: boolean\n } = {}): void {\n this.registerControl(name, control);\n this.updateValueAndValidity({emitEvent: options.emitEvent});\n this.\_onCollectionChange();\n }\n\n removeControl(this: FormGroup<{[key: string]: AbstractControl<any>>}, name: string, options?: {\n emitEvent?: boolean;\n }): void;\n removeControl<S extends string>(name: OptionalKeys<TControl>&S, options?: {\n emitEvent?: boolean;\n }): void;\n\n /\*\*\n \* Remove a control from this group. In a strongly-typed group, required controls cannot be\n \* removed.\n \*\n \* This method also updates the value and validity of the control.\n \*\n \* @param name The control name to remove from the collection\n \* @param options Specifies whether this FormGroup instance should emit events after a\n \* control is removed.\n \* \* `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n \* `valueChanges` observables emit events with the latest status and value when the control is\n \* removed. When false, no events are emitted.\n \*/\n removeControl(name: string, options: {emitEvent?: boolean; } = {}): void {\n if ((this.controls as any)[name])\n (this.controls as any)[name].\_registerOnCollectionChange(() => {});\n delete ((this.controls as any)[name]);\n this.updateValueAndValidity({emitEvent: options.emitEvent});\n this.\_onCollectionChange();\n }\n\n /\*\*\n \* Replace an existing control. In a strongly-typed group, the control must be in the group's type\n \* (possibly as an optional key).\n \*\n \* If a control with a given name does not exist in this `FormGroup`, it will be added.\n \*\n \* @param name The control name to replace in the collection\n \* @param control Provides the control for the given name\n \* @param options Specifies whether this FormGroup instance should emit events after an\n \* existing control is replaced.\n \* \* `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n \* `valueChanges` observables emit events with the latest status and value when the control is\n \* replaced with a new one. When false, no events are emitted.\n \*/\n setControl<K extends string & keyof TControl>(name: K, control: TControl[K], options?: {\n emitEvent?: boolean\n }): void;\n setControl(\n this: FormGroup<{[key: string]: AbstractControl<any>>}, name: string,\n control: AbstractControl, options?: {emitEvent?: boolean}): void;\n setControl<K extends string & keyof TControl>(name: K, control: TControl[K], options: {\n emitEvent?: boolean\n } = {}): void {\n if (this.controls[name])\n this.controls[name].\_registerOnCollectionChange(() => {});\n delete (this.controls[name]);\n if (control)\n this.registerControl(name, control);\n this.updateValueAndValidity({emitEvent: options.emitEvent});\n this.\_onCollectionChange();\n }\n\n /\*\*\n \* Check whether there is an enabled control with the given name in the group.\n \*\n \* Reports false for disabled controls. If you'd like to check for existence in the group\n \* only, use { @link AbstractControl#get get } instead.\n \*\n \* @param controlName The control name to check for existence in the collection\n \*\n \* @returns false for disabled controls, true otherwise.\n \*/\n contains<K extends string>(controlName: K): boolean;\n contains(this: FormGroup<{[key: string]: AbstractControl<any>>}, controlName: string): boolean;\n\n contains<K extends string & keyof TControl>(controlName: K): boolean {\n return this.controls.hasOwnProperty(controlName) && this.controls[controlName].enabled;\n }\n\n /\*\*\n \* Sets the value of the `FormGroup`. It accepts an object that matches\n \* the structure of the group, with control names as keys.\n \*\n \* @usageNotes\n \* ### Set the complete value for the form group\n \*\n \* ```\n \* const form =

```

new FormGroup({\n * first: new FormControl(),\n * last: new FormControl()\n * });\n *\n * console.log(form.value); // {first: null, last: null}\n *\n * form.setValue({first: 'Nancy', last: 'Drew'});\n *\n * console.log(form.value); // {first: 'Nancy', last: 'Drew'}\n *```\n *\n * @throws When strict checks fail, such as setting the value of a control\n * that doesn't exist or if you exclude a value of a control that does exist.\n *\n * @param value The new value for the control that matches the structure of the group.\n * @param options Configuration options that determine how the control propagates changes\n * and emits events after the value changes.\n * The configuration options are passed to the {@link AbstractControl#updateValueAndValidity\n * updateValueAndValidity} method.\n *\n * * `onlySelf`: When true, each change only affects this control, and not its parent. Default is\n * false.\n * * `emitEvent`: When true or not supplied (the default), both the `statusChanges`\n * and\n * `valueChanges`\n * observables emit events with the latest status and value when the control value is updated.\n * When false, no events are emitted.\n */\n override\n setValue(value: FormGroupRawValue<TControl>, options: {\n onlySelf?: boolean,\n emitEvent?: boolean\n } = {}): void {\n assertAllValuesPresent(this, true, value);\n (Object.keys(value) as Array<keyof TControl>).forEach(name => {\n assertControlPresent(this, true, name as any);\n (this.controls as any)[name].setValue(\n (value as any)[name], {onlySelf: true, emitEvent: options.emitEvent});\n });\n this.updateValueAndValidity(options);\n }\n\n /**\n * Patches the value of the `FormGroup`. It accepts an object with control\n * names as keys, and does its best to match the values to the correct controls\n * in the group.\n *\n * It accepts both super-sets and sub-sets of the group without throwing an error.\n *\n * @usageNotes\n * ### Patch the value for a form group\n *\n * ```\n * const form = new FormGroup({\n * first: new FormControl(),\n * last: new FormControl()\n * });\n * console.log(form.value); // {first: null, last: null}\n *\n * form.patchValue({first: 'Nancy'});\n * console.log(form.value); // {first: 'Nancy', last: null}\n *```\n *\n * @param value The object that matches the structure of the group.\n * @param options Configuration options that determine how the control propagates changes and\n * emits events after the value is patched.\n * * `onlySelf`: When true, each change only affects this control and not its parent. Default is\n * true.\n * * `emitEvent`: When true or not supplied (the default), both the `statusChanges`\n * and\n * `valueChanges`\n * observables emit events with the latest status and value when the control value\n * is updated. When false, no events are emitted. The configuration options are passed to\n * the {@link AbstractControl#updateValueAndValidity updateValueAndValidity} method.\n */\n override patchValue(value: FormGroupValue<TControl>, options: {\n onlySelf?: boolean,\n emitEvent?: boolean\n } = {}): void {\n // Even though the `value` argument type doesn't allow `null` and `undefined` values, the\n // `patchValue` can be called recursively and inner data structures might have these values, so\n // we just ignore such cases when a field containing FormGroup instance receives `null` or\n // `undefined` as a value.\n if (value == null /* both `null` and `undefined` */) return;\n (Object.keys(value) as Array<keyof TControl>).forEach(name => {\n // The compiler cannot see through the uninstantiated conditional type of `this.controls`, so\n // `as any` is required.\n const control = (this.controls as any)[name];\n if (control) {\n control.patchValue(\n /* Guaranteed to be present, due to the outer forEach. */ value\n [name as keyof FormGroupValue<TControl>]!,\n {onlySelf: true, emitEvent: options.emitEvent});\n }\n });\n this.updateValueAndValidity(options);\n }\n\n /**\n * Resets the `FormGroup`, marks all descendants `pristine` and `untouched` and sets\n * the value of all descendants to their default values, or null if no defaults were provided.\n *\n * You reset to a specific form state by passing in a map of states\n * that matches the structure of your form, with control names as keys. The state\n * is a standalone value or a form state object with both a value and a disabled\n * status.\n *\n * @param value Resets the control with an initial value,\n * or an object that defines the initial value and disabled state.\n *\n * @param options Configuration options that determine how the control propagates changes\n * and emits events when the group is reset.\n *\n * * `onlySelf`: When true, each change only affects this control, and not its parent. Default is\n * false.\n * * `emitEvent`: When true or not supplied (the default), both the `statusChanges`\n * and\n * `valueChanges`\n * observables emit events with the latest status and value when the control

```

```

is reset.\n * When false, no events are emitted.\n * The configuration options are passed to the {@link
AbstractControl#updateValueAndValidity}\n * updateValueAndValidity} method.\n *\n * @usageNotes\n *\n * ### Reset the form group values\n *\n * ```ts\n * const form = new FormGroup({\n *   first: new
FormControl('first name'),\n *   last: new FormControl('last name')\n * });\n *\n * console.log(form.value); //
{first: 'first name', last: 'last name'}\n *\n * form.reset({ first: 'name', last: 'last name' });\n *\n *
console.log(form.value); // {first: 'name', last: 'last name'}\n *\n * ### Reset the form group values and
disabled status\n *\n * ```\n * const form = new FormGroup({\n *   first: new FormControl('first name'),\n *
last: new FormControl('last name')\n * });\n *\n * form.reset({\n *   first: {value: 'name', disabled: true},\n *
last: 'last'\n * });\n *\n * console.log(form.value); // {last:
'last'}\n *\n * console.log(form.get('first').status); // 'DISABLED'\n *\n * ^\n\n override reset(\n   value:
TypedOrUntyped<TControl, FormGroupValue<TControl>, any> = {} as unknown as\n
FormGroupValue<TControl>,\n   options: {onlySelf?: boolean, emitEvent?: boolean} = {}): void {\n
this._forEachChild((control, name) => {\n   control.reset((value as any)[name], {onlySelf: true, emitEvent:
options.emitEvent});\n });\n this._updatePristine(options);\n this._updateTouched(options);\n
this.updateValueAndValidity(options);\n }\n\n /**\n * The aggregate value of the `FormGroup`, including any
disabled controls.\n *\n * Retrieves all values regardless of disabled status.\n * ^\n\n override getRawValue():
TypedOrUntyped<TControl, FormGroupRawValue<TControl>, any> {\n   return this._reduceChildren({}, (acc,
control, name) => {\n   (acc as any)[name] = (control as any).getRawValue();\n   return acc;\n }) as any;\n
}\n\n /** @internal\n *\n * ^\n\n override _syncPendingControls(): boolean {\n   let subtreeUpdated = this._reduceChildren(false, (updated:
boolean, child) => {\n   return child._syncPendingControls() ? true : updated;\n });\n   if (subtreeUpdated)
this.updateValueAndValidity({onlySelf: true});\n   return subtreeUpdated;\n }\n\n /** @internal ^\n\n override
_forEachChild(cb: (v: any, k: any) => void): void {\n   Object.keys(this.controls).forEach(key => {\n   // The list
of controls can change (for ex. controls might be removed) while the loop\n   // is running (as a result of invoking
Forms API in `valueChanges` subscription), so we\n   // have to null check before invoking the callback.\n   const control = (this.controls as any)[key];\n   control && cb(control, key);\n });\n }\n\n /** @internal ^\n\n
_setUpControls(): void {\n   this._forEachChild((control) => {\n   control.setParent(this);\n   control._registerOnCollectionChange(this._onCollectionChange);\n });\n }\n\n
/** @internal ^\n\n override _updateValue(): void {\n   (this as {value: any}).value = this._reduceValue();\n }\n\n
/** @internal ^\n\n override _anyControls(condition: (c: AbstractControl) => boolean): boolean {\n   for (const
[controlName, control] of Object.entries(this.controls)) {\n   if (this.contains(controlName as any) &&
condition(control as any)) {\n   return true;\n   }\n }\n   return false;\n }\n\n /** @internal ^\n\n
_reduceValue(): Partial<TControl> {\n   let acc: Partial<TControl> = {};\n   return this._reduceChildren(acc, (acc,
control, name) => {\n   if (control.enabled || this.disabled) {\n   acc[name] = control.value;\n   }\n   return
acc;\n });\n }\n\n /** @internal ^\n\n _reduceChildren<T, K extends keyof TControl>(\n   initValue: T, fn: (acc:
T, control: TControl[K], name: K) => T): T {\n   let res = initValue;\n   this._forEachChild((control: TControl[K],
name: K) => {\n   res = fn(res, control, name);\n });\n   return res;\n }\n\n /** @internal ^\n\n override _allControlsDisabled(): boolean {\n   for (const
controlName of (Object.keys(this.controls) as Array<keyof TControl>)) {\n   if ((this.controls as
any)[controlName].enabled) {\n   return false;\n   }\n }\n   return Object.keys(this.controls).length > 0 ||
this.disabled;\n }\n\n /** @internal ^\n\n override _find(name: string|number): AbstractControl|null {\n   return
this.controls.hasOwnProperty(name as string) ?\n   (this.controls as any)[name as keyof TControl] :\n   null;\n }\n\n\ninterface UntypedFormGroupCtor {\n   new(controls: {[key: string]: AbstractControl},\n   validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n   asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormGroup;\n\n /**\n * The presence of an explicit
`prototype` property provides backwards-compatibility for apps that\n * manually inspect the prototype chain.\n\n
*/\n\n prototype:

```

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FormGroup<any>;\n}\n\n/**\n * UntypedFormGroup is a non-strongly-typed version of @see FormGroup.\n *\/\nexport type UntypedFormGroup = FormGroup<any>;\n\nexport const UntypedFormGroup:
UntypedFormGroupCtor = FormGroup;\n\nexport const isFormGroup = (control: unknown): control is FormGroup
=> control instanceof FormGroup;\n\n/**\n * Tracks the value and validity state of a collection of `FormControl`
instances, each of which has\n * the same value type.\n *\/\n * `FormRecord` is very similar to {@link FormGroup},
except it can be used with a dynamic keys,\n * with controls added and removed as needed.\n *\/\n * `FormRecord`
accepts one generic argument, which describes the type of the controls it contains.\n *\/\n * @usageNotes\n *\/\n *
``\n * let numbers = new FormRecord({bill: new FormControl('415-123-456')});\n * numbers.addControl('bob',
new FormControl('415-234-567'));\n * numbers.removeControl('bill');\n * ``\n *\/\n * @publicApi\n *\/\nexport class
FormRecord<TControl> extends AbstractControl
= AbstractControl> extends\n  FormGroup<{[key: string]: TControl}> { }\n\nexport interface
FormRecord<TControl> {\n  /**\n   * Registers a control with the records's list of controls.\n   *\/\n   * See
`FormGroup#registerControl` for additional information.\n   *\/\n   registerControl(name: string, control: TControl):
TControl;\n  /**\n   * Add a control to this group.\n   *\/\n   * See `FormGroup#addControl` for additional
information.\n   *\/\n   addControl(name: string, control: TControl, options?: {emitEvent?: boolean}): void;\n  /**\n
   * Remove a control from this group.\n   *\/\n   * See `FormGroup#removeControl` for additional information.\n   *\/\n
   removeControl(name: string, options?: {emitEvent?: boolean}): void;\n  /**\n   * Replace an existing control.\n
   *\/\n   * See `FormGroup#setControl` for additional information.\n   *\/\n   setControl(name: string, control: TControl,
options?: {emitEvent?: boolean}): void;\n  /**\n   * Check whether there is an enabled control
with the given name in the group.\n   *\/\n   * See `FormGroup#contains` for additional information.\n   *\/\n
   contains(controlName: string): boolean;\n  /**\n   * Sets the value of the `FormRecord`. It accepts an object that
matches\n   * the structure of the group, with control names as keys.\n   *\/\n   * See `FormGroup#setValue` for
additional information.\n   *\/\n   setValue(value: {[key: string]: Value<TControl>}, options?: {\n     onlySelf?:
boolean,\n     emitEvent?: boolean\n   }): void;\n  /**\n   * Patches the value of the `FormRecord`. It accepts an
object with control\n   * names as keys, and does its best to match the values to the correct controls\n   * in the
group.\n   *\/\n   * See `FormGroup#patchValue` for additional information.\n   *\/\n   patchValue(value: {[key: string]:
Value<TControl>}, options?: {\n     onlySelf?: boolean,\n     emitEvent?: boolean\n   }): void;\n  /**\n   * Resets the
`FormRecord`, marks all descendants `pristine` and `untouched` and sets\n   * the
value of all descendants to null.\n   *\/\n   * See `FormGroup#reset` for additional information.\n   *\/\n   reset(value?:
{[key: string]: Value<TControl>}, options?: {\n     onlySelf?: boolean,\n     emitEvent?: boolean\n   }): void;\n  /**\n
   * The aggregate value of the `FormRecord`, including any disabled controls.\n   *\/\n   * See
`FormGroup#getRawValue` for additional information.\n   *\/\n   getRawValue(): {[key: string]:
RawValue<TControl>};\n}\n\nexport const isFormRecord = (control: unknown): control is FormRecord =>\ncontrol instanceof FormRecord;\n","/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\/\n * Use
of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\/\nimport {RuntimeError as RuntimeError} from '@angular/core';\nimport
{RuntimeErrorCode} from './errors';\nimport {AbstractControl} from './model/abstract_model';\nimport
{FormArray} from './model/form_array';\nimport
{FormControl} from './model/form_control';\nimport {FormGroup} from './model/form_group';\nimport
{getControlAsyncValidators, getControlValidators, mergeValidators} from './validators';\nimport
{AbstractControlDirective} from './abstract_control_directive';\nimport {AbstractFormGroupDirective} from
 './abstract_form_group_directive';\nimport {ControlContainer} from './control_container';\nimport
{BuiltInControlValueAccessor, ControlValueAccessor} from './control_value_accessor';\nimport
{DefaultValueAccessor} from './default_value_accessor';\nimport {NgControl} from './ng_control';\nimport
{FormArrayName} from './reactive_directives/form_group_name';\nimport {ngModelWarning} from
 './reactive_errors';\nimport {AsyncValidatorFn, Validator, ValidatorFn} from './validators';\n\nexport function
controlPath(name: string|null, parent: ControlContainer): string[] {\n  return [...parent.path!, name!];\n}\n\n/**\n *
Links a Form control and a Form directive by setting up callbacks (such

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as `onChange`) on both\n * instances. This function is typically invoked when form directive is being initialized.\n
*\n * @param control Form control instance that should be linked.\n * @param dir Directive that should be linked
with a given control.\n */\nexport function setUpControl(control: FormControl, dir: NgControl): void {\n  if (typeof
ngDevMode === 'undefined' || ngDevMode) {\n    if (!control) _throwError(dir, 'Cannot find control with');\n    if
(!dir.valueAccessor) _throwError(dir, 'No value accessor for form control with');\n  }\n  setUpValidators(control,
dir);\n  dir.valueAccessor!.writeValue(control.value);\n  if (control.disabled) {\n    dir.valueAccessor!.setDisabledState?.(true);\n  }\n  setUpViewChangePipeline(control, dir);\n  setUpModelChangePipeline(control, dir);\n  setUpBlurPipeline(control, dir);\n  setUpDisabledChangeHandler(control, dir);\n}\n\n/**\n * Reverts configuration performed by the `setUpControl`
control function.\n * Effectively disconnects
form control with a given form directive.\n * This function is typically invoked when corresponding form directive
is being destroyed.\n */\n * @param control Form control which should be cleaned up.\n * @param dir Directive that
should be disconnected from a given control.\n * @param validateControlPresenceOnChange Flag that indicates
whether onChange handler should\n *   contain asserts to verify that it's not called once directive is destroyed. We
need this flag\n *   to avoid potentially breaking changes caused by better control cleanup introduced in #39235.\n
*/\nexport function cleanUpControl(\n  control: FormControl|null, dir: NgControl,\n  validateControlPresenceOnChange: boolean = true): void {\n  const noop = () => {\n    if
(validateControlPresenceOnChange && (typeof ngDevMode === 'undefined' || ngDevMode)) {\n      _noControlError(dir);\n    }\n  }; \n  // The `valueAccessor` field is typically defined on FormControl and
FormControlName directive\n  // instances
and there is a logic in `selectValueAccessor` function that throws if it's not the\n // case. We still check the
presence of `valueAccessor` before invoking its methods to make sure\n // that cleanup works correctly if app code
or tests are setup to ignore the error thrown from\n // `selectValueAccessor`. See
https://github.com/angular/angular/issues/40521.\n  if (dir.valueAccessor) {\n    dir.valueAccessor.registerOnChange(noop);\n    dir.valueAccessor.registerOnTouched(noop);\n  }\n  cleanUpValidators(control, dir);\n  if (control) {\n    dir._invokeOnDestroyCallbacks();\n    control._registerOnCollectionChange(() => {});\n  }\n}\n\nfunction registerOnValidatorChange<V>(validators:
(V|Validator)[], onChange: () => void): void {\n  validators.forEach((validator: V|Validator) => {\n    if
(<<Validator>validator).registerOnValidatorChange)\n    (<Validator>validator).registerOnValidatorChange!(onChange);\n  });\n}\n\n/**\n * Sets up disabled change
handler function on a given
form control if ControlValueAccessor\n * associated with a given directive instance supports the `setDisabledState`
call.\n */\n * @param control Form control where disabled change handler should be setup.\n * @param dir
Corresponding directive instance associated with this control.\n */\nexport function
setUpDisabledChangeHandler(control: FormControl, dir: NgControl): void {\n  if
(dir.valueAccessor!.setDisabledState) {\n    const onDisabledChange = (isDisabled: boolean) => {\n      dir.valueAccessor!.setDisabledState!(isDisabled);\n    };\n    control.registerOnDisabledChange(onDisabledChange);\n    // Register a callback function to cleanup disabled
change handler\n    // from a control instance when a directive is destroyed.\n    dir._registerOnDestroy(() => {\n      control._unregisterOnDisabledChange(onDisabledChange);\n    });\n  }\n}\n\n/**\n * Sets up sync and async
directive validators on provided form control.\n * This function merges validators from the directive into the
validators of the control.\n */\n * @param control Form control where directive validators should be setup.\n *
@param dir Directive instance that contains validators to be setup.\n */\nexport function setUpValidators(control:
AbstractControl, dir: AbstractControlDirective): void {\n  const validators = getControlValidators(control);\n  if
(dir.validator !== null) {\n    control.setValidators(mergeValidators<ValidatorFn>(validators, dir.validator));\n  }
else if (typeof validators === 'function') {\n    // If sync validators are represented by a single validator function, we
force the\n    // `Validators.compose` call to happen by executing the `setValidators` function with\n    // an array
that contains that function. We need this to avoid possible discrepancies in\n    // validators behavior, so sync

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validators are always processed by the `Validators.compose`. \n // Note: we should consider moving this logic
inside the `setValidators` function itself, so we \n // have consistent
behavior on AbstractControl API level. The same applies to the async \n // validators logic below. \n
control.setValidators([validators]); \n } \n \n const asyncValidators = getControlAsyncValidators(control); \n if
(dir.asyncValidator !== null) { \n control.setAsyncValidators(\n
mergeValidators<AsyncValidatorFn>(asyncValidators, dir.asyncValidator)); \n } else if (typeof asyncValidators
=== 'function') { \n control.setAsyncValidators([asyncValidators]); \n } \n \n // Re-run validation when validator
binding changes, e.g. minlength=3 -> minlength=4 \n const onValidatorChange = () =>
control.updateValueAndValidity(); \n registerOnValidatorChange<ValidatorFn>(dir._rawValidators,
onValidatorChange); \n registerOnValidatorChange<AsyncValidatorFn>(dir._rawAsyncValidators,
onValidatorChange); \n } \n \n /** \n * Cleans up sync and async directive validators on provided form control. \n * This
function reverts the setup performed by the `setUpValidators` function, i.e. \n * removes directive-specific
validators from a given control instance. \n * \n * @param control Form control from where directive validators
should be removed. \n * @param dir Directive instance that contains validators to be removed. \n * @returns true if a
control was updated as a result of this action. \n */ \n \n export function cleanUpValidators(\n control:
AbstractControl | null, dir: AbstractControlDirective): boolean { \n let isControlUpdated = false; \n if (control !==
null) { \n if (dir.validator !== null) { \n const validators = getControlValidators(control); \n if
(Array.isArray(validators) && validators.length > 0) { \n // Filter out directive validator function. \n const
updatedValidators = validators.filter((validator) => validator !== dir.validator); \n if (updatedValidators.length
!== validators.length) { \n isControlUpdated = true; \n control.setValidators(updatedValidators); \n } \n
} \n } \n if (dir.asyncValidator !== null) { \n
const asyncValidators = getControlAsyncValidators(control); \n if (Array.isArray(asyncValidators) &&
asyncValidators.length > 0) { \n // Filter out directive async validator function. \n const
updatedAsyncValidators = \n asyncValidators.filter((asyncValidator) => asyncValidator !==
dir.asyncValidator); \n if (updatedAsyncValidators.length !== asyncValidators.length) { \n
isControlUpdated = true; \n control.setAsyncValidators(updatedAsyncValidators); \n } \n } \n } \n } \n \n // Clear onValidatorChange callbacks by providing a noop function. \n const noop = () => {}; \n
registerOnValidatorChange<ValidatorFn>(dir._rawValidators, noop); \n
registerOnValidatorChange<AsyncValidatorFn>(dir._rawAsyncValidators, noop); \n \n return
isControlUpdated; \n } \n \n function setUpViewChangePipeline(control: FormControl, dir: NgControl): void { \n
dir.valueAccessor!.registerOnChange((newValue: any) => { \n control._pendingValue = newValue; \n
control._pendingChange = true; \n control._pendingDirty = true; \n \n if (control.updateOn === 'change')
updateControl(control, dir); \n }); \n } \n \n function setUpBlurPipeline(control: FormControl, dir: NgControl): void { \n
dir.valueAccessor!.registerOnTouched(() => { \n control._pendingTouched = true; \n \n if (control.updateOn ===
'blur' && control._pendingChange) updateControl(control, dir); \n if (control.updateOn !== 'submit')
control.markAsTouched(); \n }); \n } \n \n function updateControl(control: FormControl, dir: NgControl): void { \n if
(control._pendingDirty) control.markAsDirty(); \n control.setValue(control._pendingValue,
{emitModelToViewChange: false}); \n dir.viewToModelUpdate(control._pendingValue); \n
control._pendingChange = false; \n } \n \n function setUpModelChangePipeline(control: FormControl, dir: NgControl):
void { \n const onChange = (newValue?: any, emitModelEvent?: boolean) => { \n // control -> view \n
dir.valueAccessor!.writeValue(newValue); \n \n //
control -> ngModel \n if (emitModelEvent) dir.viewToModelUpdate(newValue); \n }; \n
control.registerOnChange(onChange); \n \n // Register a callback function to cleanup onChange handler \n // from a
control instance when a directive is destroyed. \n dir._registerOnDestroy(() => { \n
control._unregisterOnChange(onChange); \n }); \n } \n \n /** \n * Links a FormGroup or FormArray instance and
corresponding Form directive by setting up validators \n * present in the view. \n * \n * @param control FormGroup
or FormArray instance that should be linked. \n * @param dir Directive that provides view validators. \n */ \n \n export
function setUpFormContainer(\n control: FormGroup | FormArray, dir:

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AbstractFormGroupDirective|FormArrayName) {\n  if (control == null && (typeof ngDevMode === 'undefined' ||
ngDevMode))\n    _throwError(dir, 'Cannot find control with');\n  setUpValidators(control, dir);\n}\n\n/**\n *
Reverts the setup performed by the `setUpFormContainer` function.\n *\n * @param control FormGroup
or FormArray instance that should be cleaned up.\n *\n * @param dir Directive that provided view validators.\n *\n * @returns true if a control was updated as a result of this action.\n */\n\nexport function cleanUpFormContainer(\n
control: FormGroup|FormArray, dir: AbstractFormGroupDirective|FormArrayName): boolean {\n  return
cleanUpValidators(control, dir);\n}\n\nfunction _noControlError(dir: NgControl) {\n  return _throwError(dir, 'There
is no FormControl instance attached to form control element with');\n}\n\nfunction _throwError(dir:
AbstractControlDirective, message: string): void {\n  const messageEnd = _describeControlLocation(dir);\n  throw
new Error(`${message} ${messageEnd}`);\n}\n\nfunction _describeControlLocation(dir: AbstractControlDirective):
string {\n  const path = dir.path;\n  if (path && path.length > 1) return `path: ${path.join(' -> ')}';\n  if (path?.[0])
return `name: ${path}`;\n  return 'unspecified name attribute';\n}\n\nfunction
_throwInvalidValueAccessorError(dir:
AbstractControlDirective) {\n  const loc = _describeControlLocation(dir);\n  throw new RuntimeError(\n
RuntimeErrorCode.NG_VALUE_ACCESSOR_NOT_PROVIDED,\n    `Value accessor was not provided as an
array for form control with ${loc}.` +\n    `Check that the `NG_VALUE_ACCESSOR` token is configured
as a `multi: true` provider.`);\n}\n\nexport function isPropertyUpdated(changes: {[key: string]: any}, viewModel:
any): boolean {\n  if (!changes.hasOwnProperty('model')) return false;\n  const change = changes['model'];\n  if
(change.isFirstChange()) return true;\n  return !Object.is(viewModel, change.currentValue);\n}\n\nexport function
isBuiltInAccessor(valueAccessor: ControlValueAccessor): boolean {\n  // Check if a given value accessor is an
instance of a class that directly extends\n  // `BuiltInControlValueAccessor` one.\n  return
Object.getPrototypeOf(valueAccessor.constructor) === BuiltInControlValueAccessor;\n}\n\nexport function
syncPendingControls(form:
FormGroup, directives: Set<NgControl>|NgControl[]): void {\n  form._syncPendingControls();\n
directives.forEach((dir: NgControl) => {\n    const control = dir.control as FormControl;\n    if (control.updateOn
=== 'submit' && control._pendingChange) {\n      dir.viewToModelUpdate(control._pendingValue);\n
control._pendingChange = false;\n    }\n  });\n}\n\n// TODO: vsavkin remove it once
https://github.com/angular/angular/issues/3011 is implemented\n\nexport function selectValueAccessor(\n  dir:
NgControl, valueAccessors: ControlValueAccessor[]): ControlValueAccessor|null {\n  if (!valueAccessors) return
null;\n  if (!Array.isArray(valueAccessors) && (typeof ngDevMode === 'undefined' || ngDevMode))\n    _throwInvalidValueAccessorError(dir);\n  let defaultAccessor: ControlValueAccessor|undefined = undefined;\n  let builtinAccessor: ControlValueAccessor|undefined = undefined;\n  let customAccessor:
ControlValueAccessor|undefined = undefined;\n  valueAccessors.forEach((v: ControlValueAccessor)
=> {\n    if (v.constructor === DefaultValueAccessor) {\n      defaultAccessor = v;\n    } else if
(isBuiltInAccessor(v)) {\n      if (builtinAccessor && (typeof ngDevMode === 'undefined' || ngDevMode))\n        _throwError(dir, 'More than one built-in value accessor matches form control with');\n      builtinAccessor = v;\n    }
else {\n      if (customAccessor && (typeof ngDevMode === 'undefined' || ngDevMode))\n        _throwError(dir,
'More than one custom value accessor matches form control with');\n      customAccessor = v;\n    }\n  });\n  if
(customAccessor) return customAccessor;\n  if (builtinAccessor) return builtinAccessor;\n  if (defaultAccessor)
return defaultAccessor;\n  if (typeof ngDevMode === 'undefined' || ngDevMode) {\n    _throwError(dir, 'No valid
value accessor for form control with');\n  }\n  return null;\n}\n\nexport function removeListItem<T>(list: T[], el: T):
void {\n  const index = list.indexOf(el);\n  if (index > -1) list.splice(index,
1);\n}\n\n// TODO(kara): remove after deprecation period\n\nexport function _ngModelWarning(\n  name: string,
type: {_ngModelWarningSentOnce: boolean},\n  instance: {_ngModelWarningSent: boolean}, warningConfig:
string|null) {\n  if (warningConfig === 'never') return;\n  if (((warningConfig === null || warningConfig ===
'once') && !type._ngModelWarningSentOnce) ||\n    (warningConfig === 'always' &&
!instance._ngModelWarningSent)) {\n    console.warn(ngModelWarning(name));\n    type._ngModelWarningSentOnce = true;\n    instance._ngModelWarningSent = true;\n  }\n}\n\n"/**\n * @license\n

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* Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport { AfterViewInit, Directive,
EventEmitter, forwardRef, Inject, Input, Optional, Self } from '@angular/core';\n\nimport { AbstractControl,
FormHooks } from './model/abstract_model';\nimport { FormControl }
from './model/form_control';\nimport { FormGroup } from './model/form_group';\nimport
{ composeAsyncValidators, composeValidators, NG_ASYNC_VALIDATORS, NG_VALIDATORS } from
'./validators';\n\nimport { ControlContainer } from './control_container';\nimport { Form } from
'./form_interface';\nimport { NgControl } from './ng_control';\nimport { NgModel } from './ng_model';\nimport
{ NgModelGroup } from './ng_model_group';\nimport { setUpControl, setUpFormContainer, syncPendingControls }
from './shared';\nimport { AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn } from './validators';\n\nexport
const formDirectiveProvider: any = {\n  provide: ControlContainer,\n  useExisting: forwardRef(() =>
NgForm)\n};\n\nconst resolvedPromise = (() => Promise.resolve());\n\n/**\n * @description\n * Creates a top-
level `FormGroup` instance and binds it to a form\n * to track aggregate form value and validation status.\n *\n * As
soon as you import the `FormsModule`, this directive becomes active by default on\n
* all `` tags. You don't need to add a special selector.\n *\n * You optionally export the directive into a local
template variable using `ngForm` as the key\n * (ex: `#myForm="ngForm"`). This is optional, but useful. Many
properties from the underlying\n * `FormGroup` instance are duplicated on the directive itself, so a reference to it\n
* gives you access to the aggregate value and validity status of the form, as well as\n * user interaction properties
like `dirty` and `touched`.\n *\n * To register child controls with the form, use `NgModel` with a `name`\n *
attribute. You may use `NgModelGroup` to create sub-groups within the form.\n *\n * If necessary, listen to the
directive's `ngSubmit` event to be notified when the user has\n * triggered a form submission. The `ngSubmit` event
emits the original form\n * submission event.\n *\n * In template driven forms, all `` tags are automatically
tagged as `NgForm`.\n *\n * To import the `FormsModule` but skip its usage in
some forms,\n * for example, to use native HTML5 validation, add the `ngNoForm` and the ``\n * tags
won't create an `NgForm` directive. In reactive forms, using `ngNoForm` is\n * unnecessary because the ``
tags are inert. In that case, you would\n * refrain from using the `formGroup` directive.\n *\n * @usageNotes\n *\n
* ### Listening for form submission\n *\n * The following example shows how to capture the form values from the
`ngSubmit` event.\n *\n * {@example forms/ts/simpleForm/simple_form_example.ts region='Component'}\n *\n
* ### Setting the update options\n *\n * The following example shows you how to change the `updateOn` option
from its default using\n * ngFormOptions.\n *\n * ```html\n * <form [ngFormOptions]="{updateOn: 'blur'}"\n *
<input name="one" ngModel> <!-- this ngModel will update on blur -->\n * </form>\n * ```\n *\n * ### Native
DOM validation UI\n *\n * In order to prevent the native DOM form validation UI from interfering with Angular's
form\n * validation, Angular automatically adds the `novalidate` attribute on any `` whenever\n *
`FormsModule` or `ReactiveFormsModule` are imported into the application.\n *\n * If you want to explicitly enable
native DOM validation UI with Angular forms, you can add the\n * `ngNativeValidate` attribute to the ``
element:\n *\n * ```html\n * <form ngNativeValidate>\n *   ...</form>\n * ```\n *\n * @ngModule
FormsModule\n * @publicApi\n *\n * @Directive({\n  selector: 'form:not([ngNoForm]):not([formGroup]),ng-
form,[ngForm]',\n  providers: [formDirectiveProvider],\n  host: {'(submit)': 'onSubmit($event)', '(reset)':
'onReset()'},\n  outputs: ['ngSubmit'],\n  exportAs: 'ngForm'\n})\n\nexport class NgForm extends ControlContainer
implements Form, AfterViewInit {\n  /**\n   * @description\n   * Returns whether the form submission has been
triggered.\n   *\n   * public readonly submitted: boolean = false;\n   *\n   * private _directives = new Set<NgModel>();\n   *\n
   */\n  /**\n   * @description\n   *\n   * The `FormGroup` instance created for this form.\n   *\n   * form: FormGroup;\n   *\n   */\n  /**\n   * @description\n   *
Event emitter for the `ngSubmit` event\n   *\n   * ngSubmit = new EventEmitter();\n   *\n   */\n  /**\n   * @description\n   *
Tracks options for the `NgForm` instance.\n   *\n   * **updateOn**: Sets the default `updateOn` value for all child
`NgModels` below it\n   * unless explicitly set by a child `NgModel` using `ngModelOptions`). Defaults to
`change`.\n   * Possible values: `change` | `blur` | `submit`.\n   *\n   * // TODO(issue/24571): remove '!'.\n   *\n
   * @Input('ngFormOptions') options!: {updateOn?: FormHooks};\n   *\n   * constructor(\n     @Optional() @Self()

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@Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],\n    @Optional() @Self()
@Inject(NG_ASYNC_VALIDATORS) asyncValidators:\n    (AsyncValidator|AsyncValidatorFn[]) {\n
super();\n    this.form =\n        new FormGroup({}, composeValidators(validators),
composeAsyncValidators(asyncValidators));\n    }\n\n    /** @nodoc */\n    ngAfterViewInit() {\n        this._setUpdateStrategy();\n    }\n\n    /**\n     * @description\n     * The directive instance.\n     */\n    override get formDirective(): Form {\n        return this;\n    }\n\n    /**\n     * @description\n     * The internal `FormGroup` instance.\n     */\n    override get control(): FormGroup {\n        return this.form;\n    }\n\n    /**\n     * @description\n     * Returns an array representing the path to this group. Because this directive\n     * always lives at the top level of a form, it is always an empty array.\n     */\n    override get path(): string[] {\n        return [];\n    }\n\n    /**\n     * @description\n     * Returns a map of the controls in this group.\n     */\n    get controls(): {[key: string]: AbstractControl} {\n        return this.form.controls;\n    }\n\n    /**\n     * @description\n     * Method that sets up the control directive in this group, re-calculates its value\n     * and validity, and adds the instance to the internal list of directives.\n     */\n    @param dir The `NgModel` directive instance.\n    addControl(dir: NgModel): void {\n        resolvedPromise.then(() => {\n            const container = this._findContainer(dir.path);\n            (dir as {control: FormControl}).control =\n                <FormControl>container.registerControl(dir.name, dir.control);\n            setUpControl(dir.control, dir);\n            dir.control.updateValueAndValidity({emitEvent: false});\n            this._directives.add(dir);\n        });\n    }\n\n    /**\n     * @description\n     * Retrieves the `FormControl` instance from the provided `NgModel` directive.\n     */\n    @param dir The `NgModel` directive instance.\n    getControl(dir: NgModel): FormControl {\n        return <FormControl>this.form.get(dir.path);\n    }\n\n    /**\n     * @description\n     * Removes the `NgModel` instance from the internal list of directives\n     */\n    @param dir The `NgModel` directive instance.\n    removeControl(dir: NgModel): void {\n        resolvedPromise.then(() => {\n            const container = this._findContainer(dir.path);\n            if (container) {\n                container.removeControl(dir.name);\n            }\n            this._directives.delete(dir);\n        });\n    }\n\n    /**\n     * @description\n     * Adds a new `NgModelGroup` directive instance to the form.\n     */\n    @param dir The `NgModelGroup` directive instance.\n    addFormGroup(dir: NgModelGroup): void {\n        resolvedPromise.then(() => {\n            const container = this._findContainer(dir.path);\n            const group = new FormGroup({});\n            setUpFormContainer(group, dir);\n            container.registerControl(dir.name, group);\n            group.updateValueAndValidity({emitEvent: false});\n        });\n    }\n\n    /**\n     * @description\n     * Removes the `NgModelGroup` directive instance from the form.\n     */\n    @param dir The `NgModelGroup` directive instance.\n    removeFormGroup(dir: NgModelGroup): void {\n        resolvedPromise.then(() => {\n            const container = this._findContainer(dir.path);\n            if (container) {\n                container.removeControl(dir.name);\n            }\n        });\n    }\n\n    /**\n     * @description\n     * Retrieves the `FormGroup` for a provided `NgModelGroup` directive instance\n     */\n    @param dir The `NgModelGroup` directive instance.\n    getFormGroup(dir: NgModelGroup): FormGroup {\n        return <FormGroup>this.form.get(dir.path);\n    }\n\n    /**\n     * @description\n     * Sets the new value for the provided `NgControl` directive.\n     */\n    @param dir The `NgControl` directive instance.\n    @param value The new value for the directive's control.\n    updateModel(dir: NgControl, value: any): void {\n        resolvedPromise.then(() => {\n            const ctrl = <FormControl>this.form.get(dir.path!);\n            ctrl.setValue(value);\n        });\n    }\n\n    /**\n     * @description\n     * Sets the value for this `FormGroup`.\n     */\n    @param value The new value\n    setValue(value: {[key: string]: any}): void {\n        this.control.setValue(value);\n    }\n\n    /**\n     * @description\n     * Method called when the "submit" event is triggered on the form.\n     * Triggers the `ngSubmit` emitter to emit the "submit" event as its payload.\n     */\n    @param $event The "submit" event object\n    onSubmit($event: Event): boolean {\n        (this as {submitted: boolean}).submitted = true;\n        syncPendingControls(this.form, this._directives);\n        this.ngSubmit.emit($event);\n        // Forms with `method="dialog"` have some special behavior\n        // that won't reload the page and that shouldn't be prevented.\n        return ($event?.target as HTMLFormElement | null)?.method === 'dialog';\n    }\n\n    /**\n     * @description\n     * Method called when the "reset" event is triggered on the form.\n     */\n    onReset(): void {\n        this.resetForm();\n    }\n\n    /**\n     * @description\n     * Resets the form to an initial value and resets its submitted status.\n     */\n    @param value The new value for the form.\n    resetForm(value: any = undefined): void {\n

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this.form.reset(value);\n (this as {submitted: boolean}).submitted = false;\n }\n\n private _setUpUpdateStrategy()\n {\n if (this.options && this.options.updateOn != null) {\n this.form._updateOn = this.options.updateOn;\n }\n }\n\n private _findContainer(path: string[]): FormGroup {\n path.pop();\n return path.length ?\n <FormGroup>this.form.get(path) : this.form;\n }\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights\n Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n LICENSE file at https://angular.io/license\n *\n\nexport function removeListItem<T>(list: T[], el: T): void {\n const index = list.indexOf(el);\n if (index > -1) list.splice(index, 1);\n }\n", "/*\n * @license\n * Copyright Google\n LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found\n in the LICENSE file at https://angular.io/license\n *\n\nimport {AsyncValidatorFn, ValidatorFn} from\n './directives/validators';\nimport {removeListItem} from './util';\nimport {AbstractControl,\n AbstractControlOptions,\n isOptionsObj, pickAsyncValidators, pickValidators} from './abstract_model';\n\n/**\n * FormControlState is a\n boxed form value. It is an object with a `value` key and a `disabled` key.\n *\n * @publicApi\n */\nexport interface\n FormControlState<T> {\n value: T;\n disabled: boolean;\n }\n\n/**\n * Interface for options provided to a\n `FormControl`.\n *\n * This interface extends all options from { @link AbstractControlOptions }, plus some\n options\n * unique to `FormControl`.\n *\n * @publicApi\n */\nexport interface FormControlOptions extends\n AbstractControlOptions {\n /**\n * @description\n * Whether to use the initial value used to construct the\n `FormControl`\n * as its default value\n * as well. If this option is false or not provided, the default value of a\n FormControl is `null`.\n *\n * When a FormControl is reset without an explicit value, its value reverts to\n * its\n default value.\n *\n * @nonNullable?: boolean;\n *\n * @deprecated Use `nonNullable` instead.\n *\n * @initialValueIsDefault?: boolean;\n }\n\n/**\n * Tracks the value and validation status of an individual form\n control.\n *\n * This is one of the four fundamental building blocks of Angular forms, along with\n * `FormGroup`,\n * `FormArray` and `FormRecord`. It extends the `AbstractControl` class that\n * implements most of the base\n functionality for accessing the value, validation status,\n * user interactions and events.\n *\n * `FormControl` takes\n a single generic argument, which describes the type of its value. This\n * argument\n always implicitly includes `null`\n because the control can be reset. To change this\n * behavior, set `nonNullable` or see the usage notes below.\n *\n * See [usage examples below](#usage-notes).\n *\n * @see `AbstractControl`\n * @see [Reactive Forms\n Guide](guide/reactive-forms)\n * @see [Usage Notes](#usage-notes)\n *\n * @publicApi\n */\n\n@overriddenImplementation FormControlCtor\n *\n * @usageNotes\n * ### Initializing Form Controls\n *\n * Instantiate a `FormControl`, with an initial value.\n *\n * ```ts\n * const control = new FormControl('some\n value');\n * console.log(control.value); // 'some value'\n *\n * The following example initializes the control\n with a form state object. The `value` and `disabled` keys are required in this case.\n *\n * ```ts\n * const control\n = new FormControl({ value: 'n/a', disabled: true });\n * console.log(control.value); // 'n/a'\n *\n * console.log(control.status); // 'DISABLED'\n *\n * The following example initializes the control with a\n synchronous validator.\n *\n * ```ts\n * const control = new FormControl("", Validators.required);\n *\n * console.log(control.value); // ""\n *\n * console.log(control.status); // 'INVALID'\n *\n * The following\n example initializes the control using an options object.\n *\n * ```ts\n * const control = new FormControl("", {\n * validators: Validators.required,\n * asyncValidators: myAsyncValidator\n * });\n *\n * ```\n *\n * ### The single type argument\n *\n * `FormControl` accepts a generic argument, which describes the\n type of its value.\n * In most cases, this argument will be inferred.\n *\n * If you are initializing the control to `null`,\n or you otherwise wish to provide a\n * wider type, you may specify the argument explicitly:\n *\n * ```ts\n * let fc =\n new FormControl<string|null>(null);\n * fc.setValue('foo');\n *\n * ```\n *\n * You might notice that `null` is always\n added to the type of the control.\n * This is because the control will become `null` if you call `reset`. You can\n change\n * this behavior by setting `{ nonNullable: true }`.\n *\n * ### Configure the control to update on a blur\n event\n *\n * Set the `updateOn` option to `blur` to update on the blur `event`.\n *\n * ```ts\n * const control = new\n FormControl("", { updateOn: 'blur' });\n *\n * ```\n *\n * ### Configure the control to update on a submit event\n *\n * Set the `updateOn` option to `submit` to update on a submit `event`.\n

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*\n * ``ts\n * const control = new FormControl('', { updateOn: 'submit' });\n * ``\n *\n * ### Reset the control
back to a specific value\n *\n * You reset to a specific form state by passing through a standalone\n * value or a
form state object that contains both a value and a disabled state\n * (these are the only two properties that cannot be
calculated).\n *\n * ``ts\n * const control = new FormControl('Nancy');\n *\n * console.log(control.value); //
'Nancy'\n *\n * control.reset('Drew');\n *\n * console.log(control.value); // 'Drew'\n * ``\n *\n * ### Reset the
control to its initial value\n *\n * If you wish to always reset the control to its initial value (instead of null),\n * you
can pass the `nonNullable` option:\n *\n * ``\n * const control = new FormControl('Nancy', { nonNullable: true });\n
*\n * console.log(control.value); // 'Nancy'\n *\n * control.reset();\n *\n * console.log(control.value); // 'Nancy'\n *
``\n *\n * ### Reset the control back to an initial
value and disabled\n *\n * ``\n * const control = new FormControl('Nancy');\n *\n * console.log(control.value); //
'Nancy'\n *\n * console.log(control.status); // 'VALID'\n *\n * control.reset({ value: 'Drew', disabled: true });\n *\n *
console.log(control.value); // 'Drew'\n *\n * console.log(control.status); // 'DISABLED'\n * ``\n
*\n * export interface
FormControl<TValue = any> extends AbstractControl<TValue> {\n * //*\n * The default value of this
FormControl, used whenever the control is reset without an explicit\n * value. See { @link
FormControlOptions#nonNullable} for more information on configuring\n * a default value.\n * /\n * readonly
defaultValue: TValue;\n * //*\n * @internal *\n * _onChange: Function[];\n * //*\n * This field holds a pending
value that has not yet been applied to the form's value.\n * @internal\n * /\n * _pendingValue: TValue;\n * //*\n
* @internal *\n * _pendingChange: boolean;\n * //*\n * Sets a new value for the form control.\n * /\n * @param
value The
new value for the control.\n * @param options Configuration options that determine how the control propagates
changes\n * and emits events when the value changes.\n * The configuration options are passed to the { @link
AbstractControl#updateValueAndValidity\n * updateValueAndValidity} method.\n * /\n * * `onlySelf`: When
true, each change only affects this control, and not its parent. Default is\n * false.\n * * `emitEvent`: When true or
not supplied (the default), both the `statusChanges` and\n * `valueChanges`\n * observables emit events with the
latest status and value when the control value is updated.\n * When false, no events are emitted.\n * *
`emitModelToViewChange`: When true or not supplied (the default), each change triggers an\n * `onChange`
event to\n * update the view.\n * * `emitViewToModelChange`: When true or not supplied (the default), each
change triggers an\n * `ngModelChange`\n * event to update the model.\n * /\n * /\n * setValue(value:
TValue, options?: {\n * onlySelf?: boolean,\n * emitEvent?: boolean,\n * emitModelToViewChange?: boolean,\n
* emitViewToModelChange?: boolean\n * }): void;\n * //*\n * Patches the value of a control.\n * /\n * This
function is functionally the same as { @link FormControl#setValue setValue} at this level.\n * It exists for
symmetry with { @link FormGroup#patchValue patchValue} on `FormGroups` and\n * `FormArrays`, where it
does behave differently.\n * /\n * @see `setValue` for options\n * /\n * patchValue(value: TValue, options?: {\n
* onlySelf?: boolean,\n * emitEvent?: boolean,\n * emitModelToViewChange?: boolean,\n
* emitViewToModelChange?: boolean\n * }): void;\n * //*\n * Resets the form control, marking it `pristine` and
`untouched`, and resetting\n * the value. The new value will be the provided value (if passed), `null`, or the initial
value\n * if `nonNullable` was set in the constructor via { @link FormControlOptions}.\n * /\n * ``ts\n * // By
default, the control will reset to null.\n * const dog = new FormControl('spot');\n * dog.reset(); // dog.value is
null\n *\n * // If this flag is set, the control will instead reset to the initial value.\n * const cat = new
FormControl('tabby', { nonNullable: true });\n * cat.reset(); // cat.value is \"tabby\"\n *\n * // A value passed to
reset always takes precedence.\n * const fish = new FormControl('finn', { nonNullable: true });\n *
fish.reset('bubble'); // fish.value is \"bubble\"\n * ``\n
*\n * @param formState Resets the control with an initial
value,\n * or an object that defines the initial value and disabled state.\n * /\n * @param options Configuration
options that determine how the control propagates changes\n * and emits events after the value changes.\n * /\n *
* `onlySelf`: When true, each change only affects this control, and not its parent. Default is\n * false.\n * *
`emitEvent`: When true or not supplied (the default), both the `statusChanges`
and\n * `valueChanges`\n * observables emit events with the latest status and value when the control is reset.\n
*\n * When false, no events are emitted.\n * /\n * /\n * reset(formState?: TValue|FormControlState<TValue>, options?:

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{\n  onlySelf?: boolean,\n  emitEvent?: boolean\n }): void;\n\n /**\n  * For a simple FormControl, the raw value
is equivalent to the value.\n  *\n  * getRawValue(): TValue;\n\n /**\n  * @internal\n  * ^\n  * _updateValue():
void;\n\n /**\n  * @internal\n  * ^\n  * _anyControls(condition: (c: AbstractControl) => boolean): boolean;\n\n /**\n
  * @internal\n  * ^\n  * _allControlsDisabled(): boolean;\n\n\n /**\n  * Register a listener for change events.\n  *\n  *
@param fn The method that is called when the value changes\n  * ^\n  * registerOnChange(fn: Function): void;\n\n\n
/**\n  * Internal function to unregister a change events listener.\n  * @internal\n  * ^\n  * _unregisterOnChange(fn:
(value?: any, emitModelEvent?: boolean) => void):
void;\n\n /**\n  * Register a listener for disabled events.\n  *\n  * @param fn The method that is called when the
disabled status changes.\n  * ^\n  * registerOnDisabledChange(fn: (isDisabled: boolean) => void): void;\n\n /**\n  *
Internal function to unregister a disabled event listener.\n  * @internal\n  * ^\n  * _unregisterOnDisabledChange(fn:
(isDisabled: boolean) => void): void;\n\n /**\n  * @internal\n  * ^\n  * _forEachChild(cb: (c: AbstractControl) =>
void): void;\n\n /**\n  * @internal\n  * ^\n  * _syncPendingControls(): boolean;\n\n}\n\n// This internal interface is present to
avoid a naming clash, resulting in the wrong `FormControl`\n// symbol being used.\n\ntype
FormControlInterface<TValue = any> = FormControl<TValue>;\n\n/**\n  * Various available constructors for
`FormControl`.\n  *\n  * Do not use this interface directly. Instead, use `FormControl`:\n  *\n  * const fc = new
FormControl('foo');\n  *\n  * This symbol is prefixed with `__` to make plain that it is an internal symbol.\n
  *\n  * ^\n  * ^\n  * export interface FormControlCtor {\n  * /**\n  * Construct a FormControl with no initial value or validators.\n
  * ^\n  * new(): FormControl<any>;\n\n /**\n  * Creates a new `FormControl` instance.\n  *\n  * @param formState
Initializes the control with an initial value,\n  * or an object that defines the initial value and disabled state.\n  *\n
  * @param validatorOrOpts A synchronous validator function, or an array of\n  * such functions, or a
`FormControlOptions` object that contains validation functions\n  * and a validation trigger.\n  *\n  * @param
asyncValidator A single async validator or array of async validator functions\n  * ^\n  * new<T = any>(value:
FormControlState<T>|T, opts: FormControlOptions&{nonNullable: true});\n  * FormControl<T>;\n\n /**\n  *
@deprecated Use `nonNullable` instead.\n  * ^\n  * new<T = any>(value: FormControlState<T>|T, opts:
FormControlOptions&{\n  *   initialValueIsDefault: true\n }): FormControl<T>;\n\n /**\n  * @deprecated When
passing
an `options` argument, the `asyncValidator` argument has no effect.\n  * ^\n  * new<T = any>(value:
FormControlState<T>|T, opts: FormControlOptions,\n  *   asyncValidator: AsyncValidatorFn|AsyncValidatorFn[]):
FormControl<T|nullable>;\n\n new<T = any>(value: FormControlState<T>|T,\n  *   validatorOrOpts?:
ValidatorFn|ValidatorFn[]|FormControlOptions|null,\n  *   asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null): FormControl<T|nullable>;\n\n /**\n  * The presence of an explicit
`prototype` property provides backwards-compatibility for apps that\n  * manually inspect the prototype chain.\n
  * ^\n  * prototype: FormControl<any>;\n\n\nfunction isFormControlState(formState: unknown): formState is
FormControlState<unknown> {\n  return typeof formState === 'object' && formState !== null &&\n
  Object.keys(formState).length === 2 && 'value' in formState && 'disabled' in formState;\n}\n\nexport const
FormControl: FormControlCtor =\n  (class FormControl<TValue = any>
extends AbstractControl<\n    TValue> implements FormControlInterface<TValue> {\n    /** @publicApi *\n
    public readonly defaultValue: TValue = null as unknown as TValue;\n\n    /** @internal *\n
    ^\n    ^\n    _onChange:
Array<Function> = [];\n\n    /** @internal *\n
    ^\n    ^\n    _pendingValue!: TValue;\n\n    /** @internal *\n
    ^\n    ^\n    _pendingChange: boolean = false;\n\n    constructor(\n      // formState and defaultValue will only be null if T is
nullable\n      formState: FormControlState<TValue>|TValue = null as unknown as TValue,\n
      validatorOrOpts?: ValidatorFn|ValidatorFn[]|FormControlOptions|null,\n      asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null) {\n      super(\n        pickValidators(validatorOrOpts),
pickAsyncValidators(asyncValidator, validatorOrOpts));\n      this._applyFormState(formState);\n
      this._setUpdateStrategy(validatorOrOpts);\n      this._initObservables();\n      this.updateValueAndValidity({\n
onlySelf: true,\n      // If `asyncValidator` is present, it will trigger control status change from `PENDING` to\n
      // `VALID` or `INVALID`.\n      // The status should be broadcasted via the `statusChanges` observable, so we

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set(\n      // `emitEvent` to `true` to allow that during the control creation process.\n      emitEvent:
!!this.asyncValidator\n    });\n    if (isOptionsObj(validatorOrOpts) &&\n      (validatorOrOpts.nonNullable
|| validatorOrOpts.initialValueIsDefault)) {\n      if (isFormControlState(formState)) {\n        this.defaultValue =
formState.value;\n      } else {\n        this.defaultValue = formState;\n      }\n    }\n\n    override
setValue(value: TValue, options: {\n      onlySelf?: boolean,\n      emitEvent?: boolean,\n      emitModelToViewChange?: boolean,\n      emitViewToModelChange?: boolean\n    } = {}): void {\n      (this as
{ value: TValue }).value = this._pendingValue
= value;\n      if (this._onChange.length && options.emitModelToViewChange !== false) {\n
this._onChange.forEach(\n        (changeFn) => changeFn(this.value, options.emitViewToModelChange !==
false));\n      }\n      this.updateValueAndValidity(options);\n    }\n\n    override patchValue(value: TValue,
options: {\n      onlySelf?: boolean,\n      emitEvent?: boolean,\n      emitModelToViewChange?: boolean,\n
emitViewToModelChange?: boolean\n    } = {}): void {\n      this.setValue(value, options);\n    }\n\n    override
reset(\n      formState: TValue|FormControlState<TValue> = this.defaultValue,\n      options: {onlySelf?:
boolean, emitEvent?: boolean} = {}): void {\n      this._applyFormState(formState);\n
this.markAsPristine(options);\n      this.markAsUntouched(options);\n      this.setValue(this.value, options);\n
this._pendingChange = false;\n    }\n\n    /** @internal */\n    override _updateValue():
void {\n    /** @internal */\n    override _anyControls(condition: (c: AbstractControl) => boolean): boolean
{\n      return false;\n    }\n\n    /** @internal */\n    override _allControlsDisabled(): boolean {\n      return
this.disabled;\n    }\n\n    registerOnChange(fn: Function): void {\n      this._onChange.push(fn);\n    }\n\n
/** @internal */\n    _unregisterOnChange(fn: (value?: any, emitModelEvent?: boolean) => void): void {\n
removeListItem(this._onChange, fn);\n    }\n\n    registerOnDisabledChange(fn: (isDisabled: boolean) => void):
void {\n      this._onDisabledChange.push(fn);\n    }\n\n    /** @internal */\n
_unregisterOnDisabledChange(fn: (isDisabled: boolean) => void): void {\n
removeListItem(this._onDisabledChange, fn);\n    }\n\n    /** @internal */\n    override _forEachChild(cb: (c:
AbstractControl) => void): void {\n    /** @internal */\n    override _syncPendingControls(): boolean {\n
      if (this.updateOn === 'submit') {\n        if (this._pendingDirty) this.markAsDirty();\n        if
(this._pendingTouched) this.markAsTouched();\n        if (this._pendingChange) {\n
this.setValue(this._pendingValue, {onlySelf: true, emitModelToViewChange: false});\n          return true;\n
        }\n      }\n      return false;\n    }\n\n    private _applyFormState(formState: FormControlState<TValue>|TValue)
{\n      if (isFormControlState(formState)) {\n        (this as { value: TValue }).value = this._pendingValue =
formState.value;\n        formState.disabled ? this.disable({onlySelf: true, emitEvent: false}) : \n
this.enable({onlySelf: true, emitEvent: false});\n      } else {\n        (this as { value: TValue }).value =
this._pendingValue = formState;\n      }\n    }\n\n    }};\n\n    interface UntypedFormControlCtor {\n      new():
UntypedFormControl;\n\n      new(formState?: any, validatorOrOpts?:
ValidatorFn|ValidatorFn[]|FormControlOptions|null,\n      asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormControl;\n    }\n\n    /**\n     * The presence
of an explicit `prototype` property provides backwards-compatibility for apps that\n     * manually inspect the
prototype chain.\n     */\n    prototype: FormControl<any>;\n\n    /**\n     * UntypedFormControl is a non-strongly-typed
version of @see FormControl.\n     */\n    export type UntypedFormControl = FormControl<any>;\n\n    export const
UntypedFormControl: UntypedFormControlCtor = FormControl;\n\n    export const isFormControl = (control:
unknown): control is FormControl => \n      control instanceof FormControl;\n    }"/**\n     * @license\n     * Copyright
Google LLC All Rights Reserved.\n     * Use of this source code is governed by an MIT-style license that can be\n
     * found in the LICENSE file at https://angular.io/license\n     */\n\n    import {Directive, OnDestroy, OnInit} from
'@angular/core';\n    import {FormGroup} from './model/form_group';\n    import {ControlContainer} from
'./control_container';\n    import {Form} from './form_interface';\n    import {controlPath} from './shared';\n\n\n    /**\n     * @description\n     * A base class for code shared between the `NgModelGroup` and `FormGroupName` directives.\n
     */\n    /**\n     * @publicApi\n     */\n    @Directive()\n    export class AbstractFormGroupDirective extends ControlContainer
implements OnInit, OnDestroy {\n      /**\n       * @description\n       * The parent control for the group\n       */\n

```

```

@internal\n *^/\n // TODO(issue/24571): remove '!.\n _parent!: ControlContainer;\n\n /** @nodoc */\n
ngOnInit(): void {\n  this._checkParentType();\n  // Register the group with its parent group.\n
this.formDirective!.addGroup(this);\n }\n\n /** @nodoc */\n ngOnDestroy(): void {\n  if
(this.formDirective) {\n    // Remove the group from its parent group.\n
this.formDirective.removeFormGroup(this);\n  }\n }\n\n /**\n * @description\n * The `FormGroup` bound to
this directive.\n *^/\n override get control(): FormGroup {\n
  return this.formDirective!.getFormGroup(this);\n }\n\n /**\n * @description\n * The path to this group from
the top-level directive.\n *^/\n override get path(): string[] {\n  return controlPath(this.name == null ? this.name :
this.name.toString(), this._parent);\n }\n\n /**\n * @description\n * The top-level directive for this group if
present, otherwise null.\n *^/\n override get formDirective(): Form|null {\n  return this._parent ?
this._parent.formDirective : null;\n }\n\n /** @internal */\n _checkParentType(): void {\n }\n\n /**\n *
@license\n * Copyright Google LLC All Rights Reserved.\n *^/\n * Use of this source code is governed by an MIT-
style license that can be\n * found in the LICENSE file at https://angular.io/license\n *^/\n\nimport {RuntimeError as
RuntimeError} from '@angular/core';\n\nimport {RuntimeErrorCode} from '../errors';\n\nimport
{formControlNameExample, formGroupNameExample, ngModelGroupExample,
ngModelWithFormGroupExample} from './error_examples';\n\n\nexport
function modelParentException(): Error {\n  return new
RuntimeError(RuntimeErrorCode.NGMODEL_IN_FORM_GROUP,`\n  ngModel cannot be used to register form
controls with a parent formGroup directive. Try using\n  formGroup's partner directive `formControlName`\n
instead. Example:\n\n  ${formControlNameExample}\n\n  Or, if you'd like to avoid registering this form control,
indicate that it's standalone in ngModelOptions:\n\n  Example:\n\n
${ngModelWithFormGroupExample}`);\n }\n\n\nexport function formGroupNameException(): Error {\n  return new
RuntimeError(RuntimeErrorCode.NGMODEL_IN_FORM_GROUP_NAME,`\n  ngModel cannot be used to
register form controls with a parent formGroupName or formArrayName directive.\n\n  Option 1: Use
formControlName instead of ngModel (reactive strategy):\n\n  ${formGroupNameExample}\n\n  Option 2:
Update ngModel's parent be ngModelGroup (template-driven strategy):\n\n
${ngModelGroupExample}`);\n }\n\n\nexport function
missingNameException(): Error {\n  return new RuntimeError(\n
RuntimeErrorCode.NGMODEL_WITHOUT_NAME,\n    `If ngModel is used within a form tag, either the name
attribute must be set or the form\n    control must be defined as 'standalone' in ngModelOptions.\n\n    Example 1:
<input [(ngModel)]="person.firstName" name="first">\n    Example 2: <input [(ngModel)]="person.firstName"\n
[ngModelOptions]="{standalone: true}">`);\n }\n\n\nexport function modelGroupParentException(): Error {\n  return
new RuntimeError(RuntimeErrorCode.NGMODELGROUP_IN_FORM_GROUP,`\n  ngModelGroup cannot be
used with a parent formGroup directive.\n\n  Option 1: Use formGroupName instead of ngModelGroup (reactive
strategy):\n\n  ${formGroupNameExample}\n\n  Option 2: Use a regular form tag instead of the formGroup
directive (template-driven strategy):\n\n  ${ngModelGroupExample}`);\n }\n\n\n",/**\n * @license\n * Copyright
Google LLC All Rights Reserved.\n *^/\n * Use of this source code is governed
by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *^/\n\nimport
{Directive, forwardRef, Host, Inject, Input, OnDestroy, OnInit, Optional, Self, SkipSelf} from
'@angular/core';\n\nimport {NG_ASYNC_VALIDATORS, NG_VALIDATORS} from '../validators';\n\nimport
{AbstractFormGroupDirective} from './abstract_form_group_directive';\nimport {ControlContainer} from
'./control_container';\nimport {NgForm} from './ng_form';\nimport {modelGroupParentException} from
'./template_driven_errors';\nimport {AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn} from
'../validators';\n\n\nexport const modelGroupProvider: any = {\n  provide: ControlContainer,\n  useExisting:
forwardRef(() => NgModelGroup);\n};\n\n/**\n * @description\n * Creates and binds a `FormGroup` instance to a
DOM element.\n *^/\n * This directive can only be used as a child of `NgForm` (within `<form>` tags).\n *^/\n * Use
this directive to validate a sub-group of your form separately from

```



directive into a local template variable using `ngModel` as the key (ex: `#myVar="ngModel"`). You can then access the control using the directive's `control` property. However, the most commonly used properties (like `valid` and `dirty`) also exist on the control for direct access. See a full list of properties directly available in `AbstractControlDirective`. @see `RadioControlValueAccessor` @see `SelectControlValueAccessor` @usageNotes

### Using ngModel on a standalone control

The following examples show a simple standalone control using `ngModel`:

```

@{example
forms/ts/simpleNgModel/simple_ng_model_example.ts
region='Component'}

```

When using the `ngModel` within `` tags, you'll also need to supply a `name` attribute so that the control can be registered with the parent form under that name. In the context of a parent form, it's often unnecessary to include one-way or two-way binding, as the parent form syncs the value for you. You access its properties by exporting it into a local template variable using `ngForm` such as `<#f="ngForm">`. Use the variable where needed on form submission. If you do need to populate initial values into your form, using a one-way binding for `ngModel` tends to be sufficient as long as you use the exported form's value rather than the domain model's value on submit.

### Using ngModel within a form

The following example shows controls using `ngModel` within a form:

```

@{example forms/ts/simpleForm/simple_form_example.ts
region='Component'}

```

### Using a standalone ngModel within a group

The following example shows you how to use a standalone ngModel control within a form. This controls the display of the form, but doesn't contain form data.

```

<html>
<form>
  <input name="login" ngModel placeholder="Login">
  <input type="checkbox" ngModel [ngModelOptions]="{standalone: true}"> Show more options?
</form>
<!-- form value: {login:
"} -->

```

### Setting the ngModel `name` attribute through options

The following example shows you an alternate way to set the name attribute. Here, an attribute identified as name is used within a custom form control component. To still be able to specify the NgModel's name, you must specify it using the `ngModelOptions` input instead.

```

<html>
<form>
  <my-custom-form-control name="Nancy"
ngModel [ngModelOptions]="{name: 'user'}">
</my-custom-form-control>
</form>
<!-- form value:
{user: } -->

```

@ngModule FormsModule @publicApi

@Directive({
 selector: '[ngModel]:not([formControlName]):not([formControl])',
 providers: [formControlBinding],
 exportAs: 'ngModel'})
export class NgModel extends NgControl implements OnChanges, OnDestroy {
 public override readonly control: FormControl = new FormControl();
 // At runtime we coerce arbitrary values assigned to the
 'disabled' input to a
 'boolean'.
 // This is not reflected in the type of the property because outside of templates, consumers
 // should only deal with booleans. In templates, a string is allowed for convenience and to
 // match the native
 'disabled attribute' semantics which can be observed on input elements.
 // This static member tells the compiler that values of type 'string' can also be assigned
 to the input in a template.
 /\*\* @nodoc \*/
 static ngAcceptInputType\_isDisabled: boolean|string;
 /\*\* @internal \*/
 \_registered = false;
 /\*\*
 \* Internal reference to the view model value.
 \* @nodoc
 \*/
 viewModel: any;
 /\*\*
 \* @description
 \* Tracks the name bound to the directive. If a parent form exists, it
 \* uses this name as a key to retrieve this control's value.
 \* @Input() override name!: string;
 \* @description
 \* Tracks whether the control is disabled.
 \* @Input() override isDisabled!: boolean;
 \* @description
 \* Tracks the value bound to this directive.
 \* @Input('ngModel') model: any;
 \* @description
 \* Tracks the configuration options for this `ngModel` instance.
 \* \*\*name\*\*: An alternative to setting the name attribute on the form control element. See the [example](api/forms/NgModel#using-ngmodel-on-a-standalone-control) for using `NgModel` as a standalone control.
 \* \*\*standalone\*\*: When set to true, the `ngModel` will not register itself with its parent form, and acts as if it's not in the form. Defaults to false. If no parent form exists, this option has no effect.
 \* \*\*updateOn\*\*: Defines the event upon which the form control value and validity update. Defaults to 'change'. Possible values: `change` | `blur` | `submit`.
 \* @Input('ngModelOptions') options!: {name?:

```

string, standalone?: boolean, updateOn?: FormHooks};\n\n /**\n * @description\n * Event emitter for producing
the `ngModelChange` event after\n * the view model updates.\n */\n @Output('ngModelChange') update = new
EventEmitter();\n\n constructor(\n   @Optional() @Host() parent: ControlContainer,\n   @Optional() @Self()
@Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],\n   @Optional() @Self()
@Inject(NG_ASYNC_VALIDATORS) asyncValidators: (AsyncValidator|AsyncValidatorFn)[],\n
@Optional() @Self() @Inject(NG_VALUE_ACCESSOR) valueAccessors: ControlValueAccessor[],\n
@Optional() @Inject(ChangeDetectorRef) private _changeDetectorRef?: ChangeDetectorRef|null) {\n   super();\n
this._parent = parent;\n   this._setValidators(validators);\n   this._setAsyncValidators(asyncValidators);\n
this.valueAccessor = selectValueAccessor(this, valueAccessors);\n } \n\n /** @nodoc */\n ngOnChanges(changes:
SimpleChanges) {\n   this._checkForErrors();\n
   if (!this._registered || 'name' in changes) {\n     if (this._registered) {\n       this._checkName();\n     }
if (this.formDirective) {\n       // We can't call `formDirective.removeControl(this)`, because the `name` has already
been\n       // changed. We also can't reset the name temporarily since the logic in `removeControl`\n       // is
inside a promise and it won't run immediately. We work around it by giving it an\n       // object with the same
shape instead.\n       const oldName = changes['name'].previousValue;\n       this.formDirective.removeControl({name: oldName, path: this._getPath(oldName)});\n     } \n   }\n
this._setUpControl();\n } \n   if ('isDisabled' in changes) {\n     this._updateDisabled(changes);\n   } \n   if
(isPropertyUpdated(changes, this.viewModel)) {\n     this._updateValue(this.model);\n     this.viewModel =
this.model;\n   } \n } \n\n /** @nodoc */\n ngOnDestroy(): void {\n   this.formDirective &&
this.formDirective.removeControl(this);\n } \n\n /**\n * @description\n * Returns an array that represents the
path from the top-level form to this control.\n * Each index is the string name of the control on that level.\n */\n
override getPath(): string[] {\n   return this._getPath(this.name);\n } \n\n /**\n * @description\n * The top-level
directive for this control if present, otherwise null.\n */\n override get formDirective(): any {\n   return this._parent ?
this._parent.formDirective : null;\n } \n\n /**\n * @description\n * Sets the new value for the view model and
emits an `ngModelChange` event.\n * @param newValue The new value emitted by `ngModelChange`.\n */\n
override viewToModelUpdate(newValue: any): void {\n   this.viewModel = newValue;\n   this.update.emit(newValue);\n } \n\n private _setUpControl(): void {\n   this._setUpdateStrategy();\n
this._isStandalone() ? this._setUpStandalone() : this.formDirective.addControl(this);\n   this._registered
= true;\n } \n\n private _setUpdateStrategy(): void {\n   if (this.options && this.options.updateOn != null) {\n
this.control._updateOn = this.options.updateOn;\n   } \n } \n\n private _isStandalone(): boolean {\n   return
!this._parent || !(this.options && this.options.standalone);\n } \n\n private _setUpStandalone(): void {\n
setUpControl(this.control, this);\n   this.control.updateValueAndValidity({emitEvent: false});\n } \n\n private
_checkForErrors(): void {\n   if (!this._isStandalone()) {\n     this._checkParentType();\n   } \n
this._checkName();\n } \n\n private _checkParentType(): void {\n   if (typeof ngDevMode === 'undefined' ||
ngDevMode) {\n     if (!(this._parent instanceof NgModelGroup) && this._parent instanceof
AbstractFormGroupDirective) {\n       throw formGroupNameException();\n     } else if (!(this._parent instanceof
NgModelGroup) && !(this._parent instanceof NgForm)) {\n       throw modelParentException();\n     } \n   } \n } \n\n private _checkName(): void {\n   if (this.options && this.options.name) this.name =
this.options.name;\n   if (!this._isStandalone() && !this.name && (typeof ngDevMode === 'undefined' ||
ngDevMode)) {\n     throw missingNameException();\n   } \n } \n\n private _updateValue(value: any): void {\n
resolvedPromise.then(() => {\n   this.control.setValue(value, {emitViewToModelChange: false});\n
this._changeDetectorRef?.markForCheck();\n });\n } \n\n private _updateDisabled(changes: SimpleChanges) {\n
const disabledValue = changes['isDisabled'].currentValue;\n   // checking for 0 to avoid breaking change\n   const
isDisabled = disabledValue !== 0 && coerceToBoolean(disabledValue);\n   resolvedPromise.then(() => {\n     if
(isDisabled && !this.control.disabled) {\n       this.control.disable();\n     } else if (!isDisabled &&
this.control.disabled) {\n       this.control.enable();\n     } \n   } \n   this._changeDetectorRef?.markForCheck();\n
});\n } \n\n private _getPath(controlName: string): string[] {\n   return this._parent ? controlPath(controlName,
this._parent) : [controlName];\n } \n } \n\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n */\n *

```

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```

import {Directive} from '@angular/core';
/**
 * Adds `novalidate` attribute to all forms by default.
 * `novalidate` is used to disable browser's native form validation.
 * If you want to use native validation with Angular forms, just add `ngNativeValidate` attribute:
 *
 * <form ngNativeValidate></form>
 *
 * @publicApi
 * @ngModule ReactiveFormsModule
 * @ngModule FormsModule
 */
@Directive({
  selector: 'form:not([ngNoForm]):not([ngNativeValidate])',
  host: {'novalidate': ''}
})
export class NgNoValidate {
  export {NgNoValidate as NgNoValidate};
}
/**
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 */
import {Directive, ElementRef, forwardRef, Renderer2} from '@angular/core';
import {BuiltInControlValueAccessor, ControlValueAccessor, NG_VALUE_ACCESSOR} from './control_value_accessor';
export const NUMBER_VALUE_ACCESSOR: any = {
  provide: NG_VALUE_ACCESSOR,
  useExisting: forwardRef(() => NumberValueAccessor),
  multi: true
};
/**
 * @description
 * The `ControlValueAccessor` for writing a number value and listening to number input changes.
 * The value accessor is used by the `FormControlDirective`, `FormControlName`, and `NgModel` directives.
 * @usageNotes
 * ### Using a number input with a reactive form.
 * The following example shows how to use a number input with a reactive form.
 *
 * ```ts
 * const totalCountControl = new FormControl();
 *
 * <input type="number" [formControl]=totalCountControl>
 *
 * @ngModule ReactiveFormsModule
 * @ngModule FormsModule
 * @publicApi
 */
@Directive({
  selector: 'input[type=number][formControlName],input[type=number][formControl],input[type=number][ngModel]',
  host: {
    '(input)': 'onChange($event.target.value)',
    '(blur)': 'onTouched()',
  },
  providers: [NUMBER_VALUE_ACCESSOR]
})
export class NumberValueAccessor extends BuiltInControlValueAccessor implements ControlValueAccessor {
  /**
   * Sets the `value` property on the input element.
   * @nodoc
   */
  writeValue(value: number): void {
    // The value needs to be normalized for IE9, otherwise it is set to 'null' when null
    const normalizedValue = value == null ? '' : value;
    this.setProperty('value', normalizedValue);
  }
  /**
   * Registers a function called when the control value changes.
   * @nodoc
   */
  override registerOnChange(fn: (_: number|null) => void): void {
    this.onChange = (value) => {
      fn(value == '' ? null : parseFloat(value));
    };
  }
}
/**
 * @license
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 */
import {Directive, ElementRef, forwardRef, Injectable, Injector, Input, NgModule, OnDestroy, OnInit, Renderer2, RuntimeError as RuntimeError} from '@angular/core';
import {RuntimeErrorCode} from './errors';
import {BuiltInControlValueAccessor, ControlValueAccessor, NG_VALUE_ACCESSOR} from './control_value_accessor';
import {NgControl} from './ng_control';
export const RADIO_VALUE_ACCESSOR: any = {
  provide: NG_VALUE_ACCESSOR,
  useExisting: forwardRef(() => RadioControlValueAccessor),
  multi: true
};
function throwNameError() {
  throw new RuntimeError(RuntimeErrorCode.NAME_AND_FORM_CONTROL_NAME_MUST_MATCH, `
  If you define both a name and a formControlName attribute on your radio button, their values must match. Ex: <input type="radio" formControlName="food" name="food">
  `);
}
/**
 * Internal-only NgModule that works as a host for the `RadioControlRegistry` tree-shakable provider. Note: the `InternalFormsSharedModule` can not be used here directly, since it's declared *after* the `RadioControlRegistry` class and the `providedIn` doesn't support `forwardRef` logic.
 */
@NgModule()
export class RadioControlRegistryModule {
  /**
   * @description
   * Class used by Angular to track radio buttons. For internal use only.
   */
  @Injectable({providedIn: RadioControlRegistryModule})
  export class RadioControlRegistry {
    private _accessors: any[] = [];
    /**
     * @description
     * Adds a control to the internal registry. For internal use only.
     */
    add(control: NgControl, accessor: RadioControlValueAccessor) {
      this._accessors.push([control, accessor]);
    }
  }
}

```



```

RangeValueAccessor),\n multi: true\n};\n\n/**\n * @description\n * The `ControlValueAccessor` for writing a
range value and listening to range input changes.\n * The value accessor is used by the `FormControlDirective`,
`FormControlName`, and `NgModel`\n * directives.\n *\n * @usageNotes\n *\n * ### Using a range input with a
reactive form\n *\n * The following example shows how to use a range input with a reactive form.\n *\n * ``ts\n
const ageControl = new FormControl();\n * ``\n *\n * ``\n * <input type="range"\n
[formControl]="ageControl">\n * ``\n *\n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n
* @publicApi\n */\n@Directive({\n selector:\n
'input[type=range][formControlName],input[type=range][formControl],input[type=range][ngModel]',\n host: {\n
(change): 'onChange($event.target.value)',\n
(input): 'onChange($event.target.value)',\n
(blur): 'onTouched()' \n },\n providers:
[RANGE_VALUE_ACCESSOR]\n})\nexport class RangeValueAccessor extends BuiltInControlValueAccessor
implements\n ControlValueAccessor {\n /**\n * Sets the "value" property on the input element.\n * @nodoc\n
*\n writeValue(value: any): void {\n this.setProperty('value', parseFloat(value));\n }\n\n /**\n * Registers a
function called when the control value changes.\n * @nodoc\n *\n override registerOnChange(fn: (_:
number|null) => void): void {\n this.onChange = (value) => {\n fn(value == " ? null : parseFloat(value));\n
};\n }\n\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
*\n\nimport {Directive, EventEmitter, forwardRef, Inject, InjectionToken, Input, OnChanges, OnDestroy,
Optional, Output, Self, SimpleChanges} from '@angular/core';\nimport {FormControl} from
'../model/form_control';\nimport {NG_ASYNC_VALIDATORS, NG_VALIDATORS} from
'../validators';\nimport {ControlValueAccessor, NG_VALUE_ACCESSOR} from
'./control_value_accessor';\nimport {NgControl} from './ng_control';\nimport {disabledAttrWarning} from
'./reactive_errors';\nimport {_ngModelWarning, cleanUpControl, isPropertyUpdated, selectValueAccessor,
setUpControl} from './shared';\nimport {AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn} from
'./validators';\n\n/**\n * Token to provide to turn off the ngModel warning on formControl and
formControlName.\n */\nexport const NG_MODEL_WITH_FORM_CONTROL_WARNING =\n new
InjectionToken('NgModelWithFormControlWarning');\n\nexport const formControlBinding: any = {\n provide:
NgControl,\n useExisting: forwardRef(() => FormControlDirective)\n};\n\n/**\n * @description\n * Synchronizes
a standalone `FormControl` instance to a form
control element.\n *\n * Note that support for using the `ngModel` input property and `ngModelChange` event with
reactive\n * form directives was deprecated in Angular v6 and is scheduled for removal in\n * a future version of
Angular.\n * For details, see [Deprecated features](guide/deprecations#ngmodel-with-reactive-forms).\n *\n * @see
[Reactive Forms Guide](guide/reactive-forms)\n * @see `FormControl`\n * @see `AbstractControl`\n *\n *
@usageNotes\n *\n * The following example shows how to register a standalone control and set its value.\n *\n *
{@example forms/ts/simpleFormControl/simple_form_control_example.ts region='Component'}\n *\n
*\n * @ngModule ReactiveFormsModule\n * @publicApi\n */\n@Directive({selector: '[formControl]', providers:
[formControlBinding], exportAs: 'ngForm'})\nexport class FormControlDirective extends NgControl implements
OnChanges, OnDestroy {\n /**\n * Internal reference to the view model value.\n * @nodoc\n *\n viewModel:
any;\n\n /**\n * @description\n
*\n * Tracks the `FormControl` instance bound to the directive.\n * // TODO(issue/24571): remove '!'.\n
*\n @Input('formControl') form!: FormControl;\n\n /**\n * @description\n * Triggers a warning in dev mode that
this input should not be used with reactive forms.\n * // TODO(kara): remove next 4 properties once deprecation
period is over\n\n /** @deprecated as of v6\n *\n @Input('disabled')\n set isDisabled(isDisabled: boolean)
{\n if (typeof ngDevMode === 'undefined' || ngDevMode) {\n console.warn(disabledAttrWarning);\n }\n
}\n\n // TODO(kara): remove next 4 properties once deprecation period is over\n\n /** @deprecated as of v6\n
*\n @Input('ngModel') model: any;\n\n /** @deprecated as of v6\n *\n @Output('ngModelChange') update = new
EventEmitter();\n\n /**\n * @description\n * Static property used to track whether any ngModel warnings have
been sent across\n * all instances of FormControlDirective. Used to support warning config of "once".\n *\n
*\n @internal\n */\n static _ngModelWarningSentOnce = false;\n\n /**\n * @description\n

```



```

    * Instance property used to track whether an ngModel warning has been sent out for this
    `FormControlDirective` instance. Used to support warning config of `always`.
    @internal
    _ngModelWarningSent = false;
    constructor(
        @Optional() @Self() @Inject(NG_VALIDATORS)
        validators: (Validator|ValidatorFn)[],
        @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS)
        asyncValidators: (AsyncValidator|AsyncValidatorFn)[],
        @Optional() @Self()
        @Inject(NG_VALUE_ACCESSOR) valueAccessors: ControlValueAccessor[],
        @Optional()
        @Inject(NG_MODEL_WITH_FORM_CONTROL_WARNING) private _ngModelWarningConfig: string|
        null) {
        super();
        this._setValidators(validators);
        this._setAsyncValidators(asyncValidators);
        this.valueAccessor = selectValueAccessor(this, valueAccessors);
    }
    /** @nodoc */
    ngOnChanges(changes: SimpleChanges): void {
        if (this._isControlChanged(changes)) {
            const previousForm =
                changes['form'].previousValue;
            if (previousForm) {
                cleanUpControl(previousForm, this, /*
                validateControlPresenceOnChange */ false);
            }
            setUpControl(this.form, this);
            this.form.updateValueAndValidity({emitEvent: false});
            if (isPropertyUpdated(changes, this.viewModel)) {
                if (typeof ngDevMode === 'undefined' || ngDevMode) {
                    _ngModelWarning('formControl',
                        FormControlDirective, this, this._ngModelWarningConfig);
                }
                this.form.setValue(this.model);
                this.viewModel = this.model;
            }
        }
    }
    /** @nodoc */
    ngOnDestroy() {
        if (this.form) {
            cleanUpControl(this.form, this, /* validateControlPresenceOnChange */ false);
        }
    }
    /**
     * @description
     * Returns an array that represents the path from the top-level form to this control.
     * Each index
     * is the string name of the control on that level.
     */
    override get path(): string[] {
        return [];
    }
    /**
     * @description
     */

```

```

    * The `FormControl` bound to this directive.
    */
    override get control(): FormControl {
        return this.form;
    }
    /**
     * @description
     * Sets the new value for the view model and emits an `ngModelChange` event.
     */
    * @param newValue The new value for the view model.
    */
    override viewToModelUpdate(newValue: any): void {
        this.viewModel = newValue;
        this.update.emit(newValue);
    }
    private
    _isControlChanged(changes: {[key: string]: any}): boolean {
        return changes.hasOwnProperty('form');
    }
}
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 */
import {Directive, EventEmitter, forwardRef, Inject, Input, OnChanges, OnDestroy, Optional, Output, Self,
SimpleChanges} from '@angular/core';
import {FormArray} from '../model/form_array';
import {
    FormControl, isFormControl}
    from '../model/form_control';
import {FormGroup} from '../model/form_group';
import {
    NG_ASYNC_VALIDATORS, NG_VALIDATORS}
    from '../validators';
import {ControlContainer} from
'../control_container';
import {Form} from '../form_interface';
import {missingFormException} from
'../reactive_errors';
import {cleanUpControl, cleanUpFormContainer, cleanUpValidators, removeListItem,
setUpControl, setUpFormContainer, setUpValidators, syncPendingControls} from './shared';
import {
    AsyncValidator, AsyncValidatorFn, Validator, ValidatorFn}
    from './validators';
import {FormControlName}
from './form_control_name';
import {FormArrayName, FormGroupName}
from './form_group_name';
export
const formDirectiveProvider: any = {
    provide: ControlContainer,
    useExisting: forwardRef(() =>
        FormGroupDirective)};
/**
 * @description
 * Binds an existing `FormGroup` or `FormRecord` to a
    DOM element.
    This directive accepts an existing `FormGroup` instance. It will then
    use this `FormGroup` instance to match any child `FormControl`, `FormGroup`/`FormRecord`,
    and `FormArray` instances to child `FormControlName`, `FormGroupName`,
    and `FormArrayName` directives.
    @see [Reactive Forms Guide](guide/reactive-forms)
    @see `AbstractControl`
    @usageNotes
    ### Register Form Group
    The following example registers a `FormGroup` with first name and last name
    controls,
    and listens for the `ngSubmit` event when the button is clicked.
    @example
    forms/ts/simpleFormGroup/simple_form_group_example.ts region='Component'
    @NgModule
    ReactiveFormsModule
    @publicApi
    @Directive({
        selector: '[formGroup]',
        providers:
            [formDirectiveProvider],
        host: {
            '(submit)': 'onSubmit($event)',
            '(reset)': 'onReset()',
        },
        exportAs:

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'ngForm'\n})\nexport class FormGroupDirective extends ControlContainer implements Form, OnChanges,
OnDestroy {\n /**\n * @description\n * Reports whether the form submission has been
triggered.\n */\n public readonly submitted: boolean = false;\n /**\n * Reference to an old form group input
value, which is needed to cleanup old instance in case it\n * was replaced\n with a new one.\n */\n private
_oldForm: FormGroup|undefined;\n /**\n * Callback that should be invoked when controls in FormGroup or
FormArray collection change\n * (added or removed). This callback triggers corresponding DOM updates.\n */\n
private readonly _onCollectionChange = () => this._updateDomValue();\n /**\n * @description\n * Tracks the
list of added `FormControlName` instances\n */\n directives: FormControlName[] = [];\n /**\n *
@description\n * Tracks the `FormGroup` bound to this directive.\n */\n @Input('formGroup') form: FormGroup
= null!;\n /**\n * @description\n * Emits an event when the form submission has been triggered.\n */\n
@Output() ngSubmit = new EventEmitter();\n\n constructor(\n @Optional() @Self()
@Inject(NG_VALIDATORS)
validators: (Validator|ValidatorFn)[],\n @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS)
asyncValidators: (\n (AsyncValidator|AsyncValidatorFn)[]) {\n super();\n this._setValidators(validators);\n
this._setAsyncValidators(asyncValidators);\n }\n\n /** @nodoc */\n ngOnChanges(changes: SimpleChanges):
void {\n this._checkFormPresent();\n if (changes.hasOwnProperty('form')) {\n this._updateValidators();\n
this._updateDomValue();\n this._updateRegistrations();\n this._oldForm = this.form;\n }\n }\n\n /**
@nodoc */\n ngOnDestroy() {\n if (this.form) {\n cleanUpValidators(this.form, this);\n\n // Currently the
`onCollectionChange` callback is rewritten each time the\n // `_registerOnCollectionChange` function is invoked.
The implication is that cleanup should\n // happen *only* when the `onCollectionChange` callback was set by
this directive instance.\n // Otherwise it might cause overriding a callback
of some other directive instances. We should\n // consider updating this logic later to make it similar to how
`onChange` callbacks are\n // handled, see https://github.com/angular/angular/issues/39732 for additional info.\n
if (this.form._onCollectionChange === this._onCollectionChange) {\n
this.form._registerOnCollectionChange(() => {});\n }\n }\n\n /**\n * @description\n * Returns this
directive's instance.\n */\n override get formDirective(): Form {\n return this;\n }\n\n /**\n * @description\n
* Returns the `FormGroup` bound to this directive.\n */\n override get control(): FormGroup {\n return
this.form;\n }\n\n /**\n * @description\n * Returns an array representing the path to this group. Because this
directive\n * always lives at the top level of a form, it always an empty array.\n */\n override get path(): string[]
{\n return [];\n }\n\n /**\n * @description\n * Method that sets up the control directive
in this group, re-calculates its value\n * and validity, and adds the instance to the internal list of directives.\n */\n
@param dir The `FormControlName` directive instance.\n */\n addControl(dir: FormControlName):
FormControl {\n const ctrl: any = this.form.get(dir.path);\n setUpControl(ctrl, dir);\n
ctrl.updateValueAndValidity({emitEvent: false});\n this.directives.push(dir);\n return ctrl;\n }\n\n /**\n *
@description\n * Retrieves the `FormControl` instance from the provided `FormControlName` directive\n */\n
@param dir The `FormControlName` directive instance.\n */\n getControl(dir: FormControlName): FormControl
{\n return <FormControl>this.form.get(dir.path);\n }\n\n /**\n * @description\n * Removes the
`FormControlName` instance from the internal list of directives\n */\n * @param dir The `FormControlName`
directive instance.\n */\n removeControl(dir: FormControlName): void {\n cleanUpControl(dir.control || null,
dir,\n /* validateControlPresenceOnChange */ false);\n removeListItem(this.directives, dir);\n }\n\n /**\n * Adds a
new `FormGroupName` directive instance to the form.\n */\n * @param dir The `FormGroupName` directive
instance.\n */\n addFormGroup(dir: FormGroupName): void {\n this._setUpFormContainer(dir);\n }\n\n /**\n *
Performs the necessary cleanup when a `FormGroupName` directive instance is removed from the\n * view.\n
*/\n * @param dir The `FormGroupName` directive instance.\n */\n removeFormGroup(dir: FormGroupName):
void {\n this._cleanUpFormContainer(dir);\n }\n\n /**\n * @description\n * Retrieves the `FormGroup` for a
provided `FormGroupName` directive instance\n */\n * @param dir The `FormGroupName` directive instance.\n
*/\n getFormGroup(dir: FormGroupName): FormGroup {\n return <FormGroup>this.form.get(dir.path);\n }\n\n

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/**\n * Performs the necessary setup when a `FormArrayName` directive instance is added to the view.\n *\n * @param dir The `FormArrayName` directive instance.\n */\n addFormArray(dir: FormArrayName): void {\n  this._setUpFormContainer(dir);\n }\n\n/**\n * Performs the necessary cleanup when a `FormArrayName` directive instance is removed from the\n * view.\n *\n * @param dir The `FormArrayName` directive instance.\n */\n removeFormArray(dir: FormArrayName): void {\n  this._cleanUpFormContainer(dir);\n }\n\n/**\n * @description\n * Retrieves the `FormArray` for a provided `FormArrayName` directive instance.\n *\n * @param dir The `FormArrayName` directive instance.\n */\n getFormArray(dir: FormArrayName): FormArray {\n  return <FormArray>this.form.get(dir.path);\n }\n\n/**\n * Sets the new value for the provided `FormControlName` directive.\n *\n * @param dir The `FormControlName` directive instance.\n * @param value The new value for the directive's control.\n */\n updateModel(dir: FormControlName, value: any): void {\n  const ctrl =\n    <FormControl>this.form.get(dir.path);\n    ctrl.setValue(value);\n  }\n\n/**\n * @description\n * Method called with the `submit` event is triggered on the form.\n * Triggers the `ngSubmit` emitter to emit the `submit` event as its payload.\n *\n * @param $event The `submit` event object\n */\n onSubmit($event: Event): boolean {\n  (this as {submitted: boolean}).submitted = true;\n  syncPendingControls(this.form, this.directives);\n  this.ngSubmit.emit($event);\n  // Forms with `method="dialog"` have some special behavior that won't reload the page and that\n  // shouldn't be prevented. Note that we need to null check the `event` and the `target`, because\n  // some internal apps call this method directly with the wrong arguments.\n  return ($event?.target as HTMLFormElement | null)?.method === 'dialog';\n }\n\n/**\n * @description\n * Method called when the `reset` event is triggered on the form.\n */\n onReset(): void {\n  this.resetForm();\n }\n\n/**\n * @description\n * Resets the form to an initial value and resets its submitted status.\n *\n * @param value The new value for the form.\n */\n resetForm(value: any = undefined): void {\n  this.form.reset(value);\n  (this as {submitted: boolean}).submitted = false;\n }\n\n/** @internal */\n _updateDomValue() {\n  this.directives.forEach(dir => {\n    const oldCtrl = dir.control;\n    const newCtrl = this.form.get(dir.path);\n    if (oldCtrl !== newCtrl) {\n      // Note: the value of the `dir.control` may not be defined, for example when it's a first\n      // `FormControl` that is added to a `FormGroup` instance (via `addControl` call).\n      cleanUpControl(oldCtrl || null, dir);\n      // Check whether new control at the same location inside the corresponding `FormGroup` is an\n      // instance of `FormControl` and perform control setup only if that's the case.\n      // Note: we don't need to clear the list of directives\n      (this.directives) here, it would be\n      // taken care of in the `removeControl` method invoked when corresponding `formControlName`\n      // directive instance is being removed (invoked from `FormControlName.ngOnDestroy`).\n      if (isFormControl(newCtrl)) {\n        setUpControl(newCtrl, dir);\n        (dir as {control: FormControl}).control = newCtrl;\n      }\n    }\n  });\n }\n\nprivate _setUpFormContainer(dir: FormArrayName|FormGroupName): void {\n  const ctrl: any = this.form.get(dir.path);\n  setUpFormContainer(ctrl, dir);\n  // NOTE: this operation looks unnecessary in case no new validators were added in\n  // `setUpFormContainer` call. Consider updating this code to match the logic in\n  // `_cleanUpFormContainer` function.\n  ctrl.updateValueAndValidity({emitEvent: false});\n }\n\nprivate _cleanUpFormContainer(dir: FormArrayName|FormGroupName): void {\n  if (this.form)\n    {\n      const ctrl: any = this.form.get(dir.path);\n      if (ctrl) {\n        const isControlUpdated =\n          cleanUpFormContainer(ctrl, dir);\n          if (isControlUpdated) {\n            // Run validity check only in case a control was updated (i.e. view validators were\n            // removed) as removing view validators might cause validity to change.\n            ctrl.updateValueAndValidity({emitEvent: false});\n          }\n        }\n      }\n    }\n\nprivate _updateRegistrations() {\n  this.form._registerOnCollectionChange(this._onCollectionChange);\n  if (this._oldForm) {\n    this._oldForm._registerOnCollectionChange(() => {});\n  }\n }\n\nprivate _updateValidators() {\n  setUpValidators(this.form, this);\n  if (this._oldForm) {\n    cleanUpValidators(this._oldForm, this);\n  }\n }\n\nprivate _checkFormPresent() {\n  if (!this.form && (typeof ngDevMode === 'undefined' || ngDevMode)) {\n    throw missingFormException();\n  }\n }\n\n", /**\n *

```

```

@license\n * Copyright
Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n
* found in the LICENSE file at https://angular.io/license\n *\n\nimport { Directive, forwardRef, Host, Inject, Input,
OnDestroy, OnInit, Optional, Self, SkipSelf} from '@angular/core';\n\nimport { FormArray } from
'../model/form_array';\n\nimport { NG_ASYNC_VALIDATORS, NG_VALIDATORS } from
'../validators';\n\nimport { AbstractFormGroupDirective } from './abstract_form_group_directive';\n\nimport
{ ControlContainer } from './control_container';\n\nimport { arrayParentException, groupParentException } from
'./reactive_errors';\n\nimport { controlPath } from './shared';\n\nimport { AsyncValidator, AsyncValidatorFn, Validator,
ValidatorFn } from './validators';\n\nimport { FormGroupDirective } from './form_group_directive';\n\n\nexport const
formGroupNameProvider: any = {\n  provide: ControlContainer,\n  useExisting: forwardRef(() =>
FormGroupName)\n};\n\n/**\n * @description\n *\n * Syncs a nested
`FormGroup` or `FormRecord` to a DOM element.\n *\n * This directive can only be used with a parent
`FormGroupDirective`.\n *\n * It accepts the string name of the nested `FormGroup` or `FormRecord` to link, and\n
* looks for a `FormGroup` or `FormRecord` registered with that name in the parent\n * `FormGroup` instance you
passed into `FormGroupDirective`.\n *\n * Use nested form groups to validate a sub-group of a\n * form separately
from the rest or to group the values of certain\n * controls into their own nested object.\n *\n * @see [Reactive
Forms Guide](guide/reactive-forms)\n *\n * @usageNotes\n *\n * ### Access the group by name\n *\n * The
following example uses the `AbstractControl.get` method to access the\n * associated `FormGroup`\n *\n * ``\n *
this.form.get('name');\n *\n * ``\n *\n * ### Access individual controls in the group\n *\n * The following example uses
the `AbstractControl.get` method to access\n * individual controls within the group using dot syntax.\n
*\n * ``\n * this.form.get('name.first');\n *\n * ``\n *\n * ### Register a nested `FormGroup`.\n *\n * The following
example registers a nested *name* `FormGroup` within an existing `FormGroup`,\n * and provides methods to
retrieve the nested `FormGroup` and individual controls.\n *\n * { @example
forms/ts/nestedFormGroup/nested_form_group_example.ts region='Component'}\n *\n * @ngModule
ReactiveFormsModule\n *\n * @publicApi\n *\n * ^\n * @Directive({ selector: '[formGroupName]', providers:
[formGroupNameProvider] })\n\nexport class FormGroupName extends AbstractFormGroupDirective implements
OnInit, OnDestroy {\n  /**\n   * @description\n   * Tracks the name of the `FormGroup` bound to the directive. The
name corresponds\n   * to a key in the parent `FormGroup` or `FormArray`.\n   * Accepts a name as a string or a
number.\n   * The name in the form of a string is useful for individual forms,\n   * while the numerical form allows
for form groups to be bound\n   * to indices when iterating over groups
in a `FormArray`.\n   * \n // TODO(issue/24571): remove '!'\n   * @Input('formGroupName') override name!:
string|number|null;\n\n  constructor(\n    @Optional() @Host() @SkipSelf() parent: ControlContainer,\n
    @Optional() @Self() @Inject(NG_VALIDATORS) validators: (Validator|ValidatorFn)[],\n    @Optional()
@Self() @Inject(NG_ASYNC_VALIDATORS) asyncValidators: (AsyncValidator|AsyncValidatorFn)[])\n  {\n    super();\n    this._parent = parent;\n    this._setValidators(validators);\n
    this._setAsyncValidators(asyncValidators);\n  }\n\n  /** @internal */\n  override _checkParentType(): void {\n    if
(!_hasInvalidParent(this._parent) && (typeof ngDevMode === 'undefined' || ngDevMode)) {\n      throw
groupParentException();\n    }\n  }\n\n  } }\n\n\nexport const formArrayNameProvider: any = {\n  provide:
ControlContainer,\n  useExisting: forwardRef(() => FormArrayName)\n};\n\n/**\n * @description\n *\n * Syncs a
nested `FormArray` to a DOM element.\n *\n * This directive is designed
to be used with a parent `FormGroupDirective` (selector:\n * `'[formGroup]'`).\n *\n * It accepts the string name of
the nested `FormArray` you want to link, and\n * will look for a `FormArray` registered with that name in the
parent\n * `FormGroup` instance you passed into `FormGroupDirective`.\n *\n * @see [Reactive Forms
Guide](guide/reactive-forms)\n *\n * @see `AbstractControl`\n *\n * @usageNotes\n *\n * ### Example\n *\n *
{ @example forms/ts/nestedFormArray/nested_form_array_example.ts region='Component'}\n *\n * @ngModule
ReactiveFormsModule\n *\n * @publicApi\n *\n * ^\n * @Directive({ selector: '[formArrayName]', providers:
[formArrayNameProvider] })\n\nexport class FormArrayName extends ControlContainer implements OnInit,
OnDestroy {\n  /** @internal */\n  _parent: ControlContainer;\n\n  /**\n   * @description\n   * Tracks the name of

```

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the `FormArray` bound to the directive. The name corresponds to a key in the parent `FormGroup` or
`FormArray`. Accepts a name as a string or a number.

* The name in the form of a string is useful for individual forms while the numerical form allows for form
arrays to be bound to indices when iterating over arrays in a `FormArray`. // TODO(issue/24571):
remove '!'. @Input('formArrayName') override name!: string|number|null; constructor(@Optional()
@Host() @SkipSelf() parent: ControlContainer, @Optional() @Self() @Inject(NG_VALIDATORS)
validators: (Validator|ValidatorFn)[], @Optional() @Self() @Inject(NG_ASYNC_VALIDATORS)
asyncValidators: (AsyncValidator|AsyncValidatorFn)[]){ super(); this._parent = parent;
this._setValidators(validators); this._setAsyncValidators(asyncValidators); }

/** A lifecycle method
called when the directive's inputs are initialized. For internal use only. @throws If the directive does not have a
valid parent. @nodoc */ ngOnInit(): void { this._checkParentType();
this.formDirective!.addFormArray(this);
}

/** A lifecycle method called before the directive's instance is destroyed. For internal use only.
@nodoc */ ngOnDestroy(): void { if (this.formDirective) {
this.formDirective.removeFormArray(this); } }

/** @description The `FormArray` bound to
this directive. */ override get control(): FormArray { return this.formDirective!.getFormArray(this);
}

/** @description The top-level directive for this group if present, otherwise null. */ override
get formDirective(): FormGroupDirective|null { return this._parent ?
<FormGroupDirective>this._parent.formDirective : null; }

/** @description Returns an array that
represents the path from the top-level form to this control. Each index is the string name of the control on that
level. */ override get path(): string[] { return controlPath(this.name == null ? this.name :
this.name.toString(),
this._parent); }

private _checkParentType(): void { if (_hasInvalidParent(this._parent) && (typeof
ngDevMode === 'undefined' || ngDevMode)) { throw arrayParentException(); } }

function
_hasInvalidParent(parent: ControlContainer): boolean { return !(parent instanceof FormGroupName) && !(parent
instanceof FormGroupDirective) && !(parent instanceof FormArrayName); }

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import {Directive, EventEmitter,
forwardRef, Host, Inject, Input, OnChanges, OnDestroy, Optional, Output, Self, SimpleChanges, SkipSelf} from
'@angular/core';
import {FormControl} from '../model/form_control';
import {NG_ASYNC_VALIDATORS,
NG_VALIDATORS} from '../validators';
import {AbstractFormGroupDirective} from
'./abstract_form_group_directive';
import
{ControlContainer} from './control_container';
import {ControlValueAccessor, NG_VALUE_ACCESSOR} from
'./control_value_accessor';
import {NgControl} from './ng_control';
import {controlParentException,
disabledAttrWarning, ngModelGroupException} from './reactive_errors';
import {_ngModelWarning, controlPath,
isPropertyUpdated, selectValueAccessor} from './shared';
import {AsyncValidator, AsyncValidatorFn, Validator,
ValidatorFn} from './validators';
import {NG_MODEL_WITH_FORM_CONTROL_WARNING} from
'./form_control_directive';
import {FormGroupDirective} from './form_group_directive';
import
{FormArrayName, FormGroupName} from './form_group_name';
export const controlNameBinding: any = {
provide: NgControl,
useExisting: forwardRef(() => FormControlName)};

/** @description Syncs a
`FormControl` in an existing `FormGroup` to a form control element by name. @see [Reactive Forms
Guide](guide/reactive-forms) @see `FormControl`
* @see `AbstractControl`
* @usageNotes
### Register `FormControl` within a group
The
following example shows how to register multiple form controls within a form group and set their value.
@example forms/ts/simpleFormGroup/simple_form_group_example.ts region=Component
To see
`formControlName` examples with different form control types, see:
* Radio buttons:
`RadioControlValueAccessor`
* Selects: `SelectControlValueAccessor`
* Use with ngModel is
deprecated
* Support for using the `ngModel` input property and `ngModelChange` event with reactive

```

form directives has been deprecated in Angular v6 and is scheduled for removal in a future version of Angular.

For details, see [\[Deprecated features\]\(guide/deprecations#ngmodel-with-reactive-forms\)](#).

```

@ngModule
ReactiveFormsModule
@publicApi
@Directive({selector: '[formControlName]', providers:
[controlNameBinding]})
export class FormControlName
  extends NgControl implements OnChanges, OnDestroy {
  private _added = false;
  /** Internal reference to the view model value.
   * @internal
   * @viewModel: any;
   */
  /** @description
   * Tracks the `FormControl` instance bound to the directive.
   * @TODO(issue/24571): remove '!'.
   */
  override readonly control!: FormControl;
  /** @description
   * Tracks the name of the `FormControl` bound to the directive. The name corresponds
   * to a key in the parent `FormGroup` or `FormArray`.
   * @accepts a name as a string or a number.
   * The name in the form of a string is useful for individual forms,
   * while the numerical form allows for form controls to be bound
   * to indices when iterating over controls in a `FormArray`.
   * @TODO(issue/24571): remove '!'.
   */
  @Input('formControlName') override name!: string|number|null;
  /** @description
   * Triggers a warning in dev mode that this input should not be used with reactive forms.
   */
  @Input('disabled')
  set isDisabled(isDisabled: boolean) {
    if (typeof ngDevMode === 'undefined' || ngDevMode) {
      console.warn(disabledAttrWarning);
    }
  }
  /** @TODO(kara): remove next 4 properties once deprecation period is over
   */
  @deprecated as of v6
  @Input('ngModel') model: any;
  /** @deprecated as of v6
   */
  @Output('ngModelChange') update = new EventEmitter();
  /** @description
   * Static property used to track whether any ngModel warnings have been sent across
   * all instances of FormControlName. Used to support warning config of "once".
   */
  @internal
  static _ngModelWarningSentOnce = false;
  /** @description
   * Instance property used to track whether an ngModel warning has been sent out for this
   * particular FormControlName instance. Used to support warning config of "always".
   */
  @internal
  _ngModelWarningSent = false;
  constructor(
    @Optional()
    @Host()
    @SkipSelf()
    parent: ControlContainer,
    @Optional()
    @Self()
    @Inject(NG_VALIDATORS)
    validators: (Validator|ValidatorFn)[],
    @Optional()
    @Self()
    @Inject(NG_ASYNC_VALIDATORS)
    asyncValidators: (AsyncValidator|AsyncValidatorFn)[],
    @Optional()
    @Self()
    @Inject(NG_VALUE_ACCESSOR)
    valueAccessors: ControlValueAccessor[],
    @Optional()
    @Inject(NG_MODEL_WITH_FORM_CONTROL_WARNING)
    private _ngModelWarningConfig: string|null) {
    super();
    this._parent = parent;
    this._setValidators(validators);
    this._setAsyncValidators(asyncValidators);
    this.valueAccessor = selectValueAccessor(this, valueAccessors);
  }
  /** @nodoc
   */
  ngOnChanges(changes: SimpleChanges) {
    if (!this._added) this._setUpControl();
    if (isPropertyUpdated(changes, this.viewModel)) {
      if (typeof ngDevMode === 'undefined' || ngDevMode) {
        _ngModelWarning('formControlName', FormControlName, this, this._ngModelWarningConfig);
      }
      this.viewModel = this.model;
      this.formDirective.updateModel(this, this.model);
    }
  }
  /** @nodoc
   */
  ngOnDestroy(): void {
    if (this.formDirective) {
      this.formDirective.removeControl(this);
    }
  }
  /** @description
   * Sets the new value for the view model and emits an `ngModelChange` event.
   */
  @param newValue The new value for the view model.
  override
  viewToModelUpdate(newValue: any): void {
    this.viewModel = newValue;
    this.update.emit(newValue);
  }
  /** @description
   * Returns an array that represents the path from the top-level form to this control.
   * Each index is the string name of the control on that level.
   */
  override
  getPath(): string[] {
    return controlPath(this.name === null ? this.name : this.name.toString(), this._parent!);
  }
  /** @description
   * The top-level directive for this group if present, otherwise null.
   */
  override
  get formDirective(): any {
    return this._parent ? this._parent.formDirective : null;
  }
  private _checkParentType(): void {
    if (typeof ngDevMode === 'undefined' || ngDevMode) {
      if (!(this._parent instanceof FormGroupName) && !(this._parent instanceof AbstractFormGroupDirective)) {
        throw ngModelGroupException();
      } else if (!(this._parent instanceof FormGroupName) && !(this._parent instanceof FormGroupDirective) && !(this._parent instanceof FormArrayName)) {
        throw controlParentException();
      }
    }
    private
    _setUpControl() {
      this._checkParentType();
      (this as {control: FormControl}).control =

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this.formDirective.addControl(this);\n  this._added = true;\n } \n\n"/**\n * @license\n * Copyright Google LLC\n All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in\n the LICENSE file at https://angular.io/license\n */\n\nimport { Directive, ElementRef,\n forwardRef, Host, Input, OnDestroy, Optional, Renderer2, StaticProvider, RuntimeError as RuntimeError } from\n '@angular/core';\nimport { RuntimeErrorCode } from './errors';\nimport { BuiltInControlValueAccessor,\n ControlValueAccessor, NG_VALUE_ACCESSOR } from './control_value_accessor';\n\nexport const\n SELECT_VALUE_ACCESSOR: StaticProvider = {\n provide: NG_VALUE_ACCESSOR,\n useExisting:\n forwardRef(() => SelectControlValueAccessor),\n multi: true\n};\n\nfunction _buildValueString(id: string|null,\n value: any): string {\n if (id == null) return `${value}`;\n if (value && typeof value === 'object') value = 'Object';\n return `${id}: ${value}`.slice(0, 50);\n}\n\nfunction _extractId(valueString: string): string {\n return\n valueString.split(':')[0];\n}\n\n/**\n * @description\n * The `ControlValueAccessor` for writing select control\n values and listening to select control\n * changes. The value accessor is used by the `FormControlDirective`,\n `FormControlName`, and\n * `NgModel` directives.\n\n * @usageNotes\n * ### Using select controls in a reactive form\n * The following examples show how\n to use a select control in a reactive form.\n\n * { @example\n forms/ts/reactiveSelectControl/reactive_select_control_example.ts region='Component'\n\n * ### Using select\n controls in a template-driven form\n * To use a select in a template-driven form, simply add an `ngModel` and a\n `name`\n * attribute to the main `` tag.\n\n * { @example forms/ts/selectControl/select_control_example.ts\n region='Component'\n\n * ### Customizing option selection\n * Angular uses object identity to select option.\n It's possible for the identities of items\n * to change while the data does not. This can happen, for example, if the\n items are produced\n * from an RPC to the server, and that RPC is re-run. Even if the data hasn't changed, the\n * second response will produce objects with different identities.\n\n * To customize the default option comparison\n algorithm,\n\n * `` supports `compareWith` input.\n * `compareWith` takes a **function** which has two arguments:\n `option1` and `option2`.\n * If `compareWith` is given, Angular selects option by the return value of the function.\n\n * ts\n * const selectedCountriesControl = new FormControl();\n\n * <select\n [compareWith]="compareFn"\n [formControl]="selectedCountriesControl">\n * <option *ngFor="let country\n of countries"\n [ngValue]="country">\n * {{country.name}}\n * </option>\n * </select>\n\n * compareFn(c1: Country, c2: Country): boolean {\n * return c1 && c2 ? c1.id === c2.id : c1 === c2;\n * }\n\n * **Note:** We listen to the 'change' event because 'input' events aren't fired\n * for selects in IE, see:\n https://developer.mozilla.org/en-US/docs/Web/API/HTMLElement/input_event#browser_compatibility\n\n * @ngModule ReactiveFormsModule\n * @ngModule FormsModule\n * @publicApi\n */\n@Directive({\n selector:\n 'select:not([multiple])[formControlName],select:not([multiple])[formControl],select:not([multiple])[ngModel]',\n host: {'(change)': 'onChange($event.target.value)', '(blur)': 'onTouched()'},\n providers:\n [SELECT_VALUE_ACCESSOR]})\nexport class SelectControlValueAccessor extends\n BuiltInControlValueAccessor implements\n ControlValueAccessor {\n /** @nodoc */\n value: any;\n\n /**\n @internal */\n _optionMap: Map<string, any> = new Map<string, any>();\n\n /** @internal */\n _idCounter:\n number = 0;\n\n * @description\n * Tracks the option comparison algorithm for tracking identities when\n * checking for changes.\n */\n @Input()\n set compareWith(fn: (o1: any, o2: any) => boolean) {\n if (typeof fn\n !== 'function' && (typeof ngDevMode === 'undefined' || ngDevMode)) {\n throw new RuntimeError(\n RuntimeErrorCode.COMPAREWITH_NOT_A_FN,\n `compareWith must be a function, but received\n ${JSON.stringify(fn)}`);\n }\n this._compareWith = fn;\n }\n\n private _compareWith: (o1: any, o2: any) => boolean = Object.is;\n\n /**\n * Sets the `value` property on the\n select element.\n */\n @nodoc\n writeValue(value: any): void {\n this.value = value;\n const id: string|null\n = this._getOptionId(value);\n const valueString = _buildValueString(id, value);\n this.setProperty('value',\n valueString);\n }\n\n /**\n * Registers a function called when the control value changes.\n */\n @nodoc\n override registerOnChange(fn: (value: any) => any): void {\n this.onChange = (valueString: string) => {\n

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this.value = this._getOptionValue(valueString);\n  fn(this.value);\n  };\n }\n\n /** @internal *\n _registerOption(): string {\n  return (this._idCounter++).toString();\n }\n\n /** @internal *\n _getOptionId(value: any): string|null {\n  for (const id of Array.from(this._optionMap.keys())) {\n    if\n    (this._compareWith(this._optionMap.get(id), value)) return id;\n  }\n  return null;\n }\n\n /** @internal *\n _getOptionValue(valueString: string): any {\n  const id: string = _extractId(valueString);\n  return this._optionMap.has(id) ? this._optionMap.get(id) : valueString;\n }\n\n /**\n * @description\n * Marks\n * `<option>` as dynamic, so Angular can be notified when options change.\n *\n * @see\n * `SelectControlValueAccessor`\n *\n * @ngModule ReactiveFormsModule\n *\n * @ngModule FormsModule\n *\n * @publicApi\n *\n * @Directive({ selector: 'option'})\n * export class NgSelectOption implements OnDestroy {\n *\n * @description\n * ID of the option element\n *\n * // TODO(issue/24571): remove '!'.\n * id!: string;\n *\n * constructor(\n * private _element: ElementRef, private _renderer: Renderer2,\n * @Optional() @Host() private\n * _select: SelectControlValueAccessor) {\n * if (this._select) this.id = this._select._registerOption();\n * }\n *\n * @description\n * Tracks the value bound to the option element. Unlike the value binding,\n * ngValue supports\n * binding\n * to objects.\n *\n * @Input('ngValue')\n * set ngValue(value: any) {\n * if (this._select === null) return;\n * this._select._optionMap.set(this.id, value);\n * this._setElementValue(_buildValueString(this.id, value));\n * this._select.writeValue(this._select.value);\n * }\n *\n * @description\n * Tracks simple string values bound to\n * the option element.\n * For objects, use the `ngValue` input binding.\n *\n * @Input('value')\n * set value(value:\n * any) {\n * this._setElementValue(value);\n * if (this._select) this._select.writeValue(this._select.value);\n * }\n *\n * @internal *\n * _setElementValue(value: string): void {\n * this._renderer.setProperty(this._element.nativeElement,\n * 'value', value);\n * }\n *\n * @nodoc *\n * ngOnDestroy(): void {\n * if (this._select) {\n * this._select._optionMap.delete(this.id);\n * this._select.writeValue(this._select.value);\n * }\n * }\n *\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this\n * source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n * https://angular.io/license\n *\n * @import {Directive, ElementRef, forwardRef, Host, Input, OnDestroy, Optional,\n * Renderer2, StaticProvider, RuntimeError as RuntimeError} from '@angular/core';\n * @import {RuntimeErrorCode}\n * from '../errors';\n * @import {BuiltInControlValueAccessor, ControlValueAccessor, NG_VALUE_ACCESSOR}\n * from './control_value_accessor';\n * @export const SELECT_MULTIPLE_VALUE_ACCESSOR: StaticProvider = {\n * provide: NG_VALUE_ACCESSOR,\n * useExisting: forwardRef(() => SelectMultipleControlValueAccessor),\n * multi: true\n *};\n *\n * _buildValueString(id: string, value: any): string {\n * if (id === null) return `${value}`;\n * if\n * (typeof value === 'string') value = `${value}`;\n * if (value && typeof value === 'object') value = 'Object';\n * return\n * `${id}: ${value}`.slice(0, 50);\n * }\n *\n * _extractId(valueString: string): string {\n * return\n * valueString.split(':')[0];\n * }\n *\n * Mock interface for HTML Options\n *\n * interface HTMLOption {\n * value: string;\n * selected: boolean;\n * }\n *\n * Mock interface for HTMLCollection\n *\n * abstract class HTMLCollection {\n * // TODO(issue/24571): remove '!'.\n * length!: number;\n * abstract item(_: number): HTMLOption;\n * }\n *\n * @description\n * The\n * `ControlValueAccessor` for writing multi-select control values and listening to multi-select\n * control changes. The\n * value accessor is used by the `FormControlDirective`, `FormControlName`, and\n * `NgModel` directives.\n *\n * @see\n * `SelectControlValueAccessor`\n *\n * @usageNotes\n *\n * ### Using a multi-select control\n *\n * The\n * follow example shows you how to use a multi-select control with a reactive form.\n *\n * ```ts\n * const\n * countryControl = new FormControl();\n * ```\n *\n * <select multiple name="countries"\n * [formControl]="countryControl">\n * <option *ngFor="let country of countries" [ngValue]="country">\n * {{ country.name }}\n * </option>\n * </select>\n * ```\n *\n * ### Customizing option selection\n *\n * To customize the default option comparison\n * algorithm, `<select>` supports `compareWith` input.\n * See the `SelectControlValueAccessor` for usage.\n *\n * @ngModule ReactiveFormsModule\n *\n * @ngModule FormsModule\n *\n * @publicApi\n *\n * @Directive({\n * selector: '\n * 'select[multiple][formControlName],select[multiple][formControl],select[multiple][ngModel]',\n * host: {\n * (change): 'onChange($event.target)',\n * (blur): 'onTouched()',\n * providers:

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[SELECT_MULTIPLE_VALUE_ACCESSOR])\nexport class SelectMultipleControlValueAccessor extends
BuiltInControlValueAccessor implements\n  ControlValueAccessor {\n  /**\n   * The current value.\n   * @nodoc\n   */\n  value: any;\n  /** @internal */\n  _optionMap: Map<string, NgSelectMultipleOption> = new
Map<string, NgSelectMultipleOption>();\n  /** @internal */\n  _idCounter: number = 0;\n  /**\n   * Tracks the option comparison algorithm for tracking
identities when\n   * checking for changes.\n   */\n  @Input()\n  set compareWith(fn: (o1: any, o2: any) => boolean)
{\n  if (typeof fn !== 'function' && (typeof ngDevMode === 'undefined' || ngDevMode)) {\n  throw new
RuntimeError(\n    RuntimeErrorCode.COMPAREWITH_NOT_A_FN,\n    `compareWith must be a
function, but received ${JSON.stringify(fn)}`);\n  }\n  this._compareWith = fn;\n  }\n  private _compareWith:
(o1: any, o2: any) => boolean = Object.is;\n  /**\n   * Sets the \"value\" property on one or of more of the select's
options.\n   * @nodoc\n   */\n  writeValue(value: any): void {\n  this.value = value;\n  let
optionSelectedStateSetter: (opt: NgSelectMultipleOption, o: any) => void;\n  if (Array.isArray(value)) {\n  //
convert values to ids\n  const ids = value.map((v) => this._getOptionId(v));\n  optionSelectedStateSetter = (opt,
o) => {\n  opt._setSelected(ids.indexOf(o.toString()) > -1);\n  };;\n  } else {\n  optionSelectedStateSetter
= (opt, o) => {\n  opt._setSelected(false);\n  };;\n  }\n  this._optionMap.forEach(optionSelectedStateSetter);\n  }\n  /**\n   * Registers a function called when the control
value changes\n   * and writes an array of the selected options.\n   * @nodoc\n   */\n  override registerOnChange(fn:
(value: any) => any): void {\n  this.onChange = (element: HTMLSelectElement) => {\n  const selected:
Array<any> = [];\n  const selectedOptions = element.selectedOptions;\n  if (selectedOptions !== undefined) {\n
const options = selectedOptions;\n  for (let i = 0; i < options.length; i++) {\n  const opt = options[i];\n
const val = this._getOptionValue(opt.value);\n  selected.push(val);\n  }\n  }\n  // Degrade to use
`options` when `selectedOptions` property is not available.\n  // Note: the `selectedOptions` is available in all
supported browsers, but the Domino lib\n  // doesn't have it currently,\n  see https://github.com/fgnass/domino/issues/177.\n  else {\n  const options = element.options;\n  for (let i
= 0; i < options.length; i++) {\n  const opt = options[i];\n  if (opt.selected) {\n  const val =
this._getOptionValue(opt.value);\n  selected.push(val);\n  }\n  }\n  }\n  this.value = selected;\n
fn(selected);\n  };;\n  }\n  /** @internal */\n  _registerOption(value: NgSelectMultipleOption): string {\n  const
id: string = (this._idCounter++).toString();\n  this._optionMap.set(id, value);\n  return id;\n  }\n  /** @internal
*/\n  _getOptionId(value: any): string|null {\n  for (const id of Array.from(this._optionMap.keys())) {\n  if
(this._compareWith(this._optionMap.get(id)!._value, value)) return id;\n  }\n  return null;\n  }\n  /** @internal
*/\n  _getOptionValue(valueString: string): any {\n  const id: string = _extractId(valueString);\n  return
this._optionMap.has(id)
? this._optionMap.get(id)!._value : valueString;\n  }\n  }\n  /**\n   * Marks `` as dynamic,
so Angular can be notified when options change.\n   */\n  * @see `SelectMultipleControlValueAccessor`\n  * @ngModule ReactiveFormsModule\n  * @ngModule FormsModule\n  * @publicApi\n  */\n  @Directive({ selector:
'option'})\nexport class NgSelectMultipleOption implements OnDestroy {\n  // TODO(issue/24571): remove '!'.\n
id!: string;\n  /** @internal */\n  _value: any;\n  constructor(\n  private _element: ElementRef, private
_renderer: Renderer2,\n  @Optional() @Host() private _select: SelectMultipleControlValueAccessor) {\n  if
(this._select) {\n  this.id = this._select._registerOption(this);\n  }\n  }\n  /**\n   * Tracks the
value bound to the option element. Unlike the value binding,\n   * ngValue supports binding to objects.\n   */\n  @Input('ngValue')\n  set ngValue(value: any) {\n  if (this._select == null) return;\n  this._value
= value;\n  this._setElementValue(_buildValueString(this.id, value));\n
this._select.writeValue(this._select.value);\n  }\n  /**\n   * Tracks simple string values bound to
the option element.\n   * For objects, use the `ngValue` input binding.\n   */\n  @Input('value')\n  set value(value:
any) {\n  if (this._select) {\n  this._value = value;\n  this._setElementValue(_buildValueString(this.id,
value));\n  this._select.writeValue(this._select.value);\n  } else {\n  this._setElementValue(value);\n  }\n
}\n  /** @internal */\n  _setElementValue(value: string): void {\n
this._renderer.setProperty(this._element.nativeElement, 'value', value);\n  }\n  /** @internal */\n

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_setSelected(selected: boolean) {\n  this._renderer.setProperty(this._element.nativeElement, 'selected', selected);\n}\n\n /** @nodoc */\n ngOnDestroy(): void {\n  if (this._select) {\n    this._select._optionMap.delete(this.id);\n    this._select.writeValue(this._select.value);\n  }\n}\n}\n\nexport {NgSelectMultipleOption as NgSelectMultipleOption};\n", "/*\n * @license\n * Copyright\n * Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport {Directive, forwardRef, Input, OnChanges,\n SimpleChanges, StaticProvider, coerceToBoolean as coerceToBoolean} from '@angular/core';\nimport\n {Observable} from 'rxjs';\nimport {AbstractControl} from '../model/abstract_model';\nimport {emailValidator,\n maxLengthValidator, maxValidator, minLengthValidator, minValidator, NG_VALIDATORS, nullValidator,\n patternValidator, requiredTrueValidator, requiredValidator} from '../validators';\n\n/**\n * Method that updates\n string to integer if not already a number\n *\n * @param value The value to convert to integer.\n *\n * @returns value\n of parameter converted to number or integer.\n *\n * @function toInteger(value: string|number): number\n *\n * @return typeof value === 'number' ? value : parseInt(value, 10);\n */\n\n/**\n * Method that ensures that provided\n value is a float (and converts it to float if needed).\n *\n * @param value The value to convert to float.\n *\n * @returns\n value of parameter converted to number or float.\n *\n * @function toFloat(value: string|number): number {\n * return\n typeof value === 'number' ? value : parseFloat(value);\n */\n\n/**\n * @description\n * Defines the map of errors\n returned from failed validation checks.\n *\n * @publicApi\n */\nexport type ValidationErrors = {\n [key: string]:\n any};\n\n/**\n * @description\n * An interface implemented by classes that perform synchronous validation.\n *\n * @usageNotes\n * ### Provide a custom validator\n *\n * The following example implements the `Validator`\n interface to create a\n * validator directive with a custom error key.\n *\n * ```typescript\n * @Directive({\n * selector: '[customValidator]',\n * providers: [{provide: NG_VALIDATORS, useExisting:\n * CustomValidatorDirective, multi: true}]\n * })\n * class CustomValidatorDirective implements Validator {\n * validate(control: AbstractControl): ValidationErrors|null {\n *   return {'custom': true};\n * }\n * }\n * ```\n *\n * @publicApi\n */\nexport interface Validator {\n /**\n * @description\n * Method that performs synchronous\n validation against the provided control.\n *\n * @param control The control to validate against.\n *\n * @returns A map of validation errors if validation fails,\n * otherwise null.\n */\n validate(control:\n AbstractControl): ValidationErrors|null;\n\n /**\n * @description\n * Registers a callback function to call when\n the validator inputs change.\n *\n * @param fn The callback function\n */\n registerOnValidatorChange?(fn: ()\n => void): void;\n}\n\n/**\n * A base class for Validator-based Directives. The class contains common logic shared\n across such\n * Directives.\n *\n * For internal use only, this class is not intended\n for use outside of the Forms package.\n */\n@Directive()\nabstract class AbstractValidatorDirective implements\n Validator, OnChanges {\n private _validator: ValidatorFn = nullValidator;\n private _onChange!: () => void;\n\n /**\n * A flag that tracks whether this validator is enabled.\n *\n * Marking it `internal` (vs `protected`), so that\n this flag can be used in host bindings of\n * directive classes that extend this base class.\n */\n @internal\n _enabled?: boolean;\n\n /**\n * Name of an input that matches directive selector attribute (e.g. `minlength` for\n * `MinLengthDirective`). An input with a given name might contain configuration information (like\n * `minlength=10`) or a flag that indicates whether validator should be enabled (like\n * `[required]=false`).\n */\n @internal\n abstract inputName: string;\n\n /**\n * Creates an instance of a validator (specific to a\n directive that extends this base class).\n */\n @internal\n\n /**\n * Performs the necessary input\n normalization based on a specific logic of a Directive.\n *\n * For example, the function might be used to convert\n string-based representation of the\n * `minlength` input to an integer value that can later be used in the\n `Validators.minLength`\n * validator.\n */\n @internal\n abstract normalizeInput(input: unknown):\n unknown;\n\n /** @nodoc */\n ngOnChanges(changes: SimpleChanges): void {\n  if (this.inputName in changes)\n    {\n      const input = this.normalizeInput(changes[this.inputName].currentValue);\n      this._enabled =\n this.enabled(input);\n      this._validator = this._enabled ? this.createValidator(input) : nullValidator;\n    }\n  if\n (this._onChange) {\n    this._onChange();\n  }\n}\n\n /** @nodoc */\n validate(control:\n AbstractControl): ValidationErrors|null {\n  return this._validator(control);\n}\n\n /** @nodoc */\n
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registerOnValidatorChange(fn:

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() => void): void {\n  this._onChange = fn;\n }\n\n /**\n  * @description\n  * Determines whether this validator should be active or not based on an input.\n  * Base class implementation checks whether an input is defined (if the value is different from\n  * `null` and `undefined`). Validator classes that extend this base class can override this\n  * function with the logic specific to a particular validator directive.\n  *\n  * ^\n  * enabled(input: unknown): boolean {\n  * return input != null /* both `null` and `undefined` */;\n  }\n }\n\n /**\n  * @description\n  * Provider which adds `MaxValidator` to the `NG_VALIDATORS` multi-provider list.\n  *\n  * ^\n  * export const MAX_VALIDATOR: StaticProvider = {\n  * provide: NG_VALIDATORS,\n  * useExisting: forwardRef(() => MaxValidator),\n  * multi: true\n  };\n }\n\n /**\n  * A directive which installs the {@link MaxValidator} for any `formControlName`,\n  * `formControl`, or control with `ngModel` that also has a `max` attribute.\n  *\n  * ^\n  * 
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@see [Form Validation](guide/form-validation)\n\n /**\n  * @usageNotes\n  * ### Adding a max validator\n  *\n  * The following example shows how to add a max validator to an input attached to an\n  * ngModel binding.\n  *\n  * ^\n  * `html\n  * <input type="number" ngModel max="4">\n  * ``\n  *\n  * @ngModule ReactiveFormsModule\n  * @ngModule FormsModule\n  * @publicApi\n  * ^\n  * @Directive({\n  * selector:\n  *\n  * 'input[type=number][max][formControlName],input[type=number][max][formControl],input[type=number][max][ngModel]',\n  * providers: [MAX_VALIDATOR],\n  * host: {'[attr.max]': '_enabled ? max : null'}\n  *})\n  * export class MaxValidator extends AbstractValidatorDirective {\n  * /**\n  * * @description\n  * * Tracks changes to the max bound to this directive.\n  * *\n  * ^\n  * @Input() max!: string|number|null;\n  * /**\n  * @internal\n  * ^\n  * override inputName = 'max';\n  * /**\n  * @internal\n  * ^\n  * override normalizeInput = (input: string|number): number => toFloat(input);\n  * /**\n  * @internal\n  * ^\n  * override createValidator = (max: number):
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ValidatorFn => maxValidator(max);\n }\n }\n\n /**\n  * @description\n  * Provider which adds `MinValidator` to the `NG_VALIDATORS` multi-provider list.\n  *\n  * ^\n  * export const MIN_VALIDATOR: StaticProvider = {\n  * provide: NG_VALIDATORS,\n  * useExisting: forwardRef(() => MinValidator),\n  * multi: true\n  };\n }\n\n /**\n  * A directive which installs the {@link MinValidator} for any `formControlName`,\n  * `formControl`, or control with `ngModel` that also has a `min` attribute.\n  *\n  * ^\n  * @see [Form Validation](guide/form-validation)\n  *\n  * @usageNotes\n  *\n  * ### Adding a min validator\n  *\n  * The following example shows how to add a min validator to an input attached to an\n  * ngModel binding.\n  *\n  * ^\n  * `html\n  * <input type="number" ngModel min="4">\n  * ``\n  *\n  * @ngModule ReactiveFormsModule\n  * @ngModule FormsModule\n  * @publicApi\n  * ^\n  * @Directive({\n  * selector:\n  *\n  * 'input[type=number][min][formControlName],input[type=number][min][formControl],input[type=number][min][ngModel]',\n  * providers:
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[MIN_VALIDATOR],\n * host: {'[attr.min]': '_enabled ? min : null'}\n *})\n * export class MinValidator extends AbstractValidatorDirective {\n * /**\n * * @description\n * * Tracks changes to the min bound to this directive.\n * *\n * ^\n * @Input() min!: string|number|null;\n * /**\n * @internal\n * ^\n * override inputName = 'min';\n * /**\n * @internal\n * ^\n * override normalizeInput = (input: string|number): number => toFloat(input);\n * /**\n * @internal\n * ^\n * override createValidator = (min: number): ValidatorFn => minValidator(min);\n * }\n }\n\n /**\n  * @description\n  * An interface implemented by classes that perform asynchronous validation.\n  *\n  * @usageNotes\n  *\n  * ### Provide a custom async validator directive\n  *\n  * The following example implements the `AsyncValidator` interface to create an\n  * async validator directive with a custom error key.\n  *\n  * ^\n  * `typescript\n  * import { of } from 'rxjs';\n  *\n  * @Directive({\n  * selector: '[customAsyncValidator]',\n  * providers: [{provide: NG_ASYNC_VALIDATORS, useExisting:
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CustomAsyncValidatorDirective, multi: true}]\n * })\n * class CustomAsyncValidatorDirective implements AsyncValidator {\n * validate(control: AbstractControl): Observable<ValidationErrors|null> {\n * return of({'custom': true});\n * }\n * }\n * ^\n * @publicApi\n * ^\n * export interface AsyncValidator extends Validator {\n * /**\n * * @description\n * * Method that performs async validation against the provided control.\n * *\n * ^\n * @param control The control to validate against.\n * *\n * ^\n * @returns A promise or observable that resolves a map of validation errors\n * if validation fails, otherwise null.\n * *\n * ^\n * validate(control: AbstractControl):\n * Promise<ValidationErrors|null>|Observable<ValidationErrors|null>;\n * }\n }\n\n /**\n  * @description\n  * Provider which
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adds `RequiredValidator` to the `NG_VALIDATORS` multi-provider list.\n *^\nexport const
REQUIRED_VALIDATOR: StaticProvider = {\n provide: NG_VALIDATORS,\n useExisting: forwardRef(() =>
RequiredValidator),\n
  multi: true\n};\n\n/**\n * @description\n * Provider which adds `CheckboxRequiredValidator` to the
`NG_VALIDATORS` multi-provider list.\n *^\nexport const CHECKBOX_REQUIRED_VALIDATOR:
StaticProvider = {\n provide: NG_VALIDATORS,\n useExisting: forwardRef(() =>
CheckboxRequiredValidator),\n  multi: true\n};\n\n/**\n * @description\n * A directive that adds the `required`
validator to any controls marked with the\n * `required` attribute. The directive is provided with the
`NG_VALIDATORS` multi-provider list.\n *^\n * @see [Form Validation](guide/form-validation)\n *^\n *
@usageNotes\n *^\n * ### Adding a required validator using template-driven forms\n *^\n * ```\n * <input
name="fullName" ngModel required>\n * ```\n *^\n * @ngModule FormsModule\n * @ngModule
ReactiveFormsModule\n * @publicApi\n *^\n@Directive({\n selector:\n
':not([type=checkbox])[required][formControlName],:not([type=checkbox])[required][formControl],:not([type=chec
kbox])[required][ngModel]',\n  providers:
  [REQUIRED_VALIDATOR],\n  host: {'[attr.required]': '_enabled ? \'\" : null'\n})\n})\nexport class
RequiredValidator extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the
required attribute bound to this directive.\n *^\n * @Input() required!: boolean|string;\n\n /** @internal\n *^\n
override inputName = 'required';\n\n /** @internal\n *^\n override normalizeInput = coerceToBoolean;\n\n /**
@internal\n *^\n override createValidator = (input: boolean): ValidatorFn => requiredValidator;\n\n /** @nodoc\n *^\n
override enabled(input: boolean): boolean {\n  return input;\n }\n}\n\n/**\n * A Directive that adds the
`required` validator to checkbox controls marked with the\n * `required` attribute. The directive is provided with the
`NG_VALIDATORS` multi-provider list.\n *^\n * @see [Form Validation](guide/form-validation)\n *^\n *
@usageNotes\n *^\n * ### Adding a required checkbox validator using template-driven forms\n *^\n * The following
example
shows how to add a checkbox required validator to an input attached to an\n * ngModel binding.\n *^\n * ```\n *
<input type="checkbox" name="active" ngModel required>\n * ```\n *^\n * @publicApi\n * @ngModule
FormsModule\n * @ngModule ReactiveFormsModule\n *^\n@Directive({\n selector:\n
'input[type=checkbox][required][formControlName],input[type=checkbox][required][formControl],input[type=chec
kbox][required][ngModel]',\n  providers: [CHECKBOX_REQUIRED_VALIDATOR],\n  host: {'[attr.required]':
'_enabled ? \'\" : null'\n})\n})\nexport class CheckboxRequiredValidator extends RequiredValidator {\n /** @internal
\n *^\n override createValidator = (input: unknown): ValidatorFn => requiredTrueValidator;\n}\n\n/**\n *
@description\n * Provider which adds `EmailValidator` to the `NG_VALIDATORS` multi-provider list.\n *^\n
export const EMAIL_VALIDATOR: any = {\n provide: NG_VALIDATORS,\n useExisting: forwardRef(() =>
EmailValidator),\n  multi: true\n};\n\n/**\n * A directive that adds the `email`
validator to controls marked with the\n * `email` attribute. The directive is provided with the `NG_VALIDATORS`
multi-provider list.\n *^\n * The email validation is based on the WHATWG HTML specification with some
enhancements to\n * incorporate more RFC rules. More information can be found on the [Validators.email\n *
page](api/forms/Validators#email).\n *^\n * @see [Form Validation](guide/form-validation)\n *^\n * @usageNotes\n
*\n * ### Adding an email validator\n *^\n * The following example shows how to add an email validator to an input
attached to an ngModel\n * binding.\n *^\n * ```\n * <input type="email" name="email" ngModel email>\n *
<input type="email" name="email" ngModel email="true">\n * <input type="email" name="email" ngModel
[email]="true">\n * ```\n *^\n * @publicApi\n * @ngModule FormsModule\n * @ngModule
ReactiveFormsModule\n *^\n@Directive({\n selector:\n
'[email][formControlName],[email][formControl],[email][ngModel]',\n  providers:
  [EMAIL_VALIDATOR]\n})\nexport
class EmailValidator extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the
email attribute bound to this directive.\n *^\n * @Input() email!: boolean|string;\n\n /** @internal\n *^\n
override inputName = 'email';\n\n /** @internal\n *^\n override normalizeInput = coerceToBoolean;\n\n /** @internal\n
*\n *^\n

```



```

[pattern][formControlName],[pattern][formControl],[pattern][ngModel]',\n providers:
[PATTERN_VALIDATOR],\n host: {[attr.pattern]: '_enabled ? pattern : null'}\n}))\nexport class PatternValidator
extends AbstractValidatorDirective {\n /**\n * @description\n * Tracks changes to the pattern bound to this
directive.\n *@\n @Input()\n pattern!: string|RegExp; // This input is always defined, since the name matches
selector.\n\n /** @internal *\n override inputName = 'pattern';\n\n /** @internal *\n override normalizeInput =
(input: string|RegExp): string|RegExp => input;\n\n /** @internal *\n override createValidator = (input:
string|RegExp): ValidatorFn => patternValidator(input);\n\n",/**\n * @license\n * Copyright Google LLC All
Rights Reserved.\n *@\n * Use of this source code is governed by an MIT-style
license that can be\n * found in the LICENSE file at https://angular.io/license\n *@\n\nimport {NgModule, Type}
from '@angular/core';\n\nimport {CheckboxControlValueAccessor} from
'./directives/checkbox_value_accessor';\nimport {DefaultValueAccessor} from
'./directives/default_value_accessor';\nimport {NgControlStatus, NgControlStatusGroup} from
'./directives/ng_control_status';\nimport {NgForm} from './directives/ng_form';\nimport {NgModel} from
'./directives/ng_model';\nimport {NgModelGroup} from './directives/ng_model_group';\nimport {NgNoValidate}
from './directives/ng_no_validate_directive';\nimport {NumberValueAccessor} from
'./directives/number_value_accessor';\nimport {RadioControlRegistryModule, RadioControlValueAccessor} from
'./directives/radio_control_value_accessor';\nimport {RangeValueAccessor} from
'./directives/range_value_accessor';\nimport {FormControlDirective} from
'./directives/reactive_directives/form_control_directive';\nimport {FormControlName} from
'./directives/reactive_directives/form_control_name';\nimport
{FormGroupDirective} from './directives/reactive_directives/form_group_directive';\nimport {FormArrayName,
FormGroupName} from './directives/reactive_directives/form_group_name';\nimport {NgSelectOption,
SelectControlValueAccessor} from './directives/select_control_value_accessor';\nimport {NgSelectMultipleOption,
SelectMultipleControlValueAccessor} from './directives/select_multiple_control_value_accessor';\nimport
{CheckboxRequiredValidator, EmailValidator, MaxLengthValidator, MaxValidator, MinLengthValidator,
MinValidator, PatternValidator, RequiredValidator} from './directives/validators';\n\nexport
{CheckboxControlValueAccessor} from './directives/checkbox_value_accessor';\nexport {ControlValueAccessor}
from './directives/control_value_accessor';\nexport {DefaultValueAccessor} from
'./directives/default_value_accessor';\nexport {NgControl} from './directives/ng_control';\nexport {NgControlStatus,
NgControlStatusGroup} from './directives/ng_control_status';\nexport
{NgForm} from './directives/ng_form';\nexport {NgModel} from './directives/ng_model';\nexport
{NgModelGroup} from './directives/ng_model_group';\nexport {NumberValueAccessor} from
'./directives/number_value_accessor';\nexport {RadioControlValueAccessor} from
'./directives/radio_control_value_accessor';\nexport {RangeValueAccessor} from
'./directives/range_value_accessor';\nexport {FormControlDirective,
NG_MODEL_WITH_FORM_CONTROL_WARNING} from
'./directives/reactive_directives/form_control_directive';\nexport {FormControlName} from
'./directives/reactive_directives/form_control_name';\nexport {FormGroupDirective} from
'./directives/reactive_directives/form_group_directive';\nexport {FormArrayName, FormGroupName} from
'./directives/reactive_directives/form_group_name';\nexport {NgSelectOption, SelectControlValueAccessor} from
'./directives/select_control_value_accessor';\nexport {NgSelectMultipleOption,
SelectMultipleControlValueAccessor} from './directives/select_multiple_control_value_accessor';\n\nexport
const SHARED_FORM_DIRECTIVES: Type<any>[] = [\n NgNoValidate,\n NgSelectOption,\n
NgSelectMultipleOption,\n DefaultValueAccessor,\n NumberValueAccessor,\n RangeValueAccessor,\n
CheckboxControlValueAccessor,\n SelectControlValueAccessor,\n SelectMultipleControlValueAccessor,\n
RadioControlValueAccessor,\n NgControlStatus,\n NgControlStatusGroup,\n RequiredValidator,\n
MinLengthValidator,\n MaxLengthValidator,\n PatternValidator,\n CheckboxRequiredValidator,\n
EmailValidator,\n MinValidator,\n MaxValidator,\n];\n\nexport const TEMPLATE_DRIVEN_DIRECTIVES:

```

```

Type<any>[] = [NgModel, NgModelGroup, NgForm];\n\nexport const REACTIVE_DRIVEN_DIRECTIVES:
Type<any>[] =\n  [FormControlDirective, FormGroupDirective, FormControlName, FormGroupName,
  FormArrayName];\n\n/**\n * Internal module used for sharing directives between FormsModule and
  ReactiveFormsModule\n */\n@NgModule({\n  declarations: SHARED_FORM_DIRECTIVES,\n  imports:
  [RadioControlRegistryModule],\n  exports: SHARED_FORM_DIRECTIVES,\n})\nexport class
  InternalFormsSharedModule {\n}\n\nexport {InternalFormsSharedModule as
  InternalFormsSharedModule};\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of
  this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n */\nimport {ModuleWithProviders, NgModule} from '@angular/core';\n\nimport
  {InternalFormsSharedModule, NG_MODEL_WITH_FORM_CONTROL_WARNING,
  REACTIVE_DRIVEN_DIRECTIVES, TEMPLATE_DRIVEN_DIRECTIVES} from './directives';\n\n/**\n *
  Exports the required providers and directives for template-driven forms,\n * making them available for import by
  NgModules that import this module.\n *\n * Providers associated with this module:\n * * `RadioControlRegistry`\n
  *\n * @see [Forms Overview](/guide/forms-overview)\n *\n * @see [Template-driven Forms Guide](/guide/forms)\n
  *\n * @publicApi\n */\n@NgModule({\n  declarations:
  TEMPLATE_DRIVEN_DIRECTIVES,\n  exports: [InternalFormsSharedModule,
  TEMPLATE_DRIVEN_DIRECTIVES]\n})\nexport class FormsModule {\n}\n\n/**\n * Exports the required
  infrastructure and directives for reactive forms,\n * making them available for import by NgModules that import this
  module.\n *\n * Providers associated with this module:\n * * `FormBuilder`\n * * `RadioControlRegistry`\n
  *\n * @see [Forms Overview](guide/forms-overview)\n *\n * @see [Reactive Forms Guide](guide/reactive-forms)\n
  *\n * @publicApi\n */\n@NgModule({\n  declarations: [REACTIVE_DRIVEN_DIRECTIVES],\n  exports:
  [InternalFormsSharedModule, REACTIVE_DRIVEN_DIRECTIVES]\n})\nexport class ReactiveFormsModule {\n}\n\n/**\n *
  @description\n * Provides options for configuring the reactive forms module.\n *\n * @param opts An
  object of configuration options\n * * `warnOnNgModelWithFormControl` Configures when to emit a warning
  when an `ngModel`\n * binding is used with reactive form directives.\n *\n */\n
  static withConfig(opts: {\n  /** @deprecated as of v6 */ warnOnNgModelWithFormControl:
  'never'|'once'|'always'\n }): ModuleWithProviders<ReactiveFormsModule> {\n  return {\n    ngModule:
  ReactiveFormsModule,\n    providers: [\n      {provide: NG_MODEL_WITH_FORM_CONTROL_WARNING,
  useValue: opts.warnOnNgModelWithFormControl}\n    ]\n  };\n}\n", "/*\n * @license\n * Copyright Google
  LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found
  in the LICENSE file at https://angular.io/license\n */\nimport {AsyncValidatorFn, ValidatorFn} from
  './directives/validators';\n\nimport {AbstractControl, AbstractControlOptions, assertAllValuesPresent,
  assertControlPresent, pickAsyncValidators, pickValidators, RawValue, TypedOrUntyped, Value} from
  './abstract_model';\n\n/**\n * FormArrayValue extracts the type of `value` from a FormArray's element type, and
  wraps it in an\n * array.\n *\n * Angular uses this type internally
  to support Typed Forms; do not use it directly. The untyped\n * case falls back to any[].\n */\nexport type
  FormArrayValue<T extends AbstractControl<any>> =\n  TypedOrUntyped<T, Array<Value<T>>,\n  any[]>;\n\n/**\n * FormArrayRawValue extracts the type of `getRawValue()` from a FormArray's element type,
  and\n * wraps it in an array. The untyped case falls back to any[].\n *\n * Angular uses this type internally to support
  Typed Forms; do not use it directly.\n */\nexport type FormArrayRawValue<T extends AbstractControl<any>> =\n
  TypedOrUntyped<T, Array<RawValue<T>>,\n  any[]>;\n\n/**\n * Tracks the value and validity state of an array of
  `FormControl`,\n * `FormGroup` or `FormArray` instances.\n *\n * A `FormArray` aggregates the values of each
  child `FormControl`\n * into an array.\n * It calculates its status by reducing the status values of its children. For
  example, if one of\n * the controls in a `FormArray` is invalid, the entire array becomes invalid.\n *\n *
  `FormArray` accepts
  one generic argument, which is the type of the controls inside.\n * If you need a heterogenous array, use { @link
  UntypedFormArray }.\n *\n * `FormArray` is one of the four fundamental building blocks used to define forms in
  Angular,\n * along with `FormControl`, `FormGroup`, and `FormRecord`.\n *\n * @usageNotes\n *\n * ### Create
  
```

```

an array of form controls
const arr = new FormArray([
  new FormControl('Nancy',
    Validators.minLength(2)),
  new FormControl('Drew')
]);
console.log(arr.value); // ['Nancy',
'Drew']
console.log(arr.status); // 'VALID'

### Create a form array with array-level validators
You include array-level validators and async validators. These come in handy
when you want to perform validation that considers the value of more than one child
control. The two types of validators are passed in separately as the second and third arg
respectively, or together as part of an options object.

const arr = new FormArray([
  new FormControl('Nancy'),
  new FormControl('Drew')
], {
  validators: myValidator,
  asyncValidators: myAsyncValidator
});

### Set the updateOn property for all controls in a form array
The options object is used to set a default value for each child
control's `updateOn` property. If you set `updateOn` to `blur` at the
array level, all child controls default to `blur`, unless the child
has explicitly specified a different `updateOn` value.

const arr = new FormArray([
  new FormControl(),
  { updateOn: 'blur' }
]);

### Adding or removing controls from a form array
To change the controls in the array, use the `push`, `insert`, `removeAt` or `clear`
methods in `FormArray` itself. These methods ensure the controls are properly tracked
in the form's hierarchy. Do not modify the array of `AbstractControl`s used to
instantiate the `FormArray` directly, as that result in strange and unexpected
behavior such as broken change detection.

@publicApi
export class FormArray<TControl extends AbstractControl<any> = any> extends
  AbstractControl<
    TypedOrUntyped<TControl, FormArrayValue<TControl>, any>,
    TypedOrUntyped<TControl, FormArrayRawValue<TControl>, any>> {
  /**
   * Creates a new `FormArray` instance.
   * @param controls An array of child controls. Each child control is given an index
   * where it is registered.
   * @param validatorOrOpts A synchronous validator function, or an array of
   * such functions, or an `AbstractControlOptions` object that contains validation
   * functions and a validation trigger.
   * @param asyncValidator A single async validator or array of async validator
   * functions
   * @constructor
   * @param controls: Array<TControl>,
   * @param validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,
   * @param asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null
   */
  constructor(
    controls: Array<TControl>,
    validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,
    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null
  ) {
    super(pickValidators(validatorOrOpts), pickAsyncValidators(asyncValidator,
    validatorOrOpts));
    this.controls = controls;
    this._initObservables();
    this._setUpdateStrategy(validatorOrOpts);
    this._setUpControls();
    this.updateValueAndValidity({
      onlySelf: true,
      // If `asyncValidator` is present, it will trigger control status change from `PENDING` to
      // `VALID` or `INVALID`. The status should be broadcasted via the
      `statusChanges` observable, so we set `emitEvent` to `true` to allow that
      during the control creation process.
      emitEvent: !!this.asyncValidator
    });
  }

  /**
   * Get the `AbstractControl` at the given `index` in the array.
   * @param index Index in the array to retrieve the control. If `index` is
   * negative, it will wrap around from the back, and if index is greatly
   * negative (less than `-length`), the result is undefined. This behavior
   * is the same as `Array.at(index)`.
   */
  at(index: number): TypedOrUntyped<TControl, TControl, AbstractControl<any>> {
    return (this.controls as any)[this._adjustIndex(index)];
  }

  /**
   * Insert a new `AbstractControl` at the end of the array.
   * @param control Form control to be inserted
   * @param options Specifies whether this FormArray instance should emit
   * events after a new control is added.
   * * `emitEvent`: When true or not supplied (the default), both the
   * `statusChanges` and `valueChanges` observables emit events with the
   * latest status and value when the control is inserted. When false, no
   * events are emitted.
   */
  push(control: TControl, options: { emitEvent?: boolean } = {}): void {
    this.controls.push(control);
    this._registerControl(control);
    this.updateValueAndValidity({ emitEvent: options.emitEvent });
    this._onCollectionChange();
  }

  /**
   * Insert a new `AbstractControl` at the given `index` in the array.
   * @param index Index in the array to insert the control. If `index` is
   * negative, wraps around from the back. If `index` is greatly negative
   * (less than `-length`), prepends to the array. This behavior is the same
   * as `Array.splice(index, 0, control)`.
   * @param control Form control to be inserted
   * @param options Specifies whether this FormArray

```



```

instance should emit events after a new\n * control is inserted.\n * * `emitEvent`: When true or not supplied
(the default), both the `statusChanges` and\n * `valueChanges` observables emit events with the latest status and
value when the control is\n * inserted. When false, no events are emitted.\n * /\n insert(index: number, control:
TControl, options: {emitEvent?: boolean} = {}): void {\n this.controls.splice(index, 0, control);\n\n
this._registerControl(control);\n this.updateValueAndValidity({emitEvent:
options.emitEvent});\n }\n\n /**\n * Remove the control at the given `index` in the array.\n * \n * @param
index Index in the array to remove the control. If `index` is negative, wraps around\n * from the back. If `index`
is greatly negative (less than `-length`), removes the first\n * element. This behavior is the same as
`Array.splice(index, 1)`.\n * @param options Specifies whether this FormArray instance should emit events after
a\n * control is removed.\n * * `emitEvent`: When true or not supplied (the default), both the `statusChanges`
and\n * `valueChanges` observables emit events with the latest status and value when the control is\n * removed.
When false, no events are emitted.\n * /\n removeAt(index: number, options: {emitEvent?: boolean} = {}): void
{\n // Adjust the index, then clamp it at no less than 0 to prevent undesired underflows.\n let adjustedIndex =
this._adjustIndex(index);\n if (adjustedIndex
< 0) adjustedIndex = 0;\n if (this.controls[adjustedIndex])\n
this.controls[adjustedIndex]._registerOnCollectionChange(() => {});\n this.controls.splice(adjustedIndex, 1);\n
this.updateValueAndValidity({emitEvent: options.emitEvent});\n }\n\n /**\n * Replace an existing control.\n
*\n * @param index Index in the array to replace the control. If `index` is negative, wraps around\n * from the
back. If `index` is greatly negative (less than `-length`), replaces the first\n * element. This behavior is the same
as `Array.splice(index, 1, control)`.\n * @param control The `AbstractControl` control to replace the existing
control\n * @param options Specifies whether this FormArray instance should emit events after an\n * existing
control is replaced with a new one.\n * * `emitEvent`: When true or not supplied (the default), both the
`statusChanges` and\n * `valueChanges` observables emit events with the latest status and value when the control
is\n * replaced with a new one. When false, no events are emitted.\n * /\n setControl(index: number, control:
TControl, options: {emitEvent?: boolean} = {}): void {\n // Adjust the index, then clamp it at no less than 0 to
prevent undesired underflows.\n let adjustedIndex = this._adjustIndex(index);\n if (adjustedIndex < 0)
adjustedIndex = 0;\n if (this.controls[adjustedIndex])\n
this.controls[adjustedIndex]._registerOnCollectionChange(() => {});\n this.controls.splice(adjustedIndex, 1);\n\n
if (control) {\n this.controls.splice(adjustedIndex, 0, control);\n this._registerControl(control);\n }\n\n
this.updateValueAndValidity({emitEvent: options.emitEvent});\n this._onCollectionChange();\n }\n\n /**\n *
Length of the control array.\n * /\n get length(): number {\n return this.controls.length;\n }\n\n /**\n * Sets the
value of the `FormArray`. It accepts an array that matches\n * the structure of the control.\n * \n *
This method performs strict checks, and throws an error if you try\n * to set the value of a control that doesn't exist
or if you exclude the\n * value of a control.\n * \n * @usageNotes\n * ### Set the values for the controls in the
form array\n * \n * ```\n * const arr = new FormArray([\n * new FormControl(),\n * new FormControl()\n
* ]);\n * console.log(arr.value); // [null, null]\n * \n * arr.setValue(['Nancy', 'Drew']);\n *
console.log(arr.value); // ['Nancy', 'Drew']\n * ```\n * \n * @param value Array of values for the controls\n *
@param options Configure options that determine how the control propagates changes and\n * emits events after
the value changes\n * \n * * `onlySelf`: When true, each change only affects this control, and not its parent.
Default\n * is false.\n * * * `emitEvent`: When true or not supplied (the default), both the `statusChanges` and\n *
`valueChanges`\n * observables emit events with the latest status
and value when the control value is updated.\n * When false, no events are emitted.\n * The configuration
options are passed to the {@link AbstractControl#updateValueAndValidity\n * updateValueAndValidity}
method.\n * /\n override setValue(value: FormArrayRawValue<TControl>, options: {\n onlySelf?: boolean,\n
emitEvent?: boolean\n } = {}): void {\n assertAllValuesPresent(this, false, value);\n value.forEach((newValue:
any, index: number) => {\n assertControlPresent(this, false, index);\n this.at(index).setValue(newValue,
{onlySelf: true, emitEvent: options.emitEvent});\n });\n this.updateValueAndValidity(options);\n }\n\n /**\n
* Patches the value of the `FormArray`. It accepts an array that matches the\n * structure of the control, and does

```

its best to match the values to the correct controls in the group. It accepts both super-sets and sub-sets of the array without throwing an error.

@usageNotes Patch the values for controls in a form array

```

const arr = new FormArray([
  new FormControl(),
  new FormControl()
]);
console.log(arr.value); // [null, null]
arr.patchValue(['Nancy']);
console.log(arr.value); // ['Nancy', null]

```

@param value Array of latest values for the controls

@param options Configure options that determine how the control propagates changes and emits events after the value changes

- `onlySelf`: When true, each change only affects this control, and not its parent. Default is false.
- `emitEvent`: When true or not supplied (the default), both the `statusChanges` and `valueChanges` observables emit events with the latest status and value when the control value is updated. When false, no events are emitted. The configuration options are passed to the `{@link AbstractControl#updateValueAndValidity updateValueAndValidity}` method.

`updateValueAndValidity` method

```

override patchValue(value: FormArrayValue<TControl>, options: {
  onlySelf?: boolean,
  emitEvent?: boolean
} = {}): void {
  // Even though the `value` argument type doesn't allow `null` and `undefined` values,
  // `patchValue` can be called recursively and inner data structures might have these values,
  // so we just ignore such cases when a field containing FormArray instance receives `null` or `undefined` as a value.
  if (value === null /* both `null` and `undefined` */) return;
  value.forEach((newValue, index) => {
    if (this.at(index)) {
      this.at(index).patchValue(newValue, {onlySelf: true, emitEvent: options.emitEvent});
    }
  });
  this.updateValueAndValidity(options);
}

```

Resets the `FormArray` and all descendants are marked `pristine` and `untouched`, and the value of all descendants to null or null maps. You reset to a specific form state by passing in an array of states that matches the structure of the control. The state is a standalone value or a form state object with both a value and a disabled status.

@usageNotes Reset the values in a form array

```

const arr = new FormArray([
  new FormControl(),
  new FormControl()
]);
arr.reset(['name', 'last name']);
console.log(arr.value); // ['name', 'last name']

```

Reset the values in a form array and the disabled status for the first control

```

arr.reset([
  {value: 'name', disabled: true},
  'last'
]);
console.log(arr.value); // ['last']
console.log(arr.at(0).status); // 'DISABLED'

```

@param value Array of values for the controls

@param options Configure options that determine how the control propagates changes and emits events after the value changes

- `onlySelf`: When true, each change only affects this control, and not its parent. Default is false.
- `emitEvent`: When true or not supplied (the default), both the `statusChanges` and `valueChanges` observables emit events with the latest status and value when the control is reset. When false, no events are emitted. The configuration options are passed to the `{@link AbstractControl#updateValueAndValidity updateValueAndValidity}` method.

```

override reset(value: TypedOrUntyped<TControl, FormArrayValue<TControl>, any> = [], options: {
  onlySelf?: boolean,
  emitEvent?: boolean
} = {}): void {
  this._forEachChild((control: AbstractControl, index: number) => {
    control.reset(value[index], {onlySelf: true, emitEvent: options.emitEvent});
  });
  this._updatePristine(options);
  this._updateTouched(options);
  this.updateValueAndValidity(options);
}

```

The aggregate value of the array, including any disabled controls.

Reports all values regardless of disabled status.

`getRawValue`:

```

FormArrayRawValue<TControl> {
  return this.controls.map((control: AbstractControl) =>
    control.getRawValue());
}

```

Remove all controls in the `FormArray`.

@param options Specifies whether this `FormArray` instance should emit events after all controls are removed.

- `emitEvent`: When true or not supplied (the default), both the `statusChanges` and `valueChanges` observables emit events with the latest status and value when all controls in this `FormArray` instance are removed. When false, no events are emitted.

@usageNotes Remove all elements from a `FormArray`

```

const arr = new FormArray([
  new FormControl(),
  new FormControl()
]);
console.log(arr.length); // 2
arr.clear();
console.log(arr.length); // 0

```

It's a simpler and more efficient

```

alternative to removing all elements one by one:
const arr = new FormArray([
  new FormControl(),
  new FormControl()
]);
while (arr.length) {
  arr.removeAt(0);
}
clear(options: {emitEvent?: boolean} = {}): void {
  if (this.controls.length < 1) return;
  this._forEachChild((control) => control._registerOnCollectionChange(() => {}));
  this.controls.splice(0);
  this.updateValueAndValidity({emitEvent: options.emitEvent});
}

/** Adjusts a negative index by summing it with the length of the array. For very negative indices, the result may remain negative.
@internal
private _adjustIndex(index: number): number {
  return index < 0 ? index + this.length : index;
}

/** @internal
override _syncPendingControls(): boolean {
  let subtreeUpdated = (this.controls as any).reduce((updated: any, child: any) => {
    return child._syncPendingControls() ? true : updated;
  }, false);
  if (subtreeUpdated) this.updateValueAndValidity({onlySelf: true});
  return subtreeUpdated;
}

/** @internal
override _forEachChild(cb: (c: AbstractControl, index: number) => void): void {
  this.controls.forEach((control: AbstractControl, index: number) => {
    cb(control, index);
  });
}

/** @internal
override _updateValue(): void {
  (this as {value: any}).value = this.controls.filter((control) => control.enabled || this.disabled).map((control) => control.value);
}

/** @internal
override _anyControls(condition: (c: AbstractControl) => boolean): boolean {
  return this.controls.some((control) => control.enabled && condition(control));
}

/** @internal
override _setUpControls(): void {
  this._forEachChild((control) => this._registerControl(control));
}

/** @internal
override _allControlsDisabled(): boolean {
  for (const control of this.controls) {
    if (control.enabled) return false;
  }
  return this.controls.length > 0 || this.disabled;
}

private _registerControl(control: AbstractControl) {
  control.setParent(this);
  control._registerOnCollectionChange(this._onCollectionChange);
}

/** @internal
override _find(name: string|number): AbstractControl|null {
  return this.at(name as number) ?? null;
}

interface UntypedFormArrayCtor {
  new(controls: AbstractControl[], validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null, asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormArray;
}

/** The presence of an explicit `prototype` property provides backwards-compatibility for apps that manually inspect the prototype chain.
@see UntypedFormArray, which permits heterogenous controls.
export type UntypedFormArray = FormArray<any>;
export const UntypedFormArray: UntypedFormArrayCtor = FormArray;
export const isFormArray = (control: unknown): control is FormArray => control instanceof FormArray;

" , "
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import {inject, Injectable} from '@angular/core';
import {AsyncValidatorFn, ValidatorFn} from './directives/validators';
import {ReactiveFormsModule} from './form_providers';
import {AbstractControl, AbstractControlOptions, FormHooks} from './model/abstract_model';
import {FormArray, UntypedFormArray} from './model/form_array';
import {FormControl, FormControlOptions, FormControlState, UntypedFormControl} from './model/form_control';
import {FormGroup, FormRecord, UntypedFormGroup} from './model/form_group';
function isAbstractControlOptions(options: AbstractControlOptions|{[key: string]: any}|null|undefined): options is AbstractControlOptions {
  return !!options && ((options as AbstractControlOptions).asyncValidators !== undefined || (options as AbstractControlOptions).validators !== undefined || (options as AbstractControlOptions).updateOn !== undefined);
}

/** The union of all validator types that can be accepted by a ControlConfig.
@ntype ValidatorConfig = ValidatorFn|AsyncValidatorFn|ValidatorFn[]|AsyncValidatorFn[];

/** The compiler may not always be able to prove that the elements of the control config are a tuple (i.e. occur in a fixed order). This slightly looser type is used for inference, to catch cases where the compiler cannot prove order and position.
For example, consider the simple case `fb.group({foo: ['bar', Validators.required]}`. The compiler will infer this as an array, not as a tuple.
@ntype PermissiveControlConfig<T>

```

= Array<T>FormControlState<T>|ValidatorConfig>;\n\n/\*\*\n \* FormControl<T> is a tuple containing a value of type T, plus optional validators and async\n \* validators.\n \* @publicApi\n \* ^\nexport type FormControl<T> = [T|Form\n \* ControlState<T>, (ValidatorFn|ValidatorFn[])?, (AsyncValidatorFn|AsyncValidatorFn\n \* [])?];\n\n// Disable clang-format to produce clearer formatting for this multiline type.\n// clang-format off\n\n/\*\*\n \* FormBuilder accepts values in various container shapes, as well as raw values.\n \* Element returns the appropriate corresponding model class, given the container T.\n \* The flag N, if not never, makes the resulting `FormControl` have N in its type.\n \* ^\nexport type Element<T, N extends null> =\n // The `extends` checks are wrapped in arrays in order to prevent TypeScript from applying type unions\n // through the distributive conditional type. This is the officially recommended solution:\n // https://www.typescriptlang.org/docs/handbook/2/conditional-types.html#distributive-conditional-types\n

```

//\n // Identify FormControl container types.\n [T] extends [FormControl<infer U>] ? FormControl<U> :\n // Or FormControl containers that are optional in their parent group.\n [T] extends [FormControl<infer U>|undefined] ? FormControl<U> :\n // FormGroup containers.\n [T] extends [FormGroup<infer U>] ? FormGroup<U> :\n // Optional FormGroup containers.\n [T] extends [FormGroup<infer U>|undefined] ? FormGroup<U> :\n // FormRecord containers.\n [T] extends [FormRecord<infer U>] ? FormRecord<U> :\n // Optional FormRecord containers.\n [T] extends [FormRecord<infer U>|undefined] ? FormRecord<U> :\n // FormArray containers.\n [T] extends [FormArray<infer U>] ? FormArray<U> :\n // Optional FormArray containers.\n [T] extends [FormArray<infer U>|undefined] ? FormArray<U> :\n // Otherwise unknown AbstractControl containers.\n [T] extends [AbstractControl<infer U>] ? AbstractControl<U> :\n // Optional AbstractControl containers.\n [T] extends [AbstractControl<infer U>|undefined] ? AbstractControl<U> :\n // FormControlState object container, which produces a nullable control.\n [T] extends [FormControlState<infer U>] ? FormControl<U|N> :\n // A ControlConfig tuple, which produces a nullable control.\n [T] extends [PermissiveControlConfig<infer U>] ? FormControl<Exclude<U, ValidatorConfig>|N> :\n FormControl<T|N>;\n\n// clang-format on\n\n/**\n * @description\n * Creates an `AbstractControl` from a user-specified configuration.\n * The `FormBuilder` provides syntactic sugar that shortens creating instances of a\n * `FormControl`, `FormGroup`, or `FormArray`. It reduces the amount of boilerplate needed to\n * build complex forms.\n * @see [Reactive Forms Guide](guide/reactive-forms)\n * @publicApi\n * ^\n@Injectables({ providedIn: ReactiveFormsModule })\nexport class FormBuilder {\n private useNonNullable: boolean = false;\n\n /**\n * @description\n * Returns a FormBuilder in which automatically constructed @see FormControl} elements\n * have `{nonNullable: true}` and are non-nullable.\n *\n * **Constructing non-nullable controls**\n *\n * When constructing a control, it will be non-nullable, and will reset to its initial value.\n *\n * ```ts\n * let nnfb = new FormBuilder().nonNullable;\n * let name = nnfb.control('Alex'); // FormControl<string>\n * name.reset();\n * console.log(name); // 'Alex'\n * ```\n *\n * **Constructing non-nullable groups or arrays**\n *\n * When constructing a group or array, all automatically created inner controls will be\n * non-nullable, and will reset to their initial values.\n *\n * ```ts\n * let nnfb = new FormBuilder().nonNullable;\n * let name = nnfb.group({ who: 'Alex' }); // FormGroup<{\n *   who: FormControl<string>}>\n * name.reset();\n * console.log(name); // {\n *   who: 'Alex'\n * }\n * ```\n *\n * **Constructing nullable fields on groups or arrays**\n *\n * It is still possible to have a nullable field.\n *\n * In particular, any `FormControl` which is\n * already constructed will not be altered. For example:\n *\n * ```ts\n * let nnfb = new FormBuilder().nonNullable;\n * // FormGroup<{\n *   who: FormControl<string|null>}>\n * let name = nnfb.group({ who: new FormControl('Alex') });\n * name.reset();\n * console.log(name); // {\n *   who: null\n * }\n * ```\n *\n * Because the inner control is constructed explicitly by the caller, the builder has\n * no control over how it is created, and cannot exclude the `null`.\n *\n * ^\n get nonNullable(): NonNullableFormBuilder {\n const nnfb = new FormBuilder();\n nnfb.useNonNullable = true;\n return nnfb as NonNullableFormBuilder;\n }\n\n /**\n * @description\n * Constructs a new `FormGroup` instance. Accepts a single generic argument, which is an object\n * containing all the keys and corresponding inner control types.\n * @param controls A collection of child controls. The key for each child is the name\n * under which it is

```

registered.  
 \* @param options Configuration options object for the `FormGroup`. The object should have the  
 \* `AbstractControlOptions` type and might contain the following fields:  
 \* \* `validators`: A synchronous validator function, or an array of validator functions.  
 \* \* `asyncValidators`: A single async validator or array of async validator functions.  
 \* \* `updateOn`: The event upon which the control should be updated (options: 'change' | 'blur' | 'submit').  
 \*/  
 group<T extends {}>(controls: T, options?: AbstractControlOptions|null): FormGroup<{[K in keyof T]: Element<T[K], null>>;>;  
 /\*\*  
 \* @description  
 \* Constructs a new `FormGroup` instance.  
 \* @deprecated This API is not typesafe and can result in issues with Closure Compiler renaming.  
 \* Use the `FormBuilder#group` overload with `AbstractControlOptions` instead.  
 \* Note that `AbstractControlOptions` expects `validators` and `asyncValidators` to be valid  
 \* validators. If you have custom validators, make sure their validation function parameter is  
 \* `AbstractControl` and not a sub-class, such as `FormGroup`. These functions will be called  
 \* with an object of type `AbstractControl` and that cannot be automatically downcast to a  
 \* subclass, so TypeScript sees this as an error. For example, change the `(group: FormGroup) =>  
 \* ValidationErrors|null` signature to be `(group: AbstractControl) => ValidationErrors|null`.  
 \*/  
 @param controls A record of child controls. The key for each child is the name  
 \* under which the control is registered.  
 \* @param options Configuration options object for the `FormGroup`. The legacy configuration  
 \* object consists of:  
 \* \* `validator`: A synchronous validator function, or an array of validator functions.  
 \* \* `asyncValidator`: A single async validator or array of async validator functions  
 \* Note: the legacy format is deprecated and might be removed in one of the next major  
 \* versions of Angular.  
 \*/  
 group(controls: {[key: string]: any}, options: {[key: string]: any},  
 ): FormGroup;  
 group(controls: {[key: string]: any}, options: AbstractControlOptions|{[key: string]:  
 any}|null = null):  
 FormGroup {  
 const reducedControls = this.\_reduceControls(controls);  
 let newOptions: FormControlOptions = {};  
 if (isAbstractControlOptions(options)) {  
 // `options` are `AbstractControlOptions`  
 newOptions = options;  
 } else if (options !== null) {  
 // `options` are legacy form group options  
 newOptions.validators = (options as any).validator;  
 newOptions.asyncValidators = (options as any).asyncValidator;  
 }  
 return new FormGroup(reducedControls, newOptions);  
 }  
 /\*\*  
 \* @description  
 \* Constructs a new `FormRecord` instance. Accepts a single generic argument,  
 \* which is an object  
 \* containing all the keys and corresponding inner control types.  
 \* @param controls A collection of child controls. The key for each child is the name  
 \* under which it is registered.  
 \* @param options Configuration options object for the `FormRecord`. The object should have the  
 \* `AbstractControlOptions` type and might contain the following fields:  
 \* \* `validators`: A synchronous validator function, or an array of validator functions.  
 \* \* `asyncValidators`: A single async validator or array of async validator functions.  
 \* \* `updateOn`: The event upon which the control should be updated (options: 'change' | 'blur' | 'submit').  
 \*/  
 record<T>(controls: {[key: string]: T}, options: AbstractControlOptions|null = null):  
 FormRecord<Element<T, null>> {  
 const reducedControls = this.\_reduceControls(controls);  
 // Cast to `any` because the inferred types are not as specific as Element.  
 return new FormRecord(reducedControls, options) as any;  
 }  
 /\*\* @deprecated Use `nonNullable` instead. \*/  
 control<T>(formState: T|FormControlState<T>, opts: FormControlOptions&{initialValueIsDefault: true}):  
 FormControl<T>;  
 control<T>(formState: T|FormControlState<T>, opts: FormControlOptions&{nonNullable: true}):  
 FormControl<T>;  
 /\*\*  
 \* @deprecated When passing an `options` argument, the `asyncValidator` argument has no effect.  
 \*/  
 control<T>(formState: T|FormControlState<T>, opts: FormControlOptions, asyncValidator: AsyncValidatorFn|  
 AsyncValidatorFn[]): FormControl<T>|null;  
 control<T>(formState: T|FormControlState<T>, validatorOrOpts?: ValidatorFn|ValidatorFn[]|  
 FormControlOptions|null, asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null):  
 FormControl<T>|null;  
 /\*\*  
 \* @description  
 \* Constructs a new `FormControl` with the given state, validators and options. Sets  
 \* `{nonNullable: true}` in the options to get a non-nullable control. Otherwise, the  
 \* control will be nullable. Accepts a single generic argument, which is the type of the  
 \* control's value.  
 \* @param formState Initializes the control with an initial state value,

```

or\n * with an object that contains both a value and a disabled status.\n *\n * @param validatorOrOpts A
synchronous validator function, or an array of\n * such functions, or a `FormControlOptions` object that contains\n
* validation functions and a validation trigger.\n *\n * @param asyncValidator A single async validator or array
of async validator\n * functions.\n *\n * @usageNotes\n *\n * ### Initialize a control as disabled\n *\n *
The following example returns a control with an initial value in a disabled state.\n *\n * <code-example
path=\"forms/ts/formBuilder/form_builder_example.ts\" region=\"disabled-control\">\n * </code-example>\n *\n
control<T>(\n  formState: T|FormControlState<T>,\n
  validatorOrOpts?: ValidatorFn|ValidatorFn[]|FormControlOptions|null,\n  asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null): FormControl {\n  let newOptions: FormControlOptions = {};\n  if
(!this.useNonNullable) {\n    return new FormControl(formState, validatorOrOpts, asyncValidator);\n  }\n  if
(isAbstractControlOptions(validatorOrOpts)) {\n    // If the second argument is options, then they are copied.\n
newOptions = validatorOrOpts;\n  } else {\n    // If the other arguments are validators, they are copied into an
options object.\n    newOptions.validators = validatorOrOpts;\n    newOptions.asyncValidators =
asyncValidator;\n  }\n  return new FormControl<T>(formState, {...newOptions, nonNullable: true});\n }\n\n
/**\n * Constructs a new `FormArray` from the given array of configurations,\n * validators and options. Accepts
a single generic argument, which is the type of each control\n * inside the array.\n *\n * @param controls
An array of child controls or control configs. Each child control is given an\n * index when it is registered.\n
*\n * @param validatorOrOpts A synchronous validator function, or an array of such functions, or an\n *
`AbstractControlOptions` object that contains\n * validation functions and a validation trigger.\n *\n * @param
asyncValidator A single async validator or array of async validator functions.\n */\n array<T>(\n  controls:
Array<T>,\n  validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n  asyncValidator?:
AsyncValidatorFn|AsyncValidatorFn[]|null): FormArray<Element<T, null>> {\n  const createdControls =
controls.map(c => this._createControl(c));\n  // Cast to `any` because the inferred types are not as specific as
Element.\n  return new FormArray(createdControls, validatorOrOpts, asyncValidator) as any;\n }\n\n
/**\n * @internal *\n _reduceControls<T>(controls:\n      [k: string]:
T|ControlConfig<T>|FormControlState<T>|AbstractControl<T>)}:\n
  {[key: string]: AbstractControl} {\n  const createdControls: {[key: string]: AbstractControl} = {};\n
Object.keys(controls).forEach(controlName => {\n  createdControls[controlName] =
this._createControl(controls[controlName]);\n });\n  return createdControls;\n }\n\n
/**\n * @internal *\n
_createControl<T>(controls: T|FormControlState<T>|ControlConfig<T>|FormControl<T>|\n
  AbstractControl<T>): FormControl<T>|FormControl<T>|null>|AbstractControl<T> {\n  if (controls instanceof
FormControl) {\n    return controls as FormControl<T>;\n  } else if (controls instanceof AbstractControl) { // A
control; just return it\n    return controls;\n  } else if (Array.isArray(controls)) { // ControlConfig Tuple\n
const value: T|FormControlState<T> = controls[0];\n    const validator: ValidatorFn|ValidatorFn[]|null =
controls.length > 1 ? controls[1]! : null;\n    const asyncValidator: AsyncValidatorFn|AsyncValidatorFn[]|null
= \n      controls.length > 2 ? controls[2]! : null;\n    return this.control<T>(value, validator, asyncValidator);\n
  } else { // T or FormControlState<T>\n    return this.control<T>(controls);\n  }\n }\n\n
/**\n * @description\n
* `NonNullableFormBuilder` is similar to {@link FormBuilder}, but automatically constructed\n * {@link
FormControl} elements have `{nonNullable: true}` and are non-nullable.\n *\n * @publicApi\n */\n @Injectable({\n
providedIn: ReactiveFormsModule,\n useFactory: () => inject(FormBuilder).nonNullable,\n })\n export abstract class
NonNullableFormBuilder {\n /**\n * Similar to `FormBuilder#group`, except any implicitly constructed
`FormControl`\n * will be non-nullable (i.e. it will have `nonNullable` set to true). Note\n * that already-
constructed controls will not be altered.\n */\n abstract group<T extends {}>(\n  controls: T,\n  options?:
AbstractControlOptions|null,\n  ): FormGroup<{[K in keyof
T]: Element<T[K], never>}>;\n\n
/**\n * Similar to `FormBuilder#record`, except any implicitly constructed
`FormControl`\n * will be non-nullable (i.e. it will have `nonNullable` set to true). Note\n * that already-
constructed controls will not be altered.\n */\n abstract record<T>(\n  controls: {[key: string]: T},\n  options?:
AbstractControlOptions|null,\n  ): FormRecord<Element<T, never>>;\n\n
/**\n * Similar to

```

```

`FormBuilder#array`, except any implicitly constructed `FormControl`  

`nonNullable` set to true). Note that already-constructed controls will not be altered.  

array<T>(\n    controls: Array<T>, validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): FormArray<Element<T, never>>;\n\n /**\n * Similar to `FormBuilder#control`, except this overridden version of `control` forces  

to be `true`, resulting in the control always being non-nullable.  

T|FormControlState<T>,\n    validatorOrOpts?: ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): FormControl<T>;\n\n /**\n * UntypedFormBuilder is the same as @see FormBuilder, but it provides untyped controls.  

*/\n * @Injectable({providedIn: ReactiveFormsModule})\nexport class UntypedFormBuilder extends FormBuilder {\n\n /**\n * Like `FormBuilder#group`, except the resulting group is untyped.  

controlsConfig: {[key: string]: any},\n    options?: AbstractControlOptions|null,\n    ): UntypedFormGroup;\n\n /**\n * @deprecated This API is not typesafe and can result in issues with Closure Compiler renaming.  

Use the `FormBuilder#group` overload with `AbstractControlOptions` instead.  

controlsConfig: {[key: string]: any},\n    options: {[key: string]: any},\n    ): UntypedFormGroup;\n\n override group(\n    controlsConfig: {[key: string]: any},\n    options: AbstractControlOptions|{[key: string]: any}|null = null): UntypedFormGroup {\n    return super.group(controlsConfig, options);\n  }\n\n /**\n * Like `FormBuilder#control`, except the resulting control is untyped.  

ValidatorFn|ValidatorFn[]|FormControlOptions|null,\n    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormControl {\n    return super.control(formState, validatorOrOpts, asyncValidator);\n  }\n\n /**\n * Like `FormBuilder#array`, except the resulting array is untyped.  

ValidatorFn|ValidatorFn[]|AbstractControlOptions|null,\n    asyncValidator?: AsyncValidatorFn|AsyncValidatorFn[]|null): UntypedFormArray {\n    return super.array(controlsConfig, validatorOrOpts, asyncValidator);\n  }\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at  

https://angular.io/license\n */\n * @module\n * @description\n * Entry point for all public APIs of the forms package.\n */\nimport {Version} from '@angular/core';\n/**\n * @publicApi\n */\nexport const VERSION = new Version('14.3.0');\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license that can be found in the LICENSE file at  

https://angular.io/license\n */\n * @module\n * @description\n * This module is used for handling user input, by defining and building a `FormGroup` that consists of `FormControl` objects, and mapping them onto the DOM. `FormControl` objects can then be used to read information from the form DOM elements.\n * Forms providers are not included in default providers; you must import these providers explicitly.\n */\nexport {InternalFormsSharedModule} from './directives';\nexport {AbstractControlDirective} from './directives/abstract_control_directive';\nexport {AbstractFormGroupDirective} from './directives/abstract_form_group_directive';\nexport {CheckboxControlValueAccessor} from './directives/checkbox_value_accessor';\nexport {ControlContainer} from './directives/control_container';\nexport {ControlValueAccessor, NG_VALUE_ACCESSOR} from './directives/control_value_accessor';\nexport {COMPOSITION_BUFFER_MODE, DefaultValueAccessor} from './directives/default_value_accessor';\nexport {Form} from './directives/form_interface';\nexport {NgControl} from './directives/ng_control';\nexport {NgControlStatus, NgControlStatusGroup} from './directives/ng_control_status';\nexport {NgForm} from './directives/ng_form';\nexport {NgModel} from './directives/ng_model';\nexport {NgModelGroup} from './directives/ng_model_group';\nexport {NgNoValidate} from './directives/ng_no_validate_directive';\nexport {NumberValueAccessor} from './directives/number_value_accessor';\nexport {RadioControlValueAccessor} from

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./directives/radio_control_value_accessor';\nexport {RangeValueAccessor} from
./directives/range_value_accessor';\nexport {FormControlDirective} from
./directives/reactive_directives/form_control_directive';\nexport {FormControlName} from
./directives/reactive_directives/form_control_name';\nexport {FormGroupDirective} from
./directives/reactive_directives/form_group_directive';\nexport {FormArrayName, FormGroupName} from
./directives/reactive_directives/form_group_name';\nexport {NgSelectOption, SelectControlValueAccessor} from
./directives/select_control_value_accessor';\nexport {SelectMultipleControlValueAccessor,
NgSelectMultipleOption} from './directives/select_multiple_control_value_accessor';\nexport {AsyncValidator,
AsyncValidatorFn, CheckboxRequiredValidator, EmailValidator, MaxLengthValidator, MaxValidator,
MinLengthValidator, MinValidator, PatternValidator, RequiredValidator, ValidationErrors, Validator,
ValidatorFn} from './directives/validators';\nexport {ControlConfig, FormBuilder, NonNullableFormBuilder,
UntypedFormBuilder, Element} from './form_builder';\nexport {AbstractControl, AbstractControlOptions,
FormControlStatus, CoerceStrArrToNumArr, GetProperty, Navigate, RawValue, Tokenize, TypedOrUntyped,
Value, Writable} from './model/abstract_model';\nexport {FormArray, UntypedFormArray, FormArrayRawValue,
FormArrayValue} from './model/form_array';\nexport {FormControl, FormControlOptions, FormControlState,
UntypedFormControl, FormControlCtor} from './model/form_control';\nexport {FormGroup, FormRecord,
UntypedFormGroup, FormGroupRawValue, FormGroupValue, OptionalKeys} from './model/form_group';\nexport
{NG_ASYNC_VALIDATORS, NG_VALIDATORS, Validators} from './validators';\nexport {VERSION} from
./version';\n\nexport * from './form_providers';\n\n", "/*\n * @license\n
 * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license
that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n*/\n * @module\n * @description\n
 * Entry point for all public APIs of this package.\n *\n\nexport * from './src/forms';\n\n// This file only reexports
content of the `src` folder. Keep it that way.\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n *\n\n// This file is not used to build this module. It is only used during editing\n// by the
TypeScript language service and during build for verification. `ngc`\n// replaces this file with production index.ts
when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n\n", "/*\n * Generated bundle index. Do
not edit.\n *\n\nexport * from
./index';\n\n"], "names":["getDOM", "NG_DEV_MODE", "isPromise", "isObservable", "RuntimeError", "i1.NgControl",
"i2.ControlContainer", "removeListItem", "formDirectiveProvider", "resolvedPromise", "i1.ControlContainer", "formC
ontrolBinding", "coerceToBoolean", "_buildValueString", "_extractId", "NgNoValidate", "NgSelectMultipleOption", "I
nternalFormsSharedModule", "i1.NgModel", "i2.NgModelGroup", "i3.NgForm", "i4.FormControlDirective", "i5.Form
GroupDirective", "i6.FormControlName", "i7.FormGroupName", "i7.FormArrayName"], "mappings":":;;;;;;;;;;AAAA
;;;;;AAMG;AA+HH;;;;;AAMG;MAEU,wBAAwB,CAAA;IAcN,WAAoB,CAAA,SAAoB,EAAU,WAAuB,EAA
A;QAARd,IAAS,CAAA,SAAA,GAAT,SAAS,CAAW;QAAU,IAAW,CAAA,WAAA,GAAX,WAAW,CAAY;AAb
zE;;;;;AAIG;AACH,QAAA,IAAA,CAAA,QAAQ,GAAG,CAAC,CAAM,KAAI,GAAG,CAAC;AAE1B;::AAGG;A
ACH,QAAA,IAAA,CAAA,SAAS,GAAG,MAAK,GAAG,CAAC;KAEd;AAE7E;::;AAIG;IACO,WAAW,CAAC
,GAAW,EAAE,KAAU,EAAA;AAC3C,QAAA,IAAI,CAAC,SAAS,CAAC,WAAW,CAAC,IAAI,CAAC,WAAW,
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# 1.208 angular-platform-browser-dynamic

## 14.3.0

### 1.208.1 Available under license :

No license file was found, but licenses were detected in source scan.

/\*\*

\* @license Angular v14.3.0



```
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*/
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* Use of this source code is governed by an MIT-style license that can be
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*/
```

Found in path(s):

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No license file was found, but licenses were detected in source scan.

Angular

=====

The sources for this package are in the main [Angular](<https://github.com/angular/angular>) repo. Please file issues and pull requests against that repo.

Usage information and reference details can be found in [Angular documentation](<https://angular.io/docs>).

License: MIT

Found in path(s):

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* /opt/cola/permits/1784583481_1693546587.8799314/0/platform-browser-dynamic-14-3-0-1-
tgz/package/README.md
```

No license file was found, but licenses were detected in source scan.

```
/**
* @license
* Copyright Google LLC All Rights Reserved.
*
* Use of this source code is governed by an MIT-style license that can be
* found in the LICENSE file at https://angular.io/license
*/
```

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tgz/package/esm2020/testing/src/platform_core_dynamic_testing.mjs
* /opt/cola/permits/1784583481_1693546587.8799314/0/platform-browser-dynamic-14-3-0-1-
tgz/package/esm2020/src/private_export.mjs
No license file was found, but licenses were detected in source scan.

```

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{"version":3,"file":"testing.mjs","sources":["../../../../../../packages/platform-browser-
dynamic/testing/src/dom_test_component_renderer.ts","../../../../../../packages/platform-browser-
dynamic/testing/src/platform_core_dynamic_testing.ts","../../../../../../packages/platform-browser-
dynamic/testing/src/private_export_testing.ts","../../../../../../packages/platform-browser-
dynamic/testing/src/testing.ts","../../../../../../packages/platform-browser-
dynamic/testing/public_api.ts","../../../../../../packages/platform-browser-
dynamic/testing/index.ts","../../../../../../packages/platform-browser-
dynamic/testing/testing.ts"],"sourcesContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n */\n\nimport {DOCUMENT, getDOM as getDOM} from '@angular/common';\nimport
{Inject, Injectable} from '@angular/core';\nimport {TestComponentRenderer} from
'@angular/core/testing';\n\n/**\n * A DOM based implementation of the TestComponentRenderer.\n

```

```

*\n@Injectables()\nexport class DOMTestComponentRenderer extends TestComponentRenderer {\n
  constructor(@Inject(DOCUMENT) private _doc: any) {\n    super();\n  }\n\n  override insertRootElement(rootElId:
  string) {\n    this.removeAllRootElements();\n    const rootElement =
    getDOM().getDefaultDocument().createElement('div');\n    rootElement.setAttribute('id', rootElId);\n
    this._doc.body.appendChild(rootElement);\n  }\n\n  override removeAllRootElements() {\n    // TODO(juliemr):
    can/should this be optional?\n    const oldRoots = this._doc.querySelectorAll('[id^=root]');\n    for (let i = 0; i <
    oldRoots.length; i++) {\n      getDOM().remove(oldRoots[i]);\n    }\n  }\n}\n"/**\n * @license\n * Copyright
  Google LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can
  be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { createPlatformFactory, PlatformRef }
  from '@angular/core';\nimport { platformCoreDynamic as platformCoreDynamic } from '@angular/platform-
  browser-dynamic';\n\n/**\n * Platform for dynamic tests\n */\n * @publicApi\n */\nexport const
  platformCoreDynamicTesting: (extraProviders?: any[]) => PlatformRef =\n  createPlatformFactory(\n    platformCoreDynamic,\n    'coreDynamicTesting',\n    [],\n    );\n"/**\n * @license\n * Copyright Google
  LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found
  in the LICENSE file at https://angular.io/license\n */\n\nexport { DOMTestComponentRenderer as
  DOMTestComponentRenderer } from './dom_test_component_renderer';\nexport { platformCoreDynamicTesting as
  platformCoreDynamicTesting } from './platform_core_dynamic_testing';\n"/**\n * @license\n * Copyright Google
  LLC All Rights Reserved.\n * \n * Use of this
  source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n */\n\nimport { createPlatformFactory, NgModule, PlatformRef, StaticProvider } from
  '@angular/core';\nimport { TestComponentRenderer } from '@angular/core/testing';\nimport
  { INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS as
  INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS } from '@angular/platform-browser-
  dynamic';\nimport { BrowserTestingModule } from '@angular/platform-browser/testing';\nimport
  { DOMTestComponentRenderer } from './dom_test_component_renderer';\nimport { platformCoreDynamicTesting }
  from './platform_core_dynamic_testing';\n\nexport * from './private_export_testing';\n\n/**\n * @publicApi\n
  */\n\nexport const platformBrowserDynamicTesting = createPlatformFactory(\n  platformCoreDynamicTesting,\n  'browserDynamicTesting',\n  INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS);\n\n/**\n *
  NgModule for testing.\n */\n * @publicApi\n */\n * @NgModule({\n  exports: [BrowserTestingModule],\n  providers: [\n    { provide: TestComponentRenderer, useClass: DOMTestComponentRenderer },\n  ]\n})\nexport
  class BrowserDynamicTestingModule {\n}\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
  *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n */\n\n/**\n * @module\n * @description\n * Entry point for all public APIs of this
  package.\n */\n\nexport * from './src/testing';\n"/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n
  *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n */\n\n// This file is not used to build this module. It is only used during editing\n// by the
  TypeScript language service and during build for verification. `ngc`\n// replaces this file with production index.ts
  when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n"/**\n *
  Generated bundle index. Do not edit.\n */\n\nexport * from
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```

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tgz/package/fesm2020/testing.mjs.map  
No license file was found, but licenses were detected in source scan.

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{"version":3,"file":"testing.mjs","sources":["../../../../packages/platform-browser-  
dynamic/testing/src/dom_test_component_renderer.ts","../../../../packages/platform-browser-  
dynamic/testing/src/platform_core_dynamic_testing.ts","../../../../packages/platform-browser-  
dynamic/testing/src/private_export_testing.ts","../../../../packages/platform-browser-  
dynamic/testing/src/testing.ts","../../../../packages/platform-browser-  
dynamic/testing/public_api.ts","../../../../packages/platform-browser-  
dynamic/testing/index.ts","../../../../packages/platform-browser-  
dynamic/testing/testing.ts"],"sourcesContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at\n https://angular.io/license\n *\nimport {DOCUMENT, getDOM as getDOM} from '@angular/common';\nimport\n {Inject, Injectable} from '@angular/core';\nimport {TestComponentRenderer} from\n '@angular/core/testing';\n\n/**\n * A DOM based implementation of the TestComponentRenderer.\n *\n@Injectable()\nexport class DOMTestComponentRenderer extends TestComponentRenderer {\n  constructor(@Inject(DOCUMENT) private _doc: any) {\n    super();\n  }\n\n  override insertRootElement(rootElId:  
string) {\n    this.removeAllRootElements();\n    const rootElement =\n getDOM().getDefaultDocument().createElement('div');\n    rootElement.setAttribute('id', rootElId);\n    this._doc.body.appendChild(rootElement);\n  }\n\n  override removeAllRootElements() {\n    // TODO(juliemr):  
can/should this be optional?\n    const oldRoots = this._doc.querySelectorAll('[id^=root]');\n    for (let i = 0; i <\n oldRoots.length; i++) {\n      getDOM().remove(oldRoots[i]);\n    }\n  }\n\n  /**\n * @license\n * Copyright\n Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an MIT-style license that can  
be\n * found in the LICENSE file at https://angular.io/license\n *\nimport {createPlatformFactory, PlatformRef}\n from '@angular/core';\nimport {platformCoreDynamic as platformCoreDynamic} from '@angular/platform-
```

```

browser-dynamic';\n\n/**\n * Platform for dynamic tests\n * \n * @publicApi\n * \n\nexport const
platformCoreDynamicTesting: (extraProviders?: any[]) => PlatformRef =\n  createPlatformFactory(\n
platformCoreDynamic,\n    'coreDynamicTesting',\n    [],\n    );\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * \n * Use of this source code is governed by an MIT-style license that can be\n * found
in the LICENSE file at https://angular.io/license\n * \n\nexport { DOMTestComponentRenderer as
DOMTestComponentRenderer } from './dom_test_component_renderer';\n\nexport { platformCoreDynamicTesting as
platformCoreDynamicTesting } from './platform_core_dynamic_testing';\n", "/*\n * @license\n * Copyright Google
LLC All Rights Reserved.\n * \n * Use of this
source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n\nimport { createPlatformFactory, NgModule, PlatformRef, StaticProvider } from
'@angular/core';\nimport { TestComponentRenderer } from '@angular/core/testing';\nimport
{ INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS as
INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS } from '@angular/platform-browser-
dynamic';\nimport { BrowserTestingModule } from '@angular/platform-browser/testing';\nimport
{ DOMTestComponentRenderer } from './dom_test_component_renderer';\nimport { platformCoreDynamicTesting }
from './platform_core_dynamic_testing';\n\nexport * from './private_export_testing';\n\n/**\n * @publicApi\n * \n\nexport const platformBrowserDynamicTesting = createPlatformFactory(\n  platformCoreDynamicTesting,
'browserDynamicTesting',\n  INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS);\n\n/**\n * \n\nNgModule for testing.\n * \n * @publicApi\n * \n\n@NgModule({\n  exports: [BrowserTestingModule],\n  providers: [\n    { provide: TestComponentRenderer, useClass: DOMTestComponentRenderer },\n    ]\n  })\nexport
class BrowserDynamicTestingModule {\n}\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n\n/**\n * @module\n * @description\n * Entry point for all public APIs of this
package.\n * \n\nexport * from './src/testing';\n", "/*\n * @license\n * Copyright Google LLC All Rights Reserved.\n
*\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
https://angular.io/license\n * \n\n// This file is not used to build this module. It is only used during editing\n// by the
TypeScript language service and during build for verification. `ngc` replaces this file with production index.ts
when it rewrites private symbol\n// names.\n\nexport * from './public_api';\n", "/*\n *
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'./index';\n"], "names": ["getDOM", "platformCoreDynamic", "INTERNAL_BROWSER_DYNAMIC_PLATFORM_P
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Found

in path(s):

\* /opt/cola/permits/1784583481\_1693546587.8799314/0/platform-browser-dynamic-14-3-0-1-  
tgz/package/fesm2015/testing.mjs.map

No license file was found, but licenses were detected in source scan.

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dynamic/src/private_export.ts","../../../../packages/platform-browser-  
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dynamic.ts","../../../../packages/platform-browser-dynamic/public_api.ts","../../../../packages/platform-  
browser-dynamic/index.ts","../../../../packages/platform-browser-dynamic/platform-browser-  
dynamic.ts"],"sourcesContent":["/**\n * @license\n * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an  
MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n */\nimport  
{CompilerConfig} from '@angular/compiler';\nimport {Compiler, CompilerFactory, CompilerOptions,  
InjectionToken, Injector, isDevMode, MissingTranslationStrategy, PACKAGE_ROOT_URL, StaticProvider,  
ViewEncapsulation} from '@angular/core';\n\nexport const ERROR_COLLECTOR_TOKEN = new  
InjectionToken('ErrorCollector');\n\n/**\n * A default provider for { @link PACKAGE_ROOT_URL } that maps to  
'./'\n */\nexport const DEFAULT_PACKAGE_URL_PROVIDER = {\n  provide: PACKAGE_ROOT_URL,\n  useValue: './\n};\n\nexport const COMPILER_PROVIDERS = [\n  <StaticProvider[]>[{provide: Compiler,  
useFactory: () => new Compiler()});\n\n/**\n * @publicApi\n */\n * @deprecated\n * Ivy JIT mode doesn't require  
accessing this symbol.\n * See [JIT API changes due to ViewEngine  
deprecation](guide/deprecations#jit-api-changes) for\n * additional context.\n */\nexport class JitCompilerFactory  
implements CompilerFactory {\n  private _defaultOptions: CompilerOptions[];\n\n  /* @internal */\n  constructor(defaultOptions: CompilerOptions[]) {\n    const compilerOptions: CompilerOptions = {\n      useJit:  
true,\n      defaultEncapsulation: ViewEncapsulation.Emulated,\n      missingTranslation:  
MissingTranslationStrategy.Warning,\n    }; \n\n    this._defaultOptions = [compilerOptions, ...defaultOptions];\n  }\n\n  createCompiler(options: CompilerOptions[] = []): Compiler {\n    const opts =  
_mergeOptions(this._defaultOptions.concat(options));\n    const injector = Injector.create([\n      COMPILER_PROVIDERS, {\n        provide: CompilerConfig,\n        useFactory: () => {\n          return new  
CompilerConfig({\n            // let explicit values from the compiler options overwrite options\n            // from the app  
providers\n            useJit: opts.useJit,\n
```

```

    jitDevMode: isDevMode(),\n        // let explicit values from the compiler options overwrite options\n
// from the app providers\n        defaultEncapsulation: opts.defaultEncapsulation,\n        missingTranslation:\n
opts.missingTranslation,\n        preserveWhitespaces: opts.preserveWhitespaces,\n        });\n    },\n    deps:\n
[]\n    },\n    opts.providers!\n    ]);\n    return injector.get(Compiler);\n    }\n}\n\nfunction\n
_mergeOptions(optionsArr: CompilerOptions[]): CompilerOptions {\n    return {\n        useJit:\n
_lastDefined(optionsArr.map(options => options.useJit)),\n        defaultEncapsulation:\n
_lastDefined(optionsArr.map(options => options.defaultEncapsulation)),\n        providers:\n
_mergeArrays(optionsArr.map(options => options.providers!)),\n        missingTranslation:\n
_lastDefined(optionsArr.map(options => options.missingTranslation)),\n        preserveWhitespaces:\n
_lastDefined(optionsArr.map(options => options.preserveWhitespaces)),\n    };\n}\n\nfunction\n
_lastDefined<T>(args: T[]): T|undefined {\n    for (let i = args.length - 1; i >= 0; i--) {\n        if (args[i] !== undefined)\n
{\n            return args[i];\n        }\n    }\n    return undefined;\n}\n\nfunction _mergeArrays(parts: any[][]): any[] {\n    const\n
result: any[] = [];\n    parts.forEach((part) => part && result.push(...part));\n    return result;\n}\n\n"/**\n * @license\n
 * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license\n
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { COMPILER_OPTIONS,\n
CompilerFactory, createPlatformFactory, platformCore, PlatformRef, StaticProvider } from\n
'@angular/core';\n\nimport { JitCompilerFactory } from './compiler_factory';\n\n/**\n * A platform that included\n
corePlatform and the compiler.\n */\n * @publicApi\n */\nexport const platformCoreDynamic =\n
createPlatformFactory(platformCore, 'coreDynamic', [\n    { provide: COMPILER_OPTIONS, useValue: {}, multi:\n
true },\n    { provide:\n
CompilerFactory, useClass: JitCompilerFactory, deps: [COMPILER_OPTIONS] },\n]);\n\n"/**\n * @license\n
 * Copyright Google LLC All Rights Reserved.\n * Use of this source code is governed by an MIT-style license\n
that can be\n * found in the LICENSE file at https://angular.io/license\n */\n\nimport { ResourceLoader } from\n
'@angular/compiler';\nimport { Injectable } from '@angular/core';\n\n@Injectable()\nexport class\n
ResourceLoaderImpl extends ResourceLoader {\n    override get(url: string): Promise<string> {\n        let resolve:\n
(result: any) => void;\n        let reject: (error: any) => void;\n        const promise = new Promise<string>((res, rej) => {\n
            resolve = res;\n            reject = rej;\n        });\n        const xhr = new XMLHttpRequest();\n        xhr.open('GET', url, true);\n
xhr.responseType = 'text';\n        xhr.onload = function() {\n            // responseText is the old-school way of retrieving\n
response (supported by IE8 & 9)\n            // response/responseType properties were introduced in ResourceLoader\n
Level2 spec (supported\n            // by IE10)\n            const response = xhr.response || xhr.responseText;\n            // normalize\n
IE9 bug (https://bugs.jquery.com/ticket/1450)\n            let status = xhr.status === 1223 ? 204 : xhr.status;\n            // fix\n
status code when it is 0 (0 status is undocumented).\n            // Occurs when accessing file resources or on Android 4.1\n
stock browser\n            // while retrieving files from application cache.\n            if (status === 0) {\n                status = response ?\n
200 : 0;\n            }\n            if (200 <= status && status <= 300) {\n                resolve(response);\n            } else {\n
reject('Failed to load ${url}');\n            }\n            xhr.onerror = function() {\n                reject('Failed to load ${url}');\n
            };\n            xhr.send();\n            return promise;\n        });\n    }\n}\n\n"/**\n * @license\n
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Reserved.\n * Use of this source code is governed by an MIT-style license that can be\n * found in the\n
LICENSE file at https://angular.io/license\n */\n\nimport { PLATFORM_BROWSER_ID as PLATFORM_BROWSER_ID } from '@angular/common';\nimport\n
{ ResourceLoader } from '@angular/compiler';\nimport { COMPILER_OPTIONS, PLATFORM_ID, StaticProvider }\n
from '@angular/core';\n\nimport { INTERNAL_BROWSER_PLATFORM_PROVIDERS as\n
INTERNAL_BROWSER_PLATFORM_PROVIDERS } from '@angular/platform-browser';\n\nimport\n
{ ResourceLoaderImpl } from './resource_loader/resource_loader_impl';\n\n/**\n * @publicApi\n */\nexport const\n
INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS: StaticProvider[] = [\n
INTERNAL_BROWSER_PLATFORM_PROVIDERS,\n    {\n        provide: COMPILER_OPTIONS,\n        useValue:\n
{ providers: [{ provide: ResourceLoader, useClass: ResourceLoaderImpl, deps: [] }],\n            multi: true\n        },\n
        provide: PLATFORM_ID, useValue: PLATFORM_BROWSER_ID,\n    },\n];\n\n"/**\n * @license\n
 * Copyright\n
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```

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* found in the LICENSE file at https://angular.io/license\n *\n\nimport
  {ResourceLoader} from '@angular/compiler';\nimport {global as global} from '@angular/core';\n\n/**\n * An
  implementation of ResourceLoader that uses a template cache to avoid doing an actual\n * ResourceLoader.\n *\n *
  The template cache needs to be built and loaded into window.$templateCache\n * via a separate mechanism.\n *\n *
  @publicApi\n *\n * @deprecated This was previously necessary in some cases to test AOT-compiled components
  with View\n * Engine, but is no longer since Ivy.\n */\nexport class CachedResourceLoader extends
  ResourceLoader {\n  private _cache: {[url: string]: string};\n\n  constructor() {\n    super();\n    this._cache =
    (<any>global).$templateCache;\n    if (this._cache == null) {\n      throw new Error('CachedResourceLoader:
    Template cache was not found in $templateCache.);\n    }\n  }\n\n  override get(url: string): Promise<string> {\n    if
    (this._cache.hasOwnProperty(url)) {\n      return Promise.resolve(this._cache[url]);\n    } else {\n      return
    <Promise<any>>Promise.reject(\n        'CachedResourceLoader: Did not find cached template for ' + url);\n    }\n  }\n}\n\n", "*/\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is
  governed by an MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n
  *\n\nexport {platformCoreDynamic as platformCoreDynamic} from './platform_core_dynamic';\nexport
  {INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS as
  INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS} from './platform_providers';\n\n", "*/\n *
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  style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\n/**\n * @module\n *
  @description\n * Entry point for all public APIs of the platform-browser-dynamic package.\n */\n\nimport
  {Version} from '@angular/core';\n\n/**\n * @publicApi\n */\nexport const VERSION = new
  Version('14.3.0');\n\n", "*/\n\n * @license\n * Copyright Google LLC All Rights Reserved.\n *\n * Use of this source code is governed by an
  MIT-style license that can be\n * found in the LICENSE file at https://angular.io/license\n *\n\nimport
  {ResourceLoader} from '@angular/compiler';\nimport {CompilerFactory, createPlatformFactory, platformCore,
  PlatformRef, Provider, StaticProvider} from '@angular/core';\nimport {platformCoreDynamic} from
  './platform_core_dynamic';\nimport {INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS} from
  './platform_providers';\nimport {CachedResourceLoader} from './resource_loader/resource_loader_cache';\n\nexport
  * from './private_export';\nexport {VERSION} from './version';\nexport {JitCompilerFactory} from
  './compiler_factory';\n\n/**\n * @publicApi\n *\n * @deprecated This was previously necessary in some cases to
  test AOT-compiled components with View\n * Engine, but is no longer since Ivy.\n */\nexport const
  RESOURCE_CACHE_PROVIDER: Provider[] =\n  [{provide: ResourceLoader,
  useClass: CachedResourceLoader, deps: []}];\n\n", "*/\n * @publicApi\n */\nexport const platformBrowserDynamic
  = createPlatformFactory(\n  platformCoreDynamic, 'browserDynamic',
  INTERNAL_BROWSER_DYNAMIC_PLATFORM_PROVIDERS);\n\n", "*/\n *
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  found in the LICENSE file at https://angular.io/license\n *\n\n/**\n * @module\n *
  @description\n * Entry point for all
  public APIs of this package.\n */\n\nexport * from './src/platform-browser-dynamic';\n\n// This file only reexports
  content of the `src` folder. Keep it that way.\n\n", "*/\n * @license\n * Copyright Google LLC All Rights Reserved.\n
  *\n * Use of this source code is governed by an MIT-style license that can be\n * found in the LICENSE file at
  https://angular.io/license\n *\n\n// This file is not used to build this module. It is only used during editing\n// by the
  TypeScript language service and
  during build for verification. `ngc`\n// replaces this file with production index.ts when it rewrites private symbol\n//
  names.\n\nexport * from './public_api';\n\n", "*/\n * Generated bundle index. Do not edit.\n *\n\nexport * from
  './index';\n\n", "names":["INTERNAL_BROWSER_PLATFORM_PROVIDERS","PLATFORM_BROWSER_ID","g
  lobal"],"mappings":":;,,,,,;AAAA;,,,,;AAMG;AAKI,MAAM,qBAAqB,GAAG,IAAI,cAAc,CAAC,gBAAgB,CA
  AC,CAAC;AAEIE;AAEG;AACI,MAAM,4BAA4B,GAAG;AAC1C,IAAA,OAAO,EAAE,gBAAgB;AACzB,IAA
  A,QAAQ,EAAE,GAAG;CACd,CAAC;AAEK,MAAM,kBAAkB,GACT,CAAC,EAAc,OAAO,EAAE,QAAQ,EA
  AE,UAAU,EAAE,MAAM,IAAI,QAAQ,EAAE,EAAc,CAAC,CAAC;AAC9E;,,,,;AAOG;MACU,kBAAkB,CAA

```



A;;AAI7B,IAAA,WAAA,CAAY,cAAiC,EAAA;AAC3C,QAAA,MAAM,eAAe,GAAoB;AACvC,YAAA,MAAM,EAAE,IAAI;YACZ,oBAAoB,EAAE,iBAAiB,CAAC,QAAQ;YAChD,kBAakB,EAAE,0BAA0B,CAAC,OAAO;SACvD,CAAC;QAEF,IAAI,CAAC,eAAe,GAAG,CAAC,eAAe,EAAE,GAAG,cAAc,CAAC,CAAC;KAC7D;IACD,cAAc,CAAC,UAA6B,EAAE,EAAA;AAC5C,QAAA,MAAM,IAAI,GAAG,aAAa,CAAC,IAAI,CAAC,eAAe,CAAC,MAAM,CAAC,OAAO,CAAC,CAAC,CAAC;AACjE,QAAA,MAAM,QAAQ,GAAG,QAAQ,CAAC,MAAM,CAAC;AAC/B,YAAA,kBAakB,EAAE;AACiB,gBAAA,OAAO,EAAE,cAAc;gBACvB,UAAU,EAAE,MAAK;oBACf,OAAO,IAAI,cAAc,CAAC;;;wBAGxB,MAAM,EAAE,IAAI,CAAC,MAAM;wBACnB,UAAU,EAAE,SAAS,EAAE;;;wBAGvB,oBAAoB,EAAE,IAAI,CAAC,oBAAoB;wBAC/C,kBAakB,EAAE,IAAI,CAAC,kBAakB;wBAC3C,mBAAmB,EAAE,IAAI,CAAC,mBAAmB;AAC9C,qBAAA,CAAC,CAAC;iBACJ;AACD,gBAAA,IAAI,EAAE,EAAE;AACT,aAAA;AACD,YAAA,IAAI,CAAC,SAAU;AACbB,SAAS,CAAC,CAAC;AACH,QAAA,OAAO,QAAQ,CAAC,GAAG,CAAC,QAAQ,CAAC,CAAC;KAC/B;AACF,CAAA;AAED,SAAS,aAAa,CAAC,UAA6B,EAAA;IACID,OAAO;AACL,QAAA,MAAM,EAAE,YAAY,CAAC,UAAU,CAAC,GAAG,CAAC,OAAO,IAAI,OAAO,CAAC,MAAM,CAAC,CAAC;AAC/D,QAAA,oBAAoB,EAAE,YAAY,CAAC,UAAU,CAAC,GAAG,CAAC,OAAO,IAAI,OAAO,CAAC,oBAAoB,CAAC,CAAC;AAC3F,QAAA,SAAS,EAAE,YAAY,CAAC,UAAU,CAAC,GAAG,CAAC,OAAO,IAAI,OAAO,CAAC,SAAU,CAAC,CAAC;AACTe,QAAA,kBAakB,EAAE,YAAY,CAAC,UAAU,CAAC,GAAG,CAAC,OAAO,IAAI,OAAO,CAAC,kBAakB,CAAC,CAAC;AACvF,QAAA,mBAAmB,EA AE,YAAY,CAAC,UAAU,CAAC,GAAG,CAAC,OAAO,IAAI,OAAO,CAAC,mBAAmB,CAAC,CAAC;KAC1F,CAAC;AACJ,CAAC;AAED,SAAS,YAAY,CAAI,IAAS,EAAA;AACbC,IAAA,KAAK,IAAI,CAAC,GAAG,IAAI,CAAC,MAAM,GAAG,CAAC,EAAE,CAAC,IAAI,CAAC,EAAE,CAAC,EAAE,EAAE;AACzC,QAAA,IAAI,IAAI,CAAC,CAAC,CAAC,KAAK,SAAS,EAAE;AACzB,YAAA,OAAO,IAAI,CAAC,CAAC,CAAC,CAAC;AACbB,SAAA;AACF,KAAA;AACD,IAAA,OAAO,SAAS,CAAC;AACnB,CAAC;AAED,SAAS,YAAY,CAAC,KAAc,EA AA;IACIC,MAAM,MAAM,GAAU,EAAE,CAAC;AACzB,IAAA,KAAK,CAAC,OAAO,CAAC,CAAC,IAAI,KAAK,IAAI,IAAI,MAAM,CAAC,IAAI,CAAC,GAAG,IAAI,CAAC,CAAC,CAAC;AACtD,IAAA,OAAO,MAAM,CAAC;AACbB;;AC7FA;;;;;AAMG;AAMH;;;AAIG;MACU,mBAAmB,GAAG,qBAAqB,CAAC,YAAY,EAAE,aA Aa,EAAE;IACpF,EAAC,OAAO,EAAE,gBAAgB,EAAE,QAAQ,EAAE,EAAE,EAAE,KAAK,EAAE,IAAI,EAAC;AACtD,IAAA,EAAC,OAAO,EAAE,eAAe,EAAE,QAAQ,EAAE,kBAakB,EAAE,IAAI,EAAE,CAAC,gBAAgB,CAAC,EAAC;AACnF,CAAA;;ACpBD;;;;;AAMG;AAMG,MAAO,kBAAmB,SAAQ,cAAc,CAAA;AAC3C,IAAA,GAAG,CAAC,GAAW,EAAA;AACtB,QAAA,IAAI,OAA8B,CAAC;AACnC,QAAA,IAAI,MAA4B,CAAC;QACjC,MAAM,OAAO,GAAG,IAAI,OAAO,CAAS,CAAC,GAAG,EAAE,GAAG,KAAI;YAC/C,OAAO,GAAG,GAAG,CAAC;YACd,MAAM,GAAG,GAAG,CAAC;AACf,SAAC,CAAC,CAAC;AACH,QAAA,MAAM,GAAG,GAAG,IAAI,cAAc,EAAE,CAAC;QACjC,GAAG,CAAC,IAAI,CAAC,KAAK,EAAE,GAAG,EAAE,IAAI,CAAC,CAAC;AAC3B,QAAA,GAAG,CAAC,YAAY,GAAG,MAAM,CAAC;QAE1B,GAAG,CAAC,MAAM,GAAG,YAAA;;;YAI X,MAAM,QAAQ,GAAG,GAAG,CAAC,QAAQ,IAAI,GAAG,CAAC,YAAY,CAAC;;AAGID,YAAA,IAAI,MAA M,GAAG,GAAG,CAAC,MAAM,KAAK,IAAI,GAAG,GAAG,GAAG,GAAG,CAAC,MAAM,CAAC;;;YAKpD,IA AI,MAAM,KAAK,CAAC,EAAE;gBACHb,MAAM,GAAG,QAAQ,GAAG,GAAG,GAAG,CAAC,CAAC;AAC7 B,aAAA;AAED,YAAA,IAAI,GAAG,IAAI,MAAM,IAAI,MAAM,IAAI,GAAG,EAAE;gBACiC,OAAO,CAAC,Q AAQ,CAAC,CAAC;AACnB,aAAA;AAAM,iBAAA;AACL,gBAAA,MAAM,CAAC,CAAA,eAAA,EAakB,GAA G,CAAA,CAAE,CAAC,CAAC;AACjC,aAAA;AACH,SAAC,CAAC;QAEF,GAAG,CAAC,OAAO,GAAG,YAAA ;AACZ,YAAA,MAAM,CAAC,CAAA,eAAA,EAakB,GAAG,CAAA,CAAE,CAAC,CAAC;AACIC,SAAC,CAAC ;QAEF,GAAG,CAAC,IAAI,EAAE,CAAC;AACX,QAAA,OAAO,OAAO,CAAC;KACHb;;0HAzCU,kBAakB,EA AA,IAAA,EAAA,IAAA,EAAA,MAAA,EAAA,EAAA,CAAA,eAAA,CAAA,UAAA,EAAA,CAAA,CAAA;8HAA IB,kBAakB,EAAA,CAAA,CAAA;sGAAIB,kBAakB,EAAA,UAAA,EAAA,CAAA;kBAD9B,UAAU;;;ACXX;;;;; AAMG;AAUH;;AAEG;AACU,MAAA,2CAA2C,GAAqB;IAC3EA,oCAAmC;AACnC,IAAA;AAE,QAAA,OAA O,EAAE,gBAAgB;AACzB,QAAA,QAAQ,EAAE,EAAC,SAAS,EAAE,CAAC,EAAC,OAAO,EAAE,cAAc,EAAE ,QAAQ,EAAE,kBAakB,EAAE,IAAI,EAAE,EAAE,EAAC,CAAC,EAAC;AACIF,QAAA,KAAK,EAAE,IAAI;A ACZ,KAAA;AACD,IAAA,EAAC,OAAO,EAAE,WAAW,EAAE,QAAQ,EAAEC,oBAAmB,EAAC;;;AC1BvD;;;;; ;AAMG;AAKH;;;;;AAWG;AACG,MAAO,oBAAqB,SAAQ,cAAc,CAAA;AAGtD,IAAA,WAAA,GAAA;AA CE,QAAA,KAAK,EAAE,CAAC;AACR,QAAA,IAAI,CAAC,MAAM,GAASC,OAAO,CAAC,cAAc,CAAC;AAC

```
3C,QAAA,IAAI,IAAI,CAAC,MAAM,IAAI,IAAI,EAAE;AACvB,YAAA,MAAM,IAAI,KAAK,CAAC,uEAAuE,C
AAC,CAAC;AAC1F,SAAA;KACF;AAEQ,IAAA,GAAG,CAAC,GAAW,EAAA;QACtB,IAAI,IAAI,CAAC,MAA
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B,yDAAyD,GAAG,GAAG,CAAC,CAAC;AACTE,SAAA;KACF;AACF;;AC1CD;;;;;AAMG;;ACNH;;;;;AAMG;
AAUH;;AAEG;MACU,OAAO,GAAG,IAAI,OAAO,CAAC,mBAAmB;;ACnBtD;;;;;AAMG;AAaH;;;;;AAMG;A
ACU,MAAA,uBAAuB,GACcC,CAAC,EAAC,OAAO,EAAE,cAAc,EAAE,QAAQ,EAAE,oBAAoB,EAAE,IAAI,E
AAE,EAAE,EAAC,EAAE;AAE1E;;AAEG;AACI,MAAM,sBAAsB,GAAG,qBAAqB,CACvD,mBAAmB,EAAE,g
BAAgB,EAAE,2CAA2C;;ACjCtF;;;;;AAMG;AASH;;ACfA;;;;;AAMG;;ACNH;;AAEG;;;;;"} }
```

Found

in path(s):

```
* /opt/cola/permits/1784583481_1693546587.8799314/0/platform-browser-dynamic-14-3-0-1-
tgz/package/fesm2020/platform-browser-dynamic.mjs.map
```

```
* /opt/cola/permits/1784583481_1693546587.8799314/0/platform-browser-dynamic-14-3-0-1-
tgz/package/fesm2015/platform-browser-dynamic.mjs.map
```

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```
/**
```

```
* @license Angular v14.3.0
```

```
* (c) 2010-2022 Google LLC. https://angular.io/
```

```
* License: MIT
```

```
*/
```

Found in path(s):

```
* /opt/cola/permits/1784583481_1693546587.8799314/0/platform-browser-dynamic-14-3-0-1-
tgz/package/testing/index.d.ts
```

```
* /opt/cola/permits/1784583481_1693546587.8799314/0/platform-browser-dynamic-14-3-0-1-
tgz/package/index.d.ts
```

# 1.209 angular-common 14.3.0

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## 1.210 atob 2.1.2

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## 1.214 gensync 1.0.0-beta.2

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## 1.224 color-name 1.1.3

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## 1.225 yallist 3.1.1

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## 1.226 color-convert 1.9.3

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## 1.227 is-plain-object 2.0.4

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## 1.228 chalk 2.4.2

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## 1.229 to-fast-properties 2.0.0

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## 1.230 yallist 4.0.0

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### 7.22.20

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## 1.232 @babel/helper-environment-visitor

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# 1.233 @jridgewell/gen-mapping 0.3.3

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# 1.234 @ampproject/remapping 2.2.1

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## 7.22.6

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## 1.237 update-browserslist-db 1.0.13

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## 1.238 @jridgewell/sourcemap-codec 1.4.15

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## 1.240 convert-source-map 2.0.0

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## 1.241 @babel/helper-module-imports 7.22.15

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## 1.242 @babel/helper-hoist-variables 7.22.5

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## 1.243 supports-color 5.5.0

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## 1.244 crypto-js 4.2.0

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## 1.245 @babel/helper-module-transforms

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## 1.251 node-releases 2.0.14

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# 1.252 babel-helper-compilation-targets 7.23.6

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## 1.254 @jridgewell/trace-mapping 0.3.22

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## 1.261 @jridgewell/resolve-uri 3.1.2

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# 1.262 browserslist 4.23.0

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# 1.263 caniuse-lite 1.0.30001589

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## 1.264 electron-to-chromium 1.4.679

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